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(54) Titre : PROCEDE D'UTILISATION D'UN DISPOSITIF POUR LA CONVERSION D'UN MOUVEMENT ROTATIF EN UN MOUVEMENT DE PERCUSSION ALTERNATIF ET DISPOSITIF DE CONVERSION D'UN MOUVEMENT ROTATIF EN UN MOUVEMENT DE PERCUSSION ALTERNATIF POUR LA MISE EN ŒUVRE DU PROCEDE

(54) Title: METHOD OF EQUIPMENT FOR CONVERTING ROTARY MOTION INTO RECIPROCATING IMPACT MOTION AND EQUIPMENT FOR CONVERTING ROTARY MOTION INTO RECIPROCATING IMPACT MOTION FOR IMPLEMENTING THE METHOD

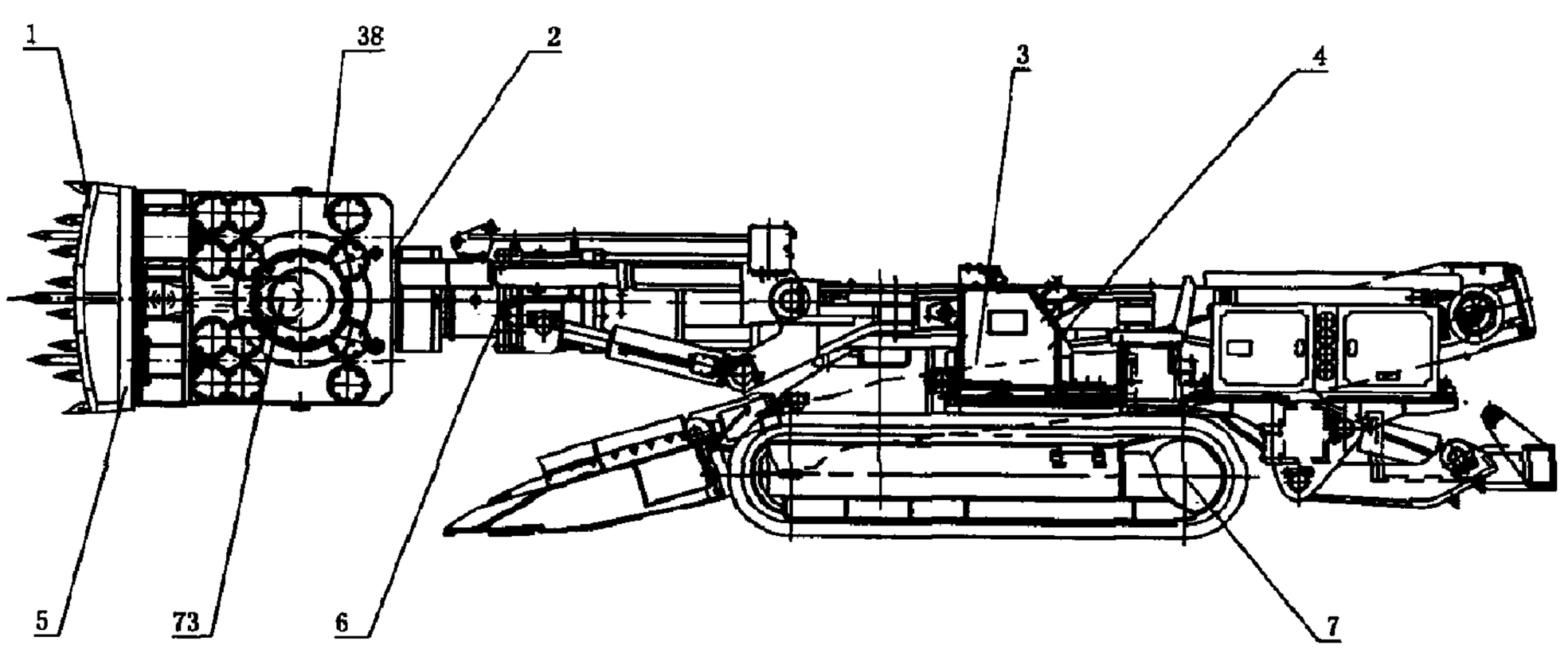


图1 / Fig.1

(57) Abrégé/Abstract:
A method and device for converting rotary motion to reciprocating percussion motion. The device comprises a machine body (4), a travel portion (7), and a reciprocating percussion portion (5). The reciprocating percussion portion (5) comprises a percussion drive mechanism (2), a rocker arm (6), and a percussion head (1). The percussion drive mechanism (2) comprises a percussion power source member (11), a transmission component, and a crankshaft (10). The percussion power source member (11) comprises a motor, and the motor comprises a power output shaft (14). The transmission component comprises a power gear (13) and a

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(57) Abrégé(suite)/Abstract(continued):
transmission gear (12). The power gear (13) is mounted on the power output shaft (14). The transmission gear (12) drives the crankshaft (10). The transmission component comprises a transmission shaft. The power output shaft (14) is perpendicular to the rocker arm (6), and is parallel to the transmission shaft and the crankshaft (10) so that the transmission gear (12) drives the crankshaft (10) to convert rotary motion to reciprocating motion; or the power output shaft (14) is parallel to the rocker arm (6), the crankshaft (10) is driven to convert rotary motion to reciprocating motion after the power direction is changed by a power bevel gear and a transmission bevel gear. The crankshaft (10) drives the percussion head (1) to perform reciprocating percussion. The travel portion (7) drives the machine body to travel. The machine body (4) drives the reciprocating percussion portion (5) to move and work continuously. The device applies to the mining field or mechanical engineering field, and has advantages such as strong structural strength and a small amount of maintenance.

Abstract

The invention belongs to the field of machinery, and in particular relates to a method for converting rotary motion into reciprocating impact motion and equipment for converting rotary motion into reciprocating impact motion by using the method, which are applicable to the excavation field or the field of engineering machinery. The equipment comprises a machine body, a traveling part and a reciprocating impact part, wherein the reciprocating impact part comprises an impact driving mechanism, a rocker arm and an impact head; the impact driving mechanism comprises an impact power source member, a transmission component and a crankshaft; the impact power source member comprises a motor, and the motor comprises a power output shaft; the transmission component comprises a power gear and a transmission gear; the impact power source member comprises a power output shaft, the power gear is arranged on the power output shaft, and the transmission gear drives the crankshaft; the transmission component comprises a transmission shaft; the power output shaft is arranged perpendicular to the rocker arm and parallel to the transmission shaft and the crankshaft to allow the transmission gear to drive the crankshaft so as to convert rotary motion into reciprocating motion, or the power output shaft is arranged parallel to the rocker arm to change the power direction through a power bevel gear and a transmission bevel gear and then drive the crankshaft so as to convert rotary motion into reciprocating motion; the crankshaft drives the impact head to perform reciprocating impact; the traveling part drives the machine body to travel; and the machine body drives the reciprocating impact part to move for continuous work. The equipment is high in structure strength, reliable in performance, high in running efficiency, low in maintenance and long in service life, and has the advantages of saving energy and reducing consumption.

METHOD OF EQUIPMENT FOR CONVERTING ROTARY MOTION INTO RECIPROCATING IMPACT MOTION AND EQUIPMENT FOR CONVERTING ROTARY MOTION INTO RECIPROCATING IMPACT MOTION FOR IMPLEMENTING THE METHOD

Field of the Invention

The present invention belongs to the field of machinery, and particularly relates to a method of equipment for converting rotary motion into reciprocating impact motion and equipment for converting rotary motion into reciprocating impact motion for implementing the method, which are suitable for the field of digging or the field of engineering machinery.

Background of the Invention

Since the driving shaft of an existing drilling and milling cutting type heading machine is arranged along the longitudinal direction of a rocker arm, in telescoping processes, a drilling and milling cutting head is liable to generate break-off damage to such transmission components as a spline shaft, a spline sleeve and the like, after being damaged, a motor or a speed reducer can only be maintained after multiple positions of the rocker arm are detached, thus resulting in large maintenance difficulty, labor consumption, time consumption and assembly difficulty, and in the maintenance and detachment processes, undamaged components are liable to be damaged, the precision of the assembly structure of the equipment is reduced, the application failure is increased and the service life of the entire machine is shortened.

The working manner of a rocker arm excavator is that the rocker arm is driven by hydraulic power to telescope and is driven by the hydraulic power to excavate materials, and a working manner of converting rotary motion into reciprocating

impact motion is not used, so that the rocker arm and/or an excavating component thereof acts slowly to cause low working efficiency.

The working principles and manners of a reciprocating impact type heading machine and a drilling and milling type heading machine are different, if the structure that the driving shaft of the drilling and milling type heading machine is arranged along the longitudinal direction of the rocker arm is still used, an impact power box is liable to generate break-off damage to such transmission components as the spline shaft, the spline sleeve and the like during telescoping and/or rotary impact, moreover the manufacturing difficulty and/or mounting complexity is increased and the failure rate of the equipment is increased.

In order to solve the above-mentioned problems, the present invention provides a method of equipment for converting rotary motion into reciprocating impact motion and equipment for converting rotary motion into reciprocating impact motion for implementing the method.

Summary of the Invention

The present invention is achieved by adopting the following technical solutions: an impact power source element is arranged, wherein the impact power source element is arranged perpendicular to a rocker arm of a heading machine or parallel to the rocker arm of the heading machine, the impact power source element is arranged to be a motor or a hydraulic motor or a pneumatic motor and the like, a power belt pulley or a power gear or a power chain wheel or a power bevel gear and the like is installed on the power output shaft of the motor or the hydraulic motor or the pneumatic motor and the like, a transmission belt pulley or a transmission gear or a transmission chain wheel or a transmission bevel gear and the like is used for driving a crank shaft, the power output shaft is perpendicular to the rocker arm, and the power output shaft, a

transmission shaft and the crank shaft and the like are arranged in parallel to enable the transmission gear to drive the crank shaft to convert rotary motion into reciprocating impact motion, or the power output shaft is arranged parallel to the rocker arm to drive the crank shaft to convert the rotary motion into the reciprocating impact motion after converting the power direction through the power bevel gear and the transmission bevel gear and the like, an impact head is connected with an impact driving mechanism, the impact driving mechanism is arranged on the rocker arm, the crank shaft is used for driving the impact head to impact in a reciprocating manner, the rocker arm is arranged at the front end of a machine body, a walking part is arranged at the lower part of the machine body, and the walking part is used for driving the machine body to walk to continuously work.

A rotating device is arranged, wherein the rotating device is arranged on a fixed seat, a movable arm and the like, the fixed seat is arranged to a fixed arm and/or a bracket and the like, the fixed arm and/or the bracket and the like are movably connected with the movable arm, and the rotating device is used for driving the movable arm to rotate relative to the fixed arm and/or the bracket and the like.

A telescopic device is arranged, wherein the telescopic device is arranged on the fixed seat and/or the movable arm and the like, one end of the telescopic device is connected with the movable arm, and the telescopic device is used for driving the movable arm to reciprocate relative to the fixed seat.

A limiting device is arranged, wherein the limiting device is used for positioning the rotation position and/or telescopic position and the like of the movable arm.

A locking device is arranged, wherein the locking device is used for locking the movable arm after rotating the same in place and/or locking the movable arm after telescoping the same in place.

An action detection and control system is arranged, wherein the action detection and control system is used for detecting and controlling the working state of a working component.

Equipment for converting rotary motion into reciprocating impact motion, including a machine body, a walking part, a reciprocating impact part and the like, wherein the reciprocating impact part includes an impact driving mechanism, a rocker arm, an impact head and the like, the impact driving mechanism includes an impact power source element, a transmission component, a crank shaft and the like, the impact power source element is arranged perpendicular to the rocker arm or parallel to the rocker arm, the impact power source element includes a motor or a hydraulic motor or a pneumatic motor and the like, the motor or the hydraulic motor or the pneumatic motor and the like includes a power output shaft and the like, the transmission component includes a belt pulley transmission component or a gear transmission component or a chain wheel transmission component or a bevel gear transmission component and the like, the belt pulley transmission component includes a belt, a power belt pulley, a transmission belt pulley and the like, the gear transmission component includes a power gear, a transmission gear and the like, the chain wheel transmission component includes a power chain wheel, a transmission chain wheel, a chain and the like, the bevel gear transmission component includes a power bevel gear, a transmission bevel gear and the like, the impact power source element includes a power output shaft and the like, the power belt pulley or the power gear or the power chain wheel or the power bevel gear and the like is installed on the power output shaft, the transmission belt pulley or the transmission gear or the transmission chain wheel or the transmission bevel gear and the like is used for driving the crank shaft, the transmission component includes a transmission shaft and the like, the power output shaft is arranged perpendicular to the rocker arm and parallel to the transmission shaft

and the crank shaft for enabling the transmission gear or the transmission belt pulley or the transmission chain wheel and the like to drive the crank shaft to convert rotary motion into reciprocating impact motion, or the power output shaft is arranged parallel to the rocker arm to drive the crank shaft to convert the rotary motion into the reciprocating impact motion after converting the power direction through the power bevel gear and the transmission bevel gear and the like, the reciprocating impact part is arranged on the machine body, the crank shaft is used for driving the impact head to impact in a reciprocating manner, the walking part is arranged at the lower part of the machine body, the walking part is used for driving the machine body to walk, and the machine body is used for driving the reciprocating impact part to move to continuously work.

The rocker arm includes a fixed seat and the like, a movable arm and the like, wherein the fixed seat and the movable arm are separated or integrated, the impact driving mechanism is arranged on the movable arm, the movable arm is arranged on the fixed seat, and the fixed seat is hinged or fixedly connected with the movable arm.

The rocker arm includes a fixed seat and the like, wherein the fixed seat is provided with an outer guide cylinder or an inner guide cylinder and the like, the movable arm is correspondingly arranged in the inner guide cylinder or the outer guide cylinder and the like, and the inner guide cylinder is arranged in the outer guide cylinder.

The rocker arm includes a rotating device and the like, wherein the rotating device includes a fixed seat, a movable arm and the like, the fixed seat includes a fixed arm and/or a bracket and the like, the fixed seat is movably connected with the movable arm, the rotating device is arranged on the fixed seat and/or the movable arm, and the rotating device is used for driving the movable arm and the like to rotate relative to the fixed seat.

The rocker arm includes a telescopic device and the like, wherein the telescopic device includes a fixed seat, a movable arm and the like, the telescopic device is arranged on the fixed seat and/or the movable arm, and the telescopic device is used for driving the movable arm and the like to reciprocate relative to the fixed seat.

The rocker arm includes a limiting device and the like, wherein the limiting device includes a rotary limiting device and/or a telescopic limiting device and the like, the rotary limiting device is used for limiting the rotation position of the movable arm and/or the telescopic limiting device is used for limiting the telescopic position of the movable arm.

The movable arm or the fixed seat includes a transition disk and the like, wherein the transition disk is movably connected with the movable arm and/or the fixed seat and the like, the rotating device and the like is arranged between the transition disk and the movable arm, the rotating device is used for driving the movable arm to rotate relative to the transition disk, the telescopic device is arranged on the transition disk and the fixed seat, the telescopic device is used for driving the transition disk to telescope relative to the fixed seat, and the transition disk is used for driving the movable arm to telescope relative to the fixed seat.

The transition disk is provided with a transition disk round hole and the like, the movable arm includes an inner guide cylinder of the movable arm, and the like, the transition disk round hole is matched with the inner guide cylinder of the movable arm, and the inner guide cylinder of the movable arm rotates in the transition disk round hole.

The rocker arm includes a rotary locking device and/or a telescopic locking device and the like, wherein the rotary locking device is used for locking the movable arm after rotating the same in place and/or the telescopic locking device is used for locking the movable arm after telescoping the same in place.

The rocker arm includes an action detection and control system and the like, wherein the action detection and control system is used for detecting and controlling the working state and the like of a working component.

The action detection and control system includes a manual action detection and control system or hydraulic action detection and control system or a pneumatic action detection and control system or an electric action detection and control system and the like.

The rocker arm includes a limiting device, a rotary locking device, a rotary telescopic device, an action detection and control system and the like, wherein the limiting device includes a rotary limiting device and/or a telescopic limiting device and the like, the rotary limiting device is used for limiting the rotation position of the movable arm, the rotary telescopic limiting device is used for limiting the telescoping of the movable arm, the rotary locking device is used for locking the movable arm and the like after rotating the same in place and/or locking the movable arm and the like after telescoping the same in place, and the action detection and control system is used for detecting and controlling the working state and the like of the working component.

The rotary limiting device includes a rotary positioning element and the like, wherein the rotary positioning element includes a rotary positioning driving component, a rotary locking pin, a rotary positioning hole slot and the like, the rotary positioning driving component is arranged on the fixed seat and/or the movable arm and the like, the rotary positioning hole slot is correspondingly arranged on the movable arm and the like and/or on the fixed seat and the like, the rotary positioning driving component is used for driving the rotary locking pin to telescopically enter the rotary positioning hole slot for positioning, and the rotary positioning driving component and the rotary locking pin and the like are separately connected or are integrated.

The movable arm includes a guide lug boss of the movable arm or a guide groove of the movable arm and the like, wherein a guide groove of the fixed seat or a guide lug boss of the fixed seat and the like is correspondingly arranged on the fixed seat, the guide groove of the fixed seat and the guide lug boss of the movable arm are buckled to guide telescoping or the guide lug boss of the fixed seat and the guide groove of the movable arm are matched to guide telescoping.

The rocker arm includes a rotating device and the like, wherein the rotating device includes a gear rotating device or a cable wire rotating device or a hydraulic rotating device or a pneumatic rotating device or a rack rotating device or a gear ring rotating device or a thread screw rotating device or a hanging gear rotating device or a chain drive rotating device or a motor drive rotating device and the like.

The gear ring rotating device includes a rotating gear ring, a rotating gear, a rotating power source element, a supporting element of the rotating power source element, and the like, wherein the rotating gear ring and the movable arm and the like are connected or integrated, the rotating gear and the rotating power source element and the like are connected or integrated, the rotating power source element is arranged on the supporting element of the rotating power source element, the rotating gear is engaged with the rotating gear ring, the rotating power source element is used for driving the rotating gear to rotate, the rotating gear is used for driving the rotating gear ring to rotate, and the rotating gear ring is used for driving the movable arm to rotate.

The gear ring rotating device includes a rotating gear ring, a rotating gear, a rotating power source element and the like, wherein the rotating gear is arranged on the movable arm, the rotating gear ring is arranged on the fixed seat, the rotating power source element is used for driving the rotating gear ring to rotate, the rotating gear ring is engaged with the rotating gear, the rotating gear ring is used for driving the

rotating gear to rotate, and the rotating gear is used for driving the movable arm to rotate.

The cable wire rotating device includes a cable wire, a rotating power source element, a supporting frame of the rotating power source element, and the like, wherein the cable wire is wound on a power source element output shaft, the two ends of the cable wire are connected with the movable arm, the rotating power source element is connected with the cable wire, the rotating power source element is arranged on a supporting element of the rotating power source element, the power source element is used for driving the cable wire, and the cable wire is used for driving the movable arm to rotate.

The cable wire rotating device includes a cable wire, a bend wheel, a rotating power source element, a supporting frame of the rotating power source element, and the like, wherein the cable wire is wound on the bend wheel, the two ends of the cable wire are connected with the movable arm through the bend wheel, the rotating power source element is connected with the cable wire or the bend wheel, the rotating power source element is arranged on a supporting element of the rotating power source element, the rotating power source element is used for driving the cable wire or the bend wheel, and the cable wire is used for driving the movable arm to rotate.

The rotating device and/or the telescopic device includes a hydraulic drive rotating device or a pneumatic rotating device or a motor drive rotating device and the like, wherein the hydraulic drive rotating device or the pneumatic rotating device and the like includes a cylinder body, a cylinder rod, a pipeline, a control valve and the like, the cylinder body and the fixed arm and the like are connected or integrated, the cylinder rod and the movable arm and the like are connected or separated or integrated, the pipeline is connected with the cylinder body and the control valve, the control valve is used for controlling the flow of liquid or a gas and the like, and the

liquid or the gas and the like is used for driving the movable arm to rotate and/or telescope.

The rocker arm includes a telescopic device and the like, wherein the telescopic device includes a gear and rack telescopic device or a screw telescopic device or a hydraulic telescopic device or a pneumatic telescopic device or a cable wire telescopic device or a chain telescopic device or a motor drive telescopic device or a jack telescopic device and the like.

The rotary locking device includes a disk brake type rotary locking device or a pin hole rotary locking device or a drum brake type rotary locking device or a hanging gear brake type rotary locking device or a cushion block brake type rotary locking device or a rope pulling type rotary locking device or a rotary locking device of a chain or a rotary locking device of catching groove or a rotary locking device of a hook or a rotary locking device of a baffle or a rotary locking device of an elastic pin or a rotary locking device of an expansion pin and the like, and the telescopic locking device and the rotary locking device and the like are separated or separately connected or integrated.

The telescopic locking device includes a disk brake type telescopic locking device or a pin hole telescopic locking device or a drum brake type telescopic locking device or a hanging gear brake type telescopic locking device or a cushion block brake type telescopic locking device or a rope pulling type telescopic locking device or a chain telescopic locking device or a catching groove telescopic locking device or a hook telescopic locking device or a baffle telescopic locking device or an elastic pin telescopic locking device or an expansion pin telescopic locking device, and the like.

The rotary limiting device includes a rotary limiting platform or a rotary limiting block or a rotary limiting pin or a rotary limiting hole or a rotary limiting plate or a rotary limiting ring or a rotary limiting tooth or a rotary limiting groove or a rotary

limiting hook or a rotary limiting rope or a rotary limiting elastic pin or a rotary limiting expansion pin or a rotary limiting chain and the like, and the telescopic device and the rotary limiting device and the like are separated or separately connected or integrated.

The telescopic limiting device includes a telescopic limiting platform or a telescopic limiting block or a telescopic limiting pin or a telescopic limiting hole or a telescopic limiting plate or a telescopic limiting ring or a telescopic limiting tooth or a telescopic limiting groove or a telescopic limiting hook or a telescopic limiting rope or a telescopic limiting elastic pin or a telescopic limiting expansion pin or a telescopic limiting chain, and the like.

The limiting device includes a limiting buffer element and the like, wherein the limiting buffer element is arranged on a limiting platform or a limiting block or a limiting pin or a limiting hole or a limiting plate or a limiting ring or a limiting tooth or a limiting groove or the movable arm or the fixed arm or the bracket, and the like.

The limiting buffer element includes a spring buffer element or a polyurethane buffer element or a rubber buffer element or a nylon buffer element or an airbag buffer element or a sac buffer element or a macromolecular buffer element or a composite material buffer element, and the like.

An access hole corresponding to the power belt pulley or the power gear or the power chain wheel or the transmission belt pulley or the transmission gear or the transmission chain wheel or the power bevel gear or the transmission bevel gear and the like is arranged on the rocker arm.

The motor or the transmission belt pulley or the transmission gear or the transmission chain wheel or the transmission bevel gear and the like is provided with a clutch shaft.

The motor drive rotating device includes a telescopic transmission device and the like, wherein the telescopic transmission device includes a spline sleeve, a spline shaft and

the like, the spline sleeve is matched with the spline shaft, under the drive of the telescopic transmission device, the spline sleeve telescopes relative to the spline shaft in a reciprocating manner to increase the digging height and/or digging depth of a digging machine.

The reciprocating impact part includes an impact power box, an inner-layer material impact mechanism, an outer-layer material impact mechanism and the like, wherein the outer-layer material impact mechanism includes outer-layer material impact teeth, an outer-layer material impact tooth seat, an outer-layer material impact protection device and the like, the outer-layer material impact tooth seat and the outer-layer material impact teeth are separated or integrated, the inner-layer material impact mechanism includes inner-layer material impact teeth, an inner-layer material impact tooth seat, an inner-layer material impact protection device and the like, the inner-layer material impact tooth seat and the inner-layer material impact teeth are separated or integrated, the outer-layer material impact protection device and the outer-layer material impact tooth seat and the like are separately connected or are integrated, the inner-layer material impact protection device and the inner-layer material impact tooth seat and the like are separately connected or are integrated, the impact power box is used for driving the outer-layer material impact mechanism and the inner-layer material impact mechanism to reciprocate, a part of the outer-layer material impact protection device and/or a part of the inner-layer material impact protection device is consistently overlapped with the impact power box, in order to prevent a material from entering the outer-layer material impact protection device and the impact power box or prevent the material from entering the inner-layer material impact protection device and the impact power box.

The outer-layer material impact protection device includes an outer-layer material impact protection plate and the like, wherein the outer-layer material impact

protection plate is arranged along the surrounding or a local part of the outer-layer material impact tooth seat, the inner-layer material impact protection device includes an inner-layer material impact protection plate and the like, and the inner-layer material impact protection plate is arranged along the surrounding or a local part of the inner-layer material impact tooth seat.

The inner-layer material impact protection device reciprocates with the inner-layer material impact tooth seat, the outer-layer material impact protection device reciprocates with the outer-layer material impact tooth seat, the inner-layer material impact protection plate and/or the outer-layer material impact protection plate reciprocates in a manner of leaning against the impact power box, and a wear-resistant gap is arranged at the leaning part.

The inner-layer material impact protection plate includes a sealing element of the inner-layer material impact protection plate and the like, the outer-layer material impact protection plate includes a sealing element of the outer-layer material impact protection plate and the like, and the sealing element of the inner-layer material impact protection plate and the sealing element of the outer-layer material impact protection plate and the like are arranged at the ends consistently overlapped with the impact power box.

The impact power box includes a sealing element of the impact power box and the like, and the sealing element of the impact power box is arranged at the end consistently overlapped with the inner-layer material impact protection plate and/or the outer-layer material impact protection plate.

A sealing element and the like is arranged at the joint site of the inner-layer material impact protection plate and/or the inner-layer material impact tooth seat, and a sealing element and the like is arranged at the joint site of the outer-layer material impact protection plate and the outer-layer material impact tooth seat.

The impact power box includes a protection plate stroke groove and the like, the outer-layer material impact protection device includes an outer-layer material impact protection plate and the like, the inner-layer material impact protection device includes an inner-layer material impact protection plate and the like, and the adjacent parts of the inner-layer material impact protection plate and the outer-layer material impact protection plate reciprocate in the protection plate stroke groove.

An elastomer and the like is arranged in the protection plate stroke groove.

An elastomer and the like is arranged at the free end of the outer-layer material impact protection plate, and/or the elastomer and the like is arranged at the free end of the inner-layer material impact protection plate.

The elastomer is used for shaking off and popping out a material brought in by the outer-layer material impact protection plate and/or the inner-layer material impact protection plate and/or other materials dropping into the protection plate stroke groove by means of elastic deformation.

The elastomer is used for absorbing the impact counterforce of the outer-layer material impact mechanism and/or the inner-layer material impact mechanism by means of elastic deformation.

The impact power box or the inner-layer material impact mechanism or the outer-layer material impact mechanism and the like includes a water spray device, wherein the water spray device is used for spraying water to the outer-layer material impact protection device and/or the inner-layer material impact protection device and/or the protection plate stroke groove and the like, in order to prevent the material from being adhered to the outer-layer material impact protection device and/or prevent the material from being adhered to the inner-layer material impact protection device and/or prevent the material from being adhered in the protection plate stroke groove, and the like.

The water spray device is provided with a water flow controller and the like, the water flow controller is used for controlling the water flow direction and/or controlling the water flow position and/or controlling the water spray time and the like, in order to control the water flow to not enter the impact power box and the inner-layer material impact protection device and/or control the water flow to not enter the impact power box and the outer-layer material impact protection device, and the like.

The outer-layer material impact protection plate and/or the inner-layer material impact protection plate is made from a metallic material or a high molecular material or a polyester material or a rubber material or a composite material, and the like.

The reciprocating impact part includes a buffer break-off prevention mechanism and the like, wherein the buffer break-off prevention mechanism includes a buffer reciprocating element, an elastomer, a buffer supporting element and the like, the elastomer is arranged between the buffer supporting element and the buffer reciprocating element or arranged on the buffer reciprocating element or arranged on the buffer supporting element and the like, the impact power source element includes a power impact element and the like, the impact head includes an impact tooth seat and the like, when the buffer reciprocating element is arranged on the power impact element, the buffer supporting element is correspondingly arranged on the impact tooth seat, when the buffer supporting element is arranged on the power impact element, the buffer reciprocating element is correspondingly arranged on the impact tooth seat, the buffer reciprocating element and the power impact element and the like are separated or separately connected or integrated, the buffer reciprocating element and the impact tooth seat and the like are separated or separately connected or integrated, the buffer supporting element and the power impact element and the like are separated or separately connected or integrated, the buffer supporting element and the impact tooth seat and the like are separated or separately connected or integrated,

the buffer break-off prevention mechanism is arranged between the impact head and the power impact element, or the buffer break-off prevention mechanism is arranged on the power impact element, or the buffer break-off prevention mechanism is arranged on the impact tooth seat, when the impact head is used for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone and the like, an impact counterforce is applied to the buffer break-off prevention mechanism, the buffer reciprocating element extrudes the elastomer, and the elastomer deforms to absorb and decompose the impact counterforce.

When the power impact element is connected with the buffer supporting element or the buffer reciprocating element, the impact head is correspondingly connected with the buffer reciprocating element or the buffer supporting element.

The buffer break-off prevention mechanism includes a buffer reciprocating element, an elastomer, a buffer supporting element, a buffer adjusting element and the like, wherein the elastomer is arranged between the buffer adjusting element and the buffer reciprocating element, the buffer supporting element is movably connected with the buffer adjusting element through threads or a locking pin or a catching groove or a hanging gear and the like, when the impact head is used for impacting the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone and the like, the impact counterforce is applied to the buffer break-off prevention mechanism, the buffer reciprocating element extrudes the elastomer, and the elastomer deforms in the buffer adjusting element to absorb and decompose the impact counterforce.

A pre-tightening force adjusting structure and the like used for adjusting the relative position of the buffer adjusting element and the buffer supporting element is arranged between the buffer adjusting element and the buffer supporting element, and the pre-tightening force adjusting structure is used for adjusting the relative position of the

buffer adjusting element and the buffer supporting element and pressing or loosening the fatigue deformed elastomer.

The pre-tightening force adjusting structure includes a thread pre-tightening force adjusting structure or a locking pin pre-tightening force adjusting structure or a clamping pin pre-tightening force adjusting structure or a catching groove pre-tightening force adjusting structure or a snap spring pre-tightening force adjusting structure or a hanging gear pre-tightening force adjusting structure, and the like.

The buffer break-off prevention mechanism includes a buffer reciprocating element, an elastomer, a buffer supporting element and the like, wherein the elastomer is arranged between the buffer supporting element and the buffer reciprocating element or arranged on the buffer reciprocating element or arranged on the buffer supporting element, the buffer supporting element and/or the buffer reciprocating element includes an elastomer fixing element and the like, the buffer supporting element and the elastomer fixing element and the like are separately connected or are integrated, the buffer reciprocating element and the elastomer fixing element and the like are separately connected or are integrated, the buffer reciprocating element and the elastomer and the like are separated or separately connected or integrated, the elastomer and the buffer supporting element are separately or movably connected and the like or are integrated, the elastomer and the elastomer fixing element are separately or movably connected and the like or are integrated, when the buffer supporting element and the power impact element and the like are separately connected or are integrated, the buffer reciprocating element and the impact head and the like are separately connected or are integrated, when the buffer reciprocating element and the power impact element and the like are separately connected or are integrated, the buffer supporting element and the impact head and the like are separately connected or are integrated, when the impact head is used for impacting the

coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone and the like, the impact counterforce is applied to the buffer break-off prevention mechanism, the elastomer fixing element extrudes the elastomer, and the elastomer deforms to absorb and decompose the impact counterforce, to avoid the break-off damage to the power impact element.

The buffer break-off prevention mechanism includes a buffer reciprocating element, an elastomer, a buffer supporting element and the like, wherein the elastomer is arranged between the buffer supporting element and the buffer reciprocating element or arranged on the buffer reciprocating element or arranged on the buffer supporting element, the buffer supporting element and/or the buffer reciprocating element includes an elastomer fixing element, the buffer supporting element and the elastomer fixing element and the like are separately connected or are integrated, the buffer reciprocating element and the elastomer fixing element and the like are separately connected or are integrated, the buffer reciprocating element and the elastomer and the like are separated or separately connected or integrated, the elastomer and the buffer supporting element are separately or movably connected and the like or are integrated, when the elastomer and the elastomer fixing element are fixedly connected and the like or are integrated, the elastomer fixing element and/or the buffer reciprocating element extrudes the elastomer, and the elastomer telescopes to absorb and decompose the impact counterforce.

The reciprocating impact part includes a guide mechanism and the like, wherein the buffer break-off prevention mechanism includes a buffer reciprocating element, an elastomer, a buffer supporting element and the like, the elastomer is arranged between the buffer supporting element and the buffer reciprocating element or arranged on the buffer reciprocating element or arranged on the buffer supporting element, the buffer supporting element and/or the buffer reciprocating element includes an elastomer

fixing element and the like, the buffer supporting element and the elastomer fixing element and the like are separated or separately connected or integrated, the buffer reciprocating element and the elastomer fixing element and the like are separated or separately connected or integrated, the buffer reciprocating element and the elastomer and the like are separated or separately connected or integrated, the elastomer and the buffer supporting element are separately or movably connected and the like or are integrated, when the elastomer and the elastomer fixing element are separated or separately connected or integrated, the elastomer fixing element and/or the buffer reciprocating element extrudes the elastomer, the elastomer deforms to absorb and decompose the impact counterforce, and the guide mechanism is used for correcting the impact direction of the impact head.

The elastomer fixing element includes a sleeve elastomer fixing element or a frame-shaped elastomer fixing element or a U-shaped elastomer fixing element or a multi-prismatic elastomer fixing element or a plate type elastomer fixing element or a rod type elastomer fixing element or a thread type elastomer fixing element or a neck elastomer fixing element or a baffle elastomer fixing element or a hinge hole elastomer fixing element or a fixing shaft elastomer fixing element or a pin shaft elastomer fixing element or a hook elastomer fixing element or a locking pin elastomer fixing element or a clamping pin elastomer fixing element or a hanging gear elastomer fixing element or a triangular elastomer fixing element or a quadrangular elastomer fixing element or a polygonal elastomer fixing element or a sleeve rod type elastomer fixing element or a positioning platform elastomer fixing element or a positioning pin elastomer fixing element or a positioning hole elastomer fixing element or a positioning groove elastomer fixing element or a positioning bolt elastomer fixing element or a positioning neck elastomer fixing element or a positioning guide post elastomer fixing element or a positioning shaft elastomer fixing

element or a positioning plate elastomer fixing element or a positioning ring elastomer fixing element or a positioning hook elastomer fixing element or a positioning thread elastomer fixing element or a clamping sleeve elastomer fixing element or a transverse H-shaped elastomer fixing element or a combined elastomer fixing element, and the like.

The buffer reciprocating element includes a cylindrical buffer reciprocating element or a frame-shaped buffer reciprocating element or a U-shaped buffer reciprocating element or a multi-prismatic buffer reciprocating element or a plate type buffer reciprocating element or a rod type buffer reciprocating element or a thread adjustment type buffer reciprocating element or a neck buffer reciprocating element or a baffle buffer reciprocating element or a hinge hole buffer reciprocating element or a pin shaft buffer reciprocating element or a hook buffer reciprocating element or a combination of multiple shapes, and the like.

The buffer break-off prevention mechanism is provided with a buffer reciprocating guide structure and the like, wherein the buffer reciprocating guide structure and the buffer supporting element and the like are separated or separately connected or integrated, or the buffer reciprocating guide structure and the buffer reciprocating element are separated or separately connected or integrated.

The buffer reciprocating guide structure includes a cylindrical buffer reciprocating guide structure or a plate type buffer reciprocating guide structure or a triangular buffer reciprocating guide structure or a quadrangular buffer reciprocating guide structure or a polygonal buffer reciprocating guide structure or a columnar buffer reciprocating guide structure or a rod type buffer reciprocating guide structure or a push-pull type buffer reciprocating guider or a sleeve rod type buffer reciprocating guider or an elastomer buffer reciprocating guider, and the like.

The buffer break-off prevention mechanism includes a buffer anti-drop limiting structure and the like, wherein the buffer anti-drop limiting structure includes an anti-drop limiting structure of the buffer reciprocating element and/or an anti-drop limiting structure of the buffer supporting element and the like, the anti-drop limiting structure of the buffer supporting element and the buffer supporting element and the like are separated or separately connected or integrated, the anti-drop limiting structure of the buffer reciprocating element and the buffer reciprocating element and the like are separated or separately connected or integrated, the buffer anti-drop limiting structure is used for preventing the separation of the buffer reciprocating element and the buffer supporting element or preventing the separation of the buffer reciprocating element and the impact tooth seat or preventing the separation of the elastomer and the buffer reciprocating element or preventing the separation of the elastomer and the buffer supporting element or preventing the separation of the elastomer and the impact tooth seat, and the like.

The anti-drop limiting structure of the reciprocating element includes a limiting platform or a limiting pin or a limiting hole or a limiting groove or a limiting bolt or a limiting neck or a limiting guide post or a limiting shaft or a limiting plate or a limiting ring or a limiting snap spring or a limiting hook or a limiting thread or a clamping sleeve or combined limiting, and the like.

The buffer supporting element includes a rod type buffer supporting element or a cylindrical buffer supporting element or a frame-shaped buffer supporting element or a U-shaped buffer supporting element or a multi-prismatic buffer supporting element or a plate type buffer supporting element or a thread adjustment type buffer supporting element or a neck buffer supporting element or a baffle buffer supporting element or a hinge hole buffer supporting element or a pin shaft buffer supporting

element or a hook buffer supporting element or a clamping sleeve buffer supporting element or a combination of multiple shapes, and the like.

The buffer break-off prevention mechanism includes a bidirectional buffer break-off prevention mechanism or a unidirectional buffer break-off prevention mechanism and the like.

A quantitative motion gap for the buffer reciprocating element is arranged at the buckling site and the like of the buffer reciprocating element and the buffer supporting element, when an impact counteraction break-off force of the impact head is applied to the buffer break-off prevention mechanism, the buffer reciprocating element swings between the buffer supporting element and the buffer reciprocating element, to prevent the impact counteraction break-off force from breaking off the impact power source element.

The bidirectional buffer break-off prevention mechanism includes a buffer supporting element, a buffer reciprocating element and the like, wherein an elastomer blocking element and the like is arranged on the buffer reciprocating element, elastomers and the like are arranged at both sides of the elastomer blocking element, a counterforce generated by the power impact element when driving the impact head to bidirectionally impact respectively acts on the elastomers at the two sides of the elastomer blocking element, and the elastomers at the two sides of the elastomer blocking element bidirectionally buffer.

The elastomer blocking element includes a lug boss or a blocking column or a baffle or a bulb column or a bulb plate or a cambered convex edge or a cambered edge plate or a cambered head column, and the like.

When the impact counteraction break-off force of the impact head is applied to the buffer break-off prevention mechanism to buffer the swing of the buffer reciprocating element between the buffer supporting element and the buffer reciprocating element,

the bulb column or the bulb plate or the cambered convex edge or the cambered edge plate or the cambered head column and the like of the elastomer blocking element generates no break-off damage to the buffer reciprocating element and/or the buffer supporting element.

A buffer supporting element bulb or a cambered surface of the buffer supporting element and the like is arranged at the part of the buffer supporting element at the joint site of the buffer supporting element and the buffer reciprocating element, when the impact counteraction break-off force of the impact head is applied to the buffer break-off prevention mechanism to buffer the swing of the buffer reciprocating element between the buffer supporting element and the buffer reciprocating element, the buffer supporting element bulb or the cambered surface of the buffer supporting element generates no break-off damage to the buffer reciprocating element and/or the buffer supporting element.

The elastomer is serially connected to the buffer reciprocating element, the buffer supporting element includes a front end guide element, a rear end guide element and the like, the buffer reciprocating element is arranged on the front end guide element and/or the rear end guide element, and the front end guide element and/or the rear end guide element is used for enlarging the correction distance and/or force of the buffer reciprocating element.

The elastomer includes a spring or elastic rubber or a spring steel plate or a disk spring or elastic polyester or elastic nylon or elastic corrugated steel or a sac or an airbag or an elastic granule or a polymeric elastomer or a composite material elastomer or an air pressure or a hydraulic pressure or a pneumatic spring or a hydraulic spring, and the like.

The buffer reciprocating element and/or the buffer supporting element includes a sealing element and the like.

A lubricant is arranged on the buffer reciprocating element or the buffer supporting element, or the buffer reciprocating element is a self-lubricating material, or the buffer supporting element is a self-lubricating material, and the like.

The reciprocating impact part includes a guide mechanism, an impact driving mechanism, an impact head and the like, wherein the guide mechanism and the impact driving mechanism are separated or separately connected or integrated, the impact driving mechanism includes a power supporting element and the like, the guide mechanism includes a guide supporting element and the like, the power supporting element and the guide supporting element and the like are separated or separately connected or integrated, the power supporting element and/or the guide supporting element includes a friction body supporting element and the like, the friction body supporting element and the power supporting element or the friction body supporting element and the guide supporting element and the like are separated or separately connected or integrated, the friction body supporting element includes a rolling body supporting element or a suspension body supporting element and the like, the rolling body supporting element and the suspension body supporting element and the like are separated or separately connected or integrated, the rolling body supporting element includes a guide rolling body supporting element and/or a power rolling body supporting element and the like, the guide rolling body supporting element and the power rolling body supporting element and the like are separated or separately connected or integrated, the suspension body supporting element includes a guide suspension body supporting element and/or a power suspension body supporting element and the like, the guide suspension body supporting element and the power suspension body supporting element and the like are separated or separately connected or integrated, the guide mechanism includes an impact guide element, a friction body, a friction body supporting element and the like, the friction body

includes a rolling body or a suspension body and the like, the rolling body includes a guide rolling body and/or a power rolling body and the like, the guide rolling body and the power rolling body are separated or separately connected or integrated, the suspension body includes a guide suspension body and/or a power suspension body and the like, and the guide suspension body and the power suspension body are separated or separately connected or integrated; the impact driving mechanism includes a power impact element, a power supporting element and the like, and the impact guide element and the power impact element and the like are separated or separately connected or integrated; the impact guide element and the impact head are separately arranged or are integrated, the power impact element and the impact head are movably connected and the like or are separated or integrated, the friction body is arranged between the guide supporting element and the impact guide element or between the power supporting element and the power impact element, the guide supporting element or the power supporting element includes a friction body supporting element and the like, the power impact element is used for driving the impact guide element or the impact head and the like to reciprocate, and the friction body and the friction body supporting element are in close fit with the impact guide element and the like to support the impact head to impact through rolling friction or suspension friction; the machine body includes a rack and the like, a lifting mechanism is arranged on the rack or no lifting mechanism is arranged on the rack, and the like, the reciprocating impact part is arranged on the rack or on the lifting mechanism, and the rack is arranged on the machine body or the rack and the lifting mechanism is cooperatively arranged on the machine body; the machine body supports the impact head to impact in a reciprocating manner for blanking.

The friction body supporting element, the impact guide element, the friction body and the like are in close buckling to support the impact head to impact through rolling

friction or suspension friction and correct the impact direction of the impact head, in order to prevent the break-off damage to the impact driving mechanism under the protection of the guide mechanism and improve the impact efficiency.

The impact driving mechanism includes a crank impact driving mechanism and the like, wherein the crank impact driving mechanism includes a power impact element, a power supporting element and the like, and the impact guide element and the power impact element and the like are separated or separately connected or integrated.

The reciprocating impact part includes an impact power box and the like, wherein the guide mechanism and the impact driving mechanism and the like are combined and arranged in the impact power box, impact heads are arranged at the two ends of the impact guide element arranged in the impact power box, or the impact head is arranged at one end of the impact guide element and a counterweight element used for preventing the impact head from breaking off the guide mechanism, the impact driving mechanism and/or the machine body due to unbalanced gravity is arranged at the other end thereof, or the impact head is arranged at one end of the impact guide element and the end part of the power impact element and the impact head and the like are connected or separated, the power supporting element and the impact power box and the like are separated or integrated or connected, and the impact power box is used for protecting the components in the impact power box from being corroded by such pollutants as dust, an etchant gas, sewage and the like.

The reciprocating impact part further includes a supporting frame and the like, and the impact driving mechanism or the guide mechanism and the like is arranged on the supporting frame.

A limiting structure and the like is arranged on the reciprocating impact part, the limiting structure is arranged to be a guide limiting structure or a power limiting structure and the like, and the guide limiting structure and the power limiting structure

and the like are separated or separately connected or integrated; the guide limiting structure and the friction body supporting element and the like are connected or separated or integrated, or the guide limiting structure and the impact guide element and the like are connected or separated or integrated, or the guide limiting structure and the guide rolling body and the like are connected or separated or integrated, or the power limiting structure and the power supporting element and the like are connected or separated or integrated, or the power limiting structure and the power impact element and the like are connected or separated or integrated, or the power limiting structure and the power rolling body and the like are connected or separated or integrated, the guide rolling body or the guide suspension body and the like is arranged on the guide limiting structure, the guide rolling body or the guide suspension body and the like is used for supporting the impact guide element to reciprocate along the friction body supporting element in the guide limiting structure, the guide limiting structure is used for limiting the motion space and/or position and the like of the guide rolling body or the guide suspension body or the impact guide element and the like, the power rolling body or the power suspension body and the like is arranged on the power limiting structure, the power rolling body or the power suspension body and the like is used for supporting the power impact element to reciprocate along the power supporting element in the power limiting structure, the power limiting structure is used for limiting the motion space and/or position and the like of the power rolling body or the power suspension body or the power impact element and the like, and the friction body is used for supporting the impact guide element or the power impact element to reciprocate.

The limiting structure includes a raceway or a circular raceway or a cylindrical raceway or a pit or a reciprocating stroke segment or a holder or a limiting plate or a limiting ring or a limiting sleeve or a limiting platform or a limiting rod or a limiting

shaft or a limiting groove or a spherical projection or a lug boss or a bearing or cooperation of an inner body and an outer sleeve or an ellipse or a dumb bell shape or a cylinder or a cone or a circular ring shape or a roller or a platform-shaped column or a platform-shaped ball or a platform-shaped drum or a groove-shaped column or a groove-shaped ball or a groove-shaped roller or a groove-shaped ellipse or a square or a U shape or a frame shape or a transverse H shape or a spline shape or a camber or a V shape or an inverted V shape or a circle or a plate shape or a polygon or a cylinder or a spline sleeve or a multi-prismatic key, and the like.

The rolling body is used for supporting the impact guide element and the guide rolling body supporting element to relatively reciprocate by means of circular rolling or reciprocating rolling or in situ rolling in the circular raceway, or rolling in the pit, or rolling in the raceway, or rolling in the holder, and the like.

A single or multiple rolling bodies and the like are longitudinally arranged along the reciprocating direction, or a single or multiple rolling bodies and the like are transversely arranged relative to the reciprocating direction.

The guide rolling body or the power rolling body and the like are arranged in parallel or in a stagger manner and the like along the reciprocating impact direction.

The impact driving mechanism includes a power supporting element, a power impact element and the like, the guide mechanism includes a guide rolling body, a guide supporting element, an impact guide element and the like, the guide rolling body includes a roller and the like, the roller is arranged between the power supporting element and the power impact element or between the guide supporting element and the impact guide element, the roller includes a roller shaft and the like, the roller and the roller shaft and the like are separated or separately connected or integrated, when the roller shaft is fixed on the power impact element, the roller rolls by leaning against the power supporting element, when the roller shaft is fixed on the power supporting

element, the roller rolls by leaning against the power impact element to prevent the joint sliding friction of the power impact element and the power supporting element and the like, or when the roller shaft is fixed on the guide supporting element, the roller rolls by leaning against the impact guide element, and when the roller shaft is fixed on the impact guide element, the roller rolls by leaning against the guide supporting element to prevent the fit sliding friction of the guide supporting element and the impact guide element and the like, so as to reduce the abrasion of the impact driving mechanism or the guide mechanism.

The impact driving mechanism includes a power supporting element, a power impact element and the like, the guide mechanism includes a guide rolling body, a guide supporting element, an impact guide element and the like, the guide rolling body includes a roller and the like, the surface of the roller is processed to a projection, a depression, a V-shaped groove or a curve shape and the like, the shape of the contact surface of the guide supporting element or the impact guide element and the roller is buckled with the shape of the surface of the roller, or the shape of the contact surface of the power supporting element or the power impact element and the roller is buckled with the shape of the surface of the roller, the motion of the impact guide element or the power impact element and the like is controlled to be linear reciprocating motion by means of rolling friction, in order to reduce the abrasion of the impact driving mechanism.

The guide supporting element or the power supporting element or the impact guide element or the power impact element and the like includes a reciprocating stroke segment, wherein the width of the reciprocating stroke segment is arranged to be not more than or equal to or close to the width of the friction body in the rolling direction, the length of the reciprocating stroke segment is equal to or close to the sum of one half of the stroke of the impact guide element or the power impact element and the

radius of the rolling body, the rolling body is arranged between the guide supporting element and the impact guide element and the like, or is arranged between the power supporting element and the power impact element and the like and is arranged in the reciprocating stroke segment, the reciprocating stroke segment is used for limiting the rolling space and/or position and the like of the rolling body, and the reciprocating stroke segment is used for ensuring rolling friction of the rolling body and the guide supporting element or the power supporting element or the impact guide element or the power impact element and the like when moving.

The friction body supporting element includes a pit or the impact guide element includes a pit or the power supporting element includes a pit or the power impact element includes a pit, and the like, the friction body is arranged between the friction body supporting element and the impact guide element and is arranged in the pit, or the friction body is arranged between the power supporting element and the power impact element and is arranged in the pit, and the pit is used for limiting the rolling space and/or position and the like of the friction body.

The friction body supporting element includes a raceway or the impact guide element includes a raceway or the friction body supporting element and the impact guide element includes raceways and the like, the friction body supporting element, the impact guide element and the friction body rolling in the raceway and the like are in close buckling to drive the impact guide element to reciprocate by means of the rolling friction of the friction body, and the raceway is used for limiting the rolling space and/or position and the like of the friction body.

The guide mechanism includes a rolling body supporting element, an impact guide element, a holder, a guide rolling body and the like, wherein the holder and the like is arranged between the rolling body supporting element and the impact guide element, the guide rolling body is arranged on the holder, the thickness of the holder is smaller

than the diameter of the guide rolling body, the two parts of the guide rolling body higher than the holder are respectively arranged on the rolling body supporting element and the impact guide element and the like, and the holder is singly arranged or fixed on the rolling body supporting element or fixed on the impact guide element; the rolling body supporting element and the impact guide element are in close fit with the guide rolling body in the holder and the like to drive the impact guide element to reciprocate through rolling friction, and the holder is used for limiting the rolling space and/or position and the like of the rolling body.

The guide mechanism further includes a guide segment and the like, wherein the guide segment is arranged on the impact guide element, the weights of the two ends except the segment overlapped with the impact guide element of the guide segment are equal or basically equal, the guide segment and the impact guide element and the like are separately connected or are integrated, the guide segment is arranged on the friction body supporting element, when moving, the guide segment is always located on the friction body supporting element to keep the gravity balance of the two ends of the impact guide element in a static or motion state, the friction body supporting element, the friction body and the impact guide element and the like are in close fit to support the impact guide element to reciprocate through rolling friction or suspension friction, and the power impact element is used for driving the impact head or the impact guide element and the like to reciprocate.

The impact driving mechanism includes a crank impact driving mechanism and the like, when the friction body supporting element includes an outer sleeve, the impact guide element includes an inner body, or when the friction body supporting element includes the inner body, the impact guide element includes the outer sleeve, the friction body is arranged between the outer sleeve and the inner body, the outer sleeve and the inner body are in close fit with the friction body and the like to relatively

reciprocate through rolling friction or suspension friction, the impact head is supported by the reciprocating outer sleeve or inner body and the like to reciprocate through rolling friction, and the power impact element is used for driving the impact head to impact.

The guide mechanism includes a guide friction body supporting element and/or a guide impact guide element and/or a guide friction body and the like, wherein the guide impact guide element, the guide friction body and the guide friction body supporting element and the like are in close buckling to ensure the linear reciprocating motion of the impact head and/or prevent the rotation of the impact head, the guide friction body supporting element and the guide supporting element and the like are separated or separately connected or integrated, and the guide impact guide element and the impact guide element and the like are separated or separately connected or integrated; or the impact driving mechanism includes a guide power supporting element and/or a guide power impact element and/or a guide friction body and the like, the guide power impact element, the guide friction body and the guide power supporting element and the like are in close buckling to ensure the linear reciprocating motion of the power impact element and/or prevent the rotation of the power impact element, the guide power supporting element and the power supporting element and the like are separated or separately connected or integrated, and the guide power impact element and the power impact element and the like are separated or separately connected or integrated.

The guide friction body supporting element includes a quadrangular friction body supporting element or a U-shaped friction body supporting element or a frame-shaped friction body supporting element or a friction body supporting element of the impact power box or a triangular friction body supporting element or an oval friction body supporting element or a polygonal friction body supporting element or a deformed

friction body supporting element or a raceway friction body supporting element or a pit friction body supporting element or a friction body supporting element of the reciprocating stroke segment or a friction body supporting element of the holder or a friction body supporting element of the circular raceway or a groove-shaped friction body supporting element or a transverse H-shaped friction body supporting element or a friction body supporting element of the spline sleeve or a cambered friction body supporting element or a V-shaped friction body supporting element or an inverted V-shaped friction body supporting element or a plate-shaped friction body supporting element or a cylindrical friction body supporting element or a multi-prismatic key friction body supporting element and the like, and the guide friction body supporting element and the power supporting element or the guide friction body supporting element and the guide supporting element and the like are separated or separately connected or integrated.

The guide impact guide element includes a quadrangular impact guide element or a U-shaped impact guide element or a frame-shaped impact guide element or a V-shaped impact guide element or a triangular impact guide element or an oval impact guide element or a polygonal impact guide element or a deformed impact guide element or a raceway impact guide element or a pit impact guide element or an impact guide element of the reciprocating stroke segment or an impact guide element of the holder or an impact guide element of the circular raceway or a groove-shaped impact guide element or a transverse H-shaped impact guide element or an impact guide element of the spline sleeve or a cambered impact guide element or an inverted V-shaped impact guide element or a plate-shaped impact guide element or a cylindrical impact guide element or a multi-prismatic key impact guide element and the like, and the guide impact guide element and the impact guide element or the guide impact guide element

and the power impact element and the like are separated or separately connected or integrated.

The rolling body includes a spherical rolling body or an oval rolling body or a dumb bell shaped rolling body or a cylindrical rolling body or a conical rolling body or a circular ring-shaped rolling body or a roller rolling body or a platform-shaped column rolling body or a platform-shaped ball rolling body or a platform-shaped drum rolling body or a groove-shaped drum rolling body or a groove-shaped column rolling body or a groove-shaped ball rolling body or a groove-shaped roller rolling body or a groove-shaped oval rolling body or a rolling body with a shaft or a rolling body with a hole or a multi-prismatic key rolling body or a multi-prismatic sleeve rolling body or a rolling drum shaped rolling body or a rolling ball rolling body or a rolling needle rolling body or roller rolling body or a linear bearing or a waist drum wheel rolling body, and the like, and the rolling body and the guide rolling body and the like are separated or separately connected or integrated.

The shape of the impact guide element and/or the friction body supporting element is in close buckling with the shape of the friction body and the like to form the guide limiting structure, or the shape of the power impact element and/or the power supporting element is in close buckling with the shape of the friction body and the like to form the power limiting structure, the limiting structure is used for controlling the motion direction of the impact guide element or the power impact element and the like, and/or preventing the rotation of the impact guide element or the power impact element and the like, and the guide limiting structure and the power limiting structure and the like are separated or separately connected or integrated.

The impact guide element includes a raceway impact guide element or a pit impact guide element or a belt frame impact guide element or a circular raceway impact guide element or a stroke segment impact guide element or a limiting impact guide

element or a cylindrical impact guide element or a U-shaped impact guide element or a V-shaped impact guide element or a polygonal impact guide element or a frame-shaped impact guide element or a deformed impact guide element or an E-shaped impact guide element, and the like.

The friction body supporting element includes a raceway friction body supporting element or a pit friction body supporting element or a belt frame friction body supporting element or a circular raceway friction body supporting element or a stroke segment friction body supporting element or a limiting friction body supporting element or a cylindrical friction body supporting element or a U-shaped friction body supporting element or V-shaped friction body supporting element or a polygonal friction body supporting element or a frame-shaped friction body supporting element or a friction body supporting element of the impact power box or a deformed friction body supporting element, and the like.

The power impact element includes a raceway power impact element or a pit power impact element or a belt frame power impact element or a circular raceway power impact element or a stroke segment power impact element or a limiting power impact element or a cylindrical power impact element or a U-shaped power impact element or a frame-shaped power impact element or a deformed power impact element or an E-shaped power impact element or a polygonal power impact element, and the like.

The power supporting element includes a raceway power supporting element or a pit power supporting element or a belt frame power supporting element or a circular raceway power supporting element or a stroke segment power supporting element or a limiting power supporting element or a cylindrical power supporting element or a U-shaped power supporting element or an E-shaped power supporting element or a polygonal power supporting element or a power supporting element of the impact

power box or a frame-shaped power supporting element or a deformed power supporting element, and the like.

The friction body ring impact guide element is arranged or arranged at one side of the impact guide element or on more than two side parts of the impact guide element, or a friction body ring power impact element is arranged or arranged at one side of the power impact element or on more than one side part of the power impact element, and the power impact element includes a piston or a cylinder rod or a piston rod or a guide rod.

The circular raceway and the like is arranged on the impact guide element or the guide rolling body supporting element, the circular raceway and the impact guide element or the guide rolling body supporting element and the like are separately connected or are integrated, the impact guide element is arranged in the guide rolling body supporting element or at the outside of the guide rolling body supporting element, the guide rolling body is arranged in the circular raceway, the guide rolling body exposed from the circular raceway is in contact with the surface of the guide rolling body supporting element or the surface of the impact guide element, the main body of the impact guide element is not in contact with the surface of the guide rolling body supporting element, and the guide rolling body is used for supporting the impact guide element and the guide rolling body supporting element to relatively reciprocate by means of rolling friction.

The circular supporting segment and the circular segment of the circular raceway are arranged along the surface of the impact guide element or the guide rolling body supporting element, the guide rolling body in the circular supporting segment supports the rolling friction of the guide rolling body supporting element and the impact guide element, and the guide rolling body in the circular segment does not support the

rolling friction of the impact guide element and the guide rolling body supporting element.

The circular raceway and the guide supporting element or the impact guide element or the power supporting element or the power impact element and the like are connected or integrated.

The circular raceway includes a pressure bearing circular raceway, a pressure-free circular raceway and the like, wherein the pressure-free circular raceway and the power supporting element or the power impact element or the guide rolling body supporting element or the impact guide element and the like are separately arranged, and the pressure-free circular raceway is detachable, thereby being conductive to convenient observation, maintenance and change of the power rolling body.

The impact guide element or the guide supporting element or the power impact element or the power supporting element and the like is made from a light material, and the light material includes an aluminum alloy or high-strength plastic or ceramic or a titanium alloy or carbon fiber or light steel or a composite material, and the like.

The guide supporting element is arranged at more than two end parts of the power supporting element to form more than two guide supporting points, the more than two end parts include more than two end parts of the main body of the guide supporting element or the spatial positions of more than two end parts excluding the main body of the guide supporting element, the more than two guide supporting points are used for supporting the lifting force of the impact head and ensuring close fit of the friction body, the impact guide element and the friction body supporting element and the like so as to form a multipoint impact head supporting structure, the multipoint impact head supporting structure is used for supporting the impact head at multiple points to correct the impact direction of the impact head, in order to widen the correction width of the impact head to the maximum, enlarge the correction force of the impact head,

control the impact direction of the impact head to the maximum, prevent the damage to the impact driving mechanism due to an impact break-off force and/or a counterforce and prolong the service life of the equipment.

More than two columns of friction bodies are arranged on the surrounding of the impact guide element or the power impact element, the more than two columns of friction bodies bear the gravity load of the impact guide element or the power impact element, at least more than one friction body in a column of friction bodies is used for supporting the impact guide element or the power impact element for reciprocating impact, and the concentrated damage to the friction bodies or the friction body supporting element resulting from that only a column of friction bodies bears the gravity load of the impact guide element or the power impact element is avoided.

The guide mechanism includes an impact guide element and the like, wherein the impact guide element includes an upper impact guide element, a lower impact guide element and the like or a left impact guide element, a right impact guide element and the like, the impact driving mechanism includes a crank impact driving mechanism and the like, the crank impact driving mechanism includes a power impact element and the like, the power impact element is arranged between the upper impact guide element and the lower impact guide element or between the left impact guide element and the right impact guide element, and the upper impact guide element or the lower impact guide element or the left impact guide element or the right impact guide element and the like forms the multipoint impact head supporting structure.

The contact surface and the like of the friction body and the friction body supporting element and/or the impact guide element is in close buckling, the contact surface of the friction body and the friction body supporting element and/or the impact guide element and the like is as large as possible, in order to prevent overlarge local stress of the friction body, reduce the concentration of the local friction of the friction body on

the friction body supporting element and/or the impact guide element and the like and enlarge the correction degree of the impact guide element, the contract surface and the like of the friction body supporting element and/or the impact guide element and the friction body are in close buckling to limit the motion space and/or position of the friction body.

The friction body is arranged between the guide supporting element and the impact guide element or between the power supporting element and the power impact element, the friction body, the impact guide element and the friction body supporting element and the like are in close fit to support the impact head to impact at multiple points by means of rolling friction or suspension friction, the impact guide element is actually extension deformation of the power impact element, due to the extension deformation of the power impact element, the correction width of the impact head is widened to the maximum, the correction force of the impact head is enlarged, the impact head is controlled to the maximum and the damage to the crank impact driving mechanism due to the impact break-off force and/or the counterforce is avoided.

The impact guide element is arranged on the friction body supporting element, the impact guide element or the friction body supporting element includes a liquid suspension body or an air suspension body and the like, or the power impact element or the power supporting element includes a liquid suspension body or an air suspension body and the like, or the impact guide element and the friction body supporting element include magnetic suspension bodies and the like, or the power impact element and the power supporting element include magnetic suspension bodies and the like, the magnetic suspension bodies include an electromagnetic suspension body or a permanent magnet suspension body and the like, the suspension body is used for forming suspension friction between the impact guide element and the friction body supporting element or between the power impact element and the like

and the power supporting element, the suspension friction is used for reducing the friction resistance and/or friction damage between the impact guide element and the friction body supporting element or between the power impact element and the power supporting element, and prolonging the service life of the impact driving mechanism or the guide mechanism.

The air suspension body includes an air source, a control valve, a conveying pipeline, an air cavity and the like, wherein the air cavity is arranged on the guide mechanism or the impact driving mechanism, the air suspension body is formed between the guide supporting element and the impact guide element, or the air suspension body is formed between the power supporting element and the power impact element, and the air suspension body is used for supporting the impact guide element to reciprocate through suspension friction or the air suspension body is used for supporting the power impact element to reciprocate through suspension friction.

The liquid suspension body includes a liquid medium source, a control valve, a conveying pipeline, a liquid cavity and the like, wherein the liquid cavity is arranged on the guide mechanism or the impact driving mechanism, the liquid suspension body is formed between the guide supporting element and the impact guide element, or the liquid suspension body is formed between the power supporting element and the power impact element, and the liquid suspension body is used for supporting the impact guide element to reciprocate through suspension friction or the liquid suspension body is used for supporting the power impact element to reciprocate through suspension friction.

The magnetic suspension body includes an electromagnetic suspension body or a permanent magnet suspension body and the like, wherein the electromagnetic suspension body includes an electromagnet and the like, the permanent magnet suspension body includes a permanent magnet and the like, the electromagnet or the

permanent magnet and the like is arranged on the impact guide element and the guide supporting element or on the power impact element and the power supporting element. The impact guide element and the guide supporting element or the power impact element and the power supporting element and the like include N pole permanent magnets, or the impact guide element and the guide supporting element or the power impact element and the power supporting element and the like include S pole permanent magnets, wherein the N pole permanent magnets and the N pole permanent magnets or the S pole permanent magnets and the S pole permanent magnets repel to each other due to the same polarity to form the magnetic suspension body, the power impact element is used for driving the impact guide element to reciprocate, the magnetic suspension body is used for supporting the impact guide element and the guide supporting element to relatively reciprocate through suspension friction or the magnetic suspension body is used for supporting the power impact element and the power supporting element to relatively reciprocate through suspension friction.

The impact guide element and the guide supporting element or the power impact element and the power supporting element and the like include negative pole electromagnets, or the impact guide element and the guide supporting element or the power impact element and the power supporting element and the like include positive pole electromagnets, wherein the negative pole electromagnets and the negative pole electromagnets or the positive pole electromagnets and the positive pole electromagnets repel to each other due to the same polarity to form the magnetic suspension body, the power impact element is used for driving the impact guide element to reciprocate, the magnetic suspension body is used for supporting the impact guide element and the guide supporting element to relatively reciprocate through suspension friction or the magnetic suspension body is used for supporting

the power impact element and the power supporting element to relatively reciprocate through suspension friction.

A break-off prevention mechanism and the like is arranged at one end or two ends of the power impact element.

The break-off prevention mechanism is arranged to be a rotary break-off prevention mechanism or a separated break-off prevention mechanism or a buffer break-off prevention mechanism and the like.

The rotary structure of the break-off prevention mechanism is arranged to be a joint bearing or a steering connector or a rzeppa universal joint or a cross-shaped universal joint or a bulb catching groove type or a cambered catching groove type and the like, and the rotary structure of the break-off prevention mechanism is stressed to rotate or a separate structure separately isolates the impact counteraction break-off force.

The break-off prevention mechanism includes a cambered catching groove type or a rotary connector and the like, wherein the cambered catching groove type includes a cambered convex head and a groove movably buckled with the cambered convex head, and the like, the groove and the power impact element and the like are separately connected or are integrated, the cambered convex head movably buckled with the groove and the impact head and the like are separately connected or are integrated, the rotary connector includes a rotary connector of a flexible universal joint or a rotary connector of a universal joint bearing or a multiple degrees of freedom platform type rotary connector or a rotary connector of a universal coupling and the like, the rotary connector of the flexible universal joint includes an elastic element, a universal joint connector and the like, when the universal joint is stressed, the universal joint connector relatively moves by means of the adjustment of the elastic element, the rotary connector of the universal joint bearing includes a universal joint seat, a rotary connector and the like, the rotary connector is fixed on the

universal joint seat, when the universal joint bearing is stressed, relative motion is adjusted by the universal joint seat, the multiple degrees of freedom platform type rotary connector is composed of a movable cylinder, an upper universal hinge, a lower universal hinge, an upper platform, a lower platform and the like, when the upper platform and the lower platform are stressed, the motion with multiple degrees of freedom of the upper platform in the space is achieved through the telescopic motion of the movable cylinder, the rotary connector of the universal coupling is a cross shaft type rotary connector, the cross shaft type rotary connector includes a cross shaft, a cross universal joint fork and the like, and the cross universal joint fork is connected by the cross shaft to realize relative motion.

The break-off prevention mechanism includes a rotary structure and the like, wherein the rotary structure includes a bulb catching groove type and the like, the bulb catching groove type includes a bulb and a bulb groove movably buckled with the bulb, and the like, the bulb and the power impact element and the like are separately connected or are integrated, the bulb groove movably buckled with the bulb and the impact head and the like are separately connected or are integrated, the power impact element and the impact head and the like are connected or separated, the power impact element is used for driving the impact head to impact, an impact break-off force is applied to the break-off prevention mechanism, and the rotary structure of the break-off prevention mechanism is stressed to rotate.

A buffer mechanism is arranged on the lifting mechanism or on the reciprocating impact part or on the machine body or between the lifting mechanism and the reciprocating impact part or between the lifting mechanism and the machine body, and the like.

The buffer mechanism includes a structure buffer mechanism or a power buffer mechanism and the like.

The structure buffer mechanism includes a fixed supporting element, a buffer supporting element, a buffer element and the like.

The power buffer mechanism includes a slide stroke spline shaft sleeve buffer device or a belt buffer device and the like.

The lifting mechanism or the reciprocating impact part or the rack and the like includes a structure buffer mechanism, wherein the structure buffer mechanism includes a fixed supporting element and a buffer supporting element and the like, when the lifting mechanism is provided with the fixed supporting element, the reciprocating impact part is correspondingly provided with the buffer supporting element, or when the rack is provided with the fixed supporting element, the lifting mechanism is correspondingly provided with the buffer supporting element, or the rack is provided with the buffer supporting element, namely, the fixed supporting element is arranged on the reciprocating impact part, a buffer element is arranged between the fixed supporting element and the buffer supporting element or between the lifting mechanism and the rack or between the lifting mechanism and the reciprocating impact part or between the rack and the reciprocating impact part, and the like, buffer guide elements are arranged on the fixed supporting element and the buffer supporting element or on the lifting mechanism and the rack or on the lifting mechanism and the reciprocating impact part or on the rack and the reciprocating impact part, the power impact element is used for driving the impact head to impact, when the impact counterforce is applied to the buffer supporting element and the fixed supporting element or to the lifting mechanism and the rack or to the lifting mechanism and the reciprocating impact part or to the rack and the reciprocating impact part, the buffer element deforms to absorb the impact counterforce, and the buffer guide elements are used for controlling the buffer direction to ensure that the

buffer is reciprocating liner buffer, so as to prevent the non-directional swing of the impact head during buffer.

The lifting mechanism or the reciprocating impact part or the rack and the like includes a structure buffer mechanism, wherein the structure buffer mechanism includes a fixed supporting element, a buffer supporting element and the like, or when the lifting mechanism is provided with the fixed supporting element, the reciprocating impact part is correspondingly provided with the buffer supporting element, or when the rack is provided with the fixed supporting element, the lifting mechanism is correspondingly provided with the buffer supporting element, or the rack is provided with the buffer supporting element, namely, the fixed supporting element is arranged on the reciprocating impact part, when the fixed supporting element includes the buffer guide element, the buffer supporting element includes a buffer guide sleeve, or when the buffer supporting element includes the buffer guide element, the fixed supporting element includes the buffer guide sleeve, when a guide lug boss or a guide groove is arranged on the buffer guide element, a guide groove or a guide lug boss buckled with the guide lug boss or the guide groove is arranged on the buffer guide sleeve, buffer elements are arranged at the two sides of the projections of the guide lug boss, the buffer guide element is used for supporting the buffer guide sleeve to linearly slide along the buffer guide element in a reciprocating manner or the buffer guide sleeve is used for supporting the buffer guide element to linearly slide along the buffer guide sleeve in a reciprocating manner, the buffer guide element, the buffer elements and the buffer guide sleeve and the like form a bidirectional buffer mechanism, the power impact element is used for driving the impact head to impact, the impact counteraction break-off force is applied to the bidirectional buffer mechanism, the bidirectional buffer mechanism absorbs the impact counterforce, the power impact element is used for driving the impact head to reciprocate, the buffer

elements at the front part of the guide lug boss and the rear of the guide lug boss absorb the impact counterforce of the impact head, the buffer guide element, the buffer guide sleeve, the buffer elements and the like cooperate to absorb the impact counterforce of the impact head and control the buffer direction as reciprocating linear buffer, and the buffer guide sleeve is leant against the buffer guide element to linearly slide relatively, in order to prevent the non-directional swing of the lifting mechanism and/or the impact driving mechanism, the guide mechanism and the like and stabilize the impact direction of the impact head.

The fixed supporting element, the buffer supporting element and the like includes a retraction prevention structure, or the buffer guide element, the buffer guide sleeve and the like includes a retraction prevention structure, wherein the retraction prevention structure includes a retraction prevention element and the like, the retraction prevention element is used for preventing the fixed supporting element and the buffer supporting element and the like from dropping off during relative reciprocating slide, or the retraction prevention element is used for preventing the buffer guide element and the buffer guide sleeve and the like from dropping off during relative reciprocating slide, the retraction prevention element and the fixed supporting element and the like are separately arranged or connected or integrated, or the retraction prevention element and the buffer supporting element and the like are separately arranged or connected or integrated, or the retraction prevention element and the buffer guide element and the like are separately arranged or connected or integrated, or the retraction prevention element and the buffer guide sleeve and the like are separately arranged or connected or integrated.

The reciprocating impact part or the lifting mechanism or the rack includes a rotary power source element, a rotary impact transmission element and the like, or when the rack includes the rotary power source element, the lifting mechanism includes the

rotary impact transmission element, or when the lifting mechanism includes the rotary power source element, the reciprocating impact part includes the rotary impact transmission element, or when the rack includes the rotary power source element, the reciprocating impact part includes the rotary impact transmission element, the rotary power source element includes a motor or a hydraulic motor or a pneumatic motor and the like, the lifting mechanism or the reciprocating impact part or the rack and the like includes a structure buffer mechanism, the structure buffer mechanism includes a fixed supporting element, a buffer supporting element and the like, or when the lifting mechanism is provided with the fixed supporting element, the reciprocating impact part is correspondingly provided with the buffer supporting element, or when the rack is provided with the fixed supporting element, the lifting mechanism is correspondingly provided with the buffer supporting element, or when the rack is provided with the fixed supporting element, the reciprocating impact part is correspondingly provided with the buffer supporting element, a buffer element is arranged between the rack and the lifting mechanism or between the fixed supporting element and the buffer supporting element or between the lifting mechanism and the reciprocating impact part or between the rack and the reciprocating impact part, a power buffer mechanism is arranged between the rotary power source element and the rotary impact transmission element or on the rotary impact transmission element, the power buffer mechanism includes a slide stroke spline shaft sleeve buffer device or a belt buffer device and the like, the slide stroke spline shaft sleeve buffer device includes a spline shaft and a spline sleeve and the like, a slide reciprocating stroke segment is arranged between the spline shaft and the spline sleeve, when being impacted, the slide reciprocating stroke segment slides in a reciprocating manner to absorb the impact counterforce, the belt buffer device includes a driving belt pulley, a driven belt pulley, a belt and the like, the driving belt pulley is arranged on the fixed

supporting element, the driving belt pulley is connected with the drive shaft of the motor or the hydraulic motor or the pneumatic motor and the like, the driven belt pulley is arranged on the buffer supporting element, the belt is arranged on the driving belt pulley and the driven belt pulley, the driven belt pulley is impacted to move together with the buffer supporting element, the belt absorbs the impact counterforce, the belt buffer device is used for preventing the damage to the motor or the hydraulic motor or the pneumatic motor and the like, the structure buffer mechanism further includes a buffer guide element, a buffer element is arranged between the rack and the reciprocating impact part or between the fixed supporting element and the buffer supporting element or between the lifting mechanism and the reciprocating impact part or between the rack and the lifting mechanism, the buffer guide element is arranged on the rack and the reciprocating impact part or on the fixed supporting element and the buffer supporting element or on the lifting mechanism and the reciprocating impact part or on the rack and the lifting mechanism, the structure buffer mechanism is used for controlling the buffer structure by use of the buffer guide element when absorbing the impact counterforce through the buffer element, the structure buffer mechanism is matched with the slide stroke spline shaft sleeve buffer device or the belt buffer device to absorb and buffer the impact counterforce of the impact head and guide the buffer direction, in order to prevent the rotary power source element or the lifting mechanism or the rack from being damaged by non-directional swing during buffer and ensure that the impact direction of the impact head faces to a material to be dug.

The reciprocating impact part includes a buffer mechanism and the like, wherein the buffer mechanism includes a rotary power buffer mechanism and the like, the rotary power buffer mechanism includes a slide stroke spline shaft sleeve buffer device and the like, the slide stroke spline shaft sleeve buffer device includes a spline shaft, a

spline sleeve and the like, a slide reciprocating stroke segment is arranged between the spline shaft and the spline sleeve, when being impacted, the slide reciprocating stroke segment slides in a reciprocating manner to absorb the impact counterforce, the spline shaft is in slide connection with the spline sleeve to buffer in a reciprocating manner, the impact driving mechanism includes a rotary power source element and a rotary impact transmission element, the rotary power source element includes a motor or a hydraulic motor or a pneumatic motor and the like, the motor or the hydraulic motor or the pneumatic motor and the like includes a drive shaft, the spline sleeve or the spline shaft and the drive shaft and the like are connected or integrated, and the spline shaft or the spline sleeve and the rotary impact transmission element and the like are connected or integrated.

The reciprocating impact part includes a buffer mechanism and the like, wherein the buffer mechanism includes a rotary power buffer mechanism and the like, the rotary power buffer mechanism includes a belt buffer device and the like, the rocker arm includes a rocker arm buffer element or a rocker arm fixing element and the like, the buffer mechanism further includes a buffer element and the like, the buffer element is arranged between the rocker arm buffer element and the rocker arm fixing element, the belt buffer device includes a driving belt pulley, a belt, a driven belt pulley and the like, the driving belt pulley is fixed on the rocker arm fixing element, the driving belt pulley is connected with the drive shaft of the motor or the hydraulic motor or the pneumatic motor and the like, the driven belt pulley is arranged on the rocker arm buffer element, the belt is arranged on the driving belt pulley and the driven belt pulley, the driven belt pulley is impacted to buffer together with the rocker arm buffer element, the belt absorbs the impact counterforce to prevent the motor or the hydraulic motor or the pneumatic motor and the like from being damaged, and the belt buffer device includes a tensioner and the like.

The tensioner is arranged at the inner side or the outer side of the belt, the tensioner includes a tensioning wheel, a tensioning wheel frame, a tensioning spring, a tensioning adjustment rod, a tensioning seat and the like, the tensioning wheel is arranged on the tensioning wheel frame, a guide hole is arranged on the tensioning wheel frame, a polish rod is arranged at one end of the tensioning adjustment rod, a lead screw is arranged at the other end of the tensioning adjustment rod, a blocking shoulder in the middle of the tensioning adjustment rod, the tensioning wheel frame is matched with the polish rod end of the tensioning adjustment rod through the guide hole, the lead screw end of the tensioning adjustment rod is in threaded connection with the tensioning seat, the tensioning spring is arranged between the tensioning wheel frame and the blocking shoulder, the tensioning wheel presses the belt through the elastic force of the spring, and a tensioning force is adjusted by the screwing length of the lead screw and the tensioning seat.

The belt buffer device includes a tensioner, wherein the tensioner includes a sliding seat, a tensioning spring and the like, the driving belt pulley and the motor or the hydraulic motor or the pneumatic motor and the like are installed on the sliding seat, the sliding seat is in slide fit with the rocker arm fixing element, one end of the tensioning spring is connected with the sliding seat, the other end of the tensioning spring is connected with the rocker arm fixing element, and a certain action force is applied to the sliding seat through the spring to tension the belt.

The lifting mechanism includes a vertical lifting mechanism and the like, wherein the vertical lifting mechanism is used for driving the reciprocating impact part to vertically move up and down, the vertical lifting mechanism includes a lifting platform, a lifting platform seating seat, a vertical lifting actuator and the like, the vertical lifting actuator includes a rope and a rope winder or a gear rack or a screw rod or coupling opening and closing device or a chain wheel and a chain or a hydraulic

element or a pneumatic element and the like, the vertical lifting actuator is used for driving the lifting platform to vertically lift, the vertical lifting mechanism further includes a positioning and locking device and the like, the positioning and locking device includes a latch pin or a spring bolt or a cushion block or a guy rope or a hydraulic cylinder or a cylinder and the like, and the positioning and locking device is used for positioning and locking the lifting platform.

The machine body includes a rotary disk and the like, wherein the reciprocating impact part is arranged on the rotary disk, and the rotary disk is used for driving the reciprocating impact part to rotate at the front part of the machine body.

The machine body includes a rotary disk and the like, the lifting mechanism includes a rocker arm lifting oil cylinder and the like, the rocker arm lifting oil cylinder is used for driving the rocker arm to move up and down, the rotary disk is used for driving the rocker arm to move left and right, and the rotary disk is matched with the rocker arm lifting oil cylinder to adjust the impact head to impact a material at multiple positions and in multiple directions.

The lifting mechanism includes a translation lifting mechanism and the like, wherein the translation lifting mechanism is arranged at the front part of the machine body, and the translation lifting mechanism is used for driving the reciprocating impact part to translate relative to the machine body.

The reciprocating impact part includes an impact power box or a supporting frame and the like, the impact driving mechanism includes a crank impact driving mechanism and the like, the crank impact driving mechanism includes a multi-throw crank shaft multi-rod impact mechanism, a power output component and the like, the multi-throw crank shaft multi-rod impact mechanism includes a multi-throw crank shaft, a connecting rod and the like, the multi-throw crank shaft includes a power concentric shaft segment, a connecting handle, an eccentric shaft and the like, the

concentric shaft segment, the connecting handle and the eccentric shaft and the like are separated or connected or integrated, one end of the power concentric shaft segment of the multi-throw crank shaft is connected with the power output component of the crank impact driving mechanism, more than two connecting handles, eccentric shafts and the like are arranged at the other end of the power concentric shaft segment, the power concentric shaft segment of the multi-throw crank shaft is installed on the impact power box or the supporting frame, the eccentric shaft of the multi-throw crank shaft is hinged with one end of the connecting rod, the other end of the connecting rod and the impact head and the like are connected or separated, and one eccentric shaft is used for driving more than one connecting rod to impact in a reciprocating manner.

One eccentric shaft or more than two eccentric shafts are arranged, the more than two eccentric shafts are arranged at intervals along the radial direction of the power output component to form angle difference, the impact driving mechanism includes a power output component, and the power concentric shaft segment of the multi-throw crank shaft and the power output component and the like are separated or connected or integrated.

The multi-throw crank shaft is provided with a liquid channel, and the liquid channel is arranged on the power concentric shaft segment, the connecting handle and/or the eccentric shaft.

The impact driving mechanism is a crank impact driving mechanism, the crank impact driving mechanism includes a power source element, a cam shaft, a cam and the like, the cam shaft and the cam and the like are separately connected or are integrated, the power source element is used for driving the cam shaft to rotate, and the cam installed on the cam shaft is used for driving the impact head to impact in a reciprocating manner.

The impact driving mechanism includes a crank impact driving mechanism and the like, wherein the crank impact driving mechanism includes a power source element, an eccentric shaft, a power impact element and the like, the eccentric shaft is hinged with one end of the power impact element, the power impact element is used for driving the eccentric shaft to rotate, and the eccentric shaft is used for driving the power impact element to impact in a reciprocating manner.

The impact driving mechanism includes a crank impact driving mechanism and the like, wherein the crank impact driving mechanism includes more than two power source elements and the like, and the more than two power source elements and the impact head and the like are connected or separated or integrated.

The reciprocating impact part includes an impact power box and the like, the impact driving mechanism includes a rotary power source element and the like, the rotary power source element includes a transmission component and the like, the transmission component includes a variable speed transmission component and the like, the variable speed transmission component is a gear transmission component, when multiple gear transmission components are arranged, a part of the gear transmission components is arranged in the impact power box, and the other part is arranged in the impact power box or at the outside of the impact power box.

The reciprocating impact part includes an impact power box and the like, the impact driving mechanism includes a rotary power source element and the like, the rotary power source element includes a transmission component and the like, the transmission component includes a variable speed transmission component and the like, and the variable speed transmission component includes a gear transmission component or a combination of the gear transmission component and a belt transmission component.

The reciprocating impact part includes one or more guide mechanism and the like.

The guide mechanism is composed of more than two guide mechanisms, the impact driving mechanism is used for driving more than two power impact elements to cooperate with the more than two guide mechanisms, and the more than two power impact elements are used for driving more than two impact heads.

The guide mechanism is composed of more than two guide mechanisms, and the impact driving mechanism is used for driving one power impact element to cooperate with the more than two guide mechanisms.

The impact guide element is arranged at one side or the front part or more than two side parts or the surrounding and the like of the impact driving mechanism.

The shape and/or arrangement and the like of the inner-layer material impact teeth is conductive to blanking the inner-layer material of a coal bed to be dug or a rock stratum or cement concrete or bituminous concrete or hardened mudstone and the like, the shape and/or arrangement and the like of the outer-layer material impact teeth is conductive to enabling the material blanked by the inner-layer material impact teeth to flow out from the gaps of the outer-layer material impact teeth, the outer-layer material impact teeth, the inner-layer material impact teeth and the like are arranged side by side to form a multilayer impact head, and the multilayer impact head is used for increasing the coal digging width and improving the coal digging efficiency.

The impact head includes a step tooth punching and cutting device and the like, wherein the step tooth punching and cutting device includes impact teeth and the like, the impact teeth are multilayer impact teeth, tooth heads are arranged on the impact teeth, the tooth heads and the impact teeth are separately connected or are integrated, the distances between the tooth heads of the two adjacent layers of impact teeth are different, the coal bed to be dug or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone and the like is impacted to a step shape, more than two relatively free surfaces are generated on each step layer of the step-

shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone and the like, the pressure stress and/or structural strength of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone and the like is greatly reduced compared with that of the original planar coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone and the like, after the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone and the like is impacted to the step shape, when each layer of the impact teeth is used for digging again, the two relatively free surfaces of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone and the like are reasonably utilized to blank the material, so as to greatly reduce the impact resistance, avoid overlarge lumps of the material blanked by the impact head, reduce the power consumption and improve the impact efficiency.

The outer-layer material impact tooth seat includes a discharge hole and the like, the outer-layer material impact teeth are arranged on the outer-layer material impact tooth seat in a manner of facing to a surface to be dug, the shape or arrangement of the outer-layer material impact teeth is conducive to blanking the outer-layer material of a layer to be dug, the inner-layer material impact teeth and the inner-layer material impact tooth frame and the like are separately connected or are integrated, the shape or arrangement of the inner-layer material impact teeth is conducive to blanking the inner-layer material of the layer to be dug, the discharge hole is conducive to enabling the material blanked by the inner-layer material impact teeth to flow out, and multiple layers of material impact mechanisms cooperate to achieve simultaneous impact blanking and discharging.

The reciprocating impact part includes an impact head and the like, wherein the impact head includes an impact tooth frame, impact teeth and the like, impact guide

elements are symmetrically or asymmetrically arranged on the impact tooth frame, and the impact teeth and the impact tooth frame and the like are separately connected or are integrated.

The reciprocating impact part includes an impact head and the like, wherein the impact head includes an impact tooth frame, impact teeth and the like, the impact teeth are multilayer impact teeth, the impact teeth are provided with tooth heads, the impact teeth and the tooth heads and the like are separately connected or are integrated, and the tooth heads are arranged to be a spherical impact head or a conical impact head or a hemispherical impact head or a shovel-shaped impact head or a trapezoidal impact head or a triangular impact head or a step-shaped impact head, and the like.

The impact tooth frame includes a curved plate or a trapezoidal frame or a semicircular frame or a triangular frame or a flat plate frame or a frame-shaped frame or a V-shaped frame and the like.

The impact head includes impact teeth and the like, wherein the impact teeth include top face cleaning teeth or bottom surface cleaning teeth or side face cleaning teeth and the like.

The impact head includes an impact tooth frame, impact teeth and the like, wherein the top face cleaning teeth, the bottom surface cleaning teeth, the side face cleaning teeth and the like are arranged on the same impact tooth frame.

The reciprocating impact part includes an impact head and the like, wherein the impact head includes shovel teeth and the like, the impact head is composed of more than one shovel tooth, the shovel teeth include long shovel teeth or short shovel teeth and the like, and cutting blades are arranged at the side parts of the shovel teeth or no cutting blade is arranged.

The reciprocating impact part includes an impact head and the like, wherein the impact head includes shovel teeth and the like, and the shovel teeth include conical teeth or wedge teeth or axe teeth or cutter teeth or chisel teeth and the like.

The reciprocating impact part includes an impact head and the like, wherein the impact head includes shovel teeth, a fixing component and the like, the fixing component is arranged on the impact tooth frame, the shovel teeth and the fixing component are integrated or movably connected, and the movable connecting manner is inserting type or catching groove type or step type or spherical surface type or pin tooth type or bolt fixing type, and the like.

The impact head is used for simultaneously finishing coal blanking and surface cleaning or impact coal blanking during once reciprocating impact.

The impact guide elements are arranged at the two sides of the impact driving mechanism, the impact head is arranged at one end of each impact guide element, and an identical or a different impact head is arranged at the other end thereof, and different impact heads include impact heads with different shapes or different weights, and the like.

The reciprocating impact part includes an impact head and the like, wherein the impact head is installed at the front part of the machine body or one side of the machine body or more than two side parts of the front part.

The reciprocating impact part includes an impact head and the like, wherein an angle adjustor is arranged between the impact head and the rocker arm or between the impact head and the machine body, and the angle adjustor is used for adjusting the impact direction of the impact head.

The reciprocating impact part includes an impact power box or a supporting frame and the like, wherein the impact power box or the supporting frame and the like includes a lubricating system.

The reciprocating impact part includes an impact power box or a supporting frame and the like, wherein the impact power box is entirely sealed or partially sealed, the impact power box or the supporting frame includes a sealing element and the like, the sealing element is arranged at the movable connecting position of the impact driving mechanism or the guide mechanism and the impact power box and the like, or the sealing element is arranged at the movable connecting position of the impact driving mechanism or the guide mechanism and the supporting frame and the like.

The guide mechanism includes an impact guide element, a friction body supporting element and the like, the impact driving mechanism includes a power impact element, a power supporting element and the like, and a sealing element and the like is arranged between the impact guide element and the friction body supporting element or between the power impact element and the power supporting element.

The sealing element includes a sealing cavity or a sealing piece or a sealing plug or a sealing pad or an O-shaped ring or a sliding ring or a retainer ring or a supporting ring or a sealing ring or a starlike ring or a pressing ring or a V-shaped body or a U-shaped body or a frame-shaped ring or a groove-shaped element or a pressure spring or an opening sealing ring or a sealing strip or a sealing plate or a sealing block or a hair brush sealing element or a trash removal sealing element or a lip-shaped sealing element, and the like. The sealing element is made from a rubber material or a polyurethane material or a nylon material or a plastic material or a metallic material or a composite material, and the like.

The guide mechanism includes an impact guide element and the like, wherein an impact element protection cover is arranged at the joint site of the power impact element and the impact head, or a guide element protection cover is arranged at the joint site of the impact guide element and the impact head, the power impact element and the impact head and the like are connected or separated or integrated, and the

impact guide element and the impact head and the like are connected or separated or integrated.

The guide mechanism includes an impact guide element and the like, wherein the impact guide element and the power impact element are separated, the power impact element and the impact head are separated, the power impact element is used for driving the impact head to impact, the impact head is arranged on the impact guide element, the machine body is arranged on the walking part, the walking part is used for driving the machine body to walk, and the machine body walks to baffle the impact head through the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone and the like.

The guide mechanism includes a friction body supporting element, an impact guide element and the like, wherein the impact guide element is arranged on the friction body supporting element, the friction body supporting element is arranged on the rack or the lifting mechanism, the power impact element includes a power impact cylinder and the like, the impact guide element and the power impact cylinder are separated, the power impact cylinder and the impact head are separated, the impact head is arranged on the impact guide element, the machine body is arranged on the walking part, the walking part is used for driving the machine body to walk, the machine body walks to baffle the impact head through the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone and the like, and the power impact cylinder is used for driving the impact head to impact.

The buffer reciprocating element or the buffer supporting element or the guide rolling body or the friction body supporting element or the impact guide element or the power impact element or the holder and the like is made from a high-strength wear-resistant material, and the high-strength wear-resistant material is a hard alloy or wear-resistant plastic or wear-resistant steel or wear-resistant rubber or wear-resistant

ceramic or a self-lubricating wear-resistant material or a composite wear-resistant material, and the like.

The machine body includes a control device, a cable towing device, a spray device, a water spray device or a cooling device and the like.

The rack or the lifting mechanism and the like includes a crushing device or a material guider and the like. The machine body includes a shovel plate and the like.

The shovel plate includes a star wheel pusher dog or a crab claw or a pusher dog or a rolling rake and the like.

The machine body includes a conveyor and the like.

The conveyor is arranged on the machine body and is used for conveying the material dug by the reciprocating impact part to the rear of the machine body, and the conveyor includes a scraper conveyer, a belt conveyor, a shell belt conveyor and the like.

The holder includes a cylindrical holder or a plate type holder or a U-shaped holder or a V-shaped holder or a polygonal holder or a deformed holder or a triangular holder or a square holder or a chain link holder, and the like.

The guide mechanism includes a guide rolling body, a guide rolling body supporting element, an impact guide element and the like, wherein the guide rolling body is arranged between the guide rolling body supporting element and the impact guide element, the guide mechanism includes an outer sleeve, an inner body and the like, a raceway and the like is arranged on the outer sleeve or the inner body, the guide rolling body is arranged on the raceway and between the outer sleeve and the inner body, the outer sleeve, the inner body and the guide rolling body and the like are in close fit to drive the outer sleeve or the inner body to relatively reciprocate through the rolling friction of the guide rolling body, the impact direction of the outer sleeve or the inner body and the like is controlled by the rolling friction, and the impact head

and the reciprocating outer sleeve or the inner body and the like are integrated or connected.

The guide mechanism includes an outer sleeve, an inner body and the like, wherein the holder is arranged between the outer sleeve and the inner body, the guide rolling body is arranged on the holder and is arranged between the outer sleeve and the inner body, when the guide rolling body supporting element is the outer sleeve, the impact guide element is the inner body, the outer sleeve is used for supporting the guide rolling body and the inner body and the like, when the guide rolling body supporting element is the inner body, the impact guide element is the outer sleeve, the inner body is used for supporting the guide rolling body and the outer sleeve, the outer sleeve, the inner body and the guide rolling body and the like are in close fit to drive the outer sleeve or the inner body to relatively reciprocate through the rolling friction of the guide rolling body, and the impact direction of the outer sleeve or the inner body and the like is controlled by the rolling friction.

The reciprocating impact part includes a guide mechanism, an impact driving mechanism and the like, wherein the impact driving mechanism includes a crank impact driving mechanism and the like, the reciprocating impact part further includes an impact power box or a supporting frame and the like, the impact power box or the supporting frame and the like is used for supporting the guide mechanism, the impact driving mechanism includes a crank multiple-throw eccentric shaft mechanism, a power output component and the like, the crank multiple-throw eccentric shaft mechanism includes a multiple-throw crank shaft, a power impact element and the like, the multiple-throw crank shaft includes a power concentric shaft segment, a connecting handle, an eccentric shaft and the like, the power concentric shaft segment, the connecting handle and the eccentric shaft and the like are separately combined or are integrated, one end of the power concentric shaft segment of the multiple-throw

crank shaft is connected with the power output component and the like, more than two connecting handles, eccentric shafts and the like are arranged at the other end thereof, the more than two eccentric shafts are arranged at intervals along the radial direction of the power concentric shaft segment to form angle difference, the power concentric shaft segment of the multiple-throw crank shaft is installed on the impact power box or the supporting frame, the more than two eccentric shafts of the multiple-throw crank shaft are hinged with one ends of more than two power impact elements, impact heads are arranged at the other ends of the power impact elements, the break-off prevention mechanism is arranged between the power impact elements and the impact heads, the break-off prevention mechanism is of a separate structure or a rotary structure or a buffer structure and the like, the guide mechanism includes an outer sleeve, an inner body, a guide rolling body and the like, the inner body includes an upper element of the inner body, a lower element of the inner body and the like, the outer sleeve is a frame-shaped outer sleeve and the like, the frame-shaped outer sleeve includes an upper element of the frame-shaped outer sleeve, a lower element of the frame-shaped outer sleeve and the like, the upper element of the frame-shaped outer sleeve or the lower element of the frame-shaped outer sleeve includes a reciprocating stroke segment or a raceway and the like, the guide rolling body is arranged between the upper element of the inner body and the upper element of the frame-shaped outer sleeve and is arranged between the lower element of the inner body and the lower element of the frame-shaped outer sleeve, the frame-shaped outer sleeve, the inner body and/or the guide rolling body arranged on the reciprocating stroke segment or the raceway and the like are in close fit to enable the guide rolling body to support the frame-shaped outer sleeve to reciprocate through rolling friction and prevent the frame-shaped outer sleeve from rotating, the outer sleeve and the impact heads and the like are connected or integrated, the more than two power impact elements are

used for alternatively driving the impact heads to impact, the rotary structure of the break-off prevention mechanism is stressed to rotate or the separate structure separately isolates or the buffer structure buffers the impact counterforce break-off force, the outer sleeve, the inner body and the guide rolling body and the like are in close fit to correct the impact direction of the impact heads, and the power impact elements are not used for guiding the impact heads and are not broken off by the break-off force.

The reciprocating impact part includes a guide mechanism, an impact driving mechanism, an impact power box, an impact head and the like, wherein the impact power box is used for supporting the guide mechanism, the impact driving mechanism includes a crank impact driving mechanism and the like, the crank impact driving mechanism includes a power impact element and the like, the power impact element is arranged in the impact power box, the power impact element and the impact head and the like are connected or separated or integrated, the guide mechanism includes a guide rolling body supporting element, a guide rolling body, an impact guide element and the like, the guide rolling body includes a roller and the like, the roller is a waist drum wheel, waist drum wheel bearings are arranged at the two ends of the waist drum wheel, the waist drum wheel bearings are installed on the guide rolling body supporting element, the shape of the impact guide element is buckled with the cambered groove of the waist drum wheel, the impact guide element linearly reciprocates by leaning against the cambered groove, the impact guide element reciprocates under the support of the waist drum wheel, the power impact element is used for driving the impact head to impact, the buffer break-off prevention mechanism is arranged on the power impact element, the buffer break-off prevention mechanism isolates an impact counteraction break-off force through buffer, the guide rolling body supporting element and the impact guide element are in close fit with the

waist drum wheel to impact the tooth frame, correct the impact direction of the impact head through rolling friction and prevent the impact head from rotating, and the power impact element is not used for guiding the impact head and is not broken off by the break-off force.

The reciprocating impact part includes a guide mechanism, an impact driving mechanism and the like, wherein the impact driving mechanism includes a crank impact driving mechanism and the like, the crank impact driving mechanism includes a power impact element and the like, the power impact element includes a connecting rod and the like, the buffer break-off prevention mechanism is arranged on the connecting rod or between the connecting rod and the impact head, the guide mechanism includes a guide rolling body supporting element, an impact guide element and the like, the guide rolling body supporting element includes an upper element of the guide rolling body supporting element, a lower element of the guide rolling body supporting element and the like, the impact guide element is a U-shaped impact guide element, the U-shaped impact guide element includes an upper element of the impact guide element, a lower element of the impact guide element and the like, a roller is arranged between the upper element of the guide rolling body supporting element and the lower element of the guide rolling body supporting element, the roller is arranged between the upper element of the guide rolling body supporting element and the upper element of the impact guide element and is arranged between the lower element of the guide rolling body supporting element and the lower element of the impact guide element, the roller is in close fit with the U-shaped impact guide element, the guide rolling body supporting element and the like to enable the roller to support the U-shaped impact guide element to reciprocate through rolling friction, control the reciprocating direction of the U-shaped impact guide element and correct the impact direction of the impact head, the U-shaped impact guide element and the impact head

and the like are connected or separated or integrated, the power impact element is used for driving the impact head to impact, and the power impact element is not used for guiding the impact head and is not broken off by the break-off force.

The impact driving mechanism includes a crank impact driving mechanism and the like, wherein the crank impact driving mechanism includes a power impact element and the like, the guide mechanism includes a linear bearing and the like, the impact guide element is installed on the linear bearing, the power impact element and the impact head and the like are connected or separated, the power impact element is used for driving the impact head to impact in a reciprocating manner, the power impact element is not used for guiding the impact head, and the guide mechanism is used for correcting the impact direction of the impact head.

The reciprocating impact part includes an impact power box, a guide mechanism, an impact driving mechanism, an impact head and the like, wherein the impact power box is used for supporting the guide mechanism, the guide mechanism includes an impact guide element, a friction body, a friction body supporting element and the like, the friction body includes a rolling body or a suspension body and the like, the rolling body includes a guide rolling body and/or a power rolling body and the like, the suspension body includes a guide suspension body or a power suspension body and the like, the suspension body includes a magnetic suspension body or a liquid suspension body or an air suspension body and the like, the guide supporting element includes a guide rolling body supporting element or a guide suspension body supporting element and the like, the impact power box and the friction body supporting element and the like are separated or separately connected or integrated, the end part of the impact guide element is stretched out from the impact power box to be connected with the impact head, the impact head is arranged at one end of the impact guide element, the impact guide element and the impact head and the like are

connected or integrated, the impact driving mechanism includes a crank impact driving mechanism and the like, the crank impact driving mechanism includes a power impact element, a power supporting element and the like, the impact power box and the power supporting element and the like are separately connected or are integrated, the power supporting element and the guide supporting element and the like are separated or separately connected or integrated, the power supporting element includes a power rolling body supporting element or a power suspension body supporting element and the like, the impact guide element and the power impact element and the like are separated or separately connected or integrated, the power impact element is arranged in the impact power box, the power impact element and the impact head and the like are connected or separated movably and the like, the power impact element is used for driving the impact head to impact, the friction body is arranged between the guide supporting element and the impact guide element to form the guide mechanism, the friction body, the friction body supporting element and the impact guide element and the like are in close fit to support the impact head to impact through rolling friction or suspension friction, and the guide mechanism is used for correcting the impact direction of the impact head and preventing the impact driving mechanism from being damaged by the break-off force and/or the impact counterforce.

The lifting mechanism includes a rocker arm lifting mechanism and the like, wherein the impact power box is arranged at the front part of the rocker arm lifting mechanism, the crank impact driving mechanism includes a transmission gear and the like, crank connecting rods are arranged at the two sides of the transmission gear, the crank connecting rod at one side is used for at least driving one impact head to impact, the crank connecting rods at the two sides of the transmission gear are used for simultaneously impacting or alternatively impacting, guide supporting elements,

impact guide elements, friction bodies and the like are arranged at more than two end parts of the impact power box, the friction bodies are arranged between the guide supporting elements and the impact guide elements to form a multipoint impact head supporting structure, the impact power box and the guide supporting elements and the like are separately connected or are integrated, more than two impact guide elements are stretched out from the impact power box to be connected with the impact head, the connecting rod and the impact head and the like are connected or separated or integrated, the break-off prevention mechanism is arranged at one end or two ends of the connecting rod, the connecting rod is used for driving the impact head to reciprocate, and the more than two impact guide elements are used for correcting the impact direction of the impact head.

The walking part or the machine body includes a rotary disk and the like, wherein the rotary disk is arranged at the upper part of the walking part and the lower part of the machine body, the impact head is arranged on the rotary disk and/or on the rocker arm, the rocker arm is arranged on the machine body and/or on the rotary disk, the walking part is used for driving the rotary disk to walk, and the rotary disk is used for driving the impact head to impact and/or excavate and load at multiple positions.

The machine body includes a rack and the like, wherein the rack includes a material excavating and loading device and the like, the material excavating and loading device includes a bucket or an excavator grab and the like, and the material excavating and loading device is used for carting the material.

The rotary disk includes an inner rotary disk, an outer rotary disk and the like, the rack includes an operating chamber and the like, the operating chamber is arranged on the inner rotary disk, an inner rotary disk rocker arm and the like is arranged on the inner rotary disk, one end of the inner rotary disk rocker arm is connected with the inner rotary disk, the other end thereof is connected with the impact head and/or the

bucket and/or the excavator grab, an outer rotary disk rocker arm is arranged on the outer rotary disk, one end of the outer rotary disk rocker arm is connected with the outer rotary disk, and the other end thereof is connected with the impact head and/or the bucket and/or the excavator grab and the like.

The rocker arm includes a quick change connector and the like, wherein the quick change connector is matched with the impact head or the bucket or the excavator grab and the like.

The crank impact driving mechanism includes an expansion piece of the crank impact driving mechanism and the like, and/or the material excavating and loading device includes an expansion piece of the material excavating and loading device and the like, wherein the expansion piece of the crank impact driving mechanism or the expansion piece of the material excavating and loading device and the like is used for preventing mutual interference when the crank impact driving mechanism or the material excavating and loading device and the like is at work.

The impact head includes a crushing impact head or a material excavating impact head or a material raking impact head or a material overturning impact head or a material loading impact head or a multifunctional combined impact head and the like.

The multifunctional combined impact head is used for impacting, crushing, stacking and carting the material.

The guide mechanism includes a rolling friction guide mechanism or a suspension friction guide mechanism or a sliding friction guide mechanism and the like.

The sliding friction guide mechanism includes a wear-resistant guide element, a sliding friction guide bracket and the like, wherein the wear-resistant guide element and the sliding friction guide bracket and the like are separated or separately connected or integrated.

The wear-resistant guide element includes a high molecular material wear-resistant guide element or a copper base alloy wear-resistant guide element or an aluminum base alloy wear-resistant guide element or a ceramimetallurgical wear-resistant guide element or a ceramic wear-resistant guide element or a cast iron wear-resistant guide element or a cast steel wear-resistant guide element or a nylon wear-resistant guide element or a metal composite material wear-resistant guide element or a non-metal composite material wear-resistant guide element or a composite material wear-resistant guide element, and the like.

The impact driving mechanism includes an eccentric shaft, a connecting rod, a power impact element, a material plate and the like, wherein the eccentric shaft and/or the connecting rod is arranged in the impact power box, the connecting rod is hinged with the eccentric shaft, the other end of the connecting rod and the power impact element and the like are separated or separately connected or integrated, the power impact element and the impact head and the like are separated or separately connected or integrated, the material plate is arranged at one side and/or more than two side parts of the impact power box, the material plate and the impact power box and the like are separated or separately connected or integrated, and the power impact element is used for driving the impact head to impact.

The material plate and/or the impact power box and the like is provided with a sliding friction guide bracket, wherein the sliding friction guide bracket and the material plate and the like are separated or separately connected or integrated, and the sliding friction guide bracket and the impact power box and the like are separated or separately connected or integrated.

The material plate and/or the impact power box and the like is provided with a rolling body supporting element, wherein the rolling body supporting element and the material plate and the like are separated or separately connected or integrated, and the

rolling body supporting element and the impact power box and the like are separated or separately connected or integrated.

The material plate and/or the impact power box and the like is provided with a guide suspension body supporting element, wherein the guide suspension body supporting element and the material plate and the like are separated or separately connected or integrated, the guide suspension body supporting element and the impact power box and the like are separated or separately connected or integrated, and the impact guide element and the power impact element and the like are separated or separately connected or integrated.

The material plate is shovel-shaped or fork-shaped or plate-shaped or bucket-shaped or pyramid-frustum-shaped or cylindrical or cambered, and the like.

The rolling friction guide mechanism includes a roller, a roller guide element, a rolling body supporting element and the like, wherein the roller is arranged on the rolling body supporting element or on the roller guide element, the power impact element and the rolling body supporting element and the like are separated or separately connected or integrated, the roller is arranged on the side part of the power impact element or in the power impact element, the roller is used for correcting the power impact element to impact in a reciprocating manner through rolling friction, the power impact element and the impact head are connected movably and the like or are integrated, the power impact element is used for driving the impact head to impact, and the roller guide element, the rolling body supporting element and the roller and the like cooperate to correct the impact direction of the impact head.

The roller guide element and the impact power box and the like are separated or separately connected or integrated, the roller guide element and the rocker arm and the like are integrated or separated or separately connected, and the roller guide

element and the material plate and the like are separated or separately connected or integrated.

The roller is in clearance fit with the roller guide elements and the like at the two sides of the roller, when the roller is in rolling friction with a rolling guide element at one side, the roller is not in contact with the rolling guide element at the other side, and the roller is limited by the roller guide elements at the two sides thereof to prevent the power impact element from swinging, so as to control the impact head to swing.

The rolling friction guide mechanism includes a rolling body, a rolling body supporting element, an impact guide element and the like, wherein the rolling body is a waist drum wheel, the rolling body supporting element and the material plate and the like are separated or separately connected or integrated, the impact guide element and the power impact element and the like are integrated or separately connected, the power impact element and the impact head and the like are integrated or separately connected, the waist drum wheel is arranged on the rolling body supporting element, a groove or a projection and the like is arranged on the waist drum wheel, a projection or a groove and the like is arranged on the corresponding power impact element, and the waist drum wheel is buckled with the power impact element and the like to correct the impact direction of the power impact element and the like through rolling friction and prevent the impact head from swinging.

The beneficial effects of the present invention are as follows:

1. The power source element is arranged perpendicular to the rocker arm of the heading machine, and the power output shaft is arranged parallel to the transmission shaft and the crank shaft, so that the structure is simple, the power transmission is smooth and the efficiency is high.

2. Since the power source element is arranged perpendicular to the rocker arm of the heading machine, and the power output shaft is arranged parallel to the transmission

shaft and the crank shaft, after the motor or the transmission component is damaged, no large-scale detachment of the rocker arm is needed, and a single component is directly and quickly overhauled only from the access hole corresponding to the single component and arranged on the rocker arm, so that the overhaul is convenient and quick and the efficiency is high.

3. The motor or the transmission belt pulley or the transmission gear or the transmission chain wheel is provided with the clutch shaft, thereby effectively improving the overload protection performance and preventing the impact counterforce from damaging the power component.

4. Due to the compact combination that the power output shaft is arranged parallel to the transmission shaft and the crank shaft, the power component is arranged on the movable arm, in order to prevent the movable arm from generating any influence and damage on the structure and/or performance of the power transmission element and/or the power component due to telescoping and/or rotation during the telescoping and/or rotation processes, so that the application failure is greatly reduced.

5. By means of the rotation and/or telescoping of the rocker arm, multidirectional impact digging of asymmetrical impact heads and trimming of a roadway are achieved.

6. The limiting device is used for positioning the rotation position and/or the telescoping position of the movable arm, and the locking device is used for locking the movable arm after rotating the same in place, thus being reliable in locking, ensuring the impact direction of the impact head, being conductive to not affecting the impact effect of the impact head due to flexible rotation, preventing the impact rotation of the impact head in an impact process and facilitating the trimming and forming of the roadway in a digging process.

7. The action detection and control system is used for detecting and controlling the working states of the working components, in order to improve the safety and reliability of the working components and improve the automation degree.

8. During the rotation and telescoping works of the rocker arm, the inner guide cylinder of the movable arm rotates and/or telescopes in the outer guide cylinder of the fixed seat, to ensure the interference of only a mechanical structure and prevent the interference of the cutting transmission component and/or the cutting power component, so that the safety and reliability are strong, the structure is simple and firm, and the impact break-off prevention capacity is strong.

9. The transition disk is arranged between the movable arm and/or the fixed seat, the impact power box and/or the driving mechanism is arranged on the movable arm, the rotating device is used for driving the movable arm to rotate relative to the transition disk, the telescopic device is arranged on the transition disk and/or the fixed seat, the telescopic device is used for driving the transition disk to telescope relative to the fixed seat, and the telescoping and rotation of the movable arm relative to the fixed seat are achieved through only the transition disk, so that the structure is simple and smart, the vulnerable parts are few and the safety and reliability are good.

10. Since the rotating mechanism adopts a gear rotating mechanism or a cable wire rotating mechanism or a hydraulic rotating mechanism or a pneumatic rotating mechanism or a rack rotating mechanism or a gear ring rotating mechanism or a thread screw rotating mechanism or a hanging gear rotating mechanism or a chain drive rotating mechanism or a motor drive rotating mechanism and the like, the rotation is reliable, the positioning is accurate, the rotating speed is high, and the material digging performance is improved by the self-locking function after rotating in place.

11. The telescopic transmission device includes the spline sleeve and the spline shaft, the spline sleeve is matched with the spline shaft, under the drive of the telescopic driving device, the spline sleeve telescopes relative to the spline shaft in a reciprocating manner to increase the digging height and/or digging depth of the digging machine, moreover the spline sleeve and the spline shaft stably and reliably transmit power, so that the transmission speed ratio is accurate.

12. The limiting device is provided with the limiting buffer element, and the limiting buffer element is used for reducing the rigid impact of the limiting device during limiting, so that the limiting is accurate and reliable.

13. The outer-layer material impact protection device reciprocates with the outer-layer material impact tooth seat, the inner-layer material impact protection device reciprocates with the inner-layer material impact tooth seat, and a part of the outer-layer material impact protection device and/or a part of the inner-layer material impact protection device is consistently overlapped with the impact power box to prevent the material from entering the space between inner-layer material impact mechanism and the impact power box or prevent the material from entering the space between the outer-layer material impact mechanism and the impact power box, in order to avoid the dust from being introduced into the impact power box to pollute the impact driving mechanism, the guide mechanism and the like, and prevent the material from colliding the reciprocating impact part to result in damage and deformation and the like of the impact guide element and/or the power impact element.

14. In order to increase the cutting depth to facilitate discharging the blanked material from the impacted and excavated coal bed or rock stratum, when the layers of impact teeth of the impact head alternatively reciprocate, the inner-layer material impact protection device and/or the outer-layer material impact protection device prevents foreign matters from entering the gaps between the two adjacent layers of impact teeth,

so as to avoid such problems of the impact head caused by material clamping as reciprocating impact failure and the like.

15. The outer-layer material impact protection plate is arranged along the surrounding or the local part of the outer-layer material impact tooth seat, and the inner-layer material impact protection plate is arranged along the surrounding or the local part of the inner-layer material impact tooth seat, in order to avoid such problems that the protection plate is arranged at the local part to enable the material to easily enter the space between the impact tooth seat and the impact power box from the site without the protection plate to pollute and damage the impact power box and/or the impact driving mechanism and/or the guide mechanism, and the like.

16. The sealing element is arranged at the joint part of the inner-layer material impact protection plate and the inner-layer material impact tooth seat, the sealing element is arranged at the joint part of the outer-layer material impact protection plate and the outer-layer material impact tooth seat, the positions of the sealing element of the inner-layer material impact protection plate and the sealing element of the outer-layer material impact protection plate are arranged at the ends consistently overlapped with the impact power box, or the sealing element of the impact power box is arranged at the end consistently overlapped with the inner-layer material impact protection plate and/or the outer-layer material impact protection plate, to effectively prevent the material, dust, water, coal slime and the like from entering from the gap between the protection plate and the impact power box to pollute and damage the impact power box and/or the impact driving mechanism and/or the guide mechanism, and the like.

17. The adjacent parts of the inner-layer material impact protection plate and the outer-layer material impact protection plate reciprocate in the protection plate stroke groove, to arrange the protection plates on the surrounding or the local part of the impact tooth seat so as to improve the multidirectional protection effect.

18. The elastomer is arranged in the protection plate stroke groove or the elastomer is arranged at the free end of the protection plate, to enable the elastomer to shake off and pop out the material brought by the outer-layer material impact protection plate and/or the inner-layer material impact protection plate and/or other materials dropping into the protection plate stroke groove by means of elastic deformation, moreover the elastomer absorbs the impact counterforce of the outer-layer material impact mechanism and/or the inner-layer material impact mechanism by means of elastic deformation.

19. The water spray device is used for spraying water to the outer-layer material impact protection device and/or the inner-layer material impact protection device and/or the protection plate stroke groove, in order to prevent the material from being adhered to the outer-layer material impact protection device or prevent the material from being adhered to the inner-layer material impact protection device and/or prevent the material from being adhered in the protection plate stroke groove.

20. The water spray device is provided with the water flow controller, the water flow controller is used for controlling the water flow direction and/or controlling the water flow position and/or controlling the water spray time, in order to control the water flow to not enter the gap between the impact power box and the protection plate and prevent the material, dust, water and coal slime and the like from entering the impact power box and/or the protection plate from any direction, so that the service life of the reciprocating impact part is prolonged.

21. Compared with the rigid connection of the power impact element and the impact head of the existing impact heading machine, the impact heading machine and the driving mechanism of the impact heading machine, the impact counterforce is reduced, when the reciprocating impact part is used for enabling the impact head to impact a rock, a cement structure member, a hardened mud rock and the like, the problem that

the power impact head cannot finish the impact stroke due to the overlarge strength of the rock, the cement structure member, the hardened mud rock and the like, is solved, since the buffer break-off prevention mechanism is arranged between the power impact element and the impact tooth frame or the buffer break-off prevention mechanism is arranged on the power impact element, the elastomer deforms to absorb and decompose the impact counterforce to obviously decrease the impact counterforce born by the power impact element, moreover, the power impact element is unlikely to damage under the protection of the buffer reciprocating element, thus ensuring the continuous work of the power impact element, protecting the components of the equipment from being damaged and greatly reducing the failure rate.

22. The buffer break-off prevention mechanism is provided with the buffer adjusting element, the pre-tightening force adjusting structure is arranged between the buffer adjusting element and the buffer supporting element, the pre-tightening force adjusting structure can be used for adjusting the relative position of the buffer adjusting element and the buffer supporting element to press or loosen the fatigue deformed elastomer, so as to effectively protect the elastomer and prolong the service life of the elastomer.

23. The counterforce generated by bidirectional impact of the power impact element respectively acts on the elastomers at the two sides of the baffle of the bidirectional buffer break-off prevention mechanism, and the elastomers at the two sides of the baffle are used for bidirectionally buffering the impact counterforce.

24. The buffer break-off prevention mechanism is used for protecting the impact head and/or the power source element, avoiding the impact damage of the impact counterforce to the power impact element and prolonging the service life of the power source element.

25. The buffer break-off prevention mechanism is used for effectively isolating the impact vibration generated by the reciprocating impact part, reducing the impact vibration on the walking part and the machine body, reducing the failure generated by overload of the equipment and improving the working efficiency of the equipment.

26. The buffer break-off prevention mechanism is provided with the buffer reciprocating guide structure, and the buffer reciprocating guide structure is used for preventing the deformation of the power impact element due to the deformation of the elastomer and reinforcing the working stability of the power impact element.

27. The supporting element anti-drop limiting structure of the buffer supporting element and the reciprocating element anti-drop limiting structure of the buffer reciprocating element mutually cooperate, to effectively prevent the separation of the buffer reciprocating element and the buffer supporting element, enable the power impact element to drive the impact head to impact in a reciprocating manner and improve the impact performance.

28. The quantitative motion gap is arranged at the buckling position of the buffer reciprocating element and the buffer supporting element, when the impact counteraction break-off force of the impact head is applied to the buffer break-off prevention mechanism, the buffer reciprocating element can swing between the buffer supporting element and the buffer reciprocating element, to prevent the impact counterforce from breaking off and damaging the impact driving mechanism.

29. The elastomer is serially connected on the buffer reciprocating element, the buffer reciprocating element is arranged on the front end guide element and/or the rear end guide element, and the front end guide element and/or the rear end guide element are used for enlarging the correction distance and/or force of the buffer reciprocating element.

30. The bulb structure of the buffer supporting element or the cambered surface of the buffer supporting element is arranged at the position of the buffer supporting element at the joint site of the buffer supporting element and the buffer reciprocating element, when the impact counteraction break-off force of the impact head is applied to the buffer break-off prevention mechanism to buffer the swing of the reciprocating element between the buffer supporting element and the buffer reciprocating element, the bulb structure or the cambered surface generates no break-off damage to the buffer reciprocating element and/or the buffer supporting element, so that the service life is prolonged.

31. The lubricant is arranged between the buffer reciprocating element and/or the buffer supporting element, and the buffer reciprocating element and/or the buffer supporting element is a self-lubricating material, to reduce the buffer friction resistance and reduce the friction loss.

32. The equipment is compact and simple in integral structure and is convenient to use and operate, drilling and milling type blanking and milling and cutting type blanking are changed into impact blanking, thereby basically eliminating the break-off of a lateral force to the reciprocating impact part, greatly reducing the damage to the components, improving the production efficiency and reducing the material consumption, and the rolling friction or the suspension friction is used for greatly reducing the friction loss and saving the power source.

33. The impact heads are arranged at the two sides of the front part of the lifting mechanism to impact in a reciprocating manner, thereby being conductive to converting the impact counterforce generated by the impact of the impact head at one side into the impact power of the impact head at the other side, and the impact power and/or the impact counterforce is reasonably utilized to greatly reduce the kinetic energy consumption.

34. The working manner of the impact head is linear reciprocating impact, compared with the drilling and milling type and milling and cutting type, the break-off degree of the impact teeth is greatly decreased, so that the service life of the impact teeth is greatly prolonged, the change frequency of the impact teeth is reduced, the dissipation of the vulnerable parts of the equipment is reduced and the working efficiency is improved.

35. The structural strength of the guide mechanism is large enough to bear and absorb strong impact counterforce and torsion especially, so that the resistance of the heading machine to the impact counterforce and the torsion is greatly reinforced.

36. The impact guide element is supported by the rolling body in the equipment, thereby greatly reducing the damage of the reciprocating impact friction to the impact guide element and reducing the kinetic energy consumption, the guide friction body supporting element, the impact guide element and the guide rolling body cooperate to ensure the rolling guide of the impact guide element, change the structure that the guide rolling body only performs a rolling friction but no guide function, and greatly reduce the loss of energy necessary for correcting the sliding friction of the impact guide element and/or damage to the equipment.

37. Since the guide mechanism is provided with the rolling body limiting structure, the safety and reliability of the equipment are improved.

38. The guide rolling body is arranged on the holder and/or in the raceway or in the pit or between the outer sleeve and the inner body, thus having a guide function when achieving the rolling friction reciprocating motion of the equipment, the guide rolling body plays the guide function while playing the rolling friction function, thereby reducing the friction resistance in the operation of the impact head when sliding friction is used as support, and the guide rolling body is used for greatly increasing the function of absorbing the impact counterforce and is good in operation guide effect,

simple in structure, few in vulnerable parts, low in production cost and stable in performance.

39. The pits or the holders are arranged on the impact guide element and the guide supporting element, the guide rolling bodies are arranged in the pits or the holders, the guide rolling bodies are arranged at intervals due to the pits or the holders, and the guide rolling bodies will not be extruded in operation, thereby generating no mutual reverse friction, greatly reducing the energy consumption, prolonging the service life and reducing the maintenance.

40. When the holder is fixed on the guide mechanism, the guide rolling body is arranged in the raceway of the holder and/or the guide rolling body supporting element, and the guide rolling body is used for supporting the impact guide element to reciprocate through rolling friction, to avoid the problem of continuous working failure due to the rotation of the guide mechanism, prevent the break-off of the impact guide element to the guide rolling body supporting element and reduce the damage to the impact driving mechanism.

41. The roller is arranged between the guide rolling body supporting element and the impact guide element, the roller is used for ensuring rolling friction of the impact guide element, to reduce the abrasion of the guide mechanism, prolong the service life and ensure low failure rate and little maintenance, the rolling friction is used for guaranteeing high reciprocating motion speed and high efficiency, the use of the roller is more clean and environmental-friendly, and no hazardous substance or poisonous gas and the like is generated due to overlarge sliding friction, so the quality of the working environment can be improved.

42. The break-off prevention mechanism is arranged between the power impact element and the impact head of the impact driving mechanism, the rotary break-off prevention structure of the break-off prevention mechanism is stressed to rotate or the

separate break-off prevention structure separately isolates the counteraction break-off force or the buffer break-off prevention structure is stressed to buffer, so as to reduce the break-off of the impact counterforce to the power impact element and prevent the damage to the impact driving mechanism.

43. The impact power box is simple, reasonable, exquisite and compact in structure, small in volume, light in weight, relatively small in abrasion, perfect in function and strong in break-off force and/or impact counterforce resistance.

44. The sealing element is arranged at the movable connecting site of the guide mechanism, the impact driving mechanism and the impact power box, so that the impact power box is of a sealed structure to effectively prevent dust and material chips from entering the impact driving mechanism and/or the guide mechanism, ensure the purity of the lubricating liquid, reduce the friction resistance and avoid the corrosion of the material to the impact driving mechanism and the guide mechanism, and the lubricating system is used for lubricating and cooling the guide mechanism and the impact driving mechanism to further reduce the friction and prolong the service life of the equipment.

45. The friction body, the impact guide element and the friction body supporting element in the equipment are in close fit to form the multipoint impact head supporting structure, the impact guide element is used for widening the correction width of the impact head to the maximum, enlarging the correction force to the impact head, controlling the impact direction of the impact head to the maximum, not only increasing the length of the break-off prevention force arm of the impact guide element, and reducing the break-off of the impact head to the impact guide element, preventing the damage to the impact driving mechanism resulting from the break-off force and/or the counterforce and prolonging the service life of the equipment.

46. The U-shaped or cylindrical impact guide element of the multipoint impact head supporting structure is connected with the impact head, in order to ensure wide breadth multipoint connection of the impact head and the impact guide element, correct the reciprocating motion direction of the impact head and prevent the rotation of the impact head.

47. The buffer mechanism is arranged between the machine body and the reciprocating impact part of the equipment or between the lifting mechanism and the reciprocating impact part of the equipment, and when the reciprocating impact part is at work, the buffer mechanism can effectively reduce the impact on the connecting element, prevent the looseness of the connecting element, avoid the fatigue damage of the connecting element, reduce the impact counterforce to the machine body, ensure stable walking of the machine body, and ensure stable operation of the electrical machine or the motor and prolong the service life of the equipment.

48. The buffer element of the structure buffer mechanism is arranged between the machine body and the lifting mechanism or between the fixed supporting element of the lifting mechanism and the buffer supporting element of the lifting mechanism, the buffer guide element is arranged between the machine body and the lifting mechanism or between the fixed supporting element of the lifting mechanism and the buffer supporting element of the lifting mechanism, when the impact counterforce is applied to the buffer supporting element of the lifting mechanism and the fixed supporting element of the lifting mechanism or on the machine body and the lifting mechanism, the buffer element can deform to absorb the impact counterforce, the buffer guide element is used for controlling the buffer direction to ensure the buffer as linear reciprocating buffer and to prevent the non-directional swing of the buffer element when absorbing the impact counterforce, and the buffer method and/or structure adopted by the equipment generates no torsional shear to the machine body or the

reciprocating impact part, reduces the impact on the walking part and the machine body, greatly reduces various coal mining faults, prolongs the service life of the machine body and improves the working efficiency.

49. The buffer element has a rebound acting force, so that the impact effect is improved, when the impact counterforce is large, the buffer element can absorb and store the impact energy and release the impact energy within the next impact period to further increase the impact force of reciprocating impact on the material.

50. The buffer guide sleeve of the buffer mechanism is in slide connection with the machine body, thereby reinforcing the capacity of the buffer mechanism for absorbing the counterforce generated when impacting the coal bed or rock stratum.

51. The buffer guide element, the buffer element and the buffer guide sleeve of the equipment cooperate to form the bidirectional buffer mechanism, the lifting mechanism is arranged on the bidirectional buffer mechanism, and the bidirectional buffer mechanism is used for increasing the buffer effect and effectively protecting the equipment.

52. In a power transfer process, the spline shaft and the spline sleeve of the slide stroke spline shaft sleeve buffer device mutually cooperate to transmit power and slide in a reciprocating manner to buffer, thus are only subjected to torque but not impacted by axial force, the vibration isolation effect is good, the dynamic sliding resistance in a heading process is small and the impact head is effectively protected, in the impact blanking and/or impact vibration transfer process of the impact head, the equipment buffers and decomposes the impact counterforce through reciprocating slide to avoid the damage to the power source element, thus greatly improving the service life and/or operation reliability of the power source element.

53. The retraction prevention element is arranged on the fixed supporting element of the lifting mechanism and the buffer supporting element of the lifting mechanism or

on the buffer guide element and the buffer guide sleeve, the retraction prevention element can be used for preventing the fixed supporting element of the lifting mechanism and the buffer supporting element of the lifting mechanism or the buffer guide element and the buffer guide sleeve from dropping during relative reciprocating slide, the retraction prevention element is separately arranged, the retraction prevention element can also be arranged to be integrated with the fixed supporting element of the lifting mechanism and the buffer supporting element of the lifting mechanism or integrated with the buffer guide element and the buffer guide sleeve, so as to ensure the safety and reliability of the buffer mechanism.

54. The multi-throw crank shaft is simple in integral manufacturing structure, enough in rigidity, large in strength and capable of transferring larger rotation torque, and the multi-throw crank shaft is reasonable in structure and small in manufacturing volume, so that the weight of the reciprocating impact part can be greatly decreased and the adjustment flexibility of the reciprocating impact part is improved.

55. The multi-throw crank shaft is composed of multiple eccentric shafts, each eccentric shaft is used for driving one power impact element, and one or more impact heads are arranged at the other end of the power impact element to greatly improve the material digging efficiency.

56. The volume of the multi-throw crank shaft is small, so that the multi-throw crank shaft can be installed between the upper impact guide element and the lower impact guide element, which is beneficial to arrangement of the impact head at one end of the impact guide element and arrangement of the counterweight element at the other end thereof, and the counterweight element is used for ensuring the gravity balance during impact, reducing the break-off of the impact guide element during impact caused by unbalanced gravity at the two ends and improving the stability of the equipment.

57. By adopting the multi-throw crank shaft, the impact head of the reciprocating impact part is simple and exquisite, the occupied space is small, which is beneficial to the power concentration of the impact head and increases the impact force of the single impact head, so that the entire equipment can pass a low region.

58. Compared with reciprocating impact of driving more than two connecting rods through gear transmission, the multi-throw crank shaft can be used for digging a thicker material to be dug in layers, in order to reduce the impact resistance of non-layered impact of the thicker material to be dug, reduce the damage of the generated larger impact counterforce to the reciprocating impact part and/or the machine body, reduce the energy consumption in the power transfer process and improve the working efficiency.

59. A lubricating liquid flow channel is arranged on the power concentric shaft segment of the multi-throw crank shaft, to improve the wear resistance of the equipment, greatly reduce the damage of the lubricated component and prolong the service life of the power impact element.

60. After being integrally manufactured and thermally treated, the multi-throw crank shaft is good in working toughness, good in impact resistance and high in impact safety factor.

61. The eccentric shafts of the multi-throw crank shaft are symmetrically arranged along the radial direction of the power concentric shaft segment to form angle difference, the power impact elements driven by the eccentric shafts can impact materials within different time slots, can convert the counterforce generated by a power impact element on the same side when impacting into the power of the next power impact element, and meanwhile decompose the counterforce of impacting thicker materials at one time, in order to ensure uniform impact force applied to the impact driving mechanism and buffer and/or stabilize the machine body.

62. Suspension liquid, suspension air or a suspension magnet and the like is arranged at the movable friction site to effectively reduce the friction resistance between the impact guide element and the guide supporting element to ensure more flexible reciprocating.

63. The variable speed transmission component is arranged on the lifting mechanism outside of the impact power box, to greatly reduce the volume of the impact power box, simplify the structure of the impact power box, ensure simple structure and few vulnerable parts of the reciprocating impact part, relieve the front supporting load of the lifting mechanism and reduce the consumption of the supporting force.

64. The reciprocating impact part of the equipment is arranged at the front end or side part of the lifting mechanism to achieve impact blanking, the rocker arm lifting oil cylinder is used for driving the rocker arm to move up and down, the rotary disk is used for driving the rocker arm to move left and right, and the rotary disk and/or the rocker arm lifting oil cylinder cooperates to adjust the impact head to blank the material at multiple positions and in multiple directions, so as to improve the impact working efficiency.

65. The vertical lifting mechanism can be used for ensuring the reciprocating impact part to vertically impact, so as to reduce the lengths of the lifting mechanism, the machine body and the like, reduce the energy consumption and ensure convenient maintenance, and the lifting track is linear, thereby increasing the lifting stability and prolonging the service life of the lifting support.

66. The multilayer impact teeth can be used for processing the rock stratum to a step shape, the pressure stress and/or structural strength of the step-shaped coal bed or rock stratum is greatly reduced compared with that of the original planar coal bed or rock stratum, when each layer of the impact teeth is used for impacting material again, the two relatively free surfaces of the step-shaped coal bed or rock stratum are reasonably

utilized to impact dropped material, so as to reduce the impact resistance, avoid overlarge lumps of the material blanked by the impact head, improve the working efficiency and save the power consumption.

67. The impact teeth of the multilayer impact teeth form height difference to enable the free surface formed by the former impact to be applied in the next impact, so as to reduce the impact resistance and reduce the power consumption, the impact teeth with different lengths are processed to different step shapes according to different demands, to be suitable for digging different coal beds or rock stratums.

68. Multiple rows of the impact teeth of the impact head are included, and when the coal bed or rock stratum is impacted to the step shape, the impact teeth can be used for decomposing the dug coal briquette or rock to form granules suitable for transport of a conveyor at one time, so as to avoid the problem that a lump material is hard to transport in the digging process.

69. The impact tooth frame of the impact head is the curved plate or the trapezoidal frame or the semicircular frame or the triangular frame or the conical frame or the flat plate frame or the frame-shaped frame or the V-shaped frame and the like, so that the impact resistance of the impact tooth frame is improved, the breadth of the impact head is increased, and the impact efficiency of the coal bed or rock stratum is improved.

70. The outer-layer material impact teeth and the inner-layer material impact teeth of the impact head cooperate to form the multilayer impact head, the discharge hole is arranged on the outer-layer material impact tooth seat of the impact head to enable the material blanked by the inner-layer material impact teeth to pass smoothly, and the multilayer impact head structure is used for solving the problem that the material clamped between the impact teeth cannot be discharged and/or the heading machine cannot continuously dig materials, achieving smooth material discharging, material

loading and the like of the heading machine and improving the material digging efficiency.

71. The shapes of the multiplayer impact teeth arranged side by side in the multilayer impact head structure are different, to avoid the break-off of the material clamped between the impact teeth to the impact head, reduce the damping action on the impact driving mechanism and better protect the equipment, the outer-layer material impact teeth and the inner-layer material impact teeth mutually cooperate to reduce the impact break-off to the impact driving mechanism and effectively reduce the power consumption of the impact driving mechanism for impacting over-high and over-wide coal bed or rock stratum at one time.

72. Multiple layers of impact heads are arranged up and down or left and right and the like, to achieve layered coal mining, the impact heads are used for blanking the material to be dug in layer, to reasonably utilize the power of the equipment and ensure the strength of the equipment.

73. The distances from the front row of impact teeth and the rear row of impact teeth of the impact head to the impact power box are different, thus when the coal bed or rock stratum is impacted, the web of a single impact tooth during once impact is greatly reduced, the pressure difference of the coal bed or rock stratum is effectively decomposed, the impact resistance is reduced, the power consumption is reduced and the working efficiency is improved.

74. The guide supporting element is arranged at more than two end parts of the power supporting element to form more than two guide supporting points, the more than two guide supporting points are used for supporting the lifting force of the impact head, the friction body, the impact guide element and the guide supporting element are in close fit to form the multipoint impact head supporting structure, the multipoint impact head supporting structure is used for supporting the impact head at multiple

points to correct the impact direction of the impact head, and the more than two guide supporting points are used for increasing the connecting width and/or supporting force of the impact head.

75. The friction body, the impact guide element and the friction body supporting element in the equipment are in close fit to form the multipoint impact head supporting structure, the impact guide element is used for widening the correction width of the impact head to the maximum, enhancing the correction force of the impact head, controlling the impact direction of the impact head to the maximum, not only increasing the length of the break-off prevention force arm of the impact guide element, and reducing the break-off of the impact head to the impact guide element, preventing the damage to the impact driving mechanism resulting from the break-off force and/or the counterforce and prolonging the service life of the equipment.

76. More than two columns of friction bodies can be arranged on the surrounding of one impact guide element, the more than two columns of friction bodies bear the gravity load of the impact head or the impact guide element, and at least more than one friction body in each column of friction bodies is used for supporting the reciprocating impact of the impact head, in order to avoid the concentrated damage to the friction bodies resulting from that only a column of friction bodies bears the gravity load of the impact head or the impact guide element and ensure better safety and reliability of the equipment.

77. The friction body supporting element is arranged to be integrated with the guide supporting element or the impact guide element or the power supporting element or the power impact element, to reduce the space occupied by the friction body supporting element, the friction body supporting element is of an integrated structure with the guide supporting element or the impact guide element or the power supporting element or the power impact element, so that the structural strength is

large and the space utilization rate is high, the limited space is used for increasing the volume of the friction body, improving the carrying capacity of the friction body, increasing the contact area of the friction body and a corresponding component and avoiding the overlarge local pressure and/or abrasion of the corresponding component due to the over-small friction body.

78. The rolling body is used for guiding the impact guide element through rolling friction, and the power rolling body is used for supporting the power impact element to reciprocate through rolling friction, in order to reduce the friction resistance and/or dissipation of supporting the impact guide element and the power impact element to move through sliding friction, and the friction body is made from the high-strength wear-resistant material, to ensure long service life, little maintenance and high working efficiency of the equipment.

79. The guide rolling body supporting element is arranged to be the inner body, the impact guide element is arranged to be the outer sleeve, the rolling body is arranged between the outer sleeve and the inner body, and the outer sleeve and the inner body are in close fit with the rolling body to drive the outer sleeve to reciprocate through rolling friction, in order to reduce the friction resistance of the outer sleeve when using sliding friction as support, greatly increase the capacity of absorbing the impact counterforce and ensure good guide effect, simple structure, few vulnerable parts and stable performance.

80. The surface of the roller can be widened to increase the contact area of the roller and the power rolling body supporting element or the power impact element or the guide rolling body supporting element or the impact guide element, in order to improve the wide breadth correction function of the roller and reduce the concentration of local abrasion.

81. The circular raceways are arranged on the rolling body supporting element or the impact guide element or the power impact element, the circular raceways are fully distributed on the rolling body, the lengths of the circular raceways are suitable for supporting the rolling friction of the corresponding component through the rolling body, the rolling support amplitude and/or force of the rolling body is improved, the defect of severe sliding friction of the original structure is changed, and the problem that the rolling support of the rolling body only works in a part of regions and the part without the rolling body generates collision friction, is solved, so as to avoid damage.

82. When the pressure bearing circular raceway and the pressure-free circular raceway are separately arranged, the pressure-free circular raceway is detachable, thereby being conductive to facilitating observing, maintaining and changing the power rolling body.

83. The friction body is arranged between the impact guide element and the guide supporting element or between the power impact element and the power supporting element to bear a pressure friction region, a reciprocating impact friction force and/or an extrusion force is applied to the friction body, the friction body is used for reducing the friction resistance and decomposing the extrusion force through rolling or suspension, to greatly reduce the break strength of the sliding friction force and/or the extrusion force, compared with the sliding friction structure, the strength and/or toughness requirement for the corresponding component is reduced and the weight of the corresponding component is reduced, and the impact guide element or the guide supporting element or the power impact element or the power supporting element can also be made from a light material, to reduce the energy consumption of reciprocating.

84. The break-off prevention mechanism is arranged on one end or two ends of the power impact element, and the break-off prevention mechanism cooperates with the guide rolling body, the guide rolling body supporting element and the impact guide

element to reduce the break-off damage to such corresponding components as the impact driving mechanism, the power impact element and the like.

85. The guide mechanism mainly adopts rolling guide or suspension guide, and the friction body plays a rolling guide function when playing a rolling friction function, thereby reducing the friction of the impact guide element and the friction body supporting element or the power impact element and the power supporting element during reciprocating impact and greatly reducing the friction loss generated by reciprocating impact.

86. The impact guide element reciprocates in a rolling friction or suspension friction manner under the support of the friction body, thereby changing the original sliding friction structure, greatly reducing the operation resistance of reciprocating impact of the equipment, improving the reciprocating speed of the impact head, improving the working efficiency, greatly reducing the power consumption, reducing the force load of the other assorted accessories, prolonging the service lives of the other accessories and reducing the assorted investment amount of the entire equipment, and the equipment is simple in structure, large in structural strength, high in space utilization rate, reliable in performance, strong in manufacturability, convenient to process and manufacture, high in operation efficiency, little in maintenance and long in service life, and has the advantages of saving energy and reducing consumption.

87. When digging the material, the digging, excavating and loading equipment does not completely crush the material, so that the rate of lump materials is high, the power consumption is small, the dust is little and the working environment is good, and a user does not need to configure additional dust removal equipment, thus reducing the investment of assorted equipment of the user and improving the use value and economic value of the material.

88. The excavating and loading equipment is provided with the quick change connector, so that it is time-saving, labor-saving, convenient and quick to change the connector.

89. The excavating and loading equipment is provided with the multifunctional combined impact head, thereby being capable of integrating such functions as material impacting and crushing, material stacking, material carting and the like.

Brief Description of the Drawings

Fig. 1 is a schematic diagram of a structure of a heading machine in embodiment 1;

Fig. 2 is a schematic diagram of a structure of a heading machine in embodiment 1;

Fig. 3 is a schematic diagram of a structure of a heading machine in embodiment 2;

Fig. 4 is a schematic diagram of a structure of a rocker arm of a heading machine in embodiment 3;

Fig. 5 is a schematic diagram of a structure of a rocker arm telescopic device of a heading machine in embodiment 4;

Fig. 6 is a schematic diagram of a structure of a rocker arm of a heading machine in embodiment 5;

Fig. 7 is a schematic diagram of a structure in an A-A direction of a rocker arm of a heading machine in embodiment 5;

Fig. 8 is a schematic diagram of a structure of a rocker arm of a heading machine in embodiment 6;

Fig. 9 is a schematic diagram of a structure of a rocker arm of a heading machine in embodiment 7;

Fig. 10 is a schematic diagram of a structure of a rocker arm of a heading machine in embodiment 8;

Fig. 11 is a schematic diagram of a structure in a B-B direction of the rocker arm of the heading machine in embodiment 8;

Fig. 12 is a schematic diagram of a structure of a locking device of a heading machine in embodiment 8;

Fig. 13 is a schematic diagram of a structure of a locking device of a heading machine in embodiment 8;

Fig. 14 is a schematic diagram of a structure of a gear ring rotating device of a heading machine in embodiment 9;

Fig. 15 is a schematic diagram of a structure of a cable wire rotating device of a heading machine in embodiment 10;

Fig. 16 is a schematic diagram of a structure of a gear and rack telescopic device of a heading machine in embodiment 11;

Fig. 17 is a schematic diagram of a structure of a telescopic transmission device of a heading machine in embodiment 12;

Fig. 18 is a schematic diagram of a structure of a telescopic transmission device of a heading machine in embodiment 12;

Fig. 19 is a top view of a reciprocating impact part in embodiment 13;

Fig. 20 is a front view of an outer-layer material impact mechanism in embodiment 14;

Fig. 21 is a front view of an inner-layer material impact mechanism in embodiment 15;

Fig. 22 is a front view of an outer-layer material impact mechanism in embodiment 16;

Fig. 23 is a left view of the outer-layer material impact mechanism in embodiment 16;

Fig. 24 is a front view of an inner-layer material impact mechanism in embodiment 17;

Fig. 25 is a section view of an A-A direction of the inner-layer material impact mechanism in embodiment 17;

Fig. 26 is a top view of a reciprocating impact part in embodiment 18;

Fig. 27 is a section view of an A-A direction in embodiment 18;

Fig. 28 is a front view of a reciprocating impact part in embodiment 19;

Fig. 29 is a top view of the reciprocating impact part in embodiment 19;

Fig. 30 is a schematic diagram of a structure of a reciprocating impact part in embodiment 20;

Fig. 31 is a schematic diagram of a structure of the reciprocating impact part in embodiment 20;

Fig. 32 is a schematic diagram of a structure of the reciprocating impact part in embodiment 20;

Fig. 33 is a schematic diagram of a structure of a reciprocating impact part in embodiment 20;

Fig. 34 is a schematic diagram of a structure of a reciprocating impact part in embodiment 20;

Fig. 35 is a schematic diagram of a structure of a reciprocating impact part in embodiment 21;

Fig. 36 is a schematic diagram of a structure of the reciprocating impact part in embodiment 21;

Fig. 37 is a schematic diagram of a structure of the reciprocating impact part in embodiment 21;

Fig. 38 is a schematic diagram of a structure of a reciprocating impact part in embodiment 22;

Fig. 39 is a schematic diagram of a structure of the reciprocating impact part in embodiment 22;

Fig. 40 is a schematic diagram of a structure of a reciprocating impact part in embodiment 23;

Fig. 41 is a schematic diagram of a structure of a reciprocating impact part in embodiment 24;

Fig. 42 is a schematic diagram of a structure of a reciprocating impact part in embodiment 25;

Fig. 43 is a schematic diagram of a structure of the reciprocating impact part in embodiment 25;

Fig. 44 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 26;

Fig. 45 is a schematic diagram of a structure of the reciprocating impact motion equipment in embodiment 26;

Fig. 46 is a schematic diagram of a structure of a reciprocating impact part in embodiment 26;

Fig. 47 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 27;

Fig. 48 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 28;

Fig. 49 is a structure diagram of a reciprocating impact part in embodiment 28;

Fig. 50 is a structure diagram of a reciprocating impact part in embodiment 29;

Fig. 51 is a structure diagram of a reciprocating impact part in embodiment 30;

Fig. 52 is a structure diagram of a reciprocating impact part in embodiment 31;

Fig. 53 is a structure diagram of the reciprocating impact part in embodiment 31;

Fig. 54 is a structure diagram of a reciprocating impact part in embodiment 32;

Fig. 55 is a structure diagram of a guide mechanism in embodiment 32;

Fig. 56 is a structure diagram of the guide mechanism in embodiment 32;

Fig. 57 is a structure diagram when a roller is arranged in embodiment 32;

Fig. 58 is a structure diagram when a roller is arranged in embodiment 33;

Fig. 59 is a structure diagram when a roller is arranged in embodiment 34;

Fig. 60 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 35;

Fig. 61 is a sectional view of a guide mechanism in embodiment 35;

Fig. 62 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 36;

Fig. 63 is a structure diagram of a reciprocating impact part in embodiment 37;

Fig. 64 is a structure diagram of a reciprocating impact part in embodiment 38;

Fig. 65 is a structure diagram of the reciprocating impact part in embodiment 38;

Fig. 66 is a structure diagram of a reciprocating impact part in embodiment 39;

Fig. 67 is a structure diagram of a reciprocating impact part in embodiment 40;

Fig. 68 is a structure diagram of a reciprocating impact part in embodiment 41;

Fig. 69 is a structure diagram of a reciprocating impact part in embodiment 42;

Fig. 70 is a structure diagram of the reciprocating impact part in embodiment 42;

Fig. 71 is a structure diagram of a reciprocating impact part in embodiment 43;

Fig. 72 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 44;

Fig. 73 is a structure diagram of a reciprocating impact part in embodiment 44;

Fig. 74 is a structure diagram of the reciprocating impact part in embodiment 44;

Fig. 75 is a structure diagram of a reciprocating impact part in embodiment 45;

Fig. 76 is a structure diagram of a buffer mechanism in embodiment 46;

Fig. 77 is a structure diagram of a reciprocating impact part in embodiment 47;

Fig. 78 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 48;

Fig. 79 is a structure diagram of a buffer mechanism in embodiment 49;

Fig. 80 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 50;

Fig. 81 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 51;

Fig. 82 is a structure diagram of a reciprocating impact part in embodiment 51;

Fig. 83 is a structure diagram of a buffer mechanism in embodiment 52;

Fig. 84 is a structure diagram of a buffer mechanism in embodiment 53;

Fig. 85 is a structure diagram of a connecting manner of the buffer guide element in embodiment 53;

Fig. 86 is a structure diagram of a connecting manner of a buffer guide element in embodiment 54;

Fig. 87 is a structure diagram of a buffer mechanism in embodiment 55;

Fig. 88 is a structure diagram of a buffer mechanism in embodiment 56;

Fig. 89 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 57;

Fig. 90 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 58;

Fig. 91 is a structure diagram of an impact driving mechanism in embodiment 59;

Fig. 92 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 60;

Fig. 93 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 61;

Fig. 94 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 62;

Fig. 95 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 63;

Fig. 96 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 64;

Fig. 97 is a schematic diagram of a structure of the reciprocating impact motion equipment in embodiment 64;

Fig. 98 is a schematic diagram of a structure of a lifting mechanism in embodiment 64;

Fig. 99 is a schematic diagram of a structure of a lifting mechanism in embodiment 65;

Fig. 100 is a schematic diagram of a structure of a lifting mechanism in embodiment 66;

Fig. 101 is a structure diagram of a reciprocating impact part in embodiment 67;

Fig. 102 is a structure diagram of a limiting mechanism in embodiment 67;

Fig. 103 is a structure diagram of a limiting mechanism in embodiment 68;

Fig. 104 is a structure diagram of a limiting mechanism in embodiment 69;

Fig. 105 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 70;

Fig. 106 is a schematic diagram of a structure of a reciprocating impact part in embodiment 70;

Fig. 107 is a schematic diagram of a structure of a reciprocating impact part in embodiment 71;

Fig. 108 is a structure diagram of a guide mechanism in embodiment 71;

Fig. 109 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 72;

Fig. 110 is a schematic diagram of a structure of a reciprocating impact part in embodiment 73;

Fig. 111 is a schematic diagram of a structure of a reciprocating impact part in embodiment 74;

Fig. 112 is a schematic diagram of a structure of a reciprocating impact part in embodiment 75;

Fig. 113 is a structure diagram of a limiting mechanism in embodiment 76;

Fig. 114 is a structure diagram of the limiting mechanism in embodiment 76;

Fig. 115 is a structure diagram of the limiting mechanism in embodiment 76;

Fig. 116 is a structure diagram of the limiting mechanism in embodiment 76;

Fig. 117 is a structure diagram of the limiting mechanism in embodiment 76;

Fig. 118 is a schematic diagram of a structure of a guide mechanism in embodiment 76;

Fig. 119 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 120 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 121 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 122 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 123 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 124 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 125 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 126 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 127 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 128 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 129 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 130 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 131 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 132 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 133 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 134 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 135 is a schematic diagram of a structure of the guide mechanism in embodiment 76;

Fig. 136 is a schematic diagram of a structure of a reciprocating impact part in embodiment 77;

Fig. 137 is a schematic diagram of a structure of a reciprocating impact part in embodiment 78;

Fig. 138 is a schematic diagram of a structure of the reciprocating impact part in embodiment 78;

Fig. 139 is a schematic diagram of a structure of a reciprocating impact part in embodiment 79;

Fig. 140 is a schematic diagram of a structure of the reciprocating impact part in embodiment 79;

Fig. 141 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 80;

Fig. 142 is a schematic diagram of a structure of a reciprocating impact part in embodiment 80;

Fig. 143 is a structure diagram of the reciprocating impact part in embodiment 80;

Fig. 144 is a structure diagram of a reciprocating impact part in embodiment 81;

Fig. 145 is a schematic diagram of a structure of reciprocating impact motion equipment in embodiment 82;

Fig. 146 is a structure diagram of a reciprocating impact part in embodiment 82;

Fig. 147 is a schematic diagram of a structure of the reciprocating impact motion equipment in embodiment 82;

Fig. 148 is a structure diagram of a reciprocating impact part in embodiment 83;

Fig. 149 is a structure diagram of a reciprocating impact part in embodiment 84;

Fig. 150 is a structure diagram of a reciprocating impact part in embodiment 85;

Fig. 151 is a structure diagram of a reciprocating impact part in embodiment 86;

Fig. 152 is a structure diagram of a reciprocating impact part in embodiment 87;

Fig. 153 is a structure diagram of a guide mechanism in embodiment 87;

Fig. 154 is a structure diagram of the guide mechanism in embodiment 87;

Fig. 155 is a structure diagram of a reciprocating impact part in embodiment 88;

Fig. 156 is a structure diagram of the reciprocating impact part in embodiment 88;

Fig. 157 is a structure diagram of the reciprocating impact part in embodiment 88;

Fig. 158 is a structure diagram of reciprocating impact motion equipment in embodiment 89;

Fig. 159 is a structure diagram of a reciprocating impact part in embodiment 89;

Fig. 160 is a structure diagram of a reciprocating impact part in embodiment 90;

Fig. 161 is a structure diagram of the reciprocating impact part in embodiment 90;

Fig. 162 is a structure diagram of a reciprocating impact part in embodiment 91;

Fig. 163 is a structure diagram of a reciprocating impact part in embodiment 92;

Fig. 164 is a structure diagram of a reciprocating impact part in embodiment 93;

Fig. 165 is a structure diagram of reciprocating impact motion equipment in embodiment 94;

Fig. 166 is a structure diagram of the reciprocating impact motion equipment in embodiment 94;

Fig. 167 is a structure diagram of the reciprocating impact motion equipment in embodiment 94;

Fig. 168 is a structure diagram of a rotary disk of the reciprocating impact motion equipment in embodiment 94;

Fig. 169 is a structure diagram of the reciprocating impact motion equipment in embodiment 94;

Fig. 170 is a structure diagram of an impact head of the reciprocating impact motion equipment in embodiment 94;

Fig. 171 is a structure diagram of a reciprocating impact part in embodiment 95;

Fig. 172 is a structure diagram of a reciprocating impact part in embodiment 95;

Fig. 173 is a structure diagram of a reciprocating impact part in embodiment 96;

Fig. 174 is a structure diagram of a reciprocating impact part in embodiment 97;

Fig. 175 is a structure diagram of the reciprocating impact part in embodiment 97;

Fig. 176 is a structure diagram of a reciprocating impact part in embodiment 98;

Fig. 177 is a structure diagram of the reciprocating impact part in embodiment 98;

Fig. 178 is a structure diagram of the reciprocating impact part in embodiment 98.

In the figures, 1. impact head; 2. impact driving mechanism; 3. rotary disk; 4. machine body; 5. reciprocating impact part; 6. rocker arm; 7. walking part; 8. movable arm; 9. fixed seat; 10. crank shaft; 11. impact power source element; 12. transmission gear; 13. power gear; 14. power output shaft; 15. rotating device; 16. telescopic device; 17. rotary positioning hole slot; 18. rotary locking pin; 19. limiting device; 20. rotary

limiting device; 21. transition disk; 22. guide groove of fixed seat; 23. guide lug boss of movable arm; 24. limiting buffer element; 25. limiting platform; 26. rotary locking device; 27. rotating gear; 28. rotating power source element; 29. gear ring rotating device; 30. rotating gear ring; 31. cable wire; 32. cable wire rotating device; 33. power source element supporting frame; 34. gear and rack telescopic device; 35. telescopic transmission device; 36. spline shaft; 37. spline sleeve; 38. impact power box; 39. inner-layer material impact mechanism; 40. inner-layer material impact mechanism; 41. outer-layer material impact protection device; 42. inner-layer material impact protection device; 43. outer-layer material impact tooth; 44. outer-layer material impact tooth seat; 45. inner-layer material impact tooth; 46. inner-layer material impact tooth seat; 47. sealing element; 48. protection plate stroke groove; 49. elastomer; 50. impact guide element; 51. power impact element; 52. water spray device; 53. buffer reciprocating element; 54. buffer supporting element; 55. anti-drop limiting structure of supporting element; 56. buffer break-off prevention mechanism; 57. disk spring; 58. anti-drop limiting structure of reciprocating element; 59. baffle; 60. front end guide element; 61. rear end guide element; 62. bidirectional buffer break-off prevention mechanism; 63. guide groove; 64. operating chamber; 65. material excavating and loading device; 66. spring; 67 elastic polyester; 68. guide mechanism; 69. elastic rubber pad; 70. rolling body supporting element; 71. rolling body; 72. roller; 73. crank impact driving mechanism; 74. power supporting element; 75. pit; 76. raceway; 77. holder; 78. oval limiting structure; 79. dumb bell-shaped limiting structure; 80. cylindrical limiting structure; 81. rack; 82. guide segment; 83. guide supporting element; 84. buffer adjusting element; 85. thread pre-tightening force adjusting structure; 86. guide rolling body; 87. roller shaft; 88. cambered surface of buffer supporting element; 89. step tooth punching and cutting device; 90. discharge hole; 91. material impact tooth frame; 92. rear supporting seat; 93. material

impact tooth supporting frame; 94. counterweight element; 95. supporting frame; 96. lifting mechanism; 97. guide limiting structure; 98. main rocker arm; 99. auxiliary rocker arm; 100. lifting oil cylinder; 101. crushing device; 102. material guider; 103. fixed supporting element; 104. guide lug boss; 105. retraction prevention element; 106. rotary impact transmission element; 107. protection cover; 108. shovel plate; 109. conveyor; 110. conical limiting structure; 111. roller limiting structure; 112. square limiting structure; 113. U-shaped limiting structure; 114. frame-shaped limiting structure; 115. transverse H-shaped limiting structure; 116. break-off prevention mechanism; 117. elastomer fixing element; 118. inner rotary disk; 119. groove; 120. rzeppa universal joint break-off prevention mechanism; 121. cambered catching groove type break-off prevention mechanism; 122. outer rotary disk; 123. bulb catching groove type break-off prevention mechanism; 124. angle adjustor; 125. frame; 126. slide stroke spline shaft sleeve buffer device; 127. belt buffer device; 128. driving belt pulley; 129. driven belt pulley; 130. belt; 131. belt tensioning device; 132. multiple-throw crank shaft multi-rod impact mechanism; 133. multiple-throw crank shaft; 134. power concentric shaft segment; 135. connecting handle; 136. eccentric shaft; 137. connecting rod; 138. vertical lifting mechanism; 139. lifting platform; 140. lifting platform seat; 141. vertical lifting actuator; 142. positioning and locking device; 143. translation device; 144. buffer element; 145. outer sleeve; 146. buffer guide element; 147. liquid cavity; 148. air cavity; 149. inner body; 150. air suspension body; 151. air source; 152. U-shaped impact guide element; 153. upper element of impact guide element; 154. lower element of impact guide element; 155. cam shaft; 156. cam; 157. crank; 158. guide friction body supporting element; 159. magnetic suspension body; 160. N pole permanent magnet; 161. bearing; 162. S pole permanent magnet; 163. liquid channel; 164. friction body; 165. friction body supporting element; 166. liquid suspension body; 167. liquid medium source; 168. control valve; 169.

conveying pipeline; 170. negative pole electromagnet; 171. positive pole electromagnet; 172. circular raceway; 173. circular supporting segment; 174. circular segment; 175. pressure bearing circular raceway; 176. pressure-free circular raceway; 177. waist drum wheel bearing; 178. guide rolling body supporting element; 179. linear bearing; 180. waist drum wheel; 181. material plate; 182. tooth frame protection plate; 183. guide roller; 184. guide rod and 185. guide element.

Detailed Description of the Embodiments

Embodiment 1

As shown in Fig. 1 and Fig. 2, equipment for converting rotary motion into reciprocating impact motion, includes a machine body 4, a walking part 7, a reciprocating impact part 5 and the like, wherein the reciprocating impact part 5 includes an impact driving mechanism 2, a rocker arm 6, an impact head 1 and the like, the impact driving mechanism 2 includes an impact power source element 11, a transmission component, a crank shaft and the like, the impact power source element 11 is arranged perpendicular to the rocker arm 6, the impact power source element 11 is a motor, the motor includes a power output shaft 14, the transmission component includes a gear transmission component, the gear transmission component includes a power gear 13 and a transmission gear 12, the impact power source element 11 includes a power output shaft 14, the power gear 13 is installed on the power output shaft 14, the transmission gear 12 is used for driving the crank shaft, the transmission component includes a transmission shaft, the power output shaft 14 is arranged perpendicular to the rocker arm 6 and is parallel to the transmission shaft and the crank shaft to enable the transmission gear 12 to drive the crank shaft to convert rotation motion into reciprocating motion, the crank shaft is used for driving the impact head 1 to impact in a reciprocating manner, the reciprocating impact part 5 is

arranged on the machine body 4, the walking part 7 is arranged at the lower part of the machine body 4, the walking part 7 is used for driving the machine body 4 to walk, and the machine body 4 is used for driving the reciprocating impact part 5 to move.

The impact power source element 11 can also be arranged parallel to the rocker arm 6, the power output shaft 14 is arranged parallel to the rocker arm 6 to drive the crank shaft to convert the rotary motion into the reciprocating impact motion after converting the power direction through a power bevel gear and a transmission bevel gear.

The impact power source element 11 can also be a hydraulic motor or a pneumatic motor and the like, the hydraulic motor or the pneumatic motor includes the power output shaft 14, the transmission component includes a belt pulley transmission component or a chain wheel transmission component or a bevel gear transmission component, the belt pulley transmission component includes a belt 130, a power belt pulley, a transmission belt pulley and the like, the chain wheel transmission component includes a power chain wheel, a transmission chain wheel, a chain and the like, the bevel gear transmission component includes a power bevel gear, a transmission bevel gear and the like, the impact power source element 11 includes the power output shaft 14, the power belt pulley or the power gear or the power chain wheel or the power bevel gear and the like is installed on the power output shaft 14, and the transmission belt pulley or the transmission chain wheel or the transmission bevel gear is used for driving the crank shaft.

An access hole corresponding to the power belt pulley or the power gear 13 or the power chain wheel or the transmission belt pulley or the transmission gear 12 or the transmission chain wheel or the power bevel gear or the transmission bevel gear is arranged on the rocker arm 6.

Embodiment 2

As shown in Fig. 3, in equipment for converting rotary motion into reciprocating impact motion, a rocker arm 6 includes a fixed seat 9, a movable arm 8 and the like, wherein the fixed seat 9 and the rocker arm 6 are separately arranged, an impact driving mechanism 2 is arranged on the movable arm 8, the movable arm 8 is arranged on the fixed seat 9, and the fixed seat 9 is hinged with the movable arm 8 to achieve the telescopic motion of the impact driving mechanism 2.

The fixed seat 9 can be integrated with the rocker arm 6, and the fixed seat 9 is fixedly connected with the movable arm 8.

The rest is the same as embodiment 1.

Embodiment 3

As shown in Fig. 4, in equipment for converting rotary motion into reciprocating impact motion, a rocker arm 6 includes a rotating device 15, a fixed seat 9, a movable arm 8 and the like, wherein the fixed seat 9 includes a fixed arm and/or a bracket, the fixed seat 9 is movably connected with the movable arm 8, one end of the rotating device 15 is arranged on the fixed seat 9, the other end of the rotating device 15 is connected with the movable arm 8, and the rotating device 15 is used for driving the movable arm 8 to rotate relative to the fixed seat 9.

The rotating device 15 can be arranged on the movable arm 8 and can also be arranged on the fixed seat 9 and the movable arm 8.

The rest is the same as embodiment 1.

Embodiment 4

As shown in Fig. 5, in equipment for converting rotary motion into reciprocating impact motion, a rocker arm 6 includes a telescopic device 16, a fixed seat 9, a movable arm 8 and the like, wherein one end of the telescopic device 16 is arranged on the fixed seat 9, the other end of the telescopic device 16 is connected with the

movable arm 8, and the telescopic device 16 is used for driving the movable arm 8 to reciprocate relative to the fixed seat 9.

The telescopic device 16 can be arranged on the movable arm 8 and can also be arranged on the fixed seat 9 and the movable arm 8.

The rest is the same as embodiment 1.

Embodiment 5

As shown in Fig. 6 and Fig. 7, in equipment for converting rotary motion into reciprocating impact motion, a rocker arm 6 includes a limiting device 19 and the like, wherein the limiting device 19 includes a rotary limiting device 20 and/or a telescopic limiting device, the rotary limiting device 20 is used for limiting the rotation position of a movable arm 8, and the telescopic limiting device is used for limiting the telescopic position of the movable arm 8.

The rotary limiting device 20 includes a rotary positioning element, wherein the rotary positioning element includes a rotary positioning driving component, a rotary locking pin 18, a rotary positioning hole slot 17 and the like, the rotary positioning driving component is arranged on a fixed seat 9 and/or the movable arm 8, the rotary positioning hole slot 17 is arranged on the movable arm 8 and/or on the fixed seat 9, the rotary positioning driving component is used for driving the rotary locking pin 18 to telescopically enter the rotary positioning hole slot 17 for positioning, and the rotary positioning driving component and the rotary locking pin 18 are separately connected.

The rotary positioning driving component and the rotary locking pin 18 can also be of an integrated structure.

The rest is the same as embodiment 1.

Embodiment 6

As shown in Fig. 8, in equipment for converting rotary motion into reciprocating impact motion, a movable arm 8 and/or a fixed seat 9 includes a transition disk 21 and the like, wherein the transition disk 21 is movably connected with the movable arm 8 and/or the fixed seat 9, a rotating device 15 is arranged between the transition disk 21 and the movable arm 8, the rotating device 15 is used for driving the movable arm 8 to rotate relative to the transition disk 21, a telescopic device 16 is arranged on the transition disk 21 and the fixed seat 9, the telescopic device 16 is used for driving the transition disk 21 to telescope relative to the fixed seat 9, and the transition disk 21 is used for driving the movable arm 8 to telescope relative to the fixed seat 9, in order to achieve the telescoping and/or rotation function of the movable arm 8.

The rest is the same as embodiment 1.

Embodiment 7

As shown in Fig. 9, in equipment for converting rotary motion into reciprocating impact motion, a guide lug boss 23 of a movable arm is arranged on a movable arm 8, a guide groove 22 of a fixed seat is correspondingly arranged on a fixed seat 9, and the guide groove 22 of the fixed seat cooperates with the corresponding guide lug boss 23 of the movable arm to telescopically guide.

When a guide groove 119 of the movable arm 8 is arranged on the movable arm 8, a guide lug boss 104 of the fixed seat 9 is correspondingly arranged on the fixed seat 9, and the guide lug boss 104 of the fixed seat 9 cooperates with the corresponding guide groove 119 of the movable arm 8 to telescopically guide.

The rest is the same as embodiment 1.

Embodiment 8

As shown in Fig. 10, Fig. 11, Fig. 12 and Fig. 13, in equipment for converting rotary motion into reciprocating impact motion, a rocker arm 6 includes a rotary locking device 26, wherein the rotary locking device 26 is used for locking a movable arm 8

after rotating the same in place and/or locking the movable arm 8 after telescoping the same in place, the rotary locking device 26 is a pin hole rotary locking device 26, after a positioning hole slot is aligned to a locking pin, the locking pin is locked, the rotary locking device 20 is a rotary limiting platform 25, a limiting device 19 includes a limiting buffer element 24, and the limiting buffer element 24 is a polyurethane buffer element 144 and is arranged on a fixed arm.

As shown in Fig. 13, the rotary locking device 26 is a disk brake type rotary locking device.

The rotary locking device 26 further includes a drum brake type rotary locking device or a hanging gear brake type rotary locking device or a cushion block brake type rotary locking device or a rope pulling type rotary locking device or a rotary locking device of a chain or a rotary locking device of a catching groove or a rotary locking device of a hook or a rotary locking device 26 of a baffle 59 or a rotary locking device of an elastic pin or a rotary locking device of an expansion pin, and the like.

The rotary limiting device 20 can also be a rotary limiting block or a rotary limiting pin or a rotary limiting hole or a rotary limiting plate or a rotary limiting ring or a rotary limiting tooth or a rotary limiting groove or a rotary limiting hook or a rotary limiting rope or a rotary limiting elastic pin or a rotary limiting expansion pin or a rotary limiting chain and the like.

The limiting buffer element 24 can also be arranged on a limiting platform 25 or a limiting block or a limiting pin or a limiting hole or a limiting plate or a limiting ring or a limiting tooth or a limiting groove or the movable arm 8 or the bracket, and the like.

The limiting buffer element 24 further includes a spring buffer element or a rubber buffer element or a nylon buffer element or an airbag buffer element or a sac buffer element or a macromolecular buffer element or a composite material buffer element,

and the like, and the buffer element can be used for effectively relieving the rigid impact during buffer limiting to ensure accurate and reliable limiting.

The rocker arm 6 includes an action detection and control system, wherein the action detection and control system is used for detecting and controlling the working state of a working component.

The action detection and control system includes a manual action detection and control system or a hydraulic action detection and control system or a pneumatic action detection and control system or an electric action detection and control system and the like.

The rest is the same as embodiment 1.

Embodiment 9

As shown in Fig. 14, in equipment for converting rotary motion into reciprocating impact motion, a rocker arm 6 includes a rotating device 15, wherein the rotating device 15 is a gear ring rotating device 29, the gear ring rotating device 29 includes a rotating gear ring 30, a rotating gear 27, a rotating power source element 28, a supporting element of the rotating power source element 28, and the like, the rotating gear ring 30 and a movable arm 8 are connected or integrated, the rotating gear 27 is connected with the rotating power source element 28, the rotating power source element 28 is arranged on a power source element supporting element, the rotating gear 27 is engaged with the rotating gear ring 30, the rotating power source element 28 is used for driving the rotating gear 27 to rotate, the rotating gear 27 is used for driving the rotating gear ring 30 to rotate, and the rotating gear ring 30 is used for driving the movable arm 8 to rotate.

The rotating gear 27 and the rotating power source element 28 can also be of an integrated structure.

The rotating gear 27 can also be arranged on the movable arm 8, the rotating gear ring 30 is arranged on a fixed seat 9, the rotating power source element 28 is used for driving the rotating gear ring 30 to rotate, the rotating gear ring 30 is engaged with the rotating gear 27, the rotating gear ring 30 is used for driving the rotating gear 27 to rotate, and the rotating gear 27 is used for driving the movable arm 8 to rotate.

The rest is the same as embodiment 1.

Embodiment 10

As shown in Fig. 15, in equipment for converting rotary motion into reciprocating impact motion, a rocker arm 6 includes a rotating device 15, wherein the rotating device 15 is a cable wire rotating device 32, the cable wire rotating device 32 includes a cable wire 31, a rotating power source element 28, a power source element supporting frame 33 and the like, the cable wire 31 is wound on a power source element output shaft, the two ends of the cable wire 31 are connected with a movable arm 8, a power source element is connected with the cable wire 31, the power source element is arranged on a power source element supporting element, the power source element is used for driving the cable wire 31, and the cable wire 31 is used for driving the movable arm 8 to rotate.

The cable wire rotating device 32 can also include the cable wire 31, a bend wheel, the rotating power source element 28, and a supporting frame 95 of the rotating power source element 28, wherein the cable wire 31 is wound on the bend wheel, the two ends of the cable wire 31 are connected with the movable arm 8 through the bend wheel, the rotating power source element 28 is connected with the cable wire 31 or the bend wheel, the rotating power source element 28 is arranged on a supporting element of the rotating power source element 28, the rotating power source element 28 is used for driving the cable wire 31 or the bend wheel, and the cable wire 31 is used for driving the movable arm 8 to rotate.

The rotating device 15 can also be a gear rotating device or a hydraulic rotating device or a pneumatic rotating device or a rotating device of a rack 81 or a thread screw rotating device or a hanging gear rotating device or a chain drive device or a motor drive rotating device, and the like.

The rest is the same as embodiment 1.

Embodiment 11

As shown in Fig. 16, in equipment for converting rotary motion into reciprocating impact motion, a rocker arm 6 includes a telescopic device 16, wherein the telescopic device 16 is a gear and rack telescopic device 34.

The telescopic device 16 can also be a screw telescopic device or a hydraulic telescopic device or a pneumatic telescopic device or a telescopic device of a cable wire 31 or a chain telescopic device or a motor drive telescopic device or a jack telescopic device, and the like.

The rest is the same as embodiment 1.

Embodiment 12

As shown in Fig. 17 and Fig. 18, in equipment for converting rotary motion into reciprocating impact motion, a motor drive rotating device 15 includes a telescopic transmission device 35, wherein the telescopic transmission device 35 includes a spline sleeve 37, a spline shaft 36 and the like, the spline sleeve 37 is matched with the spline shaft 36, under the drive of the telescopic transmission device 35, the spline sleeve 37 telescopes relative to the spline shaft 36 in a reciprocating manner to increase the digging height and/or digging depth of a digging machine.

The rest is the same as embodiment 1.

Embodiment 13

As shown in Fig. 19, equipment for converting rotary motion into reciprocating impact motion, includes an impact power box 38, an inner-layer material impact

mechanism 39, an outer-layer material impact mechanism 40 and the like, wherein the outer-layer material impact mechanism 40 includes outer-layer material impact teeth 43, an outer-layer material impact tooth seat 44, an outer-layer material impact protection device 41 and the like, the inner-layer material impact mechanism 39 includes inner-layer material impact teeth 45, an inner-layer material impact tooth seat 46, an inner-layer material impact protection device 42 and the like, the impact power box 38 is used for driving the outer-layer material impact mechanism 40 and/or the inner-layer material impact mechanism 39 to reciprocate, a part of the outer-layer material impact protection device 41 or a part of the inner-layer material impact protection device 42 is consistently overlapped with the impact power box 38, in order to prevent a material from entering the outer-layer material impact protection device 41 and the impact power box 38 or prevent the material from entering the inner-layer material impact protection device 42 and the impact power box 38.

A part of the outer-layer material impact protection device 41 and/or a part of the inner-layer material impact protection device 42 can also be consistently overlapped with the impact power box 38, in order to prevent the material from entering the outer-layer material impact protection device 41 and the impact power box 38 or prevent the material from entering the inner-layer material impact protection device 42 and the impact power box 38.

The rest is the same as embodiment 1.

Embodiment 14

As shown in Fig. 20, in equipment for converting rotary motion into reciprocating impact motion, an outer-layer material impact mechanism 40 includes outer-layer material impact teeth 43, an outer-layer material impact tooth seat 44, an outer-layer material impact protection device 41 and the like, wherein the outer-layer material impact tooth seat 44 and the outer-layer material impact teeth 43 are integrated, the

outer-layer material impact protection device 41 and the outer-layer material impact tooth seat 44 are separately connected, the outer-layer material impact protection device 41 is fixed with the outer-layer material impact tooth seat 44 through bolt connection, the outer-layer material impact protection device 41 reciprocates with the outer-layer material impact tooth seat 44, the outer-layer material impact protection device 41 reciprocates by leaning against an impact power box 38, and a wear-resistant gap is arranged at the leaning part.

The outer-layer material impact tooth seat 44 and the outer-layer material impact teeth 43 can be separately connected.

The outer-layer material impact protection device 41 and the outer-layer material impact tooth seat 44 can be integrated.

The rest is the same as embodiment 13.

Embodiment 15

As shown in Fig. 21, in equipment for converting rotary motion into reciprocating impact motion, an inner-layer material impact mechanism 39 includes inner-layer material impact teeth 45, an inner-layer material impact tooth seat 46, an inner-layer material impact protection device 42 and the like, wherein the inner-layer material impact tooth seat 46 and the inner-layer material impact teeth 45 are separately connected, the inner-layer material impact protection device 42 and the inner-layer material impact tooth seat 46 are separately connected, and the inner-layer material impact protection device 42 reciprocates with the inner-layer material impact tooth seat 46.

The inner-layer material impact tooth seat 46 and the inner-layer material impact teeth 45 can be integrated.

The inner-layer material impact protection device 42 and the inner-layer material impact tooth seat 46 can be integrated.

The rest is the same as embodiment 13.

Embodiment 16

As shown in Fig. 22 and Fig. 23, in equipment for converting rotary motion into reciprocating impact motion, an outer-layer material impact protection device 41 includes an outer-layer material impact protection plate and the like, wherein the outer-layer material impact protection plate is arranged along the surrounding or a local part of an outer-layer material impact tooth seat 44.

The inner-layer material impact protection device 42 can also include an inner-layer material impact protection plate and the like, and the inner-layer material impact protection plate is arranged along the surrounding or a local part of an inner-layer material impact tooth seat 46.

The rest is the same as embodiment 13.

Embodiment 17

As shown in Fig. 24 and Fig. 25, in equipment for converting rotary motion into reciprocating impact motion, an inner-layer material impact protection device 42 is an inner-layer material impact protection plate, wherein a sealing element 47 is arranged at the joint site of the inner-layer material impact protection plate and an inner-layer material impact tooth seat 46.

The sealing element 47 can be arranged at the joint site of the outer-layer material impact protection plate and an outer-layer material impact tooth seat 44.

The inner-layer material impact protection plate includes a sealing element of the inner-layer material impact protection plate, the outer-layer material impact protection plate includes a sealing element of the outer-layer material impact protection plate, and the sealing element of the inner-layer material impact protection plate and the sealing element of the outer-layer material impact protection plate are arranged at the ends consistently overlapped with an impact power box 38.

The impact power box 38 can include a sealing element of the impact power box, and the sealing element of the impact power box is arranged at the end consistently overlapped with the inner-layer material impact protection plate and/or the outer-layer material impact protection plate.

The sealing element 47 includes a sealing cavity or a sealing piece or a sealing plug or a sealing pad or an O-shaped ring or a sliding ring or a retainer ring or a supporting ring or a sealing ring or a starlike ring or a pressing ring or a V-shaped body or a U-shaped body or a frame-shaped ring or a groove-shaped element or a pressure spring or an opening sealing ring or a sealing strip or a sealing plate or a sealing block or a hair brush sealing element or a trash removal sealing element or a lip-shaped sealing element, and the like.

The rest is the same as embodiment 13.

Embodiment 18

As shown in Fig. 26 and Fig. 27, in equipment for converting rotary motion into reciprocating impact motion, an impact power box 38 includes a protection plate stroke groove 48 and the like, wherein an outer-layer material impact protection device 41 includes an outer-layer material impact protection plate, an inner-layer material impact protection device 42 includes an inner-layer material impact protection plate, and the adjacent parts of the inner-layer material impact protection plate and the outer-layer material impact protection plate reciprocate in the protection plate stroke groove 48, an elastomer 49 is arranged in the protection plate stroke groove 48, a part of the outer-layer material impact protection plate and a part of the inner-layer material impact protection plate are consistently overlapped with the impact power box 38 to prevent the material from entering the space between an inner-layer material impact mechanism 39 and the impact power box 38 or prevent the material from entering the space between an outer-layer material impact mechanism

40 and the impact power box 38, in order to prevent the dust from being introduced into the impact power box 38 to pollute a driving device, a guide device and the like, and prevent the material from colliding a reciprocating telescopic part to result in damage and/or deformation and the like of an impact guide element 50 and/or a power impact element 51, the elastomer 49 is used for shaking off and popping out the material brought by the outer-layer material impact protection plate and/or the inner-layer material impact protection plate and/or other materials dropping into the protection plate stroke groove 48 by means of elastic deformation, and is used for absorbing the impact counterforce of the outer-layer material impact mechanism 40 and/or the inner-layer material impact mechanism 39 by means of elastic deformation. The elastomer 49 can be arranged at the free end of the outer-layer material impact protection plate and/or the free end of the inner-layer material impact protection plate. The elastomer 49 can be a rubber material elastomer or a polyurethane material elastomer or a high molecular material elastomer or a metallic material elastomer or a composite material elastomer, and the like.

The outer-layer material impact protection plate and/or the inner-layer material impact protection plate can be made from a metallic material or a high molecular material or a polyester material or a rubber material or a composite material, and the like.

The rest is the same as embodiment 13.

Embodiment 19

As shown in Fig. 28 and Fig. 29, in equipment for converting rotary motion into reciprocating impact motion, an outer-layer material impact mechanism 40 includes a water spray device 52, wherein the water spray device 52 is arranged on an outer-layer material impact tooth seat 44, outer-layer material impact teeth 43 are used for protecting the water spray device 52 from being damaged resulting from that multiple layers of impact shovels of the protection plate impact the material, the water spray

device 52 is used for spraying water to an outer-layer material impact protection device 41 and an inner-layer material impact protection device 42, in order to prevent the material from being adhered to the outer-layer material impact protection device 41 or prevent the material from being adhered to the inner-layer material impact protection device 42 or prevent the material from being adhered in a protection plate stroke groove 48, the water spray device 52 is provided with a water flow controller, the water flow controller is used for controlling the water flow direction and/or controlling the water flow position and/or controlling the water spray time, in order to control the water flow to not enter an impact power box 38 and the inner-layer material impact protection device 42 and/or control the water flow to not enter the impact power box 38 and the outer-layer material impact protection device 41.

The water spray device 52 can also be arranged on an inner-layer material impact mechanism 39 or the impact power box 38.

The rest is the same as embodiment 13.

Embodiment 20

As shown in Fig. 30, Fig. 31, Fig. 32, Fig. 33 and Fig. 34, in equipment for converting rotary motion into reciprocating impact motion, a reciprocating impact part 5 includes a buffer break-off prevention mechanism 56, an impact head 1, an impact power source element 11 and the like, wherein the buffer break-off prevention mechanism 56 includes a buffer reciprocating element 53, an elastomer 49, a buffer supporting element 54 and the like, the elastomer 49 is arranged between the buffer supporting element 54 and the buffer reciprocating element 53, the impact power source element 11 includes a power impact element 51, the impact head 1 includes an impact tooth seat, when the buffer reciprocating element 53 is arranged on the power impact element 51, the buffer supporting element 54 is correspondingly arranged on the impact tooth seat, when the buffer supporting element 54 is arranged on the power

impact element 51, the buffer reciprocating element 53 is correspondingly arranged on the impact tooth seat, the buffer reciprocating element 53 and the power impact element 51 are separated, the buffer reciprocating element 53 and the impact tooth seat are separated, the buffer supporting element 54 and the power impact element 51 are separated, the buffer supporting element 54 and the impact tooth seat are separated, the buffer break-off prevention mechanism 56 is arranged between the impact head 1 and the power impact element 51, when the impact head 1 is used for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone, an impact counterforce is applied to the buffer break-off prevention mechanism 56, the buffer reciprocating element 53 extrudes the elastomer 49, and the elastomer 49 deforms to absorb and decompose the impact counterforce.

A quantitative motion gap of the buffer reciprocating element 53 is arranged at the buckling site of the buffer reciprocating element 53 and the buffer supporting element 54, when an impact counteraction break-off force of the impact head 1 is applied to the buffer break-off prevention mechanism 56, the buffer reciprocating element 53 swings between the buffer supporting element 54 and the buffer reciprocating element 53, to prevent the impact counteraction break-off force from breaking off the impact power source element 11.

The buffer break-off prevention mechanism 56 is provided with a buffer reciprocating guide structure, wherein the buffer reciprocating guide structure is separately connected with the buffer supporting element 54, and the buffer reciprocating guide structure and the buffer reciprocating element 53 are separated.

When the power impact element 51 is connected with the buffer supporting element 54, the impact head 1 is correspondingly connected with the buffer reciprocating element 53.

The buffer reciprocating element 53 and the power impact element 51 can be separately connected or are integrated, the buffer reciprocating element 53 and the impact tooth seat can also be separately connected or are integrated, the buffer supporting element 54 and the power impact element 51 are separately connected or are integrated, the buffer supporting element 54 and the impact tooth seat are separately connected or are integrated, the buffer break-off prevention mechanism 56 can be arranged on the power impact element 51 or the buffer break-off prevention mechanism 56 can also be arranged on the impact tooth seat.

The buffer reciprocating element 53 is a rod type buffer reciprocating element, the buffer reciprocating guide structure is a cylindrical buffer reciprocating guide structure, the buffer supporting element 54 is a cylindrical buffer supporting element, the elastomer 49 is a disk spring 57, the impact power source element 11 is a motor, and the buffer break-off prevention mechanism 56 is a bidirectional buffer break-off prevention mechanism 62.

The buffer reciprocating element 53 can also be a cylindrical buffer reciprocating element or a frame-shaped buffer reciprocating element or a U-shaped buffer reciprocating element or a multi-prismatic buffer reciprocating element or a plate type buffer reciprocating element or a thread adjustment type buffer reciprocating element or a neck buffer reciprocating element or a buffer reciprocating element of a baffle 59 or a hinge hole buffer reciprocating element or a pin shaft buffer reciprocating element or a hook buffer reciprocating element or a combination of multiple shapes, and the like.

The buffer break-off prevention mechanism 56 is provided with a buffer reciprocating guide structure, wherein the buffer reciprocating guide structure and the buffer supporting element 54 are separated or separately connected or integrated, or the

buffer reciprocating guide structure and the buffer reciprocating element 53 are separately connected or integrated.

The buffer reciprocating guide structure can also be a plate type buffer reciprocating guide structure or a triangular buffer reciprocating guide structure or a quadrangular buffer reciprocating guide structure or a polygonal buffer reciprocating guide structure or a columnar buffer reciprocating guide structure or a rod type buffer reciprocating guide structure or a push-pull type buffer reciprocating guider or a sleeve rod type buffer reciprocating guider or a buffer reciprocating guider of the elastomer 49, and the like.

The buffer supporting element 54 can also be a rod type buffer supporting element or a frame-shaped buffer supporting element or a U-shaped buffer supporting element or a multi-prismatic buffer supporting element or a plate type buffer supporting element or a thread adjustment type buffer supporting element or a neck buffer supporting element or a buffer supporting element of the baffle 59 or a hinge hole buffer supporting element or a pin shaft buffer supporting element 54 or a hook buffer supporting element or a clamping sleeve buffer supporting element or a combination of multiple shapes, and the like.

When the power impact element 51 is connected with the buffer reciprocating element 53, the impact head 1 is correspondingly connected with the buffer supporting element 54.

The impact power source element 11 can also be a hydraulic motor or a pneumatic motor or a magnetic power or hydraulic impact power source element 11 or an air pressure impact power source element 11, and the like.

The buffer reciprocating element 53 or the buffer supporting element 54 is made from a high-strength wear-resistant material, the high-strength wear-resistant material is a hard alloy or wear-resistant plastic or wear-resistant steel or wear-resistant rubber or

wear-resistant ceramic or a self-lubricating wear-resistant material or a composite wear-resistant material, and the like, a lubricant is arranged on the buffer reciprocating element 53 or the buffer supporting element 54, or the buffer reciprocating element 53 is a self-lubricating material, or the buffer supporting element 54 is a self-lubricating material, and the like.

As shown in Fig. 32, Fig. 33 and Fig. 34, the elastomer 49 is of an elastic rubber structure.

Embodiment 21

As shown in Fig. 35, Fig. 36 and Fig. 37, in equipment for converting rotary motion into reciprocating impact motion, a buffer break-off prevention mechanism 56 includes a buffer reciprocating element 53, an elastomer 49, a buffer supporting element 54 and a buffer adjusting element 84, wherein the elastomer 49 is arranged between the buffer adjusting element 84 and the buffer reciprocating element 53, the buffer supporting element 54 is in threaded connection with the buffer adjusting element 84, when an impact head 1 is used for impacting the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone, an impact counterforce is applied to the buffer break-off prevention mechanism 56, the buffer reciprocating element 53 extrudes the elastomer 49, and the elastomer 49 deforms in the buffer adjusting element 84 to absorb and decompose the impact counterforce, a pre-tightening force adjusting structure used for adjusting the relative position of the buffer adjusting element 84 and the buffer supporting element 54 is arranged between the buffer adjusting element 84 and the buffer supporting element 54, the pre-tightening force adjusting structure is used for adjusting the relative position of the buffer adjusting element 84 and the buffer supporting element 54 and pressing or loosening the fatigue deformed elastomer 49, and the pre-tightening force adjusting structure is a thread pre-tightening force adjusting structure 85.

A buffer anti-drop limiting structure includes an anti-drop limiting structure of the buffer reciprocating element and/or an anti-drop limiting structure of the buffer supporting element, wherein the anti-drop limiting structure of the buffer supporting element and the buffer supporting element 54 are separated, the anti-drop limiting structure of the buffer reciprocating element and the buffer reciprocating element 53 are integrated, the buffer anti-drop limiting structure is used for preventing the separation of the buffer reciprocating element 53 and the buffer supporting element 54 or preventing the separation of the buffer reciprocating element 53 and the impact tooth seat or preventing the separation of the elastomer 49 and the buffer reciprocating element 53 or preventing the separation of the elastomer 49 and the buffer supporting element 54 or preventing the separation of the elastomer 49 and the impact tooth seat.

The anti-drop limiting structure of the buffer supporting element 54 and the buffer reciprocating element 54 can also be separately connected or are integrated, and the anti-drop limiting structure of the buffer reciprocating element and the buffer reciprocating element 53 can also be separated or separately connected.

An anti-drop limiting structure 58 of the reciprocating element can also be a limiting platform 25 or a limiting pin or a limiting hole or a limiting groove or a limiting bolt or a limiting neck or a limiting guide post or a limiting shaft or a limiting plate or a limiting ring or a limiting snap spring or a limiting hook or a limiting thread or a clamping sleeve or combined limiting, and the like.

The pre-tightening force adjusting structure can also be a locking pin pre-tightening force adjusting structure or a clamping pin pre-tightening force adjusting structure or a catching groove pre-tightening force adjusting structure or a snap spring pre-tightening force adjusting structure or a hanging gear pre-tightening force adjusting structure, and the like.

An anti-drop limiting structure 55 of the supporting element and the buffer supporting element 54 can also be separated or separately connected, and the anti-drop limiting structure 58 of the reciprocating element and the buffer reciprocating element 53 can also be separated or separately connected.

The buffer supporting element 54 can also be movably connected with the buffer adjusting element 84 through a locking pin or a catching groove or a hanging gear.

The rest is the same as embodiment 20.

Embodiment 22

As shown in Fig. 38 and Fig. 39, in equipment for converting rotary motion into reciprocating impact motion, a bidirectional buffer break-off prevention mechanism 62 includes a buffer supporting element 54 and a buffer reciprocating element 53, wherein an elastomer blocking element is arranged on the buffer reciprocating element 53, elastomers 49 are arranged at both sides of the elastomer blocking element, a counterforce generated by a power impact element 51 when driving an impact head 1 to bidirectionally impact respectively acts on the elastomers 49 at the two sides of the elastomer blocking element, and the elastomers 49 at the two sides of the elastomer blocking element bidirectionally buffer, the elastomer blocking element is a cambered head column, a bulb of the buffer supporting element 54 or a cambered surface 88 of the buffer supporting element is arranged at the position of the buffer supporting element 54 at the joint site of the buffer supporting element 54 and the buffer reciprocating element 53, when the impact counteraction break-off force of the impact head 1 is applied to a buffer break-off prevention mechanism 56 to buffer the swing of the buffer reciprocating element 53 between the buffer supporting element 54 and the buffer reciprocating element 53, the bulb of the buffer supporting element 54 or the cambered surface 88 of the buffer supporting element generates no break-off

damage to the buffer reciprocating element 53 and/or the buffer supporting element 54.

The elastomer blocking element can also be a lug boss or a blocking column or a baffle 59 or a bulb column or a bulb plate or a cambered convex edge or a cambered edge plate or a baffle 59, and the like, wherein when the impact counteraction break-off force of the impact head 1 is applied to the buffer break-off prevention mechanism 56 to buffer the swing of the buffer reciprocating element 53 between the buffer supporting element 54 and the buffer reciprocating element 53, the bulb column or the bulb plate or the cambered convex edge or the cambered edge plate or the cambered head column and the like of the elastomer blocking element generates no break-off damage to the buffer reciprocating element 53 and/or the buffer supporting element 54.

The elastomer 49 can be serially connected to the buffer reciprocating element 53, the buffer supporting element 54 includes a front end guide element 60, a rear end guide element 61 and the like, the buffer reciprocating element 53 is arranged on the front end guide element 60 and/or the rear end guide element 61, and the front end guide element 60 and/or the rear end guide element 61 is used for enlarging the correction distance and/or force of the buffer reciprocating element 53.

The elastomer 49 can be not serially connected to the buffer reciprocating element 53 and is arranged between the buffer supporting element 54 and the buffer reciprocating element 53.

The rest is the same as embodiment 20.

Embodiment 23

As shown in Fig. 40, in equipment for converting rotary motion into reciprocating impact motion, a power impact element 51 and a buffer reciprocating element 53 are

of an integrated structure, and the power impact element 51 and a buffer reciprocating element 53 are of a hinge shaft connecting structure.

The rest is the same as embodiment 22.

Embodiment 24

As shown in Fig. 41, in equipment for converting rotary motion into reciprocating impact motion, when an elastomer 49 is a spring 66, the structure of a buffer break-off prevention mechanism 56 is as follows: the spring 66 is arranged between a buffer reciprocating element 53 and a buffer supporting element 54, a baffle 59 is arranged on the buffer reciprocating element 53, and the baffle 59 and the buffer reciprocating element 53 are of an integrated structure.

The rest is the same as embodiment 20.

Embodiment 25

As shown in Fig. 42 and Fig. 43, in equipment for converting rotary motion into reciprocating impact motion, the schematic diagram of a structure when an elastomer 49 is elastic polyester 67 is shown, a buffer supporting element 54 can be used for performing a dual function of guiding and limiting a buffer reciprocating element 53.

As shown in Fig. 43, an element of the elastic polyester 67 is located between a reciprocating element limiting structure and the buffer supporting element 54, and the reciprocating element limiting structure is used for limiting the motion of the element of the elastic polyester 67.

The elastomer 49 can also be a steel plate of a spring 66 or a disk spring 57 or elastic nylon or elastic corrugated steel or a sac or an airbag or an elastic granule or a polymeric elastomer or a composite material elastomer or an air pressure or a hydraulic pressure or a pneumatic spring 66 or a hydraulic spring, and the like.

The rest is the same as embodiment 20.

Embodiment 26

As shown in Fig. 44 to Fig. 46, in equipment for converting rotary motion into reciprocating impact motion, the reciprocating impact motion equipment includes a machine body 4, a walking part 7, a reciprocating impact part 5 and the like, wherein the reciprocating impact part 5 includes a guide mechanism 68, an impact driving mechanism 2 and the like, the guide mechanism 68 and the impact driving mechanism 2 are separated, the guide mechanism 68 includes an impact guide element 50, a guide rolling body 86, a guide supporting element 83 and the like, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, an impact head 1 is arranged at one end of the impact guide element 50 and a counterweight element 94 used for preventing the impact head 1 from breaking off the guide mechanism 68, the impact driving mechanism 2 and/or the machine body 4 and the like due to unbalanced gravity is arranged at the other end thereof, the impact head 1 is connected with the impact guide element 50, the impact driving mechanism 2 includes a power impact element 51 and the like, the power impact element 51 is used for driving the impact guide element 50 to reciprocate, the impact guide element 50 is used for driving the impact head 1 to impact a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone to blank a material, the power impact element 51 and the impact guide element 50 are separated, the machine body 4 includes a frame 125 and the like, no lifting mechanism 96 is arranged on the machine body 4, the reciprocating impact part 5 is arranged on the frame 125, and the walking part 7 is arranged at the lower part of the machine body 4 and is used for driving the machine body 4 to walk.

The guide rolling body 86 or the guide supporting element 83 or the impact guide element 50 or a power rolling body 71 or the power impact element 51 is made from a high-strength wear-resistant material, and the high-strength wear-resistant material is

a hard alloy or wear-resistant plastic or wear-resistant steel or wear-resistant rubber or wear-resistant ceramic or a self-lubricating wear-resistant material, and the like.

The impact head 1 can also be arranged at only one end of the impact guide element 50.

The power impact element 51 and the impact guide element 50 can also be connected or integrated.

The impact head 1 and the impact guide element 50 can also be integrated.

The machine body 4 can also be provided with the lifting mechanism 96 and the like, and the lifting mechanism 96 is arranged on the frame 125.

The equipment is compact and simple in integral structure and is convenient to use and operate, drilling and milling type blanking is changed into impact blanking, thereby basically eliminating the break-off of a lateral force to the reciprocating impact part 5, greatly reducing the damage to the components, improving the production efficiency and reducing the material consumption, and rolling friction is used for greatly reducing the friction loss, thus saving the power source;

compared with the existing drilling and milling type heading machine, the equipment is not used for completely crushing the material, so that the rate of lump materials is high, the power consumption is small, the dust is little and the working environment is good and the use value and economic value of the material are improved;

the impact heads 1 are arranged at the two sides of the front part of the lifting mechanism 96 to impact in a reciprocating manner, thereby being conductive to converting the impact counterforce generated by the impact of the impact head 1 at one side into the impact power of the impact head 1 at the other side, and the impact power and/or the impact counterforce is reasonably utilized to greatly reduce the kinetic energy consumption;

the working manner of the impact head 1 is linear reciprocating impact, compared with the drilling and milling type and milling and cutting type, the break-off degree of the impact teeth is greatly decreased, so that the service life of the impact teeth is greatly prolonged, the change frequency of the impact teeth is reduced, the dissipation of the vulnerable parts of the equipment is reduced and the working efficiency is improved;

the impact guide element 50 is supported by using the guide rolling body 86 in the equipment, thereby greatly reducing the damage of the reciprocating impact friction to the impact guide element 50 and reducing the kinetic energy consumption;

the counterweight is arranged at the other end of the impact head 1 to ensure the gravity balance during impact, reduce the break-off of the impact guide element 50 during impact caused by unbalanced gravity at the two ends and improve the stability of the equipment.

Embodiment 27

As shown in Fig. 47, in equipment for converting rotary motion into reciprocating impact motion, the reciprocating impact motion equipment includes a machine body 4, a walking part 7, a reciprocating impact part 5 and the like, wherein the reciprocating impact part 5 includes a guide mechanism 68, an impact driving mechanism 2 and the like, the guide mechanism 68 and the impact driving mechanism 2 are integrated, the guide mechanism 68 includes an impact guide element 50, a guide rolling body 86, a guide supporting element 83 and the like, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, an impact head 1 is integrated with the impact guide element 50, the impact driving mechanism 2 includes a power impact element 51 and the like, the power impact element 51 is used for driving the impact guide element 50 to reciprocate, the impact guide element 50 is used for driving the impact head 1 to impact a coal bed or a rock stratum or

cement concrete or bituminous concrete or hardened mudstone to blank a material, the power impact element 51 and the impact guide element 50 are integrated, the machine body 4 includes a frame 125 and the like, a lifting mechanism 96 and the like is arranged on the machine body 4, the reciprocating impact part 5 is arranged on the lifting mechanism 96, the lifting mechanism 96 is arranged on the frame 125, and the walking part 7 is arranged at the lower part of the machine body 4 and is used for driving the machine body 4 to walk.

The guide rolling body 86 or the guide supporting element 83 or the impact guide element 50 or a power rolling body 71 or the power impact element 51 is made from a high-strength wear-resistant material, and the high-strength wear-resistant material is a hard alloy or wear-resistant plastic or wear-resistant steel or wear-resistant rubber or wear-resistant ceramic or a self-lubricating wear-resistant material, and the like.

The reciprocating impact part 5 includes a rocker arm 6, the machine body 4 includes a rotary disk 3, the rocker arm 6 is arranged on the rotary disk 3, the rotary disk 3 is used for driving the rocker arm 6 to rotate at the front part of the machine body 4, the reciprocating impact part 5 includes a lifting oil cylinder 100 of the rocker arm 6, one end of the lifting oil cylinder 100 of the rocker arm 6 is fixed on the rotary disk 3, the other end thereof is connected with the rocker arm 6, and the lifting oil cylinder 100 of the rocker arm 6 is used for driving the rocker arm 6 to move up and down.

The machine body 4 further includes a shovel plate 108 and the like, wherein a star wheel pusher dog or a crab claw pusher dog and the like is arranged on the shovel plate 108, a conveyor 109 is arranged at the middle part of the machine body 4, the conveyor 109 includes a scraper conveyer, a belt 130 conveyor, a shell belt conveyor and the like, the shovel plate 108 is used for collecting the material dug by the reciprocating impact part 5 to the conveyor 109, and the conveyor 109 is used for conveying the material to the rear of the machine body 4.

The machine body 4 further includes a control device, a cable towing device, a spray device, a water spray device 52 or a cooling device and the like.

In order to achieve a better use effect, avoid the generation of overlarge lump materials and guide the material to flow to a proper position, the frame 125 or the lifting mechanism 96 includes a crushing device 101 or a material guider 102 and the like, and the machine body 4 advances and/or retreats for coal mining.

The equipment is compact and simple in integral structure and is convenient to use and operate, drilling and milling type blanking is changed into impact blanking, thereby basically eliminating the break-off of a lateral force to the reciprocating impact part 5, greatly reducing the damage to the components, improving the production efficiency and reducing the material consumption, and the rolling friction or the suspension friction is used for greatly reducing the friction loss and saving the power source;

compared with the existing drilling and milling type heading machine, the equipment is not used for completely crushing the material, so that the rate of lump materials is high, the power consumption is small, the dust is little and the working environment is good and the use value and economic value of the material are improved;

the impact heads 1 are arranged at the two sides of the front part of the lifting mechanism 96 to impact in a reciprocating manner, thereby being conductive to converting the impact counterforce generated by the impact of the impact head 1 at one side into the impact power of the impact head 1 at the other side, and the impact power and/or the impact counterforce is reasonably utilized to greatly reduce the kinetic energy consumption;

the working manner of the impact head 1 is linear reciprocating impact, compared with the drilling and milling type, the break-off degree of the impact teeth is greatly decreased, so that the service life of the impact teeth is greatly prolonged, the change

frequency of the impact teeth is reduced, the dissipation of the vulnerable parts of the equipment is reduced and the working efficiency is improved; and

the impact guide element 50 is supported by using the guide rolling body 86 in the equipment, thereby greatly reducing the damage of the reciprocating impact friction to the impact guide element 50 and reducing the kinetic energy consumption.

The rest is the same as embodiment 1.

Embodiment 28

As shown in Fig. 48 and Fig. 49, equipment for converting rotary motion into reciprocating impact motion, including a machine body 4, a walking part 7, a lifting mechanism 96, a reciprocating impact part 5 and the like, wherein the reciprocating impact part 5 includes a guide mechanism 68, an impact driving mechanism 2 and the like, the impact driving mechanism 2 includes a crank impact driving mechanism 73 and the like, the crank impact driving mechanism 73 includes a power impact element 51 and the like, the guide mechanism 68 includes a guide supporting element 83, an impact guide element 50, a guide rolling body 86 and the like, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, an impact head 1 is arranged at one end of the impact guide element 50 and a counterweight element 94 used for preventing the impact head 1 from breaking off the guide mechanism 68, the impact driving mechanism 2, the lifting mechanism 96 and/or the machine body 4 and the like due to unbalanced gravity is arranged at the other end thereof, the power impact element 51 and the impact head 1 are connected or separated, the guide mechanism 68 and the crank impact driving mechanism 73 and the like are cooperatively arranged on the lifting mechanism 96, the lifting mechanism 96 is arranged on the machine body 4, the walking part 7 and the like is arranged at the lower part of the machine body 4, the guide rolling body 86, the guide supporting element 83 and the impact guide element 50 are in close fit to enable the guide rolling

body 86 to support the impact guide element 50 to reciprocate through rolling friction, the impact direction of the impact guide element 50 is controlled through rolling friction, in order to avoid the damage to the impact guide element 50 resulting from sliding friction, the impact guide element 50 is used for supporting the impact head 1 to reciprocate through rolling friction, the power impact element 51 is used for driving the impact head 1 to impact, the counteraction break-off force of the impact head 1 for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone is applied to the guide mechanism 68, the guide mechanism 68 is used for correcting the impact direction of the impact head 1, and the walking part 7 is used for driving the machine body 4 to walk to achieve continuous digging by reciprocating impact.

The guide mechanism 68 and the impact driving mechanism 2 can also be integrated; the impact head 1 can be arranged at only one end of the impact guide element 50; the impact head 1 and the impact guide element 50 can also be integrated.

The impact guide element 50 is supported by using the guide rolling body 86 in the equipment, thereby greatly reducing the damage of the reciprocating impact friction to the impact guide element 50 and reducing the kinetic energy consumption; the guide supporting element 83, the impact guide element 50 and the guide rolling body 86 cooperate to ensure the rolling guide to the impact guide element 50, change the structure that the guide rolling body 86 only performs a rolling friction but performs no guide function, and greatly reduce the loss of energy necessary for correcting the sliding friction of the impact guide element 50 and/or damage to the equipment.

The rest is the same as embodiment 27.

Embodiment 29

As shown in Fig. 50, in equipment for converting rotary motion into reciprocating impact motion, the guide mechanism 68 includes a guide supporting element 83, an

impact guide element 50 and the like, wherein an impact head 1 is arranged at one end of the impact guide element 50 and a counterweight element 94 is arranged at the other end thereof, the guide mechanism 68 further includes a guide segment 82 and the like, the guide segment 82 is arranged on the impact guide element 50, the weights of the two ends except the segment overlapped with the impact guide element 50 of the guide segment 82 are equal or basically equal, the guide segment 82 and the impact guide element 50 are integrated, the guide segment 82 is arranged on the guide supporting element 83, when moving, the guide segment 82 is always located on the guide supporting element 83 to keep the gravity balance of the two ends of the impact guide element 50 in a static or motion state, the guide supporting element 83 and the impact guide element 50 are in close fit to support the impact guide element 50 to reciprocate, a power impact element 51 is used for driving the impact head 1 or the impact guide element 50 to reciprocate, the power impact element 51 and the impact guide element 50 are separated, the impact head 1 is supported by the impact guide element 50 to reciprocate, the impact head 1 is used for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone to blank a material.

The guide segment 82 and the impact guide element 50 can also be separately connected.

The power impact element 51 and the impact guide element 50 can also be of a connected structure or are integrated.

By adopting the structure, the gravity balance of the impact head 1, the impact guide element 50 and the like in motion can be maintained, the impact on the guide mechanism 68 caused by unbalance is reduced, the operation stability is improved and the noise is reduced.

The rest is the same as embodiment 27.

Embodiment 30

As shown in Fig. 51, in equipment for converting rotary motion into reciprocating impact motion, the guide segment 82 and the impact guide element 50 are separately connected, the guide segment 82 is arranged on the guide supporting element 83, when moving, the guide segment 82 is always located on the guide supporting element 83 to keep the gravity balance of the two ends of the impact guide element 50 in a static or motion state.

The rest is the same as embodiment 27.

Embodiment 31

As shown in Fig. 52 and Fig. 53, equipment for converting rotary motion into reciprocating impact motion, includes a machine body 4, a lifting mechanism 96, a walking part 7, a reciprocating impact part 5 and the like, wherein the reciprocating impact part 5 includes an impact driving mechanism 2, a guide mechanism 68 and the like, the impact driving mechanism 2 includes a crank impact driving mechanism 73 and the like, the crank impact driving mechanism 73 includes a power impact element 51 and the like, the reciprocating impact part 5 includes an impact power box 38 or a supporting frame 95 and the like, a guide limiting structure 97 and the like is arranged on the impact power box 38 or the supporting frame 95, the guide limiting structure 97 is used for limiting an impact guide element 50 to linearly reciprocate, the impact guide element 50 is used for supporting an impact head 1 to reciprocate through rolling friction, the power impact element 51 is used for driving the impact head 1 to impact, and the counteraction break-off force generated by the impact head 1 for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone is applied to the guide mechanism 68.

The impact power box 38 is entirely sealed or partially sealed, the impact power box 38 or the supporting frame 95 includes a sealing element 47 and the like, the sealing element 47 is arranged at the movable connecting site of the impact driving mechanism 2 or the guide mechanism 68 and the impact power box 38, or the sealing element 47 is arranged at the movable connecting site of the impact driving mechanism 2 or the guide mechanism 68 and the supporting frame 95.

An impact element protection cover 107 is arranged at the joint site of the power impact element 51 and the impact head 1, or a guide element protection cover 107 is arranged at the joint site of the impact guide element 50 and the impact head 1, the power impact element 51 and the impact head 1 are connected or separated, the impact guide element 50 and the impact head 1 are connected or integrated, and the sealing element 47 is arranged on the impact element protection cover 107 or between the guide element protection cover 107 and the impact power box 38.

The sealing element 47 is arranged between the impact guide element 50 and a guide supporting element 83 or between the power impact element 51 and a power supporting element 74, the impact guide element 50 and the power impact element 51 are separated or integrated, and the guide supporting element 83 and the power supporting element 74 are separated or integrated.

The sealing element 47 includes a sealing cavity or a sealing piece or a sealing plug or a sealing pad or an O-shaped ring or a sliding ring or an elastomer 49 or a retainer ring or a supporting ring or a sealing ring or a starlike ring or a pressing ring or a V-shaped body or a U-shaped body or a frame-shaped ring or a groove-shaped element or a pressure spring or an opening sealing ring or a sealing strip or a sealing plate or a sealing block, and the like.

The sealing element 47 is made from a rubber material or a polyurethane material or a nylon material or a plastic material or a metallic material or a composite material, and the like.

The guide mechanism 68 is provided with a limiting structure of a guide rolling body 86, and the like, so that the safety and reliability of the equipment are improved.

The impact power box 38 is simple, reasonable, exquisite and compact in structure, small in volume, light in weight, relatively small in abrasion, perfect in functions and strong in break-off force and/or impact counterforce resistance.

The rest is the same as embodiment 27.

Embodiment 32

As shown in Fig. 54, Fig. 55, Fig. 56 and Fig. 57, equipment for converting rotary motion into reciprocating impact motion, includes a machine body 4, a lifting mechanism 96, a walking part 7, a reciprocating impact part 5 and the like, wherein the reciprocating impact part 5 includes an impact driving mechanism 2, a guide mechanism 68 and the like, the impact driving mechanism 2 includes a power supporting element 74, a power impact element 51 and the like, the guide mechanism 68 includes a guide supporting element 83, an impact guide element 50, a guide rolling body 86 and the like, the guide rolling body 86 includes a roller 72 and the like, the roller 72 is arranged between the guide supporting element 83 and the impact guide element 50, the roller 72 includes a roller shaft 87 and the like, the roller shaft 87 is fixed on the impact guide element 50, the roller 72 rolls by leaning against the impact guide element 50 to prevent the joint friction of the guide supporting element 83 and the impact guide element 50.

The roller shaft 87 can also be fixed on the guide supporting element 83, and the roller 72 rolls by leaning against the impact guide element 50.

The roller 72 can also be arranged between the power supporting element 74 and the power impact element 51, when the roller shaft 87 is fixed on the power impact element 51, the roller 72 rolls by leaning against the power supporting element 74, and when the roller shaft 87 is fixed on the power supporting element 74, the roller 72 rolls by leaning against the power impact element 51.

In the equipment, the roller 72 is arranged between the guide supporting element 83 and the impact guide element 50, the roller 72 is used for ensuring rolling friction of the impact guide element 50, to reduce the abrasion of the guide mechanism 68, prolong the service life and ensure low failure rate and little maintenance, the rolling friction is used for guaranteeing high reciprocating motion speed and high efficiency. Meanwhile, the use of the roller 72 is more clean and environment-friendly, and no hazardous substance or harmful gas and the like is generated due to overlarge sliding friction, so the quality of the working environment can be improved.

The rest is the same as embodiment 27.

Embodiment 33

As shown in Fig. 58, in equipment for converting rotary motion into reciprocating impact motion, a roller 72 includes a roller shaft 87 and the like, wherein the roller shaft 87 is fixed on a power supporting element 74, the roller 72 rolls by leaning against a power impact element 51, the surface of the roller 72 is processed to a V-shaped groove, the shape of the contact surface of the power impact element 51 and the roller 72 is buckled with the shape of the surface of the roller 72 to prevent the joint friction of the power impact element 51 and the power supporting element 74, so as to reduce the abrasion of an impact driving mechanism 2.

The roller 72 can also be arranged between a guide supporting element 83 and an impact guide element 50, when the roller shaft 87 is fixed on the guide supporting element 83, the roller 72 rolls by leaning against the impact guide element 50, and

when the roller shaft 87 is fixed on the impact guide element 50, the roller 72 rolls by leaning against the guide supporting element 83.

The roller shaft 87 can also be fixed on the power impact element 51, and the roller 72 rolls by leaning against the power supporting element 74.

The surface of the roller 72 can be processed to a projection, a depression and the like.

In the equipment, the roller 72 is arranged between the guide supporting element 83 and the impact guide element 50, the roller 72 is used for ensuring rolling friction of the impact guide element 50, to reduce the abrasion of the guide mechanism 68, prolong the service life and ensure low failure rate and little maintenance, the rolling friction is used for guaranteeing high reciprocating motion speed and high efficiency. Meanwhile, the use of the roller 72 is more clean and environment-friendly, and no hazardous substance or harmful gas and the like is generated due to overlarge sliding friction, so the quality of the working environment can be improved.

The rest is the same as embodiment 32.

Embodiment 34

As shown in Fig. 59, in equipment for converting rotary motion into reciprocating impact motion, a roller 72 includes a roller shaft 87 and the like, wherein the roller shaft 87 is fixed on an impact guide element 50, the roller 72 rolls by leaning against a guide supporting element 83 to prevent the joint friction of the guide supporting element 83 and the impact guide element 50, the surface of the roller 72 is processed to a curve shape, the shape of the contact surface of the guide supporting element 83 and the roller 72 is buckled with the shape of the surface of the roller 72, and the roller 72, the guide supporting element 83 and the impact guide element 50 are in close fit to control the motion of the impact guide element 50 and a power impact element 51 as linear reciprocating motion.

The roller 72 can also be arranged between a power supporting element 74 and the power impact element 51.

The surface of the roller 72 can be processed to a projection, a V-shaped groove or a depression and the like.

The rest is the same as embodiment 32.

Embodiment 35

As shown in Fig. 60 and Fig. 61, in equipment for converting rotary motion into reciprocating impact motion, an impact driving mechanism 2 includes a crank impact driving mechanism 73 and the like, wherein the crank impact driving mechanism 73 includes a power impact element 51 and the like, a guide mechanism 68 includes a guide rolling body 86, a guide supporting element 83, an impact guide element 50 and the like, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, an impact head 1 is arranged on the impact guide element 50, the power impact element 51 and the impact head 1 are connected or separated, the guide supporting element 83 is arranged to be an inner body 149, the impact guide element 50 is arranged to be an outer sleeve 145, the guide rolling body 86 is arranged between the outer sleeve 145 and the inner body 149, the outer sleeve 145, the inner body 149 and the guide rolling body 86 are in close fit to relatively reciprocate through the rolling friction of the guide rolling body 86, the guide supporting element 83 is used for supporting the guide rolling body 86 and/or the reciprocating outer sleeve 145, the impact head 1 and the reciprocating outer sleeve 145 are integrated or connected, the impact head 1 is supported by the reciprocating outer sleeve 145 to reciprocate through rolling friction, the power impact element 51 is used for driving the impact head 1 to impact, the counteraction break-off force of the impact head 1 for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone is applied to the guide mechanism 68, to

prevent the crank impact driving mechanism 73 from being damaged by the impact counteraction break-off force, the guide mechanism 68 is used for correcting the impact direction of the impact head 1 to ensure that the next impact action of the impact head 1 is applied to an object to be dug, and a walking part 7 is used for driving a machine body 4 to walk to achieve continuous digging by reciprocating impact.

The guide supporting element 83 can also be arranged to be the outer sleeve 145, at this time, the impact guide element 50 can be arranged to be the inner body 149.

Compared with a rotating bearing 161 and/or other rolling friction devices, the guide rolling body 86 is arranged between the outer sleeve 145 and the inner body 149, to enable the device to have a guide function when achieving rolling friction reciprocating motion, the guide rolling body 86 has the guide function when performing a rolling friction function, in order to reduce the friction resistance in the operation of the reciprocating impact part 5 when sliding friction is used as support, and the guide rolling body 86 is used for greatly improving the function of absorbing the impact counterforce and has a good guide effect.

The rest is the same as embodiment 27.

Embodiment 36

As shown in Fig. 62, in equipment for converting rotary motion into reciprocating impact motion, an impact driving mechanism 2 includes a crank impact driving mechanism 73, wherein the crank impact driving mechanism 73 includes a power impact element 51 and the like, a guide mechanism 68 includes a guide rolling body 86, a guide supporting element 83, an impact guide element 50 and the like, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, an impact head 1 and the like is arranged on the impact guide element 50, the power impact element 51 and the impact head 1 are connected or

separated, the guide supporting element 83 is arranged to be an outer sleeve 145, the impact guide element 50 is arranged to be an inner body 149, the guide rolling body 86 is arranged between the outer sleeve 145 and the inner body 149, the outer sleeve 145, the inner body 149 and the guide rolling body 86 are in close fit to relatively reciprocate through the rolling friction of the guide rolling body 86, the guide supporting element 83 is used for supporting the guide rolling body 86 and/or the reciprocating inner body 149, the impact head 1 and the reciprocating inner body 149 are integrated or connected, the impact head 1 is supported by the reciprocating inner body 149 to reciprocate through rolling friction, the power impact element 51 is used for driving the impact head 1 to impact, the counteraction break-off force of the impact head 1 for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone is applied to the guide mechanism 68, to prevent the impact driving mechanism 2 and the like from being damaged by the impact counteraction break-off force, the guide mechanism 68 is used for correcting the impact direction of the impact head 1 to ensure that the next impact action of the impact head 1 is applied to an object to be dug, and a walking part 7 is used for driving a machine body 4 to walk to achieve continuous digging by reciprocating impact.

The guide supporting element 83 can also be arranged to be the inner body 149, at this time, the impact guide element 50 can be arranged to be the outer sleeve 145.

The rest is the same as embodiment 27.

Embodiment 37

As shown in Fig. 63, in equipment for converting rotary motion into reciprocating impact motion, a friction body 164, an impact guide element 50 and a friction body supporting element 165 in the equipment are in close fit to form a multipoint impact head 1 supporting structure, the impact guide element 50 is used for widening the

correction width of the impact head 1 to the maximum, enlarging the correction force of the impact head 1, controlling the impact direction of the impact head 1 to the maximum, not only increasing the length of the break-off prevention force arm of the impact guide element 50, and reducing the break-off of the impact head 1 to the impact guide element 50, preventing the damage to an impact driving mechanism 2 resulting from the break-off force and/or the counterforce and prolonging the service life of the equipment.

The rest is the same as embodiment 27.

Embodiment 38

As shown in Fig. 64 and Fig. 65, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 is a crank impact driving mechanism 73, a friction body supporting element 165 includes a pit 75, friction bodies 164 are arranged between the friction body supporting element 165 and an impact guide element 50 and is arranged in the pit 75, or the friction bodies 164 are arranged between a power supporting element 74 and a power impact element 51 and is arranged in the pit 75, the pit 75 is used for limiting the rolling space and/or position of the friction bodies 164, the counteraction break-off force generated by the impact head 1 for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone is applied to a guide mechanism 68, to prevent the crank impact driving mechanism 73 and the like from being damaged by the impact counteraction break-off force, the guide mechanism 68 is used for correcting the impact direction of an impact head 1 to ensure that the next impact action of the impact head 1 is applied to an object to be dug.

The impact guide element 50 includes the pit 75 or the power supporting element 74 includes the pit 75 or the power impact element 51 includes the pit 75.

The guide mechanism 68 is provided with the pit 75, the friction bodies 164 are arranged in the pit 75, the friction bodies 164 are arranged at intervals through the pit 75, compared with an existing linear bearing 179, no extrusion between the friction bodies 164 will be generated in operation, thereby generating no mutual reverse friction, greatly reducing the energy loss, prolonging the service life and reducing the maintenance.

The rest is the same as embodiment 27.

Embodiment 39

As shown in Fig. 66, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 is a crank impact driving mechanism 73, a guide mechanism 68 includes an impact guide element 50, a friction body 164 and a friction body supporting element 165, the friction body supporting element 165 is provided with a raceway 76, the friction body supporting element 165, the impact guide element 50 and/or the friction body 164 rolling in the raceway 76 are in close buckling to drive the impact guide element 50 to reciprocate by means of the rolling friction of the friction body 164, and the raceway 76 is used for limiting the rolling space and/or position of the friction body 164.

The raceway 76 can also be arranged on the impact guide element 50.

Compared with a rotating bearing 161 and/or other rolling friction devices, the friction body 164 is arranged in the raceway 76, to enable the device to achieve rolling friction reciprocating motion, the guide rolling body 86 plays a rolling friction function, in order to reduce the friction resistance in the operation of a reciprocating impact part 5 when sliding friction is used as support, and the friction body 164 is used for greatly improving the function of absorbing the impact counterforce and is good in operation effect, simple in structure, few in vulnerable parts, low in production cost and stable in performance.

The rest is the same as embodiment 27.

Embodiment 40

As shown in Fig. 67, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 is a crank impact driving mechanism 73, a guide mechanism 68 includes an impact guide element 50, a friction body 164 and a friction body supporting element 165, raceways 76 and the like are arranged on a guide supporting element 83 and the impact guide element 50, the friction body supporting element 165, the impact guide element 50 and/or the friction body 164 rolling in the raceways 76 are in close buckling to drive the impact guide element 50 to reciprocate by means of the rolling friction of the friction body 164, and the raceways 76 are used for limiting the rolling space and/or position of the friction body 164.

The guide supporting element 83, the impact guide element 50 and/or the friction body 164 rolling in the raceways 76 are in close buckling to drive the impact guide element 50 to reciprocate by means of the rolling friction of the friction body 164.

The rest is the same as embodiment 27.

Embodiment 41

As shown in Fig. 68, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 is a crank impact driving mechanism 73, a guide mechanism 68 includes a rolling body supporting element 70, an impact guide element 50, a holder 77 and a guiding rolling body 86, the holder 77 is arranged between the rolling body supporting element 70 and the impact guide element 50, the guide rolling body 86 is arranged on the holder 77, the thickness of the holder 77 is smaller than the diameter of the guide rolling body 86, the two parts of the guide rolling body 86 higher than the holder 77 are respectively arranged on the rolling body supporting element 70 and the impact guide element 50, the holder 77 is

separately arranged, the rolling body supporting element 70, the impact guide element 50 and the guide rolling body 86 in the holder 77 are in close fit to drive the impact guide element 50 to reciprocate through rolling friction, and the holder 77 is used for limiting the rolling space and/or position of the guide rolling body 86.

The holder 77 can also be fixed on the rolling body supporting element 70.

Compared with a rotating bearing 161 and/or other rolling friction devices, the guide rolling body 86 is arranged on the holder 77, to enable the device to achievie rolling friction reciprocating, the guide rolling body 86 plays a rolling friction function, in order to reduce the friction resistance in the operation of a reciprocating impact part 5 when sliding friction is used as support, and the guide rolling body 86 is used for greatly improving the function of absorbing the impact counterforce and is good in operation effect, simple in structure, few in vulnerable parts, low in production cost and stable in performance.

The rest is the same as embodiment 27.

Embodiment 42

As shown in Fig. 69 and Fig. 70, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 is a crank impact driving mechanism 73, a guide mechanism 68 includes a guiding rolling body 86, a guide supporting element 83, an impact guide element 50, a holder 77 and the like, and the holder 77 is fixed on the impact guide element 50.

The holder 77 can also be fixed on the guide supporting element 83 and the like.

The rest is the same as embodiment 27.

Embodiment 43

As shown in Fig. 71, in equipment for converting rotary motion into reciprocating impact motion, the guide mechanism 68 includes a guiding rolling body 86, a guide supporting element 83, an impact guide element 50, a holder 77 and the like, wherein

the holder 77 is arranged between the guide supporting element 83 and the impact guide element 50, the thickness of the holder 77 is smaller than the diameter of the guide rolling body 86, the two parts of the guide rolling body 86 higher than the holder 77 are respectively arranged on the guide supporting element 83 and the impact guide element 50, a raceway 76 and the like is arranged on the guide supporting element 83, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50 and is arranged in the holder 77 and in the raceway 76, the holder 77 and the raceway 76 are used for limiting the rolling space and/or position of the guide rolling body 86, the guide rolling body 86 rolls by leaning against the raceway 76, the guide supporting element 83, the impact guide element 50 and the guide rolling body 86 in the holder 77 and the raceway 76 are in close fit to drive the impact guide element 50 to reciprocate through rolling friction and control the impact direction of the impact guide element 50.

The raceway 76 and the like can also be arranged on the impact guide element 50.

The rest is the same as embodiment 27.

Embodiment 44

As shown in Fig. 72, Fig. 73 and Fig. 74, in equipment for converting rotary motion into reciprocating impact motion, the power impact element 51 and an impact head 1 are connected or separated or integrated, a break-off prevention mechanism 116 and the like is arranged at one end of the power impact element 51, the break-off prevention mechanism 116 is arranged to be a rotary break-off prevention structure, the rotary break-off prevention structure of the break-off prevention mechanism 116 is arranged to a cambered catching groove type break-off prevention mechanism 121, the cambered catching groove type break-off prevention mechanism 121 includes a cambered convex head and a groove 119 movably buckled with the cambered convex head, and the like, the groove 119 is arranged on the power impact element 51 or is

integrated with the power impact element 51, the cambered convex head movably buckled with the groove 119 is arranged on the impact head 1 or is integrated with the impact head 1, the rotary break-off prevention structure of the break-off prevention mechanism 116 is cooperatively used with a guide mechanism 68, the rotary break-off prevention structure is stressed to rotate to isolate the impact counteraction break-off force, the power impact element 51 is used for driving the impact head 1 to impact, and the counteraction break-off force generated by the impact head 1 for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone is applied to the guide mechanism 68.

The break-off prevention mechanisms 116 can also be arranged at the two ends of the power impact element 51.

The break-off prevention mechanism 116 can also be arranged to a separate break-off prevention mechanism or a buffer break-off prevention mechanism and the like.

The rotary break-off prevention structure of the break-off prevention mechanism 116 can also be arranged to be a joint bearing 161 or a steering connector or a rzeppa universal joint or a cross-shaped universal joint break-off prevention mechanism 116, and the like.

The rotary break-off prevention mechanism 116 is arranged between the power impact element 51 and the impact head 1 of an impact driving mechanism 2, the rotary break-off prevention structure of the break-off prevention mechanism 116 is stressed to rotate or a separate break-off prevention structure separately isolates the counteraction break-off force, so as to reduce the break-off of the impact counterforce to the power impact element 51 and prevent the damage to the impact driving mechanism 2.

The rest is the same as embodiment 27.

Embodiment 45

As shown in Fig. 75, in equipment for converting rotary motion into reciprocating impact motion, the power impact element 51 and an impact head 1 are connected or separated or integrated, a break-off prevention mechanism 116 and the like is arranged at one end of the power impact element 51, the break-off prevention mechanism 116 is arranged to be a rotary break-off prevention structure, the rotary break-off prevention structure of the break-off prevention mechanism 116 is arranged to be a rzeppa universal joint break-off prevention mechanism 120, the rotary break-off prevention structure of the break-off prevention mechanism 116 is cooperatively used with a guide mechanism 68, the rotary break-off prevention structure is stressed to rotate to isolate the impact counteraction break-off force, the power impact element 51 is used for driving the impact head 1 to impact, and the counteraction break-off force generated by the impact head 1 for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone is applied to the guide mechanism 68.

The rest is the same as embodiment 27.

Embodiment 46

As shown in Fig. 76, in equipment for converting rotary motion into reciprocating impact motion, the lifting mechanism 96 includes a structure buffer mechanism, wherein the structure buffer mechanism includes a fixed supporting element 103 and a buffer supporting element 54 and the like, a buffer element 144 and the like is arranged between the fixed supporting element 103 and the buffer supporting element 54, buffer guide elements 146 and the like are arranged on the fixed supporting element 103 and the buffer supporting element 54, a power impact element 51 is used for driving an impact head 1 to impact, when an impact counterforce is applied to the buffer supporting element 54 and the fixed supporting element 103, the buffer element 144 deforms to absorb the impact counterforce, and the buffer guide elements 146 are

used for controlling the buffer direction to ensure that the buffer is reciprocating liner buffer, so as to prevent the non-directional swing of the impact head 1 during buffer. The buffer structure adopted by the equipment generates no torsional shear to a machine body 4, a reciprocating impact part 5 and the like, reduces the impact on a walking part 7 and the machine body 4, greatly reduces various digging faults, prolongs the service life of the machine body 4 and improves the working efficiency. The buffer element 144 has a rebound acting force, so that the impact effect is improved, when the impact counterforce is large, the buffer element 144 can absorb and store the impact energy and release the impact energy within the next impact period to further increase the impact force of reciprocating impact on the material. The buffer guide sleeve of the buffer mechanism is in slide connection with the machine body 4, thereby reinforcing the capacity of the buffer mechanism for absorbing the counterforce generated when impacting the coal bed or rock stratum.

The rest is the same as embodiment 27.

Embodiment 47

As shown in Fig. 77, in equipment for converting rotary motion into reciprocating impact motion, the lifting mechanism 96 or the reciprocating impact part 5 includes a structure buffer mechanism, wherein the structure buffer mechanism includes a fixed supporting element 103 and a buffer supporting element 54 and the like, the lifting mechanism 96 is provided with the fixed supporting element 103 and the like, the reciprocating impact part 5 is correspondingly provided with the buffer supporting element 54 and the like, a buffer element 144 and the like is arranged between the fixed supporting element 103 and the buffer supporting element 54, a buffer guide element 146 and the like is arranged on the fixed supporting element 103 and/or the buffer supporting element 54, a power impact element 51 is used for driving an impact head 1 to impact, when an impact counterforce is applied to the buffer

supporting element 54 and the fixed supporting element 103 or applied to the lifting mechanism 96 and a frame 125 or on the lifting mechanism 96 and the reciprocating impact part 5, the buffer element 144 deforms to absorb the impact counterforce, and the buffer guide element 146 is used for controlling the buffer direction to ensure that the buffer is reciprocating liner buffer, so as to prevent the non-directional swing of the impact head 1 during buffer.

An angle adjustor 124 is arranged between the impact head 1 and a rocker arm lifting mechanism or between the impact head 1 and a machine body 4, and the angle adjustor 124 is used for adjusting the impact direction of the impact head 1.

The buffer structure adopted by the equipment generates no torsional shear to the machine body 4, the reciprocating impact part 5 and the like, reduces the impact on a walking part 7 and the machine body 4, greatly reduces various coal digging faults, prolongs the service life of the machine body 4 and improves the working efficiency.

The rest is the same as embodiment 27.

Embodiment 48

As shown in Fig. 78, in equipment for converting rotary motion into reciprocating impact motion, the lifting mechanism 96 or the frame 125 includes a structure buffer mechanism, wherein the structure buffer mechanism includes a fixed supporting element 103 and a buffer supporting element 54 and the like, the frame 125 is provided with the fixed supporting element 103 and the like, the lifting mechanism 96 is correspondingly provided with the buffer supporting element 54 and the like, a buffer element 144 and the like is arranged between the lifting mechanism 96 and the frame 125, buffer guide elements 146 and the like are arranged on the lifting mechanism 96 and the frame 125, a power impact element 51 is used for driving an impact head 1 to impact, when an impact counterforce is applied to the buffer supporting element 54 and the fixed supporting element 103 or applied to the lifting

mechanism 96 and the frame 125 or applied to the lifting mechanism 96 and a reciprocating impact part 5, the buffer element 144 deforms to absorb the impact counterforce, and the buffer guide elements 146 are used for controlling the buffer direction to ensure that the buffer is reciprocating liner buffer, so as to prevent the non-directional swing of the impact head 1 during buffer.

The buffer structure adopted by the equipment generates no torsional shear to the machine body 4, the reciprocating impact part 5 and the like, reduces the impact on a walking part 7 and the machine body 4, greatly reduces various digging faults, prolongs the service life of the machine body 4 and improves the working efficiency.

The rest is the same as embodiment 27.

Embodiment 49

As shown in Fig. 79, in equipment for converting rotary motion into reciprocating impact motion, a lifting mechanism 96 or a reciprocating impact part 5 or a frame 125 includes a structure buffer mechanism, wherein the structure buffer mechanism includes a fixed supporting element 103, a buffer supporting element 54 and the like, when the fixed supporting element 103 is arranged to be a buffer guide element 146, the buffer supporting element 54 is arranged to a buffer guide sleeve, or when the buffer supporting element 54 is arranged to be the buffer guide element 146, the fixed supporting element 103 is arranged to the buffer guide sleeve, when a guide lug boss 104 or a guide groove 119 is arranged on the buffer guide element 146, a guide groove 119 or a guide lug boss 104 buckled with the guide lug boss 104 or the guide groove 119 is arranged on the buffer guide sleeve, buffer elements 144 are arranged at the two sides of the projections of the guide lug boss 104, the buffer guide element 146 is used for supporting the buffer guide sleeve to linearly slide along the buffer guide element 146 in a reciprocating manner or the buffer guide sleeve is used for supporting the buffer guide element 146 to linearly slide along the buffer guide sleeve

in a reciprocating manner, the buffer guide element 146, the buffer elements 144, the buffer guide sleeve and the like form a bidirectional buffer mechanism, a power impact element 51 is used for driving an impact head 1 to impact, an impact counterforce is applied to the bidirectional buffer mechanism, the bidirectional buffer mechanism absorbs the impact counterforce, the impact head 1 is arranged at one end of an impact guide element 50 and a counterweight element 94 used for preventing the impact head 1 from breaking off a guide mechanism 68, an impact driving mechanism 2, a lifting mechanism 96 and/or a machine body 4 and the like due to unbalanced gravity is arranged at the other end thereof, the power impact element 51 is used for driving the impact head 1 to reciprocate, the buffer elements 144 at the front part of the guide lug boss 104 and the rear of the guide lug boss 104 absorb the impact counterforce of the impact head 1, the buffer guide element 146, the buffer guide sleeve, the buffer elements 144 cooperate to absorb the impact counterforce of the impact head 1 and control the buffer direction as reciprocating linear buffer, and the buffer guide sleeve is leant against the buffer guide element 146 to linearly slide relatively, in order to prevent the non-directional swing of the lifting mechanism 96 and/or the impact driving mechanism 2, the guide mechanism 68 and stabilize the impact direction of the impact head 1.

The buffer guide element 146, the buffer element 144 and the buffer guide sleeve of the equipment cooperate to form the bidirectional buffer mechanism, the lifting mechanism 96 is arranged on the bidirectional buffer mechanism, and the bidirectional buffer mechanism is used for increasing the buffer effect and effectively protecting the equipment.

The rest is the same as embodiment 27.

Embodiment 50

As shown in Fig. 80, in equipment for converting rotary motion into reciprocating impact motion, a lifting mechanism 96 or a frame 125 includes a structure buffer mechanism, wherein the structure buffer mechanism includes a fixed supporting element 103, a buffer supporting element 54 and the like, the frame 125 is provided with the fixed supporting element 103 and the like, the lifting mechanism 96 is correspondingly provided with the buffer supporting element 54 and the like, the buffer supporting element 54 is arranged to be a buffer guide element 146, the fixed supporting element 103 is arranged to be a buffer guide sleeve, when a guide lug boss 104 or a guide groove 119 is arranged on the buffer guide element 146, a guide groove 119 or a guide lug boss 104 buckled with the guide lug boss 104 or the guide groove 119 is arranged on the buffer guide sleeve, buffer elements 144 are arranged at the two sides of the projections of the guide lug boss 104, the buffer guide element 146 is used for supporting the buffer guide sleeve to linearly slide along the buffer guide element 146 in a reciprocating manner or the buffer guide sleeve is used for supporting the buffer guide element 146 to linearly slide along the buffer guide sleeve in a reciprocating manner, the buffer guide element 146, the buffer elements 144, the buffer guide sleeve and the like form a bidirectional buffer mechanism, a power impact element 51 is used for driving an impact head 1 to impact, an impact counteraction break-off force is applied to the bidirectional buffer mechanism, the bidirectional buffer mechanism absorbs the impact counterforce, the impact head 1 is arranged at one end of an impact guide element 50 and a counterweight element 94 used for preventing the impact head 1 from breaking off a guide mechanism 68, an impact driving mechanism 2, a lifting mechanism 96 and/or a machine body 4 and the like due to unbalanced gravity is arranged at the other end thereof, the power impact element 51 is used for driving the impact head 1 to reciprocate, the buffer elements 144 at the front part of the guide lug boss 104 and the rear of the guide lug boss 104

absorb the impact counterforce of the impact head 1, the buffer guide element 146, the buffer guide sleeve and the buffer elements 144 cooperate to absorb the impact counterforce of the impact head 1 and control the buffer direction as reciprocating linear buffer, and the buffer guide sleeve is leant against the buffer guide element 146 to linearly slide relatively, in order to prevent the non-directional swing of the lifting mechanism 96 and/or the impact driving mechanism 2, the guide mechanism 68 and stabilize the impact direction of the impact head 1.

The fixed supporting element 103 and the buffer supporting element 54 include a retraction prevention structure and the like, or the buffer guide element 146, the buffer guide sleeve and the like include a retraction prevention structure and the like, wherein the retraction prevention structure includes a retraction prevention element 105 and the like, the retraction prevention element 105 is used for preventing the fixed supporting element 103 and the buffer supporting element 54 from dropping during relative reciprocating slide, or the retraction prevention element 105 is used for preventing the buffer guide element 146 and the buffer guide sleeve from dropping during relative reciprocating slide, the retraction prevention element 105 and the fixed supporting element 103 are separately arranged or are integrated, or the retraction prevention element 105 and the buffer supporting element 54 are separately arranged or are integrated, or the retraction prevention element 105 and the buffer guide element 146 are separately arranged or are integrated, or the retraction prevention element 105 and the buffer guide sleeve are separately arranged or are integrated.

The rest is the same as embodiment 27.

Embodiment 51

As shown in Fig. 81 and Fig. 82, in equipment for converting rotary motion into reciprocating impact motion, the lifting mechanism 96 includes a rotary power source element 28, a rotary impact transmission element 106 and the like, wherein the rotary

power source element 28 is a motor, the lifting mechanism 96 includes a fixed supporting element 103, a buffer supporting element 54 and the like, a buffer mechanism and the like is arranged between the fixed supporting element 103 and the buffer supporting element 54, and the buffer mechanism includes a power buffer mechanism or a structure buffer mechanism and the like.

The power buffer mechanism is arranged between the rotary power source element 28 and the rotary impact transmission element 106 or arranged on the rotary impact transmission element 106, the power buffer mechanism includes a slide stroke spline shaft sleeve buffer device 126 or a belt buffer device 127 and the like, the slide stroke spline shaft sleeve buffer device 126 includes a spline shaft 36 and a spline sleeve 37 and the like, a slide reciprocating stroke segment is arranged between the spline shaft 36 and the spline sleeve 37, and when being impacted, the slide reciprocating stroke segment slides in a reciprocating manner to absorb the impact counterforce.

The belt buffer device 127 includes a driving belt pulley 128, a driven belt pulley 129, a belt 130 and the like, the driving belt pulley 128 is fixed on the fixed supporting element 103, the driving belt pulley 128 is connected with the drive shaft of the motor, the driven belt pulley 129 is arranged on the buffer supporting element 54, the belt 130 is arranged on the driving belt pulley 128 and the driven belt pulley 129, a belt tensioning device 131 and the like is arranged between the driving belt pulley 128 and the driven belt pulley 129, the driven belt pulley 129 is impacted to move together with the buffer supporting element 54, the belt 130 absorbs the impact counterforce, and the belt buffer device 127 is used for preventing the damage to the motor.

The tensioner is arranged at the inner side or the outer side of the belt 130, the tensioner includes a tensioning wheel, a tensioning wheel frame, a tensioning spring, a tensioning adjustment rod, a tensioning seat and the like, the tensioning wheel is arranged on the tensioning wheel frame, a guide hole and the like is arranged on the

tensioning wheel frame, a polish rod is arranged at one end of the tensioning adjustment rod, a lead screw is arranged at the other end of the tensioning adjustment rod, a blocking shoulder is arranged in the middle of the tensioning adjustment rod, the tensioning wheel frame is matched with the polish rod end of the tensioning adjustment rod through the guide hole, the lead screw end of the tensioning adjustment rod is in threaded connection with the tensioning seat, the tensioning spring is arranged between the tensioning wheel frame and the blocking shoulder, the tensioning wheel presses the belt 130 through the elastic force of a spring 66, and a tensioning force is adjusted by the screwing length of the lead screw and the tensioning seat.

The structure guide buffer mechanism includes a buffer element 144, a buffer guide element 146 and the like, wherein the buffer element 144 is arranged between the fixed supporting element 103 and the buffer supporting element 54, the buffer guide element 146 is arranged on the fixed supporting element 103 and the buffer supporting element 54, and the structure guide buffer mechanism is used for absorbing the impact counterforce through the buffer element 144 and controlling the buffer direction through the buffer guide element 146.

The structure guide buffer mechanism cooperates with the slide stroke spline shaft sleeve buffer device 126 or a belt buffer device 127 and the like to absorb and buffer the impact counterforce of a reciprocating impact part 5 and guide the buffer direction, in order to prevent the rotary power source element 28 or the lifting mechanism 96 or a frame 125 and the like from being damaged by non-directional swing during buffer and ensure that the impact direction of the impact head 1 faces to a material to be dug.

In a power transfer process, the spline shaft 36 and the spline sleeve 37 of the slide stroke spline shaft sleeve buffer device 126 mutually cooperate to transmit power and slide in a reciprocating manner to buffer, thus only torque is applied and no axial

force impact is applied, the vibration isolation effect is good, the dynamic sliding resistance in a heading process is small and the impact head 1 is effectively protected; in the impact blanking and/or impact vibration transfer process of the reciprocating impact part 5, the device buffers and decomposes the impact counterforce through reciprocating slide to avoid the damage to the power source element, thus greatly improving the service life and/or operation reliability of the power source element.

The rotary power source element 28 can also be a hydraulic motor or a pneumatic motor and the like.

The rest is the same as embodiment 27.

Embodiment 52

As shown in Fig. 83, in equipment for converting rotary motion into reciprocating impact motion, the frame 125 includes a rotary power source element 28, a lifting mechanism 96 includes a rotary impact transmission element 106 and the like, the rotary power source element 28 is a hydraulic motor, the frame 125 is provided with a fixed supporting element 103 and the like, the lifting mechanism 96 is correspondingly provided with a buffer supporting element 54 and the like, a buffer mechanism and the like is arranged between the frame 125 and the lifting mechanism 96, and the buffer mechanism includes a rotary power buffer mechanism or a structure guide buffer mechanism and the like.

The structure guide buffer mechanism includes a buffer element 144, a buffer guide element 146 and the like, wherein the buffer element 144 is arranged between the frame 125 and the lifting mechanism 96, the buffer guide element 146 is arranged on the frame 125 and the lifting mechanism 96, and the structure guide buffer mechanism is used for absorbing the impact counterforce through the buffer element 144 and controlling the buffer direction through the buffer guide element 146, the structure guide buffer mechanism cooperates with a slide stroke spline shaft sleeve buffer

device 126 or a belt buffer device 127 and the like to absorb and buffer the impact counterforce of a reciprocating impact part 5 and guide the buffer direction, in order to prevent the rotary power source element 28 or the lifting mechanism 96 or the frame 125 from being damaged by non-directional swing during buffer and ensure that the impact direction of an impact head 1 faces to a material to be dug.

The rest is the same as embodiment 65.

Embodiment 53

As shown in Fig. 84 and Fig. 85, in equipment for converting rotary motion into reciprocating impact motion, the buffer mechanism includes a rotary power buffer mechanism or a structure guide buffer mechanism and the like.

The rotary power buffer mechanism is arranged between a rotary power source element 28 and a rotary impact transmission element 106 or arranged on the rotary impact transmission element 106 and the like, the rotary power buffer mechanism includes a slide stroke spline shaft sleeve buffer device 126 and the like, the slide stroke spline shaft sleeve buffer device 126 includes a spline shaft 36 and a spline sleeve 37 and the like, a slide reciprocating stroke segment is arranged between the spline shaft 36 and the spline sleeve 37, when being impacted, the slide reciprocating stroke segment slides in a reciprocating manner to absorb the impact counterforce.

The structure guide buffer mechanism includes a buffer element 144, a buffer guide element 146 and the like, wherein the buffer element 144 is arranged between a fixed supporting element 103 and a buffer supporting element 54, the buffer guide element 146 is arranged on the fixed supporting element 103 and the buffer supporting element 54, the buffer guide element 146 is connected by a split bolt, the structure guide buffer mechanism is used for absorbing the impact counterforce through the buffer element 144 and controlling the buffer direction through the buffer guide element 146, the structure guide buffer mechanism cooperates with the slide stroke

spline shaft sleeve buffer device 126 or a belt buffer device 127 and the like to absorb and buffer the impact counterforce of a reciprocating impact part 5 and guide the buffer direction, in order to prevent the rotary power source element 28 or a lifting mechanism 96 or a frame 125 from being damaged by non-directional swing during buffer and ensure that the impact direction of an impact head 1 faces to a material to be dug.

The rest is the same as embodiment 27.

Embodiment 54

As shown in Fig. 86, in equipment for converting rotary motion into reciprocating impact motion, the buffer guide element 146 is connected by a split neck.

The rest is the same as embodiment 27.

Embodiment 55

As shown in Fig. 87, in equipment for converting rotary motion into reciprocating impact motion, the lifting mechanism 96 includes a rotary power source element 28, a rotary impact transmission element 106 and the like, wherein the rotary power source element 28 includes a pneumatic motor and the like, the lifting mechanism 96 includes a fixed supporting element 103, a buffer supporting element 54 and the like, a buffer mechanism and the like is arranged between the fixed supporting element 103 and the buffer supporting element 54, and the buffer mechanism includes a rotary power buffer mechanism or a structure guide buffer mechanism and the like.

The rotary power buffer mechanism is arranged between the rotary power source element 28 and the rotary impact transmission element 106 or arranged on the rotary impact transmission element 106, the rotary power buffer mechanism includes a belt buffer device 127 and the like, the belt buffer device 127 includes a driving belt pulley 128, a driven belt pulley 129, a belt 130 and the like, the driving belt pulley 128 is fixed on the fixed supporting element 103, the driving belt pulley 128 is

connected with the drive shaft of the pneumatic motor, the driven belt pulley 129 is arranged on the buffer supporting element 54, the belt 130 is arranged on the driving belt pulley 128 and the driven belt pulley 129, the driven belt pulley 129 is impacted to move together with the buffer supporting element 54, the belt 130 absorbs the impact counterforce, and the belt buffer device 127 is used for preventing the damage to the pneumatic motor.

The structure guide buffer mechanism includes a buffer element 144, a buffer guide element 146 and the like, wherein the buffer element 144 is arranged between the fixed supporting element 103 and the buffer supporting element 54, the buffer guide element 146 is arranged on the fixed supporting element 103 and the buffer supporting element 54, the structure guide buffer mechanism is used for absorbing the impact counterforce through the buffer element 144 and controlling the buffer direction through the buffer guide element 146, the structure guide buffer mechanism cooperates with a slide stroke spline shaft sleeve buffer device 126 or the belt buffer device 127 and the like to absorb and buffer the impact counterforce of a reciprocating impact part 5 and guide the buffer direction, in order to prevent the rotary power source element 28 or a lifting mechanism 96 or a frame 125 from being damaged by non-directional swing during buffer and ensure that the impact direction of an impact head 1 faces to a material to be dug.

The rest is the same as embodiment 27.

Embodiment 56

As shown in Fig. 88, in equipment for converting rotary motion into reciprocating impact motion, the lifting mechanism 96 includes a rotary power source element 28, a rotary impact transmission element 106 and the like, wherein the rotary power source element 28 includes a pneumatic motor and the like, the lifting mechanism 96 includes a fixed supporting element 103, a buffer supporting element 54 and the like,

a buffer mechanism and the like is arranged between the fixed supporting element 103 and the buffer supporting element 54, and the buffer mechanism includes a rotary power buffer mechanism or a structure guide buffer mechanism and the like.

The rotary power buffer mechanism is arranged between the rotary power source element 28 and the rotary impact transmission element 106 or arranged on the rotary impact transmission element 106 and the like, the rotary power buffer mechanism includes a belt buffer device 127 and the like, the belt buffer device 127 includes a driving belt pulley 128, a driven belt pulley 129, a belt 130 and the like, the driving belt pulley 128 is fixed on the fixed supporting element 103, the driving belt pulley 128 is connected with the drive shaft of the pneumatic motor, the driven belt pulley 129 is arranged on the buffer supporting element 54, the belt 130 is arranged on the driving belt pulley 128 and the driven belt pulley 129, a belt tensioning device 131 adopts a tensioning type of the driving belt pulley 128, the driven belt pulley 129 is impacted to move together with the buffer supporting element 54, the belt 130 absorbs the impact counterforce, and the belt buffer device 127 is used for preventing the damage to the pneumatic motor.

The belt buffer device 127 includes a tensioner and the like, wherein the tensioner includes a sliding seat, a tensioning spring and the like, the driving belt pulley 128 and the motor or the hydraulic motor or the pneumatic motor and the like are installed on the sliding seat, the sliding seat is in slide fit with a fixing element of a rocker arm 6, one end of the tensioning spring is connected with the sliding seat, the other end of the tensioning spring is connected with the fixing element of the rocker arm 6, and a certain action force is applied to the sliding seat through a spring 66 to tension the belt 130.

The structure guide buffer mechanism includes a buffer element 144, a buffer guide element 146 and the like, wherein the buffer element 144 is arranged between the

fixed supporting element 103 and the buffer supporting element 54, the buffer guide element 146 is arranged on the fixed supporting element 103 and the buffer supporting element 54, the structure guide buffer mechanism is used for absorbing the impact counterforce through the buffer element 144 and controlling the buffer direction through the buffer guide element 146, the structure guide buffer mechanism cooperates with a slide stroke spline shaft sleeve buffer device 126 or the belt buffer device 127 and the like to absorb and buffer the impact counterforce of a reciprocating impact part 5 and guide the buffer direction, in order to prevent the rotary power source element 28 or the lifting mechanism 96 or a frame 125 from being damaged by non-directional swing during buffer and ensure that the impact direction of an impact head 1 faces to a material to be dug.

The rest is the same as embodiment 27.

Embodiment 57

As shown in Fig. 89, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 includes a crank impact driving mechanism 73 and the like, a reciprocating impact part 5 includes a rocker arm 6 and the like, the rocker arm 6 is a parallelogram rocker arm 6, the parallelogram rocker arm 6 includes a main rocker arm 98 and an auxiliary rocker arm 99 and the like, the reciprocating impact part 5 includes an impact power box 38 or a supporting frame 95 and the like, one end of the main rocker arm 98 is hinged with a machine body 4, the other end thereof is hinged with the impact power box 38 or the supporting frame 95, one end of the auxiliary rocker arm 99 is hinged with the machine body 4, the other end thereof is hinged with the impact power box 38 or the supporting frame 95, the main rocker arm 98 and/or the auxiliary rocker arm 99 is used for supporting the reciprocating impact part 5, the main rocker arm 98 and the auxiliary rocker arm 99 cooperate to adjust the digging direction or position of an impact head 1, so as to

ensure that the next impact action of the impact head 1 is applied to an object to be dug, and a walking part 7 is used for driving the machine body 4 to walk to achieve continuous digging by reciprocating impact.

The rest is the same as embodiment 27.

Embodiment 58

As shown in Fig. 90, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 includes a crank impact driving mechanism 73 and the like, a reciprocating impact part 5 includes a rocker arm 6 and the like, the rocker arm 6 is a single rocker arm, the reciprocating impact part 5 includes an impact power box 38 or a supporting frame 95 and the like, one end of the rocker arm 6 is hinged with a machine body 4, the other end thereof is hinged with the impact power box 38 or the supporting frame 95, one end of a lifting oil cylinder 100 is hinged with the machine body 4, the other end thereof is hinged with the rocker arm 6, under the drive of the lifting oil cylinder, the rocker arm 6 swings up and down to adjust the digging direction or position of an impact head 1, so as to ensure that the next impact action of the impact head 1 is applied to an object to be dug, and a walking part 7 is used for driving the machine body 4 to walk to achieve continuous digging by reciprocating impact.

The rest is the same as embodiment 27.

Embodiment 59

As shown in Fig. 91, equipment for converting rotary motion into reciprocating impact motion, includes an impact power box 38 or a supporting frame 95 and the like, wherein an impact driving mechanism 2 includes a crank impact driving mechanism 73 and the like, the crank impact driving mechanism 73 includes a multi-throw crank shaft multi-rod impact mechanism 132, a power output component and the like, the multi-throw crank shaft multi-rod impact mechanism 132 includes a multi-throw

crank shaft 133, a connecting rod 137 and the like, the multi-throw crank shaft 133 includes a power concentric shaft segment 134, a connecting handle 135, an eccentric shaft 136 and the like, the concentric shaft segment 134, the connecting handle 135 and the eccentric shaft 136 are separated or integrated, one end of the power concentric shaft segment 134 of the multi-throw crank shaft 133 is connected with the power output component of the crank impact driving mechanism 73, more than two connecting handles 135 and eccentric shafts 136 are arranged at the other end of the power concentric shaft segment 134, the power concentric shaft segment 134 of the multi-throw crank shaft 133 is installed on the impact power box 38 or the supporting frame 95, the eccentric shaft 136 of the multi-throw crank shaft 133 is hinged with one end of the connecting rod 137, the other end of the connecting rod 137 and an impact head 1 are connected or separated, one eccentric shaft 136 is used for driving more than one connecting rod 137 to impact in a reciprocating manner, and a guide mechanism 68 includes a guide mechanism 68 and the like.

The multi-throw crank shaft 133 is simple in integral manufacturing structure, enough in rigidity, large in strength and capable of transferring larger rotation torque; and the multi-throw crank shaft 133 is reasonable in structure and small in manufacturing volume, so that the weight of the reciprocating impact part 5 can be greatly decreased and the adjustment flexibility of the reciprocating impact part 5 is improved.

The multi-throw crank shaft 133 is composed of multiple eccentric shafts 136 and the like, each eccentric shaft 136 is used for driving one power impact element 51, and one or more impact heads 1 are arranged at the other end of the power impact element 51 to greatly improve the digging efficiency.

The eccentric shafts 136 of the multi-throw crank shaft 133 are arranged at intervals along the radial direction of the power concentric shaft segment 134 to form angle difference, so that the power impact elements 51 driven by the eccentric shafts 136

can impact a coal bed or a rock stratum within different time slots, can convert the counterforce generated by one power impact element 51 on the same side when impacting into the power of the next power impact element 51, and meanwhile decompose the counterforce of impacting thicker coal beds or rock stratums at one time, in order to ensure uniform impact force applied to the impact driving mechanism 2 and buffer and/or stabilize a machine body 4.

Embodiment 60

As shown in Fig. 92, in equipment for converting rotary motion into reciprocating impact motion, the impact head 1 includes outer-layer material impact teeth 43 and inner-layer material impact teeth 45, wherein the shape and/or arrangement of the inner-layer material impact teeth 45 is conductive to blanking the inner-layer material of a coal bed to be dug or a rock stratum or cement concrete or bituminous concrete or hardened mudstone, the shape and/or arrangement of the outer-layer material impact teeth 43 is conductive to enabling the material blanked by the inner-layer material impact teeth 45 to flow out from the gaps of the outer-layer material impact teeth 43, the outer-layer material impact teeth 43 and the inner-layer material impact teeth 45 are arranged side by side to form a multilayer impact head 1, and the multilayer impact head 1 is used for increasing the coal digging width and improving the coal digging efficiency.

Multiple layers of material impact mechanisms are used for digging a thicker material to be dug in a layering manner, in order to reduce the impact resistance of non-layered impact of the thicker material to be dug, reduce the damage of the generated large impact counterforce to a reciprocating impact part 5 and/or a machine body 4, reduce the energy consumption in the power transfer process and improve the working efficiency.

The impact teeth includes multiple rows of impact teeth, and when impacting the coal bed or rock stratum to the step shape, the impact teeth can be used for decomposing the dug coal briquette or rock to form granules suitable for transport of a conveyor 109 at one time, so as to avoid the problem that a lump material is hard to transport in the digging process.

The rest is the same as embodiment 27.

Embodiment 61

As shown in Fig. 93, in equipment for converting rotary motion into reciprocating impact motion, the impact head 1 includes a step tooth punching and cutting device 89, wherein the step tooth punching and cutting device 89 includes impact teeth, the impact teeth are multilayer impact teeth, tooth heads are arranged on the impact teeth, the tooth heads and the impact teeth are separately connected or are integrated, the distances between the tooth heads of the two adjacent layers of impact teeth are different, a coal bed to be dug or a rock stratum or cement concrete or bituminous concrete or a hardened mudstone is impacted to a step shape, more than two relatively free surfaces are generated on each step layer of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone, the pressure stress and/or structural strength of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone is greatly reduced compared with that of the original planar coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone, after the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone is impacted to the step shape, when each layer of the impact teeth is used for digging again, the two relatively free surfaces of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone are reasonably utilized to blank the material, so as to greatly reduce the impact resistance, avoid overlarge

lumps of the material blanked by the impact head 1, reduce the power consumption and improve the impact efficiency.

The tooth heads can also be arranged to a spherical impact head 1 or a conical impact head 1 or a hemispherical impact head 1 or a shovel-shaped impact head 1 or a trapezoidal impact head 1 or a triangular impact head 1, and the like.

The step tooth punching and cutting device 89 can be used for processing the coal bed or the rock stratum to the step shape, the pressure stress and/or structural strength of the step-shaped coal bed or the rock stratum is greatly reduced compared with that of the original planar coal bed or rock stratum, when each layer of the impact teeth is used for digging again, the two relatively free surfaces of the step-shaped coal bed or rock stratum are reasonably utilized to blank the material, so as to greatly reduce the impact resistance, avoid overlarge lumps of the material blanked by the impact head 1, reduce the power consumption and improve the impact efficiency.

The rest is the same as embodiment 27.

Embodiment 62

As shown in Fig. 94, in equipment for converting rotary motion into reciprocating impact motion, the impact head 1 includes an outer-layer material impact seat 44 and outer-layer material impact teeth 43, wherein the outer-layer material impact tooth seat 44 includes a discharge hole 90, the outer-layer material impact teeth 43 are arranged on the outer-layer material impact tooth seat 44 in a manner of facing to a surface to be dug, the impact head 1 further includes an inner-layer material impact tooth seat 46 and inner-layer material impact teeth 45, the inner-layer material impact teeth 45 and the inner-layer material impact tooth seat 46 are separately connected or are integrated, the shape or arrangement of the outer-layer material impact teeth 43 is conducive to blanking the outer-layer material of a layer to be dug, the discharge hole 90 is conducive to enabling the material blanked by the inner-layer material impact

teeth 45 to flow out, and multiple layers of material impact mechanisms cooperate to achieve simultaneous impact blanking and discharging.

The impact head 1 includes impact teeth, wherein the impact teeth include top face cleaning teeth or bottom surface cleaning teeth or side face cleaning teeth and the like, and the top face cleaning teeth, the bottom surface cleaning teeth and the side face cleaning teeth are arranged on the same impact tooth frame.

The rest is the same as embodiment 27.

Embodiment 63

As shown in Fig. 95, in equipment for converting rotary motion into reciprocating impact motion, the impact head 1 includes an outer-layer material impact seat 44, outer-layer material impact teeth 43, an inner-layer material impact tooth seat 46 and inner-layer material impact teeth 45, wherein the outer-layer material impact seat 44 and the inner-layer material impact tooth seat 46 respectively include a rear supporting seat 92, an impact tooth supporting frame 93 and the like, the rear supporting seat 92 and the impact tooth supporting frame 93 form a discharge hole 90, the outer-layer material impact teeth 43 are arranged on the outer-layer material impact tooth seat 44 in a manner of facing to a surface to be dug, the inner-layer material impact teeth 45 and the inner-layer material impact tooth seat 46 are separately connected or are integrated, the shape and/or arrangement of the outer-layer material impact teeth 43 is conducive to blanking the outer-layer material of a layer to be dug, the discharge hole 90 is conducive to enabling the material blanked by the inner-layer material impact teeth 45 to flow out, and multiple layers of material impact mechanisms cooperate to achieve simultaneous impact blanking and discharging.

The rest is the same as embodiment 27.

Embodiment 64

As shown in Fig. 96, Fig. 97 and Fig. 98, in equipment for converting rotary motion into reciprocating impact motion, the lifting mechanism 96 includes a vertical lifting mechanism 138 and the like, wherein the vertical lifting mechanism 138 is used for driving a reciprocating impact part 5 to vertically move up and down, the vertical lifting mechanism 138 includes a lifting platform 139, a lifting platform seat 140, a vertical lifting actuator 141 and the like, the vertical lifting actuator 141 includes a rope and a rope winder, the vertical lifting actuator 141 is used for driving the lifting platform 139 to vertically lift, the vertical lifting mechanism 138 further includes a positioning and locking device 142 and the like, the positioning and locking device 142 includes a spring bolt, and the positioning and locking device 142 is used for positioning and locking the lifting platform 139.

The vertical lifting actuator 141 can also adopt a gear and rack 81 or a screw rod or a coupling opening and closing device or a chain wheel and a chain or a hydraulic element or a pneumatic element, and the like.

The positioning and locking device 142 can also adopt a latch pin or a cushion block or a guy rope or a hydraulic cylinder or a cylinder and the like, and the like.

The lifting mechanism 96 includes a translation device 143 and the like, wherein the translation device 143is arranged at the front part of a machine body 4, and the translation device 143 is used for driving the reciprocating impact part 5 to translate relative to the machine body 4.

The vertical lifting mechanism 138 can be used for ensuring that the reciprocating impact part 5 vertically impacts, so as to reduce the lengths of the lifting mechanism 96, the machine body 4 and the like, reduce the energy consumption and ensure convenient maintenance, and the lifting orbit is linear, thereby increasing the lifting stability and prolonging the service life of the lifting support.

The rest is the same as embodiment 27.

Embodiment 65

As shown in Fig. 99, in equipment for converting rotary motion into reciprocating impact motion, the lifting mechanism 96 includes a vertical lifting mechanism 138 and the like, wherein the vertical lifting mechanism 138 is used for driving a reciprocating impact part 5 to vertically move up and down, the vertical lifting mechanism 138 includes a lifting platform 139, a lifting platform seat 140, a vertical lifting actuator 141 and the like, the vertical lifting actuator 141 is a hydraulic element, the vertical lifting actuator 141 is used for driving the lifting platform 139 to vertically lift, the vertical lifting mechanism 138 further includes a positioning and locking device 142 and the like, the positioning and locking device 142 is a latch pin, and the positioning and locking device 142 is used for positioning and locking the lifting platform 139.

The rest is the same as embodiment 65.

Embodiment 66

As shown in Fig. 100, in equipment for converting rotary motion into reciprocating impact motion, the lifting mechanism 96 includes a vertical lifting mechanism 138 and the like, wherein the vertical lifting mechanism 138 is used for driving a reciprocating impact part 5 to vertically move up and down, the vertical lifting mechanism 138 includes a lifting platform 139, a lifting platform seat 140, a vertical lifting actuator 141 and the like, the vertical lifting actuator 141 is a screw rod, the vertical lifting actuator 141 is used for driving the lifting platform 139 to vertically lift, the vertical lifting mechanism 138 further includes a positioning and locking device 142 and the like, the positioning and locking device 142 is a latch pin, and the positioning and locking device 142 is used for positioning and locking the lifting platform 139.

The rest is the same as embodiment 65.

Embodiment 67

As shown in Fig. 101 and Fig. 102, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 includes a power supporting element 74 and the like, a guide mechanism 68 includes a guide friction body supporting element 158 and the like, the power supporting element 74 and the guide friction body supporting element 158 are separated, the guide mechanism 68 further includes an anti-rotary break-off prevention structure and the like, the anti-rotary break-off prevention structure includes an anti-rotary guide friction body supporting element 158 and/or an anti-rotary impact guide element 50 and the like, the anti-rotary guide friction body supporting element 158 includes a quadrangular guide friction body supporting element 158 and the like, the anti-rotary impact guide element 50 includes a quadrangular impact guide element 50 and the like, a guide rolling body 86 is arranged between the anti-rotary guide friction body supporting element 158 and the anti-rotary impact guide element 50, the anti-rotary guide friction body supporting element 158, the guide rolling body 86 and the anti-rotary impact guide element 50 cooperate with the anti-rotary break-off prevention structure to prevent an impact head 1 from rotating so as to correct the impact direction of the impact head 1.

The power supporting element 74 and the guide friction body supporting element 158 can also be of an integrated or connected structure and the like.

The guide friction body supporting element 158 can also be a U-shaped friction body supporting element or a V-shaped friction body supporting element or a triangular friction body supporting element or an oval friction body supporting element or a polygonal friction body supporting element or a deformed friction body supporting element or a raceway friction body supporting element or a pit friction body supporting element or a friction body supporting element of the reciprocating stroke

segment or a friction body supporting element of the holder or a friction body supporting element of the circular raceway or a groove-shaped friction body supporting element or a transverse H-shaped friction body supporting element or a friction body supporting element of the spline sleeve or a cambered friction body supporting element or a V-shaped friction body supporting element or an inverted V-shaped friction body supporting element or a plate-shaped friction body supporting element or a cylindrical friction body supporting element or a multi-prismatic key friction body supporting element and the like.

The impact guide element 50 can also be a U-shaped impact guide element or a frame-shaped impact guide element or a V-shaped impact guide element or a triangular impact guide element or an oval impact guide element or a polygonal impact guide element or a deformed impact guide element or a raceway impact guide element or a pit impact guide element or an impact guide element of the reciprocating stroke segment or an impact guide element of the holder or an impact guide element of the circular raceway or a groove-shaped impact guide element or a transverse H-shaped impact guide element or an impact guide element of the spline sleeve or a cambered impact guide element or an inverted V-shaped impact guide element or a plate-shaped impact guide element or a cylindrical impact guide element or a multi-prismatic key impact guide element, and the like.

The rest is the same as embodiment 27.

Embodiment 68

As shown in Fig. 103, in equipment for converting rotary motion into reciprocating impact motion, an anti-rotary guide friction body supporting element 158 is a U-shaped guide friction body supporting element, and an anti-rotary impact guide element is a U-shaped impact guide element.

The rest is the same as embodiment 68.

Embodiment 69

As shown in Fig. 104, in equipment for converting rotary motion into reciprocating impact motion, an anti-rotary guide friction body supporting element 158 is a triangular guide friction body supporting element, and an anti-rotary impact guide element is a triangular impact guide element.

The rest is the same as embodiment 68.

Embodiment 70

As shown in Fig. 105 and Fig. 106, in equipment for converting rotary motion into reciprocating impact motion, the guide mechanism 68 includes a guide rolling body 86, a guide rolling body supporting element 178, an impact guide element 50 and the like, wherein the guide rolling body 86 is arranged between the guide rolling body supporting element 178 and the impact guide element 50, the guide mechanism 68 includes an outer sleeve 145, an inner body 149 and the like, a raceway 76 and the like is arranged on the outer sleeve 145 or the inner body 149, the guide rolling body 86 is arranged on the raceway 76 and is arranged between the outer sleeve 145 and the inner body 149, the outer sleeve 145 and the inner body 149 are in close fit with the guide rolling body 86 to drive the outer sleeve 145 or the inner body 149 to relatively reciprocate through the rolling friction of the guide rolling body 86, the impact direction of the outer sleeve 145 or the inner body 149 is controlled by rolling friction, and an impact head 1 and the reciprocating outer sleeve 145 or the inner body 149 are integrated or connected.

The rest is the same as embodiment 27.

Embodiment 71

As shown in Fig. 107 and Fig. 108, in equipment for converting rotary motion into reciprocating impact motion, the guide mechanism 68 includes an outer sleeve 145 and an inner body 149, wherein a holder 77 and the like is arranged between the outer

sleeve 145 and the inner body 149, a guide rolling body 86 is arranged on the holder 77 and is arranged between the outer sleeve 145 and the inner body 149, a guide rolling body supporting element 83 is the inner body 149, an impact guide element 50 is the outer sleeve 145, the inner body 149 is used for supporting the guide rolling body 86 and the outer sleeve 145, the outer sleeve 145, the inner body 149 and the guide rolling body 86 are in close fit to drive the outer sleeve 145 to relatively reciprocate through rolling friction of the guide rolling body 86, and the impact direction of the outer sleeve145 is controlled by rolling friction.

The guide rolling body supporting element 83 can also be the outer sleeve145, the impact guide element 50 is the inner body 149, and the outer sleeve145 is used for supporting the guide rolling body 86 and the inner body 149.

The rest is the same as the embodiment 27.

Embodiment 72

As shown in Fig. 109, in equipment for converting rotary motion into reciprocating impact motion, the guide mechanism 68 and the crank impact driving mechanism 73 and the like are combined and arranged on a lifting mechanism 96, the crank impact driving mechanism 73 includes a power impact element 51 and the like, a break-off prevention mechanism 116 and the like is arranged at one end of the power impact element 51, the break-off prevention mechanism 116 is arranged to be a rotary break-off prevention structure, the rotary break-off prevention structure of the break-off prevention mechanism 116 is a rzeppa universal joint, the rotary break-off prevention structure of the break-off prevention mechanism 116 is cooperatively used with the guide mechanism 68, the power impact element 51 is used for driving an impact head 1 to impact, the counteraction break-off force generated by the impact head 1 for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone is applied to the rotary break-off prevention structure, the rotary

break-off prevention structure is stressed to rotate to isolate the counteraction break-off force, to prevent the crank impact driving mechanism 73 from being damaged by the impact counteraction break-off force.

The lifting mechanism 96 is provided with a rotary power source element 28, a rotary impact transmission element 106 and the like, wherein the rotary power source element 28 includes a motor and the like, the lifting mechanism 96 includes a fixed supporting element 103, a buffer supporting element 54 and the like, a buffer mechanism and the like is arranged between the fixed supporting element 103 and the buffer supporting element 54, and the buffer mechanism includes a rotary power buffer mechanism or a structure guide buffer mechanism and the like.

The rotary power buffer mechanism is arranged between the rotary power source element 28 and the rotary impact transmission element 106 or arranged on the rotary impact transmission element 106, and the rotary power buffer mechanism includes a slide stroke spline shaft sleeve buffer device 126 or a belt buffer device 127 and the like.

The slide stroke spline shaft sleeve buffer device 126 includes a spline shaft 36 and a spline sleeve 37 and the like, a slide reciprocating stroke segment is arranged between the spline shaft 36 and the spline sleeve 37, and when being impacted, the slide reciprocating stroke segment slides in a reciprocating manner to absorb the impact counterforce.

The belt buffer device 127 includes a driving belt pulley 128, a driven belt pulley 129, a belt 130 and the like, wherein the driving belt pulley 128 is fixed on the fixed supporting element 103, the driving belt pulley 128 is connected with the drive shaft of the motor or a hydraulic motor or a pneumatic motor and the like, the driven belt pulley 129 is arranged on the buffer supporting element 54, the belt 130 is arranged on the driving belt pulley 128 and the driven belt pulley 129, the driven belt pulley

129 is impacted to move together with the buffer supporting element 54, the belt 130 absorbs the impact counterforce, and the belt buffer device 127 is used for preventing the damage to the motor or the hydraulic motor or the pneumatic motor and the like.

The structure guide buffer mechanism includes a buffer element 144, a buffer guide element 146 and the like, wherein the buffer element 144 is arranged between the fixed supporting element 103 and the buffer supporting element 54, the buffer guide element 146 is arranged on the fixed supporting element 103 and the buffer supporting element 54, and the structure guide buffer mechanism is used for absorbing the impact counterforce through the buffer element 144 and controlling the buffer direction through the buffer guide element 146.

The structure guide buffer mechanism cooperates with the slide stroke spline shaft sleeve buffer device 126 or the belt buffer device 127 to absorb and buffer the impact counterforce of a reciprocating impact part 5 and guide the buffer direction, in order to prevent the rotary power source element 28 or the lifting mechanism 96 or a frame 125 and the like from being damaged by non-directional swing during buffer and ensure that the impact direction of the impact head 1 faces to a material to be dug.

The guide mechanism 68 and the crank impact driving mechanism 73 can also be cooperatively arranged on the frame 125 and the like.

The break-off prevention mechanisms 116 can also be arranged at the two ends of the power impact element 51.

The rotary break-off prevention structure of the break-off prevention mechanism 116 can also adopt a joint bearing 161 or a steering connector or a cross-shaped universal joint or a bulb catching groove type or cambered catching grove type break-off prevention mechanism 116, and the like.

The rotary power source element 28 and the rotary impact transmission element 106 can also be arranged on the reciprocating impact part 5 or the lifting mechanism 96 or

the frame 125 and the like, or when the frame 125 includes the rotary power source element 28, the lifting mechanism 96 includes the rotary impact transmission element 106, or when the lifting mechanism 96 includes the rotary power source element 28, the reciprocating impact part 5 includes the rotary impact transmission element 106.

The rotary power source element 28 can also be the hydraulic motor or the pneumatic motor and the like.

The buffer element 144 can also be arranged between the frame 125 and the reciprocating impact part 5 or between the lifting mechanism 96 and the reciprocating impact part 5 or between the frame 125 and the lifting mechanism 96, and the like.

The buffer guide element 146 is arranged on the frame 125 and the reciprocating impact part 5 or on the lifting mechanism 96 and the reciprocating impact part 5 or on the frame 125 and the lifting mechanism 96, and the like.

The rest is the same as embodiment 27.

Embodiment 73

As shown in Fig. 110, in equipment for converting rotary motion into reciprocating impact motion, the reciprocating impact part 5 includes a guide mechanism 68 and an impact driving mechanism 2, wherein the impact driving mechanism 2 includes a crank impact driving mechanism 73, the crank impact driving mechanism 73 includes a power impact element 51, the power impact element 51 includes a connecting rod 137, a buffer break-off prevention mechanism 56 is arranged on the connecting rod 137 or between the connecting rod 137 and an impact head 1, the guide mechanism 68 includes a guide rolling body supporting element 178 and an impact guide element 50, the guide rolling body supporting element 178 includes an upper element of the guide rolling body supporting element 178 and a lower element of the guide rolling body supporting element 178, the impact guide element 50 is a U-shaped impact guide element 152, the U-shaped impact guide element 152 includes an upper element 153

of the impact guide element and a lower element 154 of the impact guide element, a roller 72 is arranged on the upper element of the guide rolling body supporting element 178 and the lower element of the guide rolling body supporting element 178, the roller 72 is arranged between the upper element of the guide rolling body supporting element 178 and the upper element 153 of the impact guide element and is arranged between the lower element of the guide rolling body supporting element 178 and the lower element 154 of the impact guide element, the roller 72 is in close fit with the U-shaped impact guide element 152 and the guide rolling body supporting element 178 to enable the roller 72 to support the U-shaped impact guide element 152 to reciprocate through rolling friction, control the reciprocating direction of the U-shaped impact guide element 152 and correct the impact direction of the impact head 1, the U-shaped impact guide element 152 and the impact head 1 are connected or separated or integrated, the power impact element 51 is used for driving the impact head 1 to impact, and the power impact element 51 is not used for guiding the impact head 1 and is not broken off by the break-off force.

The rest is the same as embodiment 27.

Embodiment 74

As shown in Fig. 111, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 is a crank impact driving mechanism 73, wherein the crank impact driving mechanism 73 includes a power source element, a cam shaft 155 and a cam 156, the power source element is used for driving the cam shaft 155 to rotate, and the cam 156 installed on the cam shaft 155 is used for driving an impact head 1 to impact in a reciprocating manner.

The rest is the same as embodiment 27.

Embodiment 75

As shown in Fig. 112, in equipment for converting rotary motion into reciprocating impact motion, the impact driving mechanism 2 includes a crank impact driving mechanism 73, wherein the crank impact driving mechanism 73 includes a power source element, an eccentric shaft 136 and a power impact element 51, the eccentric shaft 136 is hinged with one end of the power impact element 51, the power source element is used for driving the eccentric shaft 136 to rotate, and the eccentric shaft 136 is used for driving the power impact element 51 to impact in a reciprocating manner.

The rest is the same as embodiment 27.

Embodiment 76

As shown in Fig. 113, in equipment for converting rotary motion into reciprocating impact motion, the guide mechanism 68 includes a guide rolling body 86, a guide supporting element 83 and an impact guide element 50, wherein the section of the guide supporting element 83 is circular ring-shaped, the section of the impact guide element 50 is multi-prismatic, the guide supporting element 83 with the circular ring-shaped section and the multi-prismatic impact guide element 50 cooperate to form a limiting structure of the guide rolling body 86, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, and the guide rolling body 86, the guide supporting element 83 and the impact guide element 50 are in close fit to achieve rolling guide.

As shown in Fig. 114, in equipment for converting rotary motion into reciprocating impact motion, the guide mechanism 68 includes a guide rolling body 86, a guide supporting element 83 and an impact guide element 50, wherein the section of the guide supporting element 83 is pentagonal, the section of the impact guide element 50 is pentagonal, a lug boss is arranged on the pentagonal guide supporting element 83 and/or the pentagonal impact guide element 50, a groove 119 is arranged on the guide

rolling body 86, the guide supporting element with the pentagonal section and the pentagonal impact guide element cooperate with the guide rolling body 86 with the groove 119 to form a limiting structure of the guide rolling body 86, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, and the guide rolling body 86, the guide supporting element 83 and the impact guide element 50 are in close fit to achieve rolling guide.

As shown in Fig. 115, the guide mechanism 68 includes a guide rolling body 86, a guide supporting element 83 and an impact guide element 50, wherein the section of the guide supporting element 83 is circular ring-shaped, the section of the impact guide element 50 is circular, the guide rolling body 86 is a rolling drum, the radius of the generatrix of the outer surface of the rolling drum is equal to the inside diameter of the circular ring-shaped section of the guide supporting element 83, a groove 119 matched with the outer surface of the rolling drum is arranged on the circular impact guide element in the radial direction, the guide supporting element with the circular ring-shaped section and the circular impact guide element cooperate with the rolling drum to form a limiting structure of the guide rolling body 86, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, and the guide rolling body 86, the guide supporting element 83 and the impact guide element 50 are in close fit to achieve rolling guide.

As shown in Fig. 116, the guide mechanism 68 includes a guide rolling body 86, a guide supporting element 83 and an impact guide element 50, wherein the section of the guide supporting element 83 is V-shaped, the section of the impact guide element 50 is triangular, the guide rolling body 86 is a concave rolling column, projections matched with the outer surface of the concave rolling column are arranged on the V-shaped inner side face of the guide supporting element 83 and the outer surface of the triangular impact guide element 50 in the radial direction, the guide supporting

element with the V-shaped section and the triangular impact guide element cooperate with the concave rolling column to form a limiting structure of the guide rolling body 86, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, and the guide rolling body 86, the guide supporting element 83 and the impact guide element 50 are in close fit to achieve rolling guide.

As shown in Fig. 117, in equipment for converting rotary motion into reciprocating impact motion, the guide mechanism 68 includes a guide rolling body 86, a guide supporting element 83 and an impact guide element 50, wherein the section of the guide supporting element 83 is semicircular ring-shaped, the section of the impact guide element 50 is semicircular, a rolling drum is arranged between the semicircular top parts of the guide supporting element 83 matched with the impact guide element 50, a lug boss rolling column is arranged at the lower part, raceways 76 matched with the lug boss rolling column are arranged on the guide supporting element 83 and the impact guide element 50, the raceways 76 on the guide supporting element 83 and the impact guide element 50 cooperate with the lug boss rolling column to form a limiting structure of the guide rolling body 86, and the guide rolling body 86, the guide supporting element 83 and the impact guide element 50 are in close fit to achieve rolling guide.

As shown in Fig. 118 and Fig. 119, the reciprocating rolling device includes a guide rolling body 86, a guide supporting element 83 and an impact guide element 50, wherein the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, the impact guide element 50, the guide supporting element 83 and/or the guide rolling body 86 is provided with a limiting structure, the limiting structure is a raceway 76, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, the guide rolling body 86 is used for supporting the impact guide element 50 to reciprocate

along the guide supporting element 83, the limiting structure is used for limiting the rolling space or position of the guide rolling body 86, the limiting structure and a rolling supporting element are connected or separated or integrated, or the limiting structure and the impact guide element 50 are connected or separated or integrated, or the limiting structure and the guide rolling body 86 are connected or separated or integrated.

As shown in Fig. 120 and Fig. 121, a limiting structure is arranged on the impact guide element 50, the limiting structure is a pit 75, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, the guide rolling body 86 is used for supporting the impact guide element 50 to reciprocate along the guide supporting element 83, the limiting structure is used for limiting the rolling space or position of the guide rolling body 86, the limiting structure is separated from the rolling supporting element, is integrated with the impact guide element 50 and is separated from the guide rolling body 86.

As shown in Fig. 122 and Fig. 123, a limiting structure is arranged on the impact guide element 50, the limiting structure is a holder 77, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, the guide rolling body 86 is used for supporting the impact guide element 50 to reciprocate along the guide supporting element 83, the limiting structure is used for limiting the rolling space or position of the guide rolling body 86, the limiting structure and a rolling supporting element are connected or separated or integrated, or the limiting structure and the impact guide element 50 are connected or separated or integrated, or the limiting structure and the guide rolling body 86 are connected or separated or integrated.

As shown in Fig. 124, raceways 76 of a limiting structure is arranged on the impact guide element 50 and the guide supporting element 83, the limiting structure is

formed by cooperation of an inner body 149 and an outer sleeve 145, the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50, the guide rolling body 86 is used for supporting the impact guide element 50 to reciprocate along the guide supporting element 83, the limiting structure is used for limiting the rolling space or position of the guide rolling body 86, the limiting structure and a rolling supporting element are connected or separated or integrated, or the limiting structure and the impact guide element 50 are connected or separated or integrated, or the limiting structure and the guide rolling body 86 are connected or separated or integrated.

As shown in Fig. 125 and Fig. 126, the limiting structure can be an oval limiting structure 78;

as shown in Fig. 127 and Fig. 128, the limiting structure can be a dumb bell-shaped limiting structure 79;

as shown in Fig. 129, the limiting structure can be a cylindrical limiting structure 80;

as shown in Fig. 130, the limiting structure can be a conical limiting structure 110;

as shown in Fig. 131, the limiting structure can be a roller limiting structure 111;

as shown in Fig. 132, the limiting structure can be a square limiting structure 112;

as shown in Fig. 133, the limiting structure can be a U-shaped limiting structure 113;

as shown in Fig. 134, the limiting structure can be a frame-shaped limiting structure 114;

as shown in Fig. 135, the limiting structure can be a transverse H-shaped limiting structure 115; and

the limiting structure further includes a drum passage or a limiting plate or a limiting sleeve or a limiting rod or a limiting shaft or a limiting groove or a spherical projection or a lug boss or a bearing 161 or a circular ring shape or a platform-shaped column or a platform-shaped ball or a platform-shaped drum or a groove-shaped

column or a groove-shaped ball or a groove-shaped roller or a groove-shaped ellipse or a spline shape or a camber or a plate shape or a polygon or a cylinder or a spline sleeve 37.

Embodiment 77

As shown in Fig. 136, equipment for converting rotary motion into reciprocating impact motion, includes a guide mechanism 68 and an impact driving mechanism 2, wherein the guide mechanism 68 includes an impact guide element 50, the impact driving mechanism 2 includes an impact driving mechanism 2 of a cam 156, the impact driving mechanism 2 of the cam 156 includes the cam 156 and a power impact element 51, the cam 156 cooperates with the power impact element 51 to drive the power impact element 51 to impact, a bearing 161 is arranged between the cam 156 and the power impact element 51, the bearing 161 is in rolling friction with the power impact element 51, and the power impact element 51 and the impact guide element 50 are separated or connected or integrated.

The rest is the same as embodiment 27.

Embodiment 78

As shown in Fig. 137 and Fig. 138, equipment for converting rotary motion into reciprocating impact motion, includes a guide mechanism 68 and an impact driving mechanism 2, wherein the guide mechanism 68 includes an impact guide element 50, the impact driving mechanism 2 includes a crank impact driving mechanism 2, the crank impact driving mechanism 2 includes an eccentric shaft 136 and a power impact element 51, the eccentric shaft 136 cooperates with the power impact element 51 to drive the power impact element 51 to impact, a bearing 161 is arranged between the eccentric shaft 136 and the power impact element 51, the bearing 161 is in rolling friction with the power impact element 51, and the power impact element 51 and the impact guide element 50 are separated or connected or integrated.

The rest is the same as embodiment 27.

Embodiment 79

As shown in Fig. 139 and Fig. 140, equipment for converting rotary motion into reciprocating impact motion, includes a guide mechanism 68 and an impact driving mechanism 2, wherein the guide mechanism 68 includes an impact guide element 50, the impact driving mechanism 2 includes a crank impact driving mechanism 73, the crank impact driving mechanism 73 includes a crank 157 and a power impact element 51, the crank 157 cooperates with the power impact element 51 to drive the power impact element 51 to impact, a bearing 161 is arranged between the crank 157 and the power impact element 51, the bearing 161 is in rolling friction with the power impact element 51, and the power impact element 51 and the impact guide element 50 are separated or connected or integrated.

The rest is the same as embodiment 27.

Embodiment 80

As shown in Fig. 141, Fig. 142 and Fig. 143, equipment for converting rotary motion into reciprocating impact motion, includes an impact power box 38, a guide mechanism 68, an impact driving mechanism 2, impact heads 1 and the like, wherein the impact power box 38 is used for supporting the guide mechanism 68, the guide mechanism 68 includes an impact guide element 50, a friction body 164, a friction body supporting element 165 and the like, the friction body 164 includes a rolling body 71 and the like, the rolling body 71 includes a guide rolling body 86 and the like, the guide supporting element 83 includes a guide rolling body supporting element 178 and the like, the impact power box 38 and the friction body supporting element 165 are separated or separately connected or integrated, the end part of the impact guide element 50 is stretched out from the impact power box 38 so as to be connected with the impact heads 1, the impact heads 1 are arranged at the two ends of the impact

guide element 50, the impact guide element 50 and the impact heads 1 are connected or integrated, the impact driving mechanism 2 includes a crank impact driving mechanism 73, the crank impact driving mechanism 73 includes a power impact element 51, a power supporting element 74 and the like, the impact power box 38 and the power supporting element 74 are separately connected or are integrated, the power supporting element 74 and the guide supporting element 83 are separated or separately connected or integrated, the impact guide element 50 and the power impact element 51 are separated or separately connected or integrated, the power impact element 51 is arranged in the impact power box 38, the power impact element 51 and the impact heads 1 are movably connected or are separated, a break-off prevention mechanism 116 is arranged at one end of the power impact element 51, the break-off prevention mechanism 116 includes a rotary structure and the like, the power impact element 51 is used for driving the impact heads 1 to impact, an impact break-off force is applied to the break-off prevention mechanism 116, and the rotary structure of the break-off prevention mechanism 116 is stressed to rotate to isolate the impact counterforce, the friction body 164 is arranged between the guide supporting element 83 and the impact guide element 50 to form the guide mechanism 68, the friction body 164, the friction body supporting element 165 and the impact guide element 50 and the like are in close fit to support the impact heads 1 to impact through rolling friction or suspension friction, and the guide mechanism 68 is used for correcting the impact direction of the impact head 1 and preventing the impact driving mechanism 2 from being damaged by the break-off force and/or the impact counterforce.

The crank impact driving mechanism 73 includes a multi-throw crank shaft multi-rod impact mechanism 132, a power output component and the like, wherein the multi-throw crank shaft multi-rod impact mechanism 132 includes a multi-throw crank shaft 133, a connecting rod 137 and the like, the multi-throw crank shaft 133 includes a

power concentric shaft segment 134, a connecting handle 135, an eccentric shaft 136 and the like, the concentric shaft segment 134, the connecting handle 135 and the eccentric shaft 136 and the like are separated or connected or integrated, one end of the power concentric shaft segment 134 of the multi-throw crank shaft 133 is connected with the power output component of the crank impact driving mechanism 73, more than two connecting handles 135, eccentric shafts 136 and the like are arranged at the other end of the power concentric shaft segment 134, the power concentric shaft segment 134 of the multi-throw crank shaft 133 is installed on the impact power box 38 or a supporting frame 95, the eccentric shaft 136 of the multi-throw crank shaft 133 is hinged with one end of the connecting rod 137, the other end of the connecting rod 137 and the impact heads 1 are connected or separated, and one eccentric shaft 136 is used for driving more than one connecting rod 137 to impact in a reciprocating manner.

One eccentric shaft 136 or more than two eccentric shafts 136 are arranged, the more than two eccentric shafts 136 are arranged at intervals along the radial direction of the power concentric shaft segment 134 to form angle difference, the impact driving mechanism 2 includes a power output component, and the power concentric shaft segment 134 of the multi-throw crank shaft 133 and the power output component are separated or connected or integrated.

The multi-throw crank shaft 133 is provided with a liquid channel 163, and the liquid channel 163 is arranged on the power concentric shaft segment 134, the connecting handle 135 and/or the eccentric shaft 136.

The impact power box 38 includes a lubricating system.

The impact power box 38 includes a sealing element 47, wherein the sealing element 47 is arranged at the movable connecting site of the impact driving mechanism 2 or the guide mechanism 68 and the impact power box 38.

An impact element protection cover 107 is arranged at the joint site of the power impact element 51 and the impact head 1, or a guide element protection cover 107 is arranged at the joint site of the impact guide element 50 and the impact head 1, the power impact element 51 and the impact heads 1 are connected or separated or integrated, the impact guide element 50 and the impact heads 1 are connected or integrated, and the sealing element 47 is arranged between the impact element protection cover 107 or the guide element protection cover 107 and the impact power box 38.

The sealing element 47 is arranged between the impact guide element 50 and the friction body supporting element 165 or between the power impact element 51 and a power supporting element 74.

The sealing element 47 includes a sealing cavity or a sealing piece or a sealing plug or a sealing pad or an O-shaped ring or a sliding ring or an elastomer 4 or a retainer ring or a supporting ring or a sealing ring or a starlike ring or a pressing ring or a V-shaped body or a U-shaped body or a frame-shaped ring or a groove-shaped element or a pressure spring or an opening sealing ring or a sealing strip or a sealing plate or a sealing block.

The sealing element 47 is made from a rubber material or a polyurethane material or a nylon material or a plastic material or a metallic material or a composite material.

The impact head 1 includes outer-layer material impact teeth 43 and inner-layer material impact teeth 45 and the like, wherein the shape and arrangement of the outer-layer material impact teeth 43 are conductive to enabling the material blanked by the inner-layer material impact teeth 45 to flow out from the gaps of the outer-layer material impact teeth 43.

The shape or arrangement of the inner-layer material impact teeth 45 is conductive to blanking the inner-layer material of a coal bed to be dug or a rock stratum or cement concrete or bituminous concrete or hardened mudstone.

The outer-layer material impact teeth 43 and the inner-layer material impact teeth 45 are arranged side by side to form a multilayer impact head 1, multiple layers of impact mechanisms cooperate to achieve impact blanking and material discharging, and multiple layers of impact teeth are used for increasing the coal digging width and improving the coal digging efficiency.

The distances between the tooth heads of two adjacent layers of impact teeth are different, the impact teeth are arranged to be multilayer impact teeth, a coal bed to be dug or a rock stratum or cement concrete or bituminous concrete or a hardened mudstone is impacted to a step shape, more than two relatively free surfaces are generated on each step layer of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone, the pressure stress and/or structural strength of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone is greatly reduced compared with that of the original planar coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone, and the tooth heads and the impact teeth are separately connected or are integrated.

After the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone is impacted to the step shape, when each layer of the impact teeth is used for digging again, the two relatively free surfaces of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone are reasonably utilized to blank the material, so as to greatly reduce the impact resistance, avoid overlarge lumps of the material blanked by the

impact head 1, reduce the power consumption, reduce impact counterforce and improve the impact efficiency.

A discharge hole 90 is arranged on an outer-layer material impact tooth seat 44, and the discharge hole 90 is conducive to enabling the material blanked by inner-layer material impact teeth 45 to flow out.

A machine body 4 includes a frame 125 and the like, no lifting mechanism 96 is arranged on the machine body 4, a reciprocating impact part 5 is arranged on the frame 125, and a walking part 7 is arranged at the lower part of the machine body 4 and is used for driving the machine body 4 to walk.

The friction body 164 can also include a suspension body and the like, and the rolling body 71 can also include a power rolling body 71 and the like.

The impact head 1 can also be arranged at one end of the impact guide element 50 or the impact head 1 is arranged at one end and a counterweight element 94 is arranged at the other end.

The break-off prevention mechanisms 116 can also be arranged at two ends of the power impact element 51, and the break-off prevention mechanism 116 can also include a separate break-off prevention structure and the like.

The rest is the same as embodiment 27.

Embodiment 81

As shown in Fig. 144, equipment for converting rotary motion into reciprocating impact motion, includes an impact power box 38, a guide mechanism 68, an impact driving mechanism 2, impact heads 1 and the like, wherein the impact power box 38 is used for supporting the guide mechanism 68, the guide mechanism 68 includes an impact guide element 50, a friction body 164, a friction body supporting element 165 and the like, the friction body 164 includes a rolling body 71 and the like, the rolling body 71 includes a linear bearing 179 and the like, the impact power box 38 and the

friction body supporting element 165 are separated or separately connected or integrated, the end part of the impact guide element 50 is stretched out from the impact power box 38 so as to be connected with the impact heads 1, the impact heads 1 are arranged at the two ends of the impact guide element 50, the impact guide element 50 and the impact heads 1 are connected or integrated, the impact driving mechanism 2 includes a crank impact driving mechanism 73, the crank impact driving mechanism 73 includes a power impact element 51, a power supporting element 74 and the like, the impact power box 38 and the power supporting element 74 are separately connected or are integrated, the power supporting element 74 and the guide supporting element 83 are separated or separately connected or integrated, the impact guide element 50 and the power impact element 51 are separated or separately connected or integrated, the power impact element 51 is arranged in the impact power box 38, the power impact element 51 and the impact head 1 are movably connected or are separated, the friction body 164 is arranged between the guide supporting element 83 and the impact guide element 50 to form the guide mechanism 68, the friction body 164, the friction body supporting element 165 and the impact guide element 50 and the like are in close fit to support the impact heads 1 to impact through rolling friction or suspension friction, and the guide mechanism 68 is used for correcting the impact direction of the impact head 1 and preventing the impact driving mechanism 2 from being damaged by the break-off force and/or the impact counterforce.

The rest is the same as embodiment 27.

Embodiment 82

As shown in Fig. 145, Fig. 146 and Fig. 147, in equipment for converting rotary motion into reciprocating impact motion, a reciprocating impact part 5 includes a rocker arm lifting mechanism, wherein an impact power box 38 is arranged at the front part of the rocker arm lifting mechanism, a crank impact driving mechanism 73

includes a transmission gear 12, connecting rods 137 of a crank 157 are arranged at the two sides of the transmission gear 12, the connecting rod 137 of the crank 157 at one side is used for at least driving one impact head 1 to impact, the connecting rods 137 of the crank 157 at the two sides of the transmission gear 12 are used for simultaneously impacting or alternatively impacting, guide supporting elements 83, impact guide elements 50 and friction bodies 164 are arranged at more than two end parts of the impact power box 38, the friction bodies 164 are arranged between the guide supporting elements 83 and the impact guide elements 50 to form a multipoint impact head 1 supporting structure, the impact power box 38 and the guide supporting elements 83 and the like are separately connected or are integrated, more than two impact guide elements 50 are stretched out from the impact power box so as to be connected with the impact head 1, the connecting rod 137 and the impact head 1 are connected or separated or integrated, a break-off prevention mechanism 116 is arranged at one end or two ends of the connecting rod 137, the connecting rod 137 is used for driving the impact head 1 to reciprocate, and the more than two impact guide elements 50 are used for correcting the impact direction of the impact head 1.

The rest is the same as embodiment 27.

Embodiment 83

As shown in Fig. 148, in equipment for converting rotary motion into reciprocating impact motion, a liquid suspension body 166 includes a liquid medium source 167, a control valve 168, a conveying pipeline 169, a liquid cavity 147 and the like, wherein the liquid cavity 147 is arranged on a guide mechanism 68, the liquid suspension body 166 is formed between a guide supporting element 83 and an impact guide element 50, and the liquid suspension body 166 is used for supporting the impact guide element 50 to reciprocate through suspension friction.

The liquid cavity 147 can also be arranged on an impact driving mechanism 2, and the liquid suspension body 166 is formed between a power supporting element 74 and a power impact element 51.

The rest is the same as embodiment 27.

Embodiment 84

As shown in Fig. 149, in equipment for converting rotary motion into reciprocating impact motion, an air suspension body 150 includes an air source 151, a control valve 168, a conveying pipeline 169, an air cavity 148 and the like, wherein the air cavity 148 is arranged on a guide mechanism 68 or an impact driving mechanism 2, the air suspension body 150 is formed between a friction body supporting element 165 and an impact guide element 50, or the air suspension body 150 is formed between a power supporting element 74 and a power impact element 51, the power supporting element 74 and the friction body supporting element 165 are separated or separately connected or integrated, the impact guide element 50 and the power impact element 51 are separated or separately connected or integrated, and the air suspension body 150 is used for supporting the impact guide element 50 to reciprocate through suspension friction or the air suspension body 150 is used for supporting the power impact element 51 to reciprocate through suspension friction.

The rest is the same as embodiment 27.

Embodiment 85

As shown in Fig. 150, in equipment for converting rotary motion into reciprocating impact motion, an impact guide element 50 and a friction body supporting element 165 include N pole permanent magnets 160, a power impact element 51 and a power supporting element 74 include S pole permanent magnets 162, wherein the N pole permanent magnets 160 and the N pole permanent magnets 160 or the S pole permanent magnets 162 and the S pole permanent magnets 162 repel each other due

to the same polarity to form a magnetic suspension body 159, the power impact element 51 is used for driving the impact guide element 50 to reciprocate, the magnetic suspension body 159 is used for supporting the impact guide element 50 and the friction body supporting element 165 to relatively reciprocate through suspension friction or the magnetic suspension body 159 is used for supporting the power impact element 51 and the power supporting element 74 to relatively reciprocate through suspension friction.

The power impact element 51 and the power supporting element 74 can also include the N pole permanent magnets 160, and the impact guide element 50 and the friction body supporting element 165 can also include the S pole permanent magnets 162.

The rest is the same as embodiment 27.

Embodiment 86

As shown in Fig. 151, in equipment for converting rotary motion into reciprocating impact motion, an impact guide element 50 and a friction body supporting element 165 or a power impact element 51 and a power supporting element 74 include negative pole permanent magnets 170, or the impact guide element 50 and the friction body supporting element 165 or the power impact element 51 and the power supporting element 74 include positive pole permanent magnets 171, wherein the negative pole permanent magnets 170 and the negative pole permanent magnets 170 or the positive pole permanent magnets 171 and the positive pole permanent magnets 171 repel each other due to the same polarity to form a magnetic suspension body 159, the power impact element 51 is used for driving the impact guide element 50 to reciprocate, the magnetic suspension body 159 is used for supporting the impact guide element 50 and the friction body supporting element 165 to relatively reciprocate through suspension friction or the magnetic suspension body 159 is used for

supporting the power impact element 51 and the power supporting element 74 to relatively reciprocate through suspension friction.

The rest is the same as embodiment 27.

Embodiment 87

As shown in Fig. 152, Fig. 153 and Fig. 154, in equipment for converting rotary motion into reciprocating impact motion, a circular raceway 172 is arranged on an impact guide element 50, wherein the circular raceway 172 includes a circular supporting segment 173 and a circular segment 174, the plane of the circular raceway 172 is arranged to be approximately parallel to the surface of a guide supporting element 83, a rolling body 71 in the circular supporting segment 173 supports the rolling friction of the guide supporting element 83, and the rolling body 71 in the circular segment 174 does not support the rolling friction of the guide supporting element 83.

The rolling body 71 in the circular supporting segment 173 supports the rolling friction of the impact guide element 50 and the guide supporting element 83 or supports the rolling friction of a power impact element 51 and a power supporting element 74, and the rolling body 71 in the circular segment 174 does not support the rolling friction of the guide supporting element 83, the impact guide element 50, the power impact element 51 and the power supporting element 74, and the like.

The impact guide element 50 or the guide supporting element 83 or the power impact element 51 or the power supporting element 74 is made from a light material, and the light material includes an aluminum alloy or high-strength plastic or ceramic or a titanium alloy or carbon fiber or light steel or a composite material, and the like.

The power supporting element 74 can be a raceway power supporting element or a pit power supporting element or a belt frame power supporting element or a circular raceway power supporting element or a stroke segment power supporting element or a

limiting power supporting element or a cylindrical power supporting element or a U-shaped power supporting element or an E-shaped power supporting element or a polygonal power supporting element or a power supporting element of an impact power box 38 or a frame-shaped power supporting element or a deformed power supporting element, and the like.

The rest is the same as embodiment 27.

Embodiment 88

As shown in Fig. 155, Fig. 156 and Fig. 157, in equipment for converting rotary motion into reciprocating impact motion, the reciprocating impact part 5 includes a guide mechanism 68, an impact driving mechanism 2, an impact power box 38, an impact head 1 and the like, wherein the impact power box 38 is used for supporting the guide mechanism 68, the impact driving mechanism 2 includes a crank impact driving mechanism 73 and the like, the crank impact driving mechanism 73 includes a power impact element 51, the power impact element 51 is arranged on the impact power box 38, the power impact element 51 and an impact head 1 are connected or separated or integrated, the guide mechanism 68 includes a guide rolling body supporting element 178, a guide rolling body 86 and an impact guide element 50, the guide rolling body 86 includes a roller 72, the roller 72 is a waist drum wheel 180, waist drum wheel bearings 177 are arranged at the two ends of the waist drum wheel 180, the waist drum wheel bearings 177 are installed on the guide rolling body supporting element 178, the shape of the impact guide element 50 is buckled with the cambered groove 119 of the waist drum wheel 180, the impact guide element 50 linearly reciprocates by leaning against the cambered groove 119, the impact guide element 50 reciprocates under the support of the waist drum wheel, the power impact element 51 is used for driving the impact head 1 to impact, a buffer break-off prevention mechanism 56 is arranged on the power impact element 51, the buffer

break-off prevention mechanism 56 isolates an impact counteraction break-off force through buffer, the guide rolling body supporting element 178 and the impact guide element 50 are in close fit with the waist drum wheel 180 to correct the impact direction of the impact head 1 through rolling friction and prevent the impact head 1 from rotating, and the power impact element 51 is not used for guiding the impact head 1 and is not broken off by the break-off force.

The rest is the same as embodiment 27.

Embodiment 89

As shown in Fig. 158 to Fig. 159, equipment for converting rotary motion into reciprocating impact motion, includes an impact driving mechanism 2, a guide mechanism 68 and the like, wherein the impact driving mechanism 2 includes a crank impact driving mechanism 73 and the like, the crank impact driving mechanism 73 includes a power impact element 51 and the like, the guide mechanism 68 and the crank impact driving mechanism 73 and the like are combined to form more than two reciprocating impact parts 5, the more than two reciprocating impact parts 5 are arranged at the front part of a lifting mechanism 96, and the more than two reciprocating impact parts 5 are arranged left and right to increase the digging width.

The guide mechanism 68 includes a guide rolling body 86, a guide supporting element 83, an impact guide element 50 and the like, wherein the guide rolling body 86 is arranged between the guide supporting element 83 and the impact guide element 50.

The reciprocating impact part 5 includes an impact power box 38 and the like, wherein the crank impact driving mechanism 73 includes an assembly of a crank 157 and the like, the assembly of the crank 157 is used for driving the power impact element 51, the guide mechanism 68 and the assembly of the crank 157 are cooperatively arranged in the impact power box 38, an impact head 1 is arranged at the end of the impact guide element 50 stretched out from the impact power box 38,

and a counterweight element 94 used for preventing the impact head 1 from breaking off the guide mechanism 68, the impact driving mechanism 2 and/or a machine body 4 and the like due to unbalanced gravity is arranged at the other end thereof, and more than two end parts of the power impact element 51 stretched out from the impact power box 38 and the impact head 1 are connected or separated.

When the guide mechanism 68 and the assembly of the crank 157 are cooperatively arranged at the front part of a lifting mechanism 96, the impact power box 38 supports the assembly of the crank 157, the guide mechanism 68, the impact head 1 and the like, and the impact power box 38 is arranged at the front part of the lifting mechanism 96 or a frame 125.

A limiting structure of the guide rolling body 86 and the like is arranged on the guide supporting element 83 or the impact guide element 50, the limiting structure of the guide rolling body 86 is used for limiting the rolling space of the guide rolling body 86, the guide rolling body 86, the guide supporting element 83 and the impact guide element 50 are in close fit to enable the guide rolling body 86 arranged in the limiting structure of the guide rolling body 86 to support the impact guide element 50 to reciprocate through rolling friction an control the impact direction of the impact guide element 50.

The more than two reciprocating impact parts 5 can also be arranged at the front part of the frame 125.

The impact heads 1 are arranged at the two ends of the impact guide element 50 stretched out from the impact power box 38, or the impact head 1 is only arranged at one end thereof.

The rest is the same as embodiment 27.

Embodiment 90

As shown in Fig. 160 to Fig. 161, in equipment for converting rotary motion into reciprocating impact motion, a buffer break-off prevention mechanism 56 includes a buffer reciprocating element 53, an elastomer 49, a buffer supporting element 54 and the like, wherein the elastomer 49 is arranged between the buffer supporting element 54 and the buffer reciprocating element 53 or arranged on the buffer reciprocating element 53 or arranged on the buffer supporting element 54, the buffer supporting element 54 and/or the buffer reciprocating element 53 includes an elastomer fixing element 117, the buffer supporting element 54 and the elastomer fixing element 117 are integrated, the buffer reciprocating element 53 and the elastomer fixing element 117 are separately connected, the buffer reciprocating element 53 and the elastomer 49 are integrated, the elastomer 49 and the buffer supporting element 54 are separated, the elastomer 49 and the elastomer fixing element 117 are separated, when the buffer supporting element 54 and a power impact element 51 are integrated, the buffer reciprocating element 53 and an impact head 1 are separately connected or are integrated, when the impact head 1 is used for impacting the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone, an impact counterforce is applied to the buffer break-off prevention mechanism 56, the elastomer fixing element 117 extrudes the elastomer 49, and the elastomer 49 deforms to absorb and decompose the impact counterforce, to avoid the break-off damage to the power impact element 51.

The elastomer fixing element 117 is a thread elastomer fixing element 117.

The buffer supporting element 54 and the elastomer fixing element 117 can also be separately connected, the buffer reciprocating element 53 and the elastomer 49 can also be separated or separately connected, the buffer reciprocating element 53 and the elastomer fixing element 117 can also be of an integrated structure, the elastomer 49 and the buffer supporting element 54 can also be movably connected or are integrated,

the elastomer 49 and the elastomer fixing element 117 can also be movably connected or are integrated, when the buffer supporting element 54 and the power impact element 51 are separately connected, the buffer reciprocating element 53 and the impact head 1 are separately connected or are integrated.

When the buffer reciprocating element 53 and the power impact element 51 are separately connected or are integrated, the buffer supporting element 54 and the impact head 1 are separately connected or are integrated.

Embodiment 91

As shown in Fig. 162, in equipment for converting rotary motion into reciprocating impact motion, an elastomer fixing element 117 includes a neck elastomer fixing element 117.

The elastomer fixing element 117 can also be a sleeve elastomer fixing element or a frame-shaped elastomer fixing element or a U-shaped elastomer fixing element or a multi-prismatic elastomer fixing element or a plate type elastomer fixing element or a rod type elastomer fixing element or a baffle elastomer fixing element or a hinge hole elastomer fixing element or a fixing shaft elastomer fixing element or a pin shaft elastomer fixing element or a hook elastomer fixing element or a locking pin elastomer fixing element or a clamping pin elastomer fixing element or a hanging gear elastomer fixing element or a triangular elastomer fixing element or a quadrangular elastomer fixing element or a polygonal elastomer fixing element or a sleeve rod type elastomer fixing element or a positioning platform elastomer fixing element or a positioning pin elastomer fixing element or a positioning hole elastomer fixing element or a positioning groove elastomer fixing element or a positioning bolt elastomer fixing element or a positioning neck elastomer fixing element or a positioning guide post elastomer fixing element or a positioning shaft elastomer fixing element or a positioning plate elastomer fixing element or a positioning ring elastomer

fixing element or a positioning hook elastomer fixing element or a positioning thread elastomer fixing element or a clamping sleeve elastomer fixing element or a transverse H-shaped elastomer fixing element or a combined elastomer fixing element, and the like.

The rest is the same as embodiment 90.

Embodiment 92

As shown in Fig. 163, in equipment for converting rotary motion into reciprocating impact motion, the buffer break-off prevention mechanism 56 includes a buffer reciprocating element 53, an elastomer 49, a buffer supporting element 54 and the like, wherein the elastomer 49 is arranged between the buffer supporting element 54 and the buffer reciprocating element 53, the buffer supporting element 54 and/or the buffer reciprocating element 53 includes an elastomer fixing element 117, the buffer supporting element 54 and the elastomer fixing element 117 are separately connected, the buffer reciprocating element 53 and the elastomer fixing element 117 are separately connected, the buffer reciprocating element 53 and the elastomer 49 are integrated, the elastomer 49 and the buffer supporting element 54 are separated, when the elastomer 49 and the elastomer fixing element 117 are fixedly connected or are integrated, the elastomer fixing element 117 extrudes the elastomer 49, and the elastomer 49 deforms to absorb and decompose the impact counterforce.

The elastomer 49 can also be arranged on the buffer reciprocating element 53 or on the buffer supporting element 54, the buffer supporting element 54 and the elastomer fixing element 117 can also be integrated, the buffer reciprocating element 53 and the elastomer fixing element 117 can also be integrated, the buffer reciprocating element 53 and the elastomer 49 are separated or separately connected, and the elastomer 49 and the buffer supporting element 54 can also be movably connected or are integrated.

The rest is the same as embodiment 90.

Embodiment 93

As shown in Fig. 164, in equipment for converting rotary motion into reciprocating impact motion, a reciprocating impact part 5 includes a guide mechanism 68, a buffer break-off prevention mechanism 56 includes a buffer reciprocating element 53, an elastomer 49, a buffer supporting element 54 and the like, wherein the elastomer 49 is arranged between the buffer supporting element 54 and the buffer reciprocating element 53, the buffer supporting element 54 and/or the buffer reciprocating element 53 includes an elastomer fixing element 117, the buffer supporting element 54 and the elastomer fixing element 117 are integrated, the buffer reciprocating element 53 and the elastomer fixing element 117 are integrated, the buffer reciprocating element 53 and the elastomer 49 are integrated, the elastomer 49 and the buffer supporting element 54 are separated, when the elastomer 49 and the elastomer fixing element 117 are separately connected, the elastomer fixing element 117 and/or the buffer reciprocating element 53 extrudes the elastomer 49, the elastomer 49 deforms to absorb and decompose the impact counterforce, and the guide mechanism 68 is used for correcting the impact direction of an impact head 1.

The buffer supporting element 54 and the elastomer fixing element 117 can also be separated or separately connected, the buffer reciprocating element 53 and the elastomer fixing element 117 can also be separated or separately connected, the buffer reciprocating element 53 and the elastomer 49 are separated or separately connected, and the elastomer 49 and the buffer supporting element 54 can also be movably connected or are integrated.

The rest is the same as embodiment 90.

Embodiment 94

As shown in Fig. 165, Fig. 166, Fig. 167, Fig. 168, Fig. 169 and Fig. 170, in equipment for converting rotary motion into reciprocating impact motion, the walking

part 7 or the machine body 4 includes a rotary disk 3, wherein the rotary disk 3 is arranged at the upper part of the walking part 7 and the lower part of the machine body 4, an impact head 1 is arranged on the rotary disk 3 and/or on a rocker arm 6, the rocker arm 6 is arranged on the machine body 4 and/or on the rotary disk 3, the walking part 7 is used for driving the rotary disk 3 to walk, the rotary disk 3 is used for driving the impact head 1 to impact and/or excavate and load at multiple positions, the machine body 4 includes a frame 125, wherein the frame 125 includes a material excavating and loading device 65, the material excavating and loading device 65 includes a bucket or an excavator grab, the material excavating and loading device 65 is used for carting the material, the rotary disk 3 includes an inner rotary disk 118 and an outer rotary disk 122, the frame 125 includes an operating chamber 64, the operating chamber 64 is arranged in the inner rotary disk 118, an inner rotary disk rocker arm 6 is arranged on the inner rotary disk 118, one end of the inner rotary disk rocker arm 6 is connected with the inner rotary disk 118, the other end thereof is connected with the impact head 1 and/or the bucket and/or the excavator grab, an outer rotary disk rocker arm 6 is arranged on the outer rotary disk 122, one end of the outer rotary disk rocker arm 6 is connected with the outer rotary disk, and the other end thereof is connected with the impact head 1 and/or the bucket and/or the excavator grab, a crank impact driving mechanism 73 includes an expansion piece of the crank impact driving mechanism, and/or the material excavating and loading device 65 includes an expansion piece of the material excavating and loading device, the expansion piece of the crank 157 impact mechanism or the expansion piece of the material excavating and loading device is used for preventing mutual interference when the crank impact driving mechanism 73 or the material excavating and loading device 65 is at work, the impact head 1 includes a multifunctional combined impact

head 1, and the multifunctional combined impact head 1 is used for impacting, crushing, stacking and carting the material.

Embodiment 95

As shown in Fig. 171 and Fig. 172, in equipment for converting rotary motion into reciprocating impact motion, the rolling friction guide mechanism 68 includes a roller 72, a guide element of the roller 72 and a rolling body supporting element 70, wherein the roller 72 is arranged on the rolling body supporting element 70 or on the guide element of the roller 72, a power impact element 51 and the rolling body supporting element 70 are separated or separately connected or integrated, the roller 72 is arranged on the side part of the power impact element 51 or in the power impact element 51, the roller 72 is used for correcting the power impact element 51 to impact in a reciprocating manner through rolling friction, the power impact element 51 and an impact head 1 are movably connected or are integrated, the power impact element 51 is used for driving the impact head 1 to impact, and the guide element of the roller 72, the rolling body supporting element 70 and the roller 72 cooperate to correct the impact direction of the impact head 1.

The rest is the same as embodiment 94.

Embodiment 96

As shown in Fig. 173, in equipment for converting rotary motion into reciprocating impact motion, the guide element of the roller 72 and an impact power box 38 are separated or separately connected or integrated, the guide element of the roller 72 and a rocker arm 6 are integrated or separated or separately connected, the guide element of the roller 72 and a material plate 181 are separated or separately connected or integrated, the roller 72 is in clearance fit with the guide elements of the roller 72 at the two sides of the roller 72, when the roller 72 is in rolling friction with the guide element of the roller 72 at one side, the roller 72 is not in contact with the guide

element of the roller 72 at the other side, the roller 72 is limited by the guide elements of the roller 72 at the two sides, to prevent a power impact element 51 from swinging so as to control an impact head 1 to swing.

The rest is the same as embodiment 94.

Embodiment 97

As shown in Fig. 174 and Fig. 175, in equipment for converting rotary motion into reciprocating impact motion, the rolling friction guide mechanism 68 includes a rolling body 71, a rolling body supporting element 70 and an impact guide element 50, wherein the rolling body 71 is a waist drum wheel 180, the rolling body supporting element 70 and a material plate 181 are separated or separately connected or integrated, the impact guide element 50 and a power impact element 51 are integrated or separately connected, the power impact element 51 and an impact head 1 are integrated or separately connected, the waist drum wheel 180 is arranged on the rolling body supporting element 70, a groove 119 or a projection is arranged on the waist drum wheel 180, a projection or a groove 119 is arranged on the corresponding power impact element 51, and the waist drum wheel 180 is buckled with the power impact element 51 to correct the impact direction of the power impact element 51 through rolling friction and prevent the impact head 1 from swinging.

Embodiment 98

As shown in Fig. 176, Fig. 177 and Fig. 178, in equipment for converting rotary motion into reciprocating impact motion, the impact power box 38 and/or the material plate 181 includes a protection plate stroke groove 48, wherein the protection plate stroke groove 48 is arranged along the surrounding or a local part of the impact power box 38 and/or the material plate 181, a protection element includes a protection plate, and the protection plate reciprocates in the protection plate stroke groove 48 arranged along the surrounding or the local part.

The rest is the same as embodiment 94.

Claims

1. A method of equipment for converting rotary motion into reciprocating impact motion, characterized in that, an impact power source element is arranged, wherein the impact power source element is arranged perpendicular to a rocker arm or parallel to the rocker arm, the impact power source element is arranged to be a motor or a hydraulic motor or a pneumatic motor, a power belt pulley or a power gear or a power chain wheel or a power bevel gear is installed on the power output shaft of the motor or the hydraulic motor or the pneumatic motor, a transmission belt pulley or a transmission gear or a transmission chain wheel or a transmission bevel gear is used for driving a crank shaft, the power output shaft is perpendicular to the rocker arm, and the power output shaft, a transmission shaft and the crank shaft are arranged in parallel to enable the transmission gear to drive the crank shaft to convert rotary motion into reciprocating impact motion, or the power output shaft is arranged parallel to the rocker arm to drive the crank shaft to convert the rotary motion into the reciprocating impact motion after converting the power direction through the power bevel gear and the transmission bevel gear, an impact head is connected with an impact driving mechanism, the impact driving mechanism is arranged on the rocker arm, the crank shaft is used for driving the impact head to impact in a reciprocating manner, the rocker arm is arranged at the front end of a machine body, a walking part is arranged at the lower part of the machine body, and the walking part is used for driving the machine body to walk to continuously work.

2. The method of equipment for converting rotary motion into reciprocating impact motion according to claim 1, characterized in that, a rotating device is arranged, wherein the rotating device is arranged on a fixed seat and a movable arm, the fixed seat is arranged to a fixed arm and/or a bracket, the fixed arm and/or the bracket is

movably connected with the movable arm, and the rotating device is used for driving the movable arm to rotate relative to the fixed arm and/or the bracket.

3. The method of equipment for converting rotary motion into reciprocating impact motion according to claim 1, characterized in that, a telescopic device is arranged, wherein the telescopic device is arranged on the fixed seat and/or the movable arm, one end of the telescopic device is connected with the movable arm, and the telescopic device is used for driving the movable arm to reciprocate relative to the fixed seat.

4. The method of equipment for converting rotary motion into reciprocating impact motion according to claim 1, characterized in that, a limiting device is arranged, wherein the limiting device is used for positioning the rotation position and/or telescopic position of the movable arm.

5. The method of equipment for converting rotary motion into reciprocating impact motion according to claim 1, characterized in that, a locking device is arranged, wherein the locking device is used for locking the movable arm after rotating the same in place and/or locking the movable arm after telescoping the same in place.

6. The method of equipment for converting rotary motion into reciprocating impact motion according to claim 1, characterized in that, an action detection and control system is arranged, wherein the action detection and control system is used for detecting and controlling the working state of a working component.

7. Equipment for converting rotary motion into reciprocating impact motion, for implementing the method of the equipment for converting rotary motion into reciprocating impact motion of claim 1, comprising a machine body, a walking part and a reciprocating impact part, characterized in that, the reciprocating impact part comprises an impact driving mechanism, a rocker arm and an impact head, the impact driving mechanism comprises an impact power source element, a transmission

component and a crank shaft, the impact power source element is arranged perpendicular to the rocker arm or parallel to the rocker arm, the impact power source element comprises a motor or a hydraulic motor or a pneumatic motor, the motor or the hydraulic motor or the pneumatic motor comprises a power output shaft, the transmission component comprises a belt pulley transmission component or a gear transmission component or a chain wheel transmission component or a bevel gear transmission component, the belt pulley transmission component comprises a belt, a power belt pulley and a transmission belt pulley, the gear transmission component comprises a power gear and a transmission gear, the chain wheel transmission component comprises a power chain wheel, a transmission chain wheel and a chain, the bevel gear transmission component comprises a power bevel gear and a transmission bevel gear, the impact power source element comprises a power output shaft, the power belt pulley or the power gear or the power chain wheel or the power bevel gear is installed on the power output shaft, the transmission belt pulley or the transmission gear or the transmission chain wheel or the transmission bevel gear is used for driving the crank shaft, the transmission component comprises a transmission shaft, the power output shaft is arranged perpendicular to the rocker arm and parallel to the transmission shaft and the crank shaft for enabling the transmission gear or the transmission belt pulley or the transmission chain wheel to drive the crank shaft to convert rotary motion into reciprocating impact motion, or the power output shaft is arranged parallel to the rocker arm to drive the crank shaft to convert the rotary motion into the reciprocating impact motion after converting the power direction through the power bevel gear and the transmission bevel gear, the reciprocating impact part is arranged on the machine body, the crank shaft is used for driving the impact head to impact in a reciprocating manner, the walking part is arranged at the lower part of the machine body, the walking part is used for driving the machine body

to walk, and the machine body is used for driving the reciprocating impact part to move to continuously work.

8. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises a fixed seat and a movable arm, wherein the fixed seat and the movable arm are separated or integrated, the impact driving mechanism is arranged on the movable arm, the movable arm is arranged on the fixed seat, and the fixed seat is hinged or fixedly connected with the movable arm.

9. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises a fixed seat, wherein the fixed seat is provided with an outer guide cylinder or an inner guide cylinder, the movable arm is correspondingly arranged in the inner guide cylinder or the outer guide cylinder, and the inner guide cylinder is arranged in the outer guide cylinder.

10. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises a rotating device, wherein the rotating device comprises a fixed seat and a movable arm, the fixed seat comprises a fixed arm and/or a bracket, the fixed seat is movably connected with the movable arm, the rotating device is arranged on the fixed seat and/or the movable arm, and the rotating device is used for driving the movable arm to rotate relative to the fixed seat.

11. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises a telescopic device, wherein the telescopic device comprises a fixed seat and a movable arm, the telescopic device is arranged on the fixed seat and/or the movable arm, and the

telescopic device is used for driving the movable arm to reciprocate relative to the fixed seat.

12. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises a limiting device, wherein the limiting device comprises a rotary limiting device and/or a telescopic limiting device, the rotary limiting device is used for limiting the rotation position of the movable arm and/or the telescopic limiting device is used for limiting the telescopic position of the movable arm.

13. The equipment for converting rotary motion into reciprocating impact motion according to claim 8, characterized in that, the movable arm or the fixed seat comprises a transition disk, wherein the transition disk is movably connected with the movable arm and/or the fixed seat, the rotating device is arranged between the transition disk and the movable arm, the rotating device is used for driving the movable arm to rotate relative to the transition disk, the telescopic device is arranged on the transition disk and the fixed seat, the telescopic device is used for driving the transition disk to telescope relative to the fixed seat, and the transition disk is used for driving the movable arm to telescope relative to the fixed seat.

14. The equipment for converting rotary motion into reciprocating impact motion according to claim 13, characterized in that, the transition disk is provided with a transition disk round hole, the movable arm comprises an inner guide cylinder of the movable arm, the transition disk round hole is matched with the inner guide cylinder of the movable arm, and the inner guide cylinder of the movable arm rotates in the transition disk round hole.

15. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises a rotary locking device and/or a telescopic locking device, wherein the rotary locking device is used

for locking the movable arm after rotating the same in place and/or the telescopic locking device is used for locking the movable arm after telescoping the same in place.

16. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises an action detection and control system, wherein the action detection and control system is used for detecting and controlling the working state of a working component.

17. The equipment for converting rotary motion into reciprocating impact motion according to claim 16, characterized in that, the action detection and control system comprises a manual action detection and control system or hydraulic action detection and control system or a pneumatic action detection and control system or an electric action detection and control system.

18. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises a limiting device, a rotary locking device, a rotary telescopic device, an action detection and control system, wherein the limiting device comprises a rotary limiting device and/or a telescopic limiting device, the rotary limiting device is used for limiting the rotation position of the movable arm, the rotary telescopic limiting device is used for limiting the telescoping of the movable arm, the rotary locking device is used for locking the movable arm after rotating the same in place and/or locking the movable arm after telescoping the same in place, and the action detection and control system is used for detecting and controlling the working state of the working component.

19. The equipment for converting rotary motion into reciprocating impact motion according to claim 12, characterized in that, the rotary limiting device comprises a rotary positioning element, wherein the rotary positioning element comprises a rotary positioning driving component, a rotary locking pin and a rotary positioning hole slot, the rotary positioning driving component is arranged on the fixed seat and/or the

movable arm, the rotary positioning hole slot is correspondingly arranged on the movable arm and/or on the fixed seat, the rotary positioning driving component is used for driving the rotary locking pin to telescopically enter the rotary positioning hole slot for positioning, and the rotary positioning driving component and the rotary locking pin are separately connected or are integrated.

20. The equipment for converting rotary motion into reciprocating impact motion according to claim 8, characterized in that, the movable arm comprises a guide lug boss of the movable arm or a guide groove of the movable arm, wherein a guide groove of the fixed seat or a guide lug boss of the fixed seat is correspondingly arranged on the fixed seat, the guide groove of the fixed seat and the guide lug boss of the movable arm are buckled to guide telescoping or the guide lug boss of the fixed seat and the guide groove of the movable arm are matched to guide telescoping.

21. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises a rotating device, wherein the rotating device comprises a gear rotating device or a cable wire rotating device or a hydraulic rotating device or a pneumatic rotating device or a rack rotating device or a gear ring rotating device or a thread screw rotating device or a hanging gear rotating device or a chain drive rotating device or a motor drive rotating device.

22. The equipment for converting rotary motion into reciprocating impact motion according to claim 21, characterized in that, the gear ring rotating device comprises a rotating gear ring, a rotating gear, a rotating power source element, a supporting element of the rotating power source element, wherein the rotating gear ring and the movable arm are connected or integrated, the rotating gear and the rotating power source element are connected or integrated, the rotating power source element is arranged on the supporting element of the rotating power source element, the rotating gear is engaged with the rotating gear ring, the rotating power source element is used

for driving the rotating gear to rotate, the rotating gear is used for driving the rotating gear ring to rotate, and the rotating gear ring is used for driving the movable arm to rotate.

23. The equipment for converting rotary motion into reciprocating impact motion according to claim 21, characterized in that, the gear ring rotating device comprises a rotating gear ring, a rotating gear and a rotating power source element, wherein the rotating gear is arranged on the movable arm, the rotating gear ring is arranged on the fixed seat, the rotating power source element is used for driving the rotating gear ring to rotate, the rotating gear ring is engaged with the rotating gear, the rotating gear ring is used for driving the rotating gear to rotate, and the rotating gear is used for driving the movable arm to rotate.

24. The equipment for converting rotary motion into reciprocating impact motion according to claim 21, characterized in that, the cable wire rotating device comprises a cable wire, a rotating power source element, and a supporting frame of the rotating power source element, wherein the cable wire is wound on a power source element output shaft, the two ends of the cable wire are connected with the movable arm, the rotating power source element is connected with the cable wire, the rotating power source element is arranged on a supporting element of the rotating power source element, the power source element is used for driving the cable wire, and the cable wire is used for driving the movable arm to rotate.

25. The equipment for converting rotary motion into reciprocating impact motion according to claim 21, characterized in that, the cable wire rotating device comprises a cable wire, a bend wheel, a rotating power source element, and a supporting frame of the rotating power source element, wherein the cable wire is wound on the bend wheel, the two ends of the cable wire are connected with the movable arm through the bend wheel, the rotating power source element is connected with the cable wire or the bend

wheel, the rotating power source element is arranged on a supporting element of the rotating power source element, the rotating power source element is used for driving the cable wire or the bend wheel, and the cable wire is used for driving the movable arm to rotate.

26. The equipment for converting rotary motion into reciprocating impact motion according to claim 10 or 11, characterized in that, the rotating device and/or the telescopic device comprises a hydraulic drive rotating device or a pneumatic rotating device or a motor drive rotating device, wherein the hydraulic drive rotating device or the pneumatic rotating device comprises a cylinder body, a cylinder rod, a pipeline, a control valve, the cylinder body and the fixed arm are connected or integrated, the cylinder rod and the movable arm are connected or separated or integrated, the pipeline is connected with the cylinder body and the control valve, the control valve is used for controlling the flow of liquid or a gas, and the liquid or the gas is used for driving the movable arm to rotate and/or telescope.

27. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the rocker arm comprises a telescopic device, wherein the telescopic device comprises a gear and rack telescopic device or a screw telescopic device or a hydraulic telescopic device or a pneumatic telescopic device or a cable wire telescopic device or a chain telescopic device or a motor drive telescopic device or a jack telescopic device.

28. The equipment for converting rotary motion into reciprocating impact motion according to claim 15, characterized in that, the rotary locking device comprises a disk brake type rotary locking device or a pin hole rotary locking device or a drum brake type rotary locking device or a hanging gear brake type rotary locking device or a cushion block brake type rotary locking device or a rope pulling type rotary locking device or a rotary locking device of a chain or a rotary locking device of catching

groove or a rotary locking device of a hook or a rotary locking device of a baffle or a rotary locking device of an elastic pin or a rotary locking device of an expansion pin, and the telescopic locking device and the rotary locking device are separated or separately connected or integrated.

29. The equipment for converting rotary motion into reciprocating impact motion according to claim 15, characterized in that, the telescopic locking device comprises a disk brake type telescopic locking device or a pin hole telescopic locking device or a drum brake type telescopic locking device or a hanging gear brake type telescopic locking device or a cushion block brake type telescopic locking device or a rope pulling type telescopic locking device or a chain telescopic locking device or a catching groove telescopic locking device or a hook telescopic locking device or a baffle telescopic locking device or an elastic pin telescopic locking device or an expansion pin telescopic locking device.

30. The equipment for converting rotary motion into reciprocating impact motion according to claim 12, characterized in that, the rotary limiting device comprises a rotary limiting platform or a rotary limiting block or a rotary limiting pin or a rotary limiting hole or a rotary limiting plate or a rotary limiting ring or a rotary limiting tooth or a rotary limiting groove or a rotary limiting hook or a rotary limiting rope or a rotary limiting elastic pin or a rotary limiting expansion pin or a rotary limiting chain, and the telescopic device and the rotary limiting device are separated or separately connected or integrated.

31. The equipment for converting rotary motion into reciprocating impact motion according to claim 12, characterized in that, the telescopic limiting device comprises a telescopic limiting platform or a telescopic limiting block or a telescopic limiting pin or a telescopic limiting hole or a telescopic limiting plate or a telescopic limiting ring or a telescopic limiting tooth or a telescopic limiting groove or a telescopic limiting

hook or a telescopic limiting rope or a telescopic limiting elastic pin or a telescopic limiting expansion pin or a telescopic limiting chain.

32. The equipment for converting rotary motion into reciprocating impact motion according to claim 12, characterized in that, the limiting device comprises a limiting buffer element, wherein the limiting buffer element is arranged on a limiting platform or a limiting block or a limiting pin or a limiting hole or a limiting plate or a limiting ring or a limiting tooth or a limiting groove or the movable arm or the fixed arm or the bracket.

33. The equipment for converting rotary motion into reciprocating impact motion according to claim 32, characterized in that, the limiting buffer element comprises a spring buffer element or a polyurethane buffer element or a rubber buffer element or a nylon buffer element or an airbag buffer element or a sac buffer element or a macromolecular buffer element or a composite material buffer element.

34. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, an access hole corresponding to the power belt pulley or the power gear or the power chain wheel or the transmission belt pulley or the transmission gear or the transmission chain wheel or the power bevel gear or the transmission bevel gear is arranged on the rocker arm.

35. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the motor or the transmission belt pulley or the transmission gear or the transmission chain wheel or the transmission bevel gear is provided with a clutch shaft.

36. The equipment for converting rotary motion into reciprocating impact motion according to claim 21, characterized in that, the motor drive rotating device comprises a telescopic transmission device, wherein the telescopic transmission device comprises a spline sleeve and a spline shaft, the spline sleeve is matched with the

spline shaft, under the drive of the telescopic transmission device, the spline sleeve telescopes relative to the spline shaft in a reciprocating manner to increase the digging height and/or digging depth of a digging machine.

37. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the reciprocating impact part comprises an impact power box, an inner-layer material impact mechanism, and an outer-layer material impact mechanism, wherein the outer-layer material impact mechanism comprises outer-layer material impact teeth, an outer-layer material impact tooth seat, and an outer-layer material impact protection device, the outer-layer material impact tooth seat and the outer-layer material impact teeth are separated or integrated, the inner-layer material impact mechanism comprises inner-layer material impact teeth, an inner-layer material impact tooth seat, and an inner-layer material impact protection device, the inner-layer material impact tooth seat and the inner-layer material impact teeth are separated or integrated, the outer-layer material impact protection device and the outer-layer material impact tooth seat are separately connected or are integrated, the inner-layer material impact protection device and the inner-layer material impact tooth seat are separately connected or are integrated, the impact power box is used for driving the outer-layer material impact mechanism and the inner-layer material impact mechanism to reciprocate, a part of the outer-layer material impact protection device and/or a part of the inner-layer material impact protection device is consistently overlapped with the impact power box, in order to prevent a material from entering the outer-layer material impact protection device and the impact power box or prevent the material from entering the inner-layer material impact protection device and the impact power box.

38. The equipment for converting rotary motion into reciprocating impact motion according to claim 37, characterized in that, the outer-layer material impact protection

device comprises an outer-layer material impact protection plate, wherein the outer-layer material impact protection plate is arranged along the surrounding or a local part of the outer-layer material impact tooth seat, the inner-layer material impact protection device comprises an inner-layer material impact protection plate, and the inner-layer material impact protection plate is arranged along the surrounding or a local part of the inner-layer material impact tooth seat.

39. The equipment for converting rotary motion into reciprocating impact motion according to claim 37, characterized in that, the inner-layer material impact protection device reciprocates with the inner-layer material impact tooth seat, the outer-layer material impact protection device reciprocates with the outer-layer material impact tooth seat, the inner-layer material impact protection plate and/or the outer-layer material impact protection plate reciprocates in a manner of leaning against the impact power box, and a wear-resistant gap is arranged at the leaning part.

40. The equipment for converting rotary motion into reciprocating impact motion according to claim 37, characterized in that, the inner-layer material impact protection plate comprises a sealing element of the inner-layer material impact protection plate, the outer-layer material impact protection plate comprises a sealing element of the outer-layer material impact protection plate, and the sealing element of the inner-layer material impact protection plate and the sealing element of the outer-layer material impact protection plate are arranged at the ends consistently overlapped with the impact power box.

41. The equipment for converting rotary motion into reciprocating impact motion according to claim 37, characterized in that, the impact power box comprises a sealing element of the impact power box, and the sealing element of the impact power box is arranged at the end consistently overlapped with the inner-layer material impact protection plate and/or the outer-layer material impact protection plate.

42. The equipment for converting rotary motion into reciprocating impact motion according to claim 37, characterized in that, a sealing element is arranged at the joint site of the inner-layer material impact protection plate and/or the inner-layer material impact tooth seat, and a sealing element is arranged at the joint site of the outer-layer material impact protection plate and the outer-layer material impact tooth seat.

43. The equipment for converting rotary motion into reciprocating impact motion according to claim 37, characterized in that, the impact power box comprises a protection plate stroke groove, the outer-layer material impact protection device comprises an outer-layer material impact protection plate, the inner-layer material impact protection device comprises an inner-layer material impact protection plate, and the adjacent parts of the inner-layer material impact protection plate and the outer-layer material impact protection plate reciprocate in the protection plate stroke groove.

44. The equipment for converting rotary motion into reciprocating impact motion according to claim 43, characterized in that, an elastomer is arranged in the protection plate stroke groove.

45. The equipment for converting rotary motion into reciprocating impact motion according to claim 38, characterized in that, an elastomer is arranged at the free end of the outer-layer material impact protection plate, and/or the elastomer is arranged at the free end of the inner-layer material impact protection plate.

46. The equipment for converting rotary motion into reciprocating impact motion according to claim 44 or 45, characterized in that, the elastomer is used for shaking off and popping out a material brought in by the outer-layer material impact protection plate and/or the inner-layer material impact protection plate and/or other materials dropping into the protection plate stroke groove by means of elastic deformation.

47. The equipment for converting rotary motion into reciprocating impact motion according to claim 44 or 45, characterized in that, the elastomer is used for absorbing the impact counterforce of the outer-layer material impact mechanism and/or the inner-layer material impact mechanism by means of elastic deformation.

48. The equipment for converting rotary motion into reciprocating impact motion according to claim 37, characterized in that, the impact power box or the inner-layer material impact mechanism or the outer-layer material impact mechanism comprises a water spray device, wherein the water spray device is used for spraying water to the outer-layer material impact protection device and/or the inner-layer material impact protection device and/or the protection plate stroke groove, in order to prevent the material from being adhered to the outer-layer material impact protection device and/or prevent the material from being adhered to the inner-layer material impact protection device and/or prevent the material from being adhered in the protection plate stroke groove.

49. The equipment for converting rotary motion into reciprocating impact motion according to claim 48, characterized in that, the water spray device is provided with a water flow controller, the water flow controller is used for controlling the water flow direction and/or controlling the water flow position and/or controlling the water spray time, in order to control the water flow to not enter the impact power box and the inner-layer material impact protection device and/or control the water flow to not enter the impact power box and the outer-layer material impact protection device.

50. The equipment for converting rotary motion into reciprocating impact motion according to claim 38, characterized in that, the outer-layer material impact protection plate and/or the inner-layer material impact protection plate is made from a metallic material or a high molecular material or a polyester material or a rubber material or a composite material.

51. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the reciprocating impact part comprises a buffer break-off prevention mechanism, wherein the buffer break-off prevention mechanism comprises a buffer reciprocating element, an elastomer and a buffer supporting element, the elastomer is arranged between the buffer supporting element and the buffer reciprocating element or arranged on the buffer reciprocating element or arranged on the buffer supporting element, the impact power source element comprises a power impact element, the impact head comprises an impact tooth seat, when the buffer reciprocating element is arranged on the power impact element, the buffer supporting element is correspondingly arranged on the impact tooth seat, when the buffer supporting element is arranged on the power impact element, the buffer reciprocating element is correspondingly arranged on the impact tooth seat, the buffer reciprocating element and the power impact element are separated or separately connected or integrated, the buffer reciprocating element and the impact tooth seat are separated or separately connected or integrated, the buffer supporting element and the power impact element are separated or separately connected or integrated, the buffer supporting element and the impact tooth seat are separated or separately connected or integrated, the buffer break-off prevention mechanism is arranged between the impact head and the power impact element, or the buffer break-off prevention mechanism is arranged on the power impact element, or the buffer break-off prevention mechanism is arranged on the impact tooth seat, when the impact head is used for impacting a coal bed or a rock stratum or cement concrete or bituminous concrete or hardened mudstone, an impact counterforce is applied to the buffer break-off prevention mechanism, the buffer reciprocating element extrudes the elastomer, and the elastomer deforms to absorb and decompose the impact counterforce.

52. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, When the power impact element is connected with the buffer supporting element or the buffer reciprocating element, the impact head is correspondingly connected with the buffer reciprocating element or the buffer supporting element.

53. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer break-off prevention mechanism comprises a buffer reciprocating element, an elastomer, a buffer supporting element and a buffer adjusting element, wherein the elastomer is arranged between the buffer adjusting element and the buffer reciprocating element, the buffer supporting element is movably connected with the buffer adjusting element through threads or a locking pin or a catching groove or a hanging gear, when the impact head is used for impacting the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone, the impact counterforce is applied to the buffer break-off prevention mechanism, the buffer reciprocating element extrudes the elastomer, and the elastomer deforms in the buffer adjusting element to absorb and decompose the impact counterforce.

54. The equipment for converting rotary motion into reciprocating impact motion according to claim 53, characterized in that, a pre-tightening force adjusting structure used for adjusting the relative position of the buffer adjusting element and the buffer supporting element is arranged between the buffer adjusting element and the buffer supporting element, and the pre-tightening force adjusting structure is used for adjusting the relative position of the buffer adjusting element and the buffer supporting element and pressing or loosening the fatigue deformed elastomer.

55. The equipment for converting rotary motion into reciprocating impact motion according to claim 54, characterized in that, the pre-tightening force adjusting

structure comprises a thread pre-tightening force adjusting structure or a locking pin pre-tightening force adjusting structure or a clamping pin pre-tightening force adjusting structure or a catching groove pre-tightening force adjusting structure or a snap spring pre-tightening force adjusting structure or a hanging gear pre-tightening force adjusting structure.

56. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer break-off prevention mechanism comprises a buffer reciprocating element, an elastomer and a buffer supporting element, wherein the elastomer is arranged between the buffer supporting element and the buffer reciprocating element or arranged on the buffer reciprocating element or arranged on the buffer supporting element, the buffer supporting element and/or the buffer reciprocating element comprises an elastomer fixing element, the buffer supporting element and the elastomer fixing element are separately connected or are integrated, the buffer reciprocating element and the elastomer fixing element are separately connected or are integrated, the buffer reciprocating element and the elastomer are separated or separately connected or integrated, the elastomer and the buffer supporting element are separately or movably connected or are integrated, the elastomer and the elastomer fixing element are separately or movably connected or are integrated, when the buffer supporting element and the power impact element are separately connected or are integrated, the buffer reciprocating element and the impact head are separately connected or are integrated, when the buffer reciprocating element and the power impact element are separately connected or are integrated, the buffer supporting element and the impact head are separately connected or are integrated, when the impact head is used for impacting the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone, the impact counterforce is applied to the buffer break-off prevention mechanism, the

elastomer fixing element extrudes the elastomer, and the elastomer deforms to absorb and decompose the impact counterforce, to avoid the break-off damage to the power impact element.

57. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer break-off prevention mechanism comprises a buffer reciprocating element, an elastomer and a buffer supporting element, wherein the elastomer is arranged between the buffer supporting element and the buffer reciprocating element or arranged on the buffer reciprocating element or arranged on the buffer supporting element, the buffer supporting element and/or the buffer reciprocating element comprises an elastomer fixing element, the buffer supporting element and the elastomer fixing element are separately connected or are integrated, the buffer reciprocating element and the elastomer fixing element are separately connected or are integrated, the buffer reciprocating element and the elastomer are separated or separately connected or integrated, the elastomer and the buffer supporting element are separately or movably connected or are integrated, when the elastomer and the elastomer fixing element are fixedly connected or are integrated, the elastomer fixing element and/or the buffer reciprocating element extrudes the elastomer, and the elastomer telescopes to absorb and decompose the impact counterforce.

58. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the reciprocating impact part comprises a guide mechanism, wherein the buffer break-off prevention mechanism comprises a buffer reciprocating element, an elastomer and a buffer supporting element, the elastomer is arranged between the buffer supporting element and the buffer reciprocating element or arranged on the buffer reciprocating element or arranged on the buffer supporting element, the buffer supporting element and/or the buffer

reciprocating element comprises an elastomer fixing element, the buffer supporting element and the elastomer fixing element are separated or separately connected or integrated, the buffer reciprocating element and the elastomer fixing element are separated or separately connected or integrated, the buffer reciprocating element and the elastomer are separated or separately connected or integrated, the elastomer and the buffer supporting element are separately or movably connected or are integrated, when the elastomer and the elastomer fixing element are separated or separately connected or integrated, the elastomer fixing element and/or the buffer reciprocating element extrudes the elastomer, the elastomer deforms to absorb and decompose the impact counterforce, and the guide mechanism is used for correcting the impact direction of the impact head.

59. The equipment for converting rotary motion into reciprocating impact motion according to claim 56, 57 or 58, characterized in that, the elastomer fixing element comprises a sleeve elastomer fixing element or a frame-shaped elastomer fixing element or a U-shaped elastomer fixing element or a multi-prismatic elastomer fixing element or a plate type elastomer fixing element or a rod type elastomer fixing element or a thread type elastomer fixing element or a neck elastomer fixing element or a baffle elastomer fixing element or a hinge hole elastomer fixing element or a fixing shaft elastomer fixing element or a pin shaft elastomer fixing element or a hook elastomer fixing element or a locking pin elastomer fixing element or a clamping pin elastomer fixing element or a hanging gear elastomer fixing element or a triangular elastomer fixing element or a quadrangular elastomer fixing element or a polygonal elastomer fixing element or a sleeve rod type elastomer fixing element or a positioning platform elastomer fixing element or a positioning pin elastomer fixing element or a positioning hole elastomer fixing element or a positioning groove elastomer fixing element or a positioning bolt elastomer fixing element or a

positioning neck elastomer fixing element or a positioning guide post elastomer fixing element or a positioning shaft elastomer fixing element or a positioning plate elastomer fixing element or a positioning ring elastomer fixing element or a positioning hook elastomer fixing element or a positioning thread elastomer fixing element or a clamping sleeve elastomer fixing element or a transverse H-shaped elastomer fixing element or a combined elastomer fixing element.

60. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer reciprocating element comprises a cylindrical buffer reciprocating element or a frame-shaped buffer reciprocating element or a U-shaped buffer reciprocating element or a multi-prismatic buffer reciprocating element or a plate type buffer reciprocating element or a rod type buffer reciprocating element or a thread adjustment type buffer reciprocating element or a neck buffer reciprocating element or a baffle buffer reciprocating element or a hinge hole buffer reciprocating element or a pin shaft buffer reciprocating element or a hook buffer reciprocating element or a combination of multiple shapes.

61. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer break-off prevention mechanism is provided with a buffer reciprocating guide structure, wherein the buffer reciprocating guide structure and the buffer supporting element are separated or separately connected or integrated, or the buffer reciprocating guide structure and the buffer reciprocating element are separated or separately connected or integrated.

62. The equipment for converting rotary motion into reciprocating impact motion according to claim 61, characterized in that, the buffer reciprocating guide structure comprises a cylindrical buffer reciprocating guide structure or a plate type buffer reciprocating guide structure or a triangular buffer reciprocating guide structure or a quadrangular buffer reciprocating guide structure or a polygonal buffer reciprocating

guide structure or a columnar buffer reciprocating guide structure or a rod type buffer reciprocating guide structure or a push-pull type buffer reciprocating guider or a sleeve rod type buffer reciprocating guider or an elastomer buffer reciprocating guider.

63. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer break-off prevention mechanism comprises a buffer anti-drop limiting structure, wherein the buffer anti-drop limiting structure comprises an anti-drop limiting structure of the buffer reciprocating element and/or an anti-drop limiting structure of the buffer supporting element, the anti-drop limiting structure of the buffer supporting element and the buffer supporting element are separated or separately connected or integrated, the anti-drop limiting structure of the buffer reciprocating element and the buffer reciprocating element are separated or separately connected or integrated, the buffer anti-drop limiting structure is used for preventing the separation of the buffer reciprocating element and the buffer supporting element or preventing the separation of the buffer reciprocating element and the impact tooth seat or preventing the separation of the elastomer and the buffer reciprocating element or preventing the separation of the elastomer and the buffer supporting element or preventing the separation of the elastomer and the impact tooth seat.

64. The equipment for converting rotary motion into reciprocating impact motion according to claim 63, characterized in that, the anti-drop limiting structure of the reciprocating element comprises a limiting platform or a limiting pin or a limiting hole or a limiting groove or a limiting bolt or a limiting neck or a limiting guide post or a limiting shaft or a limiting plate or a limiting ring or a limiting snap spring or a limiting hook or a limiting thread or a clamping sleeve or combined limiting.

65. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer supporting element comprises

a rod type buffer supporting element or a cylindrical buffer supporting element or a frame-shaped buffer supporting element or a U-shaped buffer supporting element or a multi-prismatic buffer supporting element or a plate type buffer supporting element or a thread adjustment type buffer supporting element or a neck buffer supporting element or a baffle buffer supporting element or a hinge hole buffer supporting element or a pin shaft buffer supporting element or a hook buffer supporting element or a clamping sleeve buffer supporting element or a combination of multiple shapes.

66. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer break-off prevention mechanism comprises a bidirectional buffer break-off prevention mechanism or a unidirectional buffer break-off prevention mechanism.

67. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, a quantitative motion gap for the buffer reciprocating element is arranged at the buckling site of the buffer reciprocating element and the buffer supporting element, when an impact counteraction break-off force of the impact head is applied to the buffer break-off prevention mechanism, the buffer reciprocating element swings between the buffer supporting element and the buffer reciprocating element, to prevent the impact counteraction break-off force from breaking off the impact power source element.

68. The equipment for converting rotary motion into reciprocating impact motion according to claim 66, characterized in that, the bidirectional buffer break-off prevention mechanism comprises a buffer supporting element and a buffer reciprocating element, wherein an elastomer blocking element is arranged on the buffer reciprocating element, elastomers are arranged at both sides of the elastomer blocking element, a counterforce generated by the power impact element when driving the impact head to bidirectionally impact respectively acts on the elastomers

at the two sides of the elastomer blocking element, and the elastomers at the two sides of the elastomer blocking element bidirectionally buffer.

69. The equipment for converting rotary motion into reciprocating impact motion according to claim 68, characterized in that, the elastomer blocking element comprises a lug boss or a blocking column or a baffle or a bulb column or a bulb plate or a cambered convex edge or a cambered edge plate or a cambered head column.

70. The equipment for converting rotary motion into reciprocating impact motion according to claim 69, characterized in that, when the impact counteraction break-off force of the impact head is applied to the buffer break-off prevention mechanism to buffer the swing of the buffer reciprocating element between the buffer supporting element and the buffer reciprocating element, the bulb column or the bulb plate or the cambered convex edge or the cambered edge plate or the cambered head column of the elastomer blocking element generates no break-off damage to the buffer reciprocating element and/or the buffer supporting element.

71. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, a buffer supporting element bulb or a cambered surface of the buffer supporting element is arranged at the part of the buffer supporting element at the joint site of the buffer supporting element and the buffer reciprocating element, when the impact counteraction break-off force of the impact head is applied to the buffer break-off prevention mechanism to buffer the swing of the buffer reciprocating element between the buffer supporting element and the buffer reciprocating element, the buffer supporting element bulb or the cambered surface of the buffer supporting element generates no break-off damage to the buffer reciprocating element and/or the buffer supporting element.

72. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the elastomer is serially connected to the

buffer reciprocating element, the buffer supporting element comprises a front end guide element, a rear end guide element, the buffer reciprocating element is arranged on the front end guide element and/or the rear end guide element, and the front end guide element and/or the rear end guide element is used for enlarging the correction distance and/or force of the buffer reciprocating element.

73. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the elastomer comprises a spring or elastic rubber or a spring steel plate or a disk spring or elastic polyester or elastic nylon or elastic corrugated steel or a sac or an airbag or an elastic granule or a polymeric elastomer or a composite material elastomer or an air pressure or a hydraulic pressure or a pneumatic spring or a hydraulic spring.

74. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer reciprocating element and/or the buffer supporting element comprises a sealing element.

75. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, a lubricant is arranged on the buffer reciprocating element or the buffer supporting element, or the buffer reciprocating element is a self-lubricating material, or the buffer supporting element is a self-lubricating material.

76. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the reciprocating impact part comprises a guide mechanism, an impact driving mechanism, an impact head, wherein the guide mechanism and the impact driving mechanism are separated or separately connected or integrated, the impact driving mechanism comprises a power supporting element, the guide mechanism comprises a guide supporting element, the power supporting element and the guide supporting element are separated or separately connected or

integrated, the power supporting element and/or the guide supporting element comprises a friction body supporting element, the friction body supporting element and the power supporting element or the friction body supporting element and the guide supporting element are separated or separately connected or integrated, the friction body supporting element comprises a rolling body supporting element or a suspension body supporting element, the rolling body supporting element and the suspension body supporting element are separated or separately connected or integrated, the rolling body supporting element comprises a guide rolling body supporting element and/or a power rolling body supporting element, the guide rolling body supporting element and the power rolling body supporting element are separated or separately connected or integrated, the suspension body supporting element comprises a guide suspension body supporting element and/or a power suspension body supporting element, the guide suspension body supporting element and the power suspension body supporting element are separated or separately connected or integrated, the guide mechanism comprises an impact guide element, a friction body, a friction body supporting element, the friction body comprises a rolling body or a suspension body, the rolling body comprises a guide rolling body and/or a power rolling body, the guide rolling body and the power rolling body are separated or separately connected or integrated, the suspension body comprises a guide suspension body and/or a power suspension body, and the guide suspension body and the power suspension body are separated or separately connected or integrated; the impact driving mechanism comprises a power impact element, a power supporting element, and the impact guide element and the power impact element are separated or separately connected or integrated; the impact guide element and the impact head are separately arranged or are integrated, the power impact element and the impact head are movably connected or are separated or integrated, the friction body is arranged

between the guide supporting element and the impact guide element or between the power supporting element and the power impact element, the guide supporting element or the power supporting element comprises a friction body supporting element, the power impact element is used for driving the impact guide element or the impact head to reciprocate, and the friction body and the friction body supporting element are in close fit with the impact guide element to support the impact head to impact through rolling friction or suspension friction; the machine body comprises a rack, a lifting mechanism is arranged on the rack or no lifting mechanism is arranged on the rack, the reciprocating impact part is arranged on the rack or on the lifting mechanism, and the rack is arranged on the machine body or the rack and the lifting mechanism is cooperatively arranged on the machine body; the machine body supports the impact head to impact in a reciprocating manner for blanking.

77. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the friction body supporting element, the impact guide element, the friction body are in close buckling to support the impact head to impact through rolling friction or suspension friction and correct the impact direction of the impact head, in order to prevent the break-off damage to the impact driving mechanism under the protection of the guide mechanism and improve the impact efficiency.

78. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact driving mechanism comprises a crank impact driving mechanism, wherein the crank impact driving mechanism comprises a power impact element and a power supporting element, and the impact guide element and the power impact element are separated or separately connected or integrated.

79. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact power box, wherein the guide mechanism and the impact driving mechanism are combined and arranged in the impact power box, impact heads are arranged at the two ends of the impact guide element arranged in the impact power box, or the impact head is arranged at one end of the impact guide element and a counterweight element used for preventing the impact head from breaking off the guide mechanism, the impact driving mechanism and/or the machine body due to unbalanced gravity is arranged at the other end thereof, or the impact head is arranged at one end of the impact guide element and the end part of the power impact element and the impact head are connected or separated, the power supporting element and the impact power box are separated or integrated or connected, and the impact power box is used for protecting the components in the impact power box from being corroded by such pollutants as dust, an etchant gas, sewage.

80. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part further comprises a supporting frame, and the impact driving mechanism or the guide mechanism is arranged on the supporting frame.

81. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, a limiting structure is arranged on the reciprocating impact part, the limiting structure is arranged to be a guide limiting structure or a power limiting structure, and the guide limiting structure and the power limiting structure are separated or separately connected or integrated; the guide limiting structure and the friction body supporting element are connected or separated or integrated, or the guide limiting structure and the impact guide element are connected or separated or integrated, or the guide limiting structure and the guide

rolling body are connected or separated or integrated, or the power limiting structure and the power supporting element are connected or separated or integrated, or the power limiting structure and the power impact element are connected or separated or integrated, or the power limiting structure and the power rolling body are connected or separated or integrated, the guide rolling body or the guide suspension body is arranged on the guide limiting structure, the guide rolling body or the guide suspension body is used for supporting the impact guide element to reciprocate along the friction body supporting element in the guide limiting structure, the guide limiting structure is used for limiting the motion space and/or position of the guide rolling body or the guide suspension body or the impact guide element, the power rolling body or the power suspension body is arranged on the power limiting structure, the power rolling body or the power suspension body is used for supporting the power impact element to reciprocate along the power supporting element in the power limiting structure, the power limiting structure is used for limiting the motion space and/or position of the power rolling body or the power suspension body or the power impact element, and the friction body is used for supporting the impact guide element or the power impact element to reciprocate.

82. The equipment for converting rotary motion into reciprocating impact motion according to claim 81, characterized in that, the limiting structure comprises a raceway or a circular raceway or a cylindrical raceway or a pit or a reciprocating stroke segment or a holder or a limiting plate or a limiting ring or a limiting sleeve or a limiting platform or a limiting rod or a limiting shaft or a limiting groove or a spherical projection or a lug boss or a bearing or cooperation of an inner body and an outer sleeve or an ellipse or a dumb bell shape or a cylinder or a cone or a circular ring shape or a roller or a platform-shaped column or a platform-shaped ball or a platform-shaped drum or a groove-shaped column or a groove-shaped ball or a

groove-shaped roller or a groove-shaped ellipse or a square or a U shape or a frame shape or a transverse H shape or a spline shape or a camber or a V shape or an inverted V shape or a circle or a plate shape or a polygon or a cylinder or a spline sleeve or a multi-prismatic key.

83. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the rolling body is used for supporting the impact guide element and the guide rolling body supporting element to relatively reciprocate by means of circular rolling or reciprocating rolling or in situ rolling in the circular raceway, or rolling in the pit, or rolling in the raceway, or rolling in the holder.

84. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, a single or multiple rolling bodies are longitudinally arranged along the reciprocating direction, or a single or multiple rolling bodies are transversely arranged relative to the reciprocating direction.

85. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide rolling body or the power rolling body are arranged in parallel or in a stagger manner along the reciprocating impact direction.

86. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact driving mechanism comprises a power supporting element and a power impact element, the guide mechanism comprises a guide rolling body, a guide supporting element, an impact guide element, the guide rolling body comprises a roller, the roller is arranged between the power supporting element and the power impact element or between the guide supporting element and the impact guide element, the roller comprises a roller shaft, the roller and the roller shaft are separated or separately connected or integrated, when the roller shaft is fixed on the power impact element, the roller rolls by leaning against the

power supporting element, when the roller shaft is fixed on the power supporting element, the roller rolls by leaning against the power impact element to prevent the joint sliding friction of the power impact element and the power supporting element, or when the roller shaft is fixed on the guide supporting element, the roller rolls by leaning against the impact guide element, and when the roller shaft is fixed on the impact guide element, the roller rolls by leaning against the guide supporting element to prevent the fit sliding friction of the guide supporting element and the impact guide element, so as to reduce the abrasion of the impact driving mechanism or the guide mechanism.

87. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact driving mechanism comprises a power supporting element and a power impact element, the guide mechanism comprises a guide rolling body, a guide supporting element and an impact guide element, the guide rolling body comprises a roller, the surface of the roller is processed to a projection, a depression, a V-shaped groove or a curve shape, the shape of the contact surface of the guide supporting element or the impact guide element and the roller is buckled with the shape of the surface of the roller, or the shape of the contact surface of the power supporting element or the power impact element and the roller is buckled with the shape of the surface of the roller, the motion of the impact guide element or the power impact element is controlled to be linear reciprocating motion by means of rolling friction, in order to reduce the abrasion of the impact driving mechanism.

88. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide supporting element or the power supporting element or the impact guide element or the power impact element comprises a reciprocating stroke segment, wherein the width of the reciprocating

stroke segment is arranged to be not more than or equal to or close to the width of the friction body in the rolling direction, the length of the reciprocating stroke segment is equal to or close to the sum of one half of the stroke of the impact guide element or the power impact element and the radius of the rolling body, the rolling body is arranged between the guide supporting element and the impact guide element, or is arranged between the power supporting element and the power impact element and is arranged in the reciprocating stroke segment, the reciprocating stroke segment is used for limiting the rolling space and/or position of the rolling body, and the reciprocating stroke segment is used for ensuring rolling friction of the rolling body and the guide supporting element or the power supporting element or the impact guide element or the power impact element when moving.

89. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the friction body supporting element comprises a pit or the impact guide element comprises a pit or the power supporting element comprises a pit or the power impact element comprises a pit, the friction body is arranged between the friction body supporting element and the impact guide element and is arranged in the pit, or the friction body is arranged between the power supporting element and the power impact element and is arranged in the pit, and the pit is used for limiting the rolling space and/or position of the friction body.

90. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the friction body supporting element comprises a raceway or the impact guide element comprises a raceway or the friction body supporting element and the impact guide element comprises raceways, the friction body supporting element, the impact guide element and the friction body rolling in the raceway are in close buckling to drive the impact guide element to

reciprocate by means of the rolling friction of the friction body, and the raceway is used for limiting the rolling space and/or position of the friction body.

91. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism comprises a rolling body supporting element, an impact guide element, a holder and a guide rolling body, wherein the holder is arranged between the rolling body supporting element and the impact guide element, the guide rolling body is arranged on the holder, the thickness of the holder is smaller than the diameter of the guide rolling body, the two parts of the guide rolling body higher than the holder are respectively arranged on the rolling body supporting element and the impact guide element, and the holder is singly arranged or fixed on the rolling body supporting element or fixed on the impact guide element; the rolling body supporting element and the impact guide element are in close fit with the guide rolling body in the holder to drive the impact guide element to reciprocate through rolling friction, and the holder is used for limiting the rolling space and/or position of the rolling body.

92. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism further comprises a guide segment, wherein the guide segment is arranged on the impact guide element, the weights of the two ends except the segment overlapped with the impact guide element of the guide segment are equal or basically equal, the guide segment and the impact guide element are separately connected or are integrated, the guide segment is arranged on the friction body supporting element, when moving, the guide segment is always located on the friction body supporting element to keep the gravity balance of the two ends of the impact guide element in a static or motion state, the friction body supporting element, the friction body and the impact guide element are in close fit to support the impact guide element to reciprocate through rolling friction or suspension

friction, and the power impact element is used for driving the impact head or the impact guide element to reciprocate.

93. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact driving mechanism comprises a crank impact driving mechanism, when the friction body supporting element comprises an outer sleeve, the impact guide element comprises an inner body, or when the friction body supporting element comprises the inner body, the impact guide element comprises the outer sleeve, the friction body is arranged between the outer sleeve and the inner body, the outer sleeve and the inner body are in close fit with the friction body to relatively reciprocate through rolling friction or suspension friction, the impact head is supported by the reciprocating outer sleeve or inner body to reciprocate through rolling friction, and the power impact element is used for driving the impact head to impact.

94. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism comprises a guide friction body supporting element and/or a guide impact guide element and/or a guide friction body, wherein the guide impact guide element, the guide friction body and the guide friction body supporting element are in close buckling to ensure the linear reciprocating motion of the impact head and/or prevent the rotation of the impact head, the guide friction body supporting element and the guide supporting element are separated or separately connected or integrated, and the guide impact guide element and the impact guide element are separated or separately connected or integrated; or the impact driving mechanism comprises a guide power supporting element and/or a guide power impact element and/or a guide friction body, the guide power impact element, the guide friction body and the guide power supporting element are in close buckling to ensure the linear reciprocating motion of the power impact element and/or

prevent the rotation of the power impact element, the guide power supporting element and the power supporting element are separated or separately connected or integrated, and the guide power impact element and the power impact element are separated or separately connected or integrated.

95. The equipment for converting rotary motion into reciprocating impact motion according to claim 94, characterized in that, the guide friction body supporting element comprises a quadrangular friction body supporting element or a U-shaped friction body supporting element or a frame-shaped friction body supporting element or a friction body supporting element of the impact power box or a triangular friction body supporting element or an oval friction body supporting element or a polygonal friction body supporting element or a deformed friction body supporting element or a raceway friction body supporting element or a pit friction body supporting element or a friction body supporting element of the reciprocating stroke segment or a friction body supporting element of the holder or a friction body supporting element of the circular raceway or a groove-shaped friction body supporting element or a transverse H-shaped friction body supporting element or a friction body supporting element of the spline sleeve or a cambered friction body supporting element or a V-shaped friction body supporting element or an inverted V-shaped friction body supporting element or a plate-shaped friction body supporting element or a cylindrical friction body supporting element or a multi-prismatic key friction body supporting element, and the guide friction body supporting element and the power supporting element or the guide friction body supporting element and the guide supporting element are separated or separately connected or integrated.

96. The equipment for converting rotary motion into reciprocating impact motion according to claim 94, characterized in that, the guide impact guide element comprises a quadrangular impact guide element or a U-shaped impact guide element

or a frame-shaped impact guide element or a V-shaped impact guide element or a triangular impact guide element or an oval impact guide element or a polygonal impact guide element or a deformed impact guide element or a raceway impact guide element or a pit impact guide element or an impact guide element of the reciprocating stroke segment or an impact guide element of the holder or an impact guide element of the circular raceway or a groove-shaped impact guide element or a transverse H-shaped impact guide element or an impact guide element of the spline sleeve or a cambered impact guide element or an inverted V-shaped impact guide element or a plate-shaped impact guide element or a cylindrical impact guide element or a multi-prismatic key impact guide element, and the guide impact guide element and the impact guide element or the guide impact guide element and the power impact element are separated or separately connected or integrated.

97. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the rolling body comprises a spherical rolling body or an oval rolling body or a dumb bell shaped rolling body or a cylindrical rolling body or a conical rolling body or a circular ring-shaped rolling body or a roller rolling body or a platform-shaped column rolling body or a platform-shaped ball rolling body or a platform-shaped drum rolling body or a groove-shaped drum rolling body or a groove-shaped column rolling body or a groove-shaped ball rolling body or a groove-shaped roller rolling body or a groove-shaped oval rolling body or a rolling body with a shaft or a rolling body with a hole or a multi-prismatic key rolling body or a multi-prismatic sleeve rolling body or a rolling drum shaped rolling body or a rolling ball rolling body or a rolling needle rolling body or roller rolling body or a linear bearing or a waist drum wheel rolling body, and the rolling body and the guide rolling body are separated or separately connected or integrated.

98. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the shape of the impact guide element and/or the friction body supporting element is in close buckling with the shape of the friction body to form the guide limiting structure, or the shape of the power impact element and/or the power supporting element is in close buckling with the shape of the friction body to form the power limiting structure, the limiting structure is used for controlling the motion direction of the impact guide element or the power impact element, and/or preventing the rotation of the impact guide element or the power impact element, and the guide limiting structure and the power limiting structure are separated or separately connected or integrated.

99. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact guide element comprises a raceway impact guide element or a pit impact guide element or a belt frame impact guide element or a circular raceway impact guide element or a stroke segment impact guide element or a limiting impact guide element or a cylindrical impact guide element or a U-shaped impact guide element or a V-shaped impact guide element or a polygonal impact guide element or a frame-shaped impact guide element or a deformed impact guide element or an E-shaped impact guide element.

100. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the friction body supporting element comprises a raceway friction body supporting element or a pit friction body supporting element or a belt frame friction body supporting element or a circular raceway friction body supporting element or a stroke segment friction body supporting element or a limiting friction body supporting element or a cylindrical friction body supporting element or a U-shaped friction body supporting element or V-shaped friction body supporting element or a polygonal friction body supporting

element or a frame-shaped friction body supporting element or a friction body supporting element of the impact power box or a deformed friction body supporting element.

101. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the power impact element comprises a raceway power impact element or a pit power impact element or a belt frame power impact element or a circular raceway power impact element or a stroke segment power impact element or a limiting power impact element or a cylindrical power impact element or a U-shaped power impact element or a frame-shaped power impact element or a deformed power impact element or an E-shaped power impact element or a polygonal power impact element.

102. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the power supporting element comprises a raceway power supporting element or a pit power supporting element or a belt frame power supporting element or a circular raceway power supporting element or a stroke segment power supporting element or a limiting power supporting element or a cylindrical power supporting element or a U-shaped power supporting element or an E-shaped power supporting element or a polygonal power supporting element or a power supporting element of the impact power box or a frame-shaped power supporting element or a deformed power supporting element.

103. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the friction body ring impact guide element is arranged or arranged at one side of the impact guide element or on more than two side parts of the impact guide element, or a friction body ring power impact element is arranged or arranged at one side of the power impact element or on more

than one side part of the power impact element, and the power impact element comprises a piston or a cylinder rod or a piston rod or a guide rod.

104. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the circular raceway is arranged on the impact guide element or the guide rolling body supporting element, the circular raceway and the impact guide element or the guide rolling body supporting element are separately connected or are integrated, the impact guide element is arranged in the guide rolling body supporting element or at the outside of the guide rolling body supporting element, the guide rolling body is arranged in the circular raceway, the guide rolling body exposed from the circular raceway is in contact with the surface of the guide rolling body supporting element or the surface of the impact guide element, the main body of the impact guide element is not in contact with the surface of the guide rolling body supporting element, and the guide rolling body is used for supporting the impact guide element and the guide rolling body supporting element to relatively reciprocate by means of rolling friction.

105. The equipment for converting rotary motion into reciprocating impact motion according to claim 104, characterized in that, the circular supporting segment and the circular segment of the circular raceway are arranged along the surface of the impact guide element or the guide rolling body supporting element, the guide rolling body in the circular supporting segment supports the rolling friction of the guide rolling body supporting element and the impact guide element, and the guide rolling body in the circular segment does not support the rolling friction of the impact guide element and the guide rolling body supporting element.

106. The equipment for converting rotary motion into reciprocating impact motion according to claim 104, characterized in that, the circular raceway and the guide

supporting element or the impact guide element or the power supporting element or the power impact element are connected or integrated.

107. The equipment for converting rotary motion into reciprocating impact motion according to claim 104, characterized in that, the circular raceway comprises a pressure bearing circular raceway and a pressure-free circular raceway, wherein the pressure-free circular raceway and the power supporting element or the power impact element or the guide rolling body supporting element or the impact guide element are separately arranged, and the pressure-free circular raceway is detachable, thereby being conductive to convenient observation, maintenance and change of the power rolling body.

108. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact guide element or the guide supporting element or the power impact element or the power supporting element is made from a light material, and the light material comprises an aluminum alloy or high-strength plastic or ceramic or a titanium alloy or carbon fiber or light steel or a composite material.

109. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide supporting element is arranged at more than two end parts of the power supporting element to form more than two guide supporting points, the more than two end parts comprise more than two end parts of the main body of the guide supporting element or the spatial positions of more than two end parts excluding the main body of the guide supporting element, the more than two guide supporting points are used for supporting the lifting force of the impact head and ensuring close fit of the friction body, the impact guide element and the friction body supporting element so as to form a multipoint impact head supporting structure, the multipoint impact head supporting structure is used for

supporting the impact head at multiple points to correct the impact direction of the impact head, in order to widen the correction width of the impact head to the maximum, enlarge the correction force of the impact head, control the impact direction of the impact head to the maximum, prevent the damage to the impact driving mechanism due to an impact break-off force and/or a counterforce and prolong the service life of the equipment.

110. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, more than two columns of friction bodies are arranged on the surrounding of the impact guide element or the power impact element, the more than two columns of friction bodies bear the gravity load of the impact guide element or the power impact element, at least more than one friction body in a column of friction bodies is used for supporting the impact guide element or the power impact element for reciprocating impact, and the concentrated damage to the friction bodies or the friction body supporting element resulting from that only a column of friction bodies bears the gravity load of the impact guide element or the power impact element is avoided.

111. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism comprises an impact guide element, wherein the impact guide element comprises an upper impact guide element, a lower impact guide element or a left impact guide element, a right impact guide element, the impact driving mechanism comprises a crank impact driving mechanism, the crank impact driving mechanism comprises a power impact element, the power impact element is arranged between the upper impact guide element and the lower impact guide element or between the left impact guide element and the right impact guide element, and the upper impact guide element or the lower

impact guide element or the left impact guide element or the right impact guide element forms the multipoint impact head supporting structure.

112. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the contact surface of the friction body and the friction body supporting element and/or the impact guide element is in close buckling, the contact surface of the friction body and the friction body supporting element and/or the impact guide element is as large as possible, in order to prevent overlarge local stress of the friction body, reduce the concentration of the local friction of the friction body on the friction body supporting element and/or the impact guide element and enlarge the correction degree of the impact guide element, the contract surface of the friction body supporting element and/or the impact guide element and the friction body are in close buckling to limit the motion space and/or position of the friction body.

113. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the friction body is arranged between the guide supporting element and the impact guide element or between the power supporting element and the power impact element, the friction body, the impact guide element and the friction body supporting element are in close fit to support the impact head to impact at multiple points by means of rolling friction or suspension friction, the impact guide element is actually extension deformation of the power impact element, due to the extension deformation of the power impact element, the correction width of the impact head is widened to the maximum, the correction force of the impact head is enlarged, the impact head is controlled to the maximum and the damage to the crank impact driving mechanism due to the impact break-off force and/or the counterforce is avoided.

114. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact guide element is arranged on the friction body supporting element, the impact guide element or the friction body supporting element comprises a liquid suspension body or an air suspension body, or the power impact element or the power supporting element comprises a liquid suspension body or an air suspension body, or the impact guide element and the friction body supporting element comprise magnetic suspension bodies, or the power impact element and the power supporting element comprise magnetic suspension bodies, the magnetic suspension bodies comprise an electromagnetic suspension body or a permanent magnet suspension body, the suspension body is used for forming suspension friction between the impact guide element and the friction body supporting element or between the power impact element and the power supporting element, the suspension friction is used for reducing the friction resistance and/or friction damage between the impact guide element and the friction body supporting element or between the power impact element and the power supporting element, and prolonging the service life of the impact driving mechanism or the guide mechanism.

115. The equipment for converting rotary motion into reciprocating impact motion according to claim 114, characterized in that, the air suspension body comprises an air source, a control valve, a conveying pipeline and an air cavity, wherein the air cavity is arranged on the guide mechanism or the impact driving mechanism, the air suspension body is formed between the guide supporting element and the impact guide element, or the air suspension body is formed between the power supporting element and the power impact element, and the air suspension body is used for supporting the impact guide element to reciprocate through suspension friction or the air suspension body is used for supporting the power impact element to reciprocate through suspension friction.

116. The equipment for converting rotary motion into reciprocating impact motion according to claim 114, characterized in that, the liquid suspension body comprises a liquid medium source, a control valve, a conveying pipeline and a liquid cavity, wherein the liquid cavity is arranged on the guide mechanism or the impact driving mechanism, the liquid suspension body is formed between the guide supporting element and the impact guide element, or the liquid suspension body is formed between the power supporting element and the power impact element, and the liquid suspension body is used for supporting the impact guide element to reciprocate through suspension friction or the liquid suspension body is used for supporting the power impact element to reciprocate through suspension friction.

117. The equipment for converting rotary motion into reciprocating impact motion according to claim 114, characterized in that, the magnetic suspension body comprises an electromagnetic suspension body or a permanent magnet suspension body, wherein the electromagnetic suspension body comprises an electromagnet, the permanent magnet suspension body comprises a permanent magnet, the electromagnet or the permanent magnet is arranged on the impact guide element and the guide supporting element or on the power impact element and the power supporting element.

118. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact guide element and the guide supporting element or the power impact element and the power supporting element comprise N pole permanent magnets, or the impact guide element and the guide supporting element or the power impact element and the power supporting element comprise S pole permanent magnets, wherein the N pole permanent magnets and the N pole permanent magnets or the S pole permanent magnets and the S pole permanent magnets repel to each other due to the same polarity to form the magnetic suspension body, the power impact element is used for driving the impact guide element to

reciprocate, the magnetic suspension body is used for supporting the impact guide element and the guide supporting element to relatively reciprocate through suspension friction or the magnetic suspension body is used for supporting the power impact element and the power supporting element to relatively reciprocate through suspension friction.

119. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact guide element and the guide supporting element or the power impact element and the power supporting element comprise negative pole electromagnets, or the impact guide element and the guide supporting element or the power impact element and the power supporting element comprise positive pole electromagnets, wherein the negative pole electromagnets and the negative pole electromagnets or the positive pole electromagnets and the positive pole electromagnets repel to each other due to the same polarity to form the magnetic suspension body, the power impact element is used for driving the impact guide element to reciprocate, the magnetic suspension body is used for supporting the impact guide element and the guide supporting element to relatively reciprocate through suspension friction or the magnetic suspension body is used for supporting the power impact element and the power supporting element to relatively reciprocate through suspension friction.

120. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, a break-off prevention mechanism is arranged at one end or two ends of the power impact element.

121. The equipment for converting rotary motion into reciprocating impact motion according to claim 120, characterized in that, the break-off prevention mechanism is arranged to be a rotary break-off prevention mechanism or a separated break-off prevention mechanism or a buffer break-off prevention mechanism.

122. The equipment for converting rotary motion into reciprocating impact motion according to claim 121, characterized in that, the rotary break-off prevention mechanism is arranged to be a joint bearing or a steering connector or a rzeppa universal joint or a cross-shaped universal joint or a bulb catching groove type or a cambered catching groove type, and the rotary structure of the break-off prevention mechanism is stressed to rotate or a separate structure separately isolates the impact counteraction break-off force.

123. The equipment for converting rotary motion into reciprocating impact motion according to claim 120, characterized in that, the break-off prevention mechanism comprises a cambered catching groove type or a rotary connector, wherein the cambered catching groove type comprises a cambered convex head and a groove movably buckled with the cambered convex head, the groove and the power impact element are separately connected or are integrated, the cambered convex head movably buckled with the groove and the impact head are separately connected or are integrated, the rotary connector comprises a rotary connector of a flexible universal joint or a rotary connector of a universal joint bearing or a multiple degrees of freedom platform type rotary connector or a rotary connector of a universal coupling, the rotary connector of the flexible universal joint comprises an elastic element, a universal joint connector, when the universal joint is stressed, the universal joint connector relatively moves by means of the adjustment of the elastic element, the rotary connector of the universal joint bearing comprises a universal joint seat and a rotary connector, the rotary connector is fixed on the universal joint seat, when the universal joint bearing is stressed, relative motion is adjusted by the universal joint seat, the multiple degrees of freedom platform type rotary connector is composed of a movable cylinder, an upper universal hinge, a lower universal hinge, an upper platform and a lower platform, when the upper platform and the lower platform are

stressed, the motion with multiple degrees of freedom of the upper platform in the space is achieved through the telescopic motion of the movable cylinder, the rotary connector of the universal coupling is a cross shaft type rotary connector, the cross shaft type rotary connector comprises a cross shaft, a cross universal joint fork, and the cross universal joint fork is connected by the cross shaft to realize relative motion.

124. The equipment for converting rotary motion into reciprocating impact motion according to claim 120, characterized in that, the break-off prevention mechanism comprises a rotary structure, wherein the rotary structure comprises a bulb catching groove type, the bulb catching groove type comprises a bulb and a bulb groove movably buckled with the bulb, the bulb and the power impact element are separately connected or are integrated, the bulb groove movably buckled with the bulb and the impact head are separately connected or are integrated, the power impact element and the impact head are connected or separated, the power impact element is used for driving the impact head to impact, an impact break-off force is applied to the break-off prevention mechanism, and the rotary structure of the break-off prevention mechanism is stressed to rotate.

125. The equipment for converting rotary motion into reciprocating impact motion according to claim76, characterized in that, a buffer mechanism is arranged on the lifting mechanism or on the reciprocating impact part or on the machine body or between the lifting mechanism and the reciprocating impact part or between the lifting mechanism and the machine body.

126. The equipment for converting rotary motion into reciprocating impact motion according to claim 125, characterized in that, the buffer mechanism comprises a structure buffer mechanism or a power buffer mechanism.

127. The equipment for converting rotary motion into reciprocating impact motion according to claim 126, characterized in that, the structure buffer mechanism

comprises a fixed supporting element, a buffer supporting element and a buffer element.

128. The equipment for converting rotary motion into reciprocating impact motion according to claim 126, characterized in that, the power buffer mechanism comprises a slide stroke spline shaft sleeve buffer device or a belt buffer device.

129. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the lifting mechanism or the reciprocating impact part or the rack comprises a structure buffer mechanism, wherein the structure buffer mechanism comprises a fixed supporting element and a buffer supporting element, when the lifting mechanism is provided with the fixed supporting element, the reciprocating impact part is correspondingly provided with the buffer supporting element, or when the rack is provided with the fixed supporting element, the lifting mechanism is correspondingly provided with the buffer supporting element, or the rack is provided with the buffer supporting element, namely, the fixed supporting element is arranged on the reciprocating impact part, a buffer element is arranged between the fixed supporting element and the buffer supporting element or between the lifting mechanism and the rack or between the lifting mechanism and the reciprocating impact part or between the rack and the reciprocating impact part, buffer guide elements are arranged on the fixed supporting element and the buffer supporting element or on the lifting mechanism and the rack or on the lifting mechanism and the reciprocating impact part or on the rack and the reciprocating impact part, the power impact element is used for driving the impact head to impact, when the impact counterforce is applied to the buffer supporting element and the fixed supporting element or to the lifting mechanism and the rack or to the lifting mechanism and the reciprocating impact part or to the rack and the reciprocating impact part, the buffer element deforms to absorb the impact counterforce, and the buffer guide elements are

used for controlling the buffer direction to ensure that the buffer is reciprocating liner buffer, so as to prevent the non-directional swing of the impact head during buffer.

130. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the lifting mechanism or the reciprocating impact part or the rack comprises a structure buffer mechanism, wherein the structure buffer mechanism comprises a fixed supporting element and a buffer supporting element, or when the lifting mechanism is provided with the fixed supporting element, the reciprocating impact part is correspondingly provided with the buffer supporting element, or when the rack is provided with the fixed supporting element, the lifting mechanism is correspondingly provided with the buffer supporting element, or the rack is provided with the buffer supporting element, namely, the fixed supporting element is arranged on the reciprocating impact part, when the fixed supporting element comprises the buffer guide element, the buffer supporting element comprises a buffer guide sleeve, or when the buffer supporting element comprises the buffer guide element, the fixed supporting element comprises the buffer guide sleeve, when a guide lug boss or a guide groove is arranged on the buffer guide element, a guide groove or a guide lug boss buckled with the guide lug boss or the guide groove is arranged on the buffer guide sleeve, buffer elements are arranged at the two sides of the projections of the guide lug boss, the buffer guide element is used for supporting the buffer guide sleeve to linearly slide along the buffer guide element in a reciprocating manner or the buffer guide sleeve is used for supporting the buffer guide element to linearly slide along the buffer guide sleeve in a reciprocating manner, the buffer guide element, the buffer elements and the buffer guide sleeve form a bidirectional buffer mechanism, the power impact element is used for driving the impact head to impact, the impact counteraction break-off force is applied to the bidirectional buffer mechanism, the bidirectional buffer mechanism absorbs the

impact counterforce, the power impact element is used for driving the impact head to reciprocate, the buffer elements at the front part of the guide lug boss and the rear of the guide lug boss absorb the impact counterforce of the impact head, the buffer guide element, the buffer guide sleeve, the buffer elements cooperate to absorb the impact counterforce of the impact head and control the buffer direction as reciprocating linear buffer, and the buffer guide sleeve is leant against the buffer guide element to linearly slide relatively, in order to prevent the non-directional swing of the lifting mechanism and/or the impact driving mechanism, the guide mechanism and stabilize the impact direction of the impact head.

131. The equipment for converting rotary motion into reciprocating impact motion according to claim 129 or 130, characterized in that, the fixed supporting element, the buffer supporting element comprises a retraction prevention structure, or the buffer guide element, the buffer guide sleeve comprises a retraction prevention structure, wherein the retraction prevention structure comprises a retraction prevention element, the retraction prevention element is used for preventing the fixed supporting element and the buffer supporting element from dropping off during relative reciprocating slide, or the retraction prevention element is used for preventing the buffer guide element and the buffer guide sleeve from dropping off during relative reciprocating slide, the retraction prevention element and the fixed supporting element are separately arranged or connected or integrated, or the retraction prevention element and the buffer supporting element are separately arranged or connected or integrated, or the retraction prevention element and the buffer guide element are separately arranged or connected or integrated, or the retraction prevention element and the buffer guide sleeve are separately arranged or connected or integrated.

132. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part or the lifting

mechanism or the rack comprises a rotary power source element and a rotary impact transmission element, or when the rack comprises the rotary power source element, the lifting mechanism comprises the rotary impact transmission element, or when the lifting mechanism comprises the rotary power source element, the reciprocating impact part comprises the rotary impact transmission element, or when the rack comprises the rotary power source element, the reciprocating impact part comprises the rotary impact transmission element, the rotary power source element comprises a motor or a hydraulic motor or a pneumatic motor, the lifting mechanism or the reciprocating impact part or the rack comprises a structure buffer mechanism, the structure buffer mechanism comprises a fixed supporting element and a buffer supporting element, or when the lifting mechanism is provided with the fixed supporting element, the reciprocating impact part is correspondingly provided with the buffer supporting element, or when the rack is provided with the fixed supporting element, the lifting mechanism is correspondingly provided with the buffer supporting element, or when the rack is provided with the fixed supporting element, the reciprocating impact part is correspondingly provided with the buffer supporting element, a buffer element is arranged between the rack and the lifting mechanism or between the fixed supporting element and the buffer supporting element or between the lifting mechanism and the reciprocating impact part or between the rack and the reciprocating impact part, a power buffer mechanism is arranged between the rotary power source element and the rotary impact transmission element or on the rotary impact transmission element, the power buffer mechanism comprises a slide stroke spline shaft sleeve buffer device or a belt buffer device, the slide stroke spline shaft sleeve buffer device comprises a spline shaft and a spline sleeve, a slide reciprocating stroke segment is arranged between the spline shaft and the spline sleeve, when being impacted, the slide reciprocating stroke segment slides in a reciprocating manner to

absorb the impact counterforce, the belt buffer device comprises a driving belt pulley, a driven belt pulley and a belt, the driving belt pulley is arranged on the fixed supporting element, the driving belt pulley is connected with the drive shaft of the motor or the hydraulic motor or the pneumatic motor, the driven belt pulley is arranged on the buffer supporting element, the belt is arranged on the driving belt pulley and the driven belt pulley, the driven belt pulley is impacted to move together with the buffer supporting element, the belt absorbs the impact counterforce, the belt buffer device is used for preventing the damage to the motor or the hydraulic motor or the pneumatic motor, the structure buffer mechanism further comprises a buffer guide element, a buffer element is arranged between the rack and the reciprocating impact part or between the fixed supporting element and the buffer supporting element or between the lifting mechanism and the reciprocating impact part or between the rack and the lifting mechanism, the buffer guide element is arranged on the rack and the reciprocating impact part or on the fixed supporting element and the buffer supporting element or on the lifting mechanism and the reciprocating impact part or on the rack and the lifting mechanism, the structure buffer mechanism is used for controlling the buffer structure by use of the buffer guide element when absorbing the impact counterforce through the buffer element, the structure buffer mechanism is matched with the slide stroke spline shaft sleeve buffer device or the belt buffer device to absorb and buffer the impact counterforce of the impact head and guide the buffer direction, in order to prevent the rotary power source element or the lifting mechanism or the rack from being damaged by non-directional swing during buffer and ensure that the impact direction of the impact head faces to a material to be dug.

133. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises a buffer mechanism, wherein the buffer mechanism comprises a rotary power buffer

mechanism, the rotary power buffer mechanism comprises a slide stroke spline shaft sleeve buffer device, the slide stroke spline shaft sleeve buffer device comprises a spline shaft and a spline sleeve, a slide reciprocating stroke segment is arranged between the spline shaft and the spline sleeve, when being impacted, the slide reciprocating stroke segment slides in a reciprocating manner to absorb the impact counterforce, the spline shaft is in slide connection with the spline sleeve to buffer in a reciprocating manner, the impact driving mechanism comprises a rotary power source element and a rotary impact transmission element, the rotary power source element comprises a motor or a hydraulic motor or a pneumatic motor, the motor or the hydraulic motor or the pneumatic motor comprises a drive shaft, the spline sleeve or the spline shaft and the drive shaft are connected or integrated, and the spline shaft or the spline sleeve and the rotary impact transmission element are connected or integrated.

134. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises a buffer mechanism, wherein the buffer mechanism comprises a rotary power buffer mechanism, the rotary power buffer mechanism comprises a belt buffer device, the rocker arm comprises a rocker arm buffer element or a rocker arm fixing element, the buffer mechanism further comprises a buffer element, the buffer element is arranged between the rocker arm buffer element and the rocker arm fixing element, the belt buffer device comprises a driving belt pulley, a belt, a driven belt pulley, the driving belt pulley is fixed on the rocker arm fixing element, the driving belt pulley is connected with the drive shaft of the motor or the hydraulic motor or the pneumatic motor, the driven belt pulley is arranged on the rocker arm buffer element, the belt is arranged on the driving belt pulley and the driven belt pulley, the driven belt pulley is impacted to buffer together with the rocker arm buffer element, the belt absorbs the

impact counterforce to prevent the motor or the hydraulic motor or the pneumatic motor from being damaged, and the belt buffer device comprises a tensioner.

135. The equipment for converting rotary motion into reciprocating impact motion according to claim 134, characterized in that, the tensioner is arranged at the inner side or the outer side of the belt, the tensioner comprises a tensioning wheel, a tensioning wheel frame, a tensioning spring, a tensioning adjustment rod and a tensioning seat, the tensioning wheel is arranged on the tensioning wheel frame, a guide hole is arranged on the tensioning wheel frame, a polish rod is arranged at one end of the tensioning adjustment rod, a lead screw is arranged at the other end of the tensioning adjustment rod, a blocking shoulder in the middle of the tensioning adjustment rod, the tensioning wheel frame is matched with the polish rod end of the tensioning adjustment rod through the guide hole, the lead screw end of the tensioning adjustment rod is in threaded connection with the tensioning seat, the tensioning spring is arranged between the tensioning wheel frame and the blocking shoulder, the tensioning wheel presses the belt through the elastic force of the spring, and a tensioning force is adjusted by the screwing length of the lead screw and the tensioning seat.

136. The equipment for converting rotary motion into reciprocating impact motion according to claim 134, characterized in that, the belt buffer device comprises a tensioner, wherein the tensioner comprises a sliding seat and a tensioning spring, the driving belt pulley and the motor or the hydraulic motor or the pneumatic motor are installed on the sliding seat, the sliding seat is in slide fit with the rocker arm fixing element, one end of the tensioning spring is connected with the sliding seat, the other end of the tensioning spring is connected with the rocker arm fixing element, and a certain action force is applied to the sliding seat through the spring to tension the belt.

137. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the lifting mechanism comprises a vertical lifting mechanism, wherein the vertical lifting mechanism is used for driving the reciprocating impact part to vertically move up and down, the vertical lifting mechanism comprises a lifting platform, a lifting platform seating seat and a vertical lifting actuator, the vertical lifting actuator comprises a rope and a rope winder or a gear rack or a screw rod or coupling opening and closing device or a chain wheel and a chain or a hydraulic element or a pneumatic element, the vertical lifting actuator is used for driving the lifting platform to vertically lift, the vertical lifting mechanism further comprises a positioning and locking device, the positioning and locking device comprises a latch pin or a spring bolt or a cushion block or a guy rope or a hydraulic cylinder or a cylinder, and the positioning and locking device is used for positioning and locking the lifting platform.

138. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the machine body comprises a rotary disk, wherein the reciprocating impact part is arranged on the rotary disk, and the rotary disk is used for driving the reciprocating impact part to rotate at the front part of the machine body.

139. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the machine body comprises a rotary disk, the lifting mechanism comprises a rocker arm lifting oil cylinder, the rocker arm lifting oil cylinder is used for driving the rocker arm to move up and down, the rotary disk is used for driving the rocker arm to move left and right, and the rotary disk is matched with the rocker arm lifting oil cylinder to adjust the impact head to impact a material at multiple positions and in multiple directions.

140. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the lifting mechanism comprises a translation lifting mechanism, wherein the translation lifting mechanism is arranged at the front part of the machine body, and the translation lifting mechanism is used for driving the reciprocating impact part to translate relative to the machine body.

141. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact power box or a supporting frame, the impact driving mechanism comprises a crank impact driving mechanism, the crank impact driving mechanism comprises a multi-throw crank shaft multi-rod impact mechanism and a power output component, the multi-throw crank shaft multi-rod impact mechanism comprises a multi-throw crank shaft and a connecting rod, the multi-throw crank shaft comprises a power concentric shaft segment, a connecting handle and an eccentric shaft, the concentric shaft segment, the connecting handle and the eccentric shaft are separated or connected or integrated, one end of the power concentric shaft segment of the multi-throw crank shaft is connected with the power output component of the crank impact driving mechanism, more than two connecting handles, eccentric shafts are arranged at the other end of the power concentric shaft segment, the power concentric shaft segment of the multi-throw crank shaft is installed on the impact power box or the supporting frame, the eccentric shaft of the multi-throw crank shaft is hinged with one end of the connecting rod, the other end of the connecting rod and the impact head are connected or separated, and one eccentric shaft is used for driving more than one connecting rod to impact in a reciprocating manner.

142. The equipment for converting rotary motion into reciprocating impact motion according to claim 141, characterized in that, one eccentric shaft or more than two eccentric shafts are arranged, the more than two eccentric shafts are arranged at

intervals along the radial direction of the power output component to form angle difference, the impact driving mechanism comprises a power output component, and the power concentric shaft segment of the multi-throw crank shaft and the power output component are separated or connected or integrated.

143. The equipment for converting rotary motion into reciprocating impact motion according to claim 141, characterized in that, the multi-throw crank shaft is provided with a liquid channel, and the liquid channel is arranged on the power concentric shaft segment, the connecting handle and/or the eccentric shaft.

144. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact driving mechanism is a crank impact driving mechanism, the crank impact driving mechanism comprises a power source element, a cam shaft and a cam, the cam shaft and the cam are separately connected or are integrated, the power source element is used for driving the cam shaft to rotate, and the cam installed on the cam shaft is used for driving the impact head to impact in a reciprocating manner.

145. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact driving mechanism comprises a crank impact driving mechanism, wherein the crank impact driving mechanism comprises a power source element, an eccentric shaft and a power impact element, the eccentric shaft is hinged with one end of the power impact element, the power impact element is used for driving the eccentric shaft to rotate, and the eccentric shaft is used for driving the power impact element to impact in a reciprocating manner.

146. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact driving mechanism comprises a crank impact driving mechanism, wherein the crank impact driving mechanism

comprises more than two power source elements, and the more than two power source elements and the impact head are connected or separated or integrated.

147. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact power box, the impact driving mechanism comprises a rotary power source element, the rotary power source element comprises a transmission component, the transmission component comprises a variable speed transmission component, the variable speed transmission component is a gear transmission component, when multiple gear transmission components are arranged, a part of the gear transmission components is arranged in the impact power box, and the other part is arranged in the impact power box or at the outside of the impact power box.

148. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact power box, the impact driving mechanism comprises a rotary power source element, the rotary power source element comprises a transmission component, the transmission component comprises a variable speed transmission component, and the variable speed transmission component comprises a gear transmission component or a combination of the gear transmission component and a belt transmission component.

149. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises one or more guide mechanism.

150. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism is composed of more than two guide mechanisms, the impact driving mechanism is used for driving more than two power impact elements to cooperate with the more than two guide

mechanisms, and the more than two power impact elements are used for driving more than two impact heads.

151. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism is composed of more than two guide mechanisms, and the impact driving mechanism is used for driving one power impact element to cooperate with the more than two guide mechanisms.

152. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact guide element is arranged at one side or the front part or more than two side parts or the surrounding of the impact driving mechanism.

153. The equipment for converting rotary motion into reciprocating impact motion according to claim 37, characterized in that, the shape and/or arrangement of the inner-layer material impact teeth is conductive to blanking the inner-layer material of a coal bed to be dug or a rock stratum or cement concrete or bituminous concrete or hardened mudstone, the shape and/or arrangement of the outer-layer material impact teeth is conductive to enabling the material blanked by the inner-layer material impact teeth to flow out from the gaps of the outer-layer material impact teeth, the outer-layer material impact teeth, the inner-layer material impact teeth are arranged side by side to form a multilayer impact head, and the multilayer impact head is used for increasing the coal digging width and improving the coal digging efficiency.

154. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the impact head comprises a step tooth punching and cutting device, wherein the step tooth punching and cutting device comprises impact teeth, the impact teeth are multilayer impact teeth, tooth heads are arranged on the impact teeth, the tooth heads and the impact teeth are separately

connected or are integrated, the distances between the tooth heads of the two adjacent layers of impact teeth are different, the coal bed to be dug or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone is impacted to a step shape, more than two relatively free surfaces are generated on each step layer of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone, the pressure stress and/or structural strength of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone is greatly reduced compared with that of the original planar coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone, after the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone is impacted to the step shape, when each layer of the impact teeth is used for digging again, the two relatively free surfaces of the step-shaped coal bed or rock stratum or cement concrete or bituminous concrete or hardened mudstone are reasonably utilized to blank the material, so as to greatly reduce the impact resistance, avoid overlarge lumps of the material blanked by the impact head, reduce the power consumption and improve the impact efficiency.

155. The equipment for converting rotary motion into reciprocating impact motion according to claim 37, characterized in that, the outer-layer material impact tooth seat comprises a discharge hole, the outer-layer material impact teeth are arranged on the outer-layer material impact tooth seat in a manner of facing to a surface to be dug, the shape or arrangement of the outer-layer material impact teeth is conducive to blanking the outer-layer material of a layer to be dug, the inner-layer material impact teeth and the inner-layer material impact tooth frame are separately connected or are integrated, the shape or arrangement of the inner-layer material impact teeth is conducive to blanking the inner-layer material of the layer to be dug, the discharge hole is conducive to enabling the material blanked by the inner-layer material impact teeth to

flow out, and multiple layers of material impact mechanisms cooperate to achieve simultaneous impact blanking and discharging.

156. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact head, wherein the impact head comprises an impact tooth frame and impact teeth, impact guide elements are symmetrically or asymmetrically arranged on the impact tooth frame, and the impact teeth and the impact tooth frame are separately connected or are integrated.

157. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact head, wherein the impact head comprises an impact tooth frame, impact teeth, the impact teeth are multilayer impact teeth, the impact teeth are provided with tooth heads, the impact teeth and the tooth heads are separately connected or are integrated, and the tooth heads are arranged to be a spherical impact head or a conical impact head or a hemispherical impact head or a shovel-shaped impact head or a trapezoidal impact head or a triangular impact head or a step-shaped impact head.

158. The equipment for converting rotary motion into reciprocating impact motion according to claim 156 or 157, characterized in that, the impact tooth frame comprises a curved plate or a trapezoidal frame or a semicircular frame or a triangular frame or a flat plate frame or a frame-shaped frame or a V-shaped frame.

159. The equipment for converting rotary motion into reciprocating impact motion according to claim 156 or 157, characterized in that, the impact head comprises impact teeth, wherein the impact teeth comprise top face cleaning teeth or bottom surface cleaning teeth or side face cleaning teeth.

160. The equipment for converting rotary motion into reciprocating impact motion according to claim 159, characterized in that, the impact head comprises an impact

tooth frame and impact teeth, wherein the top face cleaning teeth, the bottom surface cleaning teeth, the side face cleaning teeth are arranged on the same impact tooth frame.

161. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact head, wherein the impact head comprises shovel teeth, the impact head is composed of more than one shovel tooth, the shovel teeth comprise long shovel teeth or short shovel teeth, and cutting blades are arranged at the side parts of the shovel teeth or no cutting blade is arranged.

162. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact head, wherein the impact head comprises shovel teeth, and the shovel teeth comprise conical teeth or wedge teeth or axe teeth or cutter teeth or chisel teeth.

163. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact head, wherein the impact head comprises shovel teeth and a fixing component, the fixing component is arranged on the impact tooth frame, the shovel teeth and the fixing component are integrated or movably connected, and the movable connecting manner is inserting type or catching groove type or step type or spherical surface type or pin tooth type or bolt fixing type.

164. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact head is used for simultaneously finishing coal blanking and surface cleaning or impact coal blanking during once reciprocating impact.

165. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact guide elements are arranged at

the two sides of the impact driving mechanism, the impact head is arranged at one end of each impact guide element, and an identical or a different impact head is arranged at the other end thereof, and different impact heads comprise impact heads with different shapes or different weights.

166. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact head, wherein the impact head is installed at the front part of the machine body or one side of the machine body or more than two side parts of the front part.

167. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact head, wherein an angle adjustor is arranged between the impact head and the rocker arm or between the impact head and the machine body, and the angle adjustor is used for adjusting the impact direction of the impact head.

168. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact power box or a supporting frame, wherein the impact power box or the supporting frame comprises a lubricating system.

169. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact power box or a supporting frame, wherein the impact power box is entirely sealed or partially sealed, the impact power box or the supporting frame comprises a sealing element, the sealing element is arranged at the movable connecting position of the impact driving mechanism or the guide mechanism and the impact power box, or the sealing element is arranged at the movable connecting position of the impact driving mechanism or the guide mechanism and the supporting frame.

170. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism comprises an impact guide element, a friction body supporting element, the impact driving mechanism comprises a power impact element and a power supporting element, and a sealing element is arranged between the impact guide element and the friction body supporting element or between the power impact element and the power supporting element.

171. The equipment for converting rotary motion into reciprocating impact motion according to claim 42, 74, 169 or 170, characterized in that, the sealing element comprises a sealing cavity or a sealing piece or a sealing plug or a sealing pad or an O-shaped ring or a sliding ring or a retainer ring or a supporting ring or a sealing ring or a starlike ring or a pressing ring or a V-shaped body or a U-shaped body or a frame-shaped ring or a groove-shaped element or a pressure spring or an opening sealing ring or a sealing strip or a sealing plate or a sealing block or a hair brush sealing element or a trash removal sealing element or a lip-shaped sealing element.

172. The equipment for converting rotary motion into reciprocating impact motion according to claim 42, 74, 169 or 170, characterized in that, the sealing element is made from a rubber material or a polyurethane material or a nylon material or a plastic material or a metallic material or a composite material.

173. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism comprises an impact guide element, wherein an impact element protection cover is arranged at the joint site of the power impact element and the impact head, or a guide element protection cover is arranged at the joint site of the impact guide element and the impact head, the power impact element and the impact head are connected or

separated or integrated, and the impact guide element and the impact head are connected or separated or integrated.

174. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism comprises an impact guide element, wherein the impact guide element and the power impact element are separated, the power impact element and the impact head are separated, the power impact element is used for driving the impact head to impact, the impact head is arranged on the impact guide element, the machine body is arranged on the walking part, the walking part is used for driving the machine body to walk, and the machine body walks to baffle the impact head through the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone.

175. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism comprises a friction body supporting element and an impact guide element, wherein the impact guide element is arranged on the friction body supporting element, the friction body supporting element is arranged on the rack or the lifting mechanism, the power impact element comprises a power impact cylinder, the impact guide element and the power impact cylinder are separated, the power impact cylinder and the impact head are separated, the impact head is arranged on the impact guide element, the machine body is arranged on the walking part, the walking part is used for driving the machine body to walk, the machine body walks to baffle the impact head through the coal bed or the rock stratum or the cement concrete or the bituminous concrete or the hardened mudstone, and the power impact cylinder is used for driving the impact head to impact.

176. The equipment for converting rotary motion into reciprocating impact motion according to claim 51, characterized in that, the buffer reciprocating element or the

buffer supporting element or the guide rolling body or the friction body supporting element or the impact guide element or the power impact element or the holder is made from a high-strength wear-resistant material, and the high-strength wear-resistant material is a hard alloy or wear-resistant plastic or wear-resistant steel or wear-resistant rubber or wear-resistant ceramic or a self-lubricating wear-resistant material or a composite wear-resistant material.

177. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the machine body comprises a control device, a cable towing device, a spray device, a water spray device or a cooling device.

178. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the rack or the lifting mechanism comprises a crushing device or a material guider.

179. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the machine body comprises a shovel plate.

180. The equipment for converting rotary motion into reciprocating impact motion according to claim 179, characterized in that, the shovel plate comprises a star wheel pusher dog or a crab claw or a pusher dog or a rolling rake.

181. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the machine body comprises a conveyor.

182. The equipment for converting rotary motion into reciprocating impact motion according to claim 181, characterized in that, the conveyor is arranged on the machine body and is used for conveying the material dug by the reciprocating impact part to the rear of the machine body, and the conveyor comprises a scraper conveyer, a belt conveyor and a shell belt conveyor.

183. The equipment for converting rotary motion into reciprocating impact motion according to claim 82, characterized in that, the holder comprises a cylindrical holder

or a plate type holder or a U-shaped holder or a V-shaped holder or a polygonal holder or a deformed holder or a triangular holder or a square holder or a chain link holder.

184. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism comprises a guide rolling body, a guide rolling body supporting element, an impact guide element, wherein the guide rolling body is arranged between the guide rolling body supporting element and the impact guide element, the guide mechanism comprises an outer sleeve and an inner body, a raceway is arranged on the outer sleeve or the inner body, the guide rolling body is arranged on the raceway and between the outer sleeve and the inner body, the outer sleeve, the inner body and the guide rolling body are in close fit to drive the outer sleeve or the inner body to relatively reciprocate through the rolling friction of the guide rolling body, the impact direction of the outer sleeve or the inner body is controlled by the rolling friction, and the impact head and the reciprocating outer sleeve or the inner body are integrated or connected.

185. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the guide mechanism comprises an outer sleeve and an inner body, wherein the holder is arranged between the outer sleeve and the inner body, the guide rolling body is arranged on the holder and is arranged between the outer sleeve and the inner body, when the guide rolling body supporting element is the outer sleeve, the impact guide element is the inner body, the outer sleeve is used for supporting the guide rolling body and the inner body, when the guide rolling body supporting element is the inner body, the impact guide element is the outer sleeve, the inner body is used for supporting the guide rolling body and the outer sleeve, the outer sleeve, the inner body and the guide rolling body are in close fit to drive the outer sleeve or the inner body to relatively reciprocate through the rolling

friction of the guide rolling body, and the impact direction of the outer sleeve or the inner body is controlled by the rolling friction.

186. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises a guide mechanism and an impact driving mechanism, wherein the impact driving mechanism comprises a crank impact driving mechanism, the reciprocating impact part further comprises an impact power box or a supporting frame, the impact power box or the supporting frame is used for supporting the guide mechanism, the impact driving mechanism comprises a crank multiple-throw eccentric shaft mechanism and a power output component, the crank multiple-throw eccentric shaft mechanism comprises a multiple-throw crank shaft, a power impact element, the multiple-throw crank shaft comprises a power concentric shaft segment, a connecting handle and an eccentric shaft, the power concentric shaft segment, the connecting handle and the eccentric shaft are separately combined or are integrated, one end of the power concentric shaft segment of the multiple-throw crank shaft is connected with the power output component, more than two connecting handles, eccentric shafts are arranged at the other end thereof, the more than two eccentric shafts are arranged at intervals along the radial direction of the power concentric shaft segment to form angle difference, the power concentric shaft segment of the multiple-throw crank shaft is installed on the impact power box or the supporting frame, the more than two eccentric shafts of the multiple-throw crank shaft are hinged with one ends of more than two power impact elements, impact heads are arranged at the other ends of the power impact elements, the break-off prevention mechanism is arranged between the power impact elements and the impact heads, the break-off prevention mechanism is of a separate structure or a rotary structure or a buffer structure, the guide mechanism comprises an outer sleeve, an inner body, a guide rolling body, the inner body

comprises an upper element of the inner body and a lower element of the inner body, the outer sleeve is a frame-shaped outer sleeve, the frame-shaped outer sleeve comprises an upper element of the frame-shaped outer sleeve, a lower element of the frame-shaped outer sleeve, the upper element of the frame-shaped outer sleeve or the lower element of the frame-shaped outer sleeve comprises a reciprocating stroke segment or a raceway, the guide rolling body is arranged between the upper element of the inner body and the upper element of the frame-shaped outer sleeve and is arranged between the lower element of the inner body and the lower element of the frame-shaped outer sleeve, the frame-shaped outer sleeve, the inner body and/or the guide rolling body arranged on the reciprocating stroke segment or the raceway are in close fit to enable the guide rolling body to support the frame-shaped outer sleeve to reciprocate through rolling friction and prevent the frame-shaped outer sleeve from rotating, the outer sleeve and the impact heads are connected or integrated, the more than two power impact elements are used for alternatively driving the impact heads to impact, the rotary structure of the break-off prevention mechanism is stressed to rotate or the separate structure separately isolates or the buffer structure buffers the impact counterforce break-off force, the outer sleeve, the inner body and the guide rolling body are in close fit to correct the impact direction of the impact heads, and the power impact elements are not used for guiding the impact heads and are not broken off by the break-off force.

187. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises a guide mechanism, an impact driving mechanism, an impact power box and an impact head, wherein the impact power box is used for supporting the guide mechanism, the impact driving mechanism comprises a crank impact driving mechanism, the crank impact driving mechanism comprises a power impact element, the power impact

element is arranged in the impact power box, the power impact element and the impact head are connected or separated or integrated, the guide mechanism comprises a guide rolling body supporting element, a guide rolling body and an impact guide element, the guide rolling body comprises a roller, the roller is a waist drum wheel, waist drum wheel bearings are arranged at the two ends of the waist drum wheel, the waist drum wheel bearings are installed on the guide rolling body supporting element, the shape of the impact guide element is buckled with the cambered groove of the waist drum wheel, the impact guide element linearly reciprocates by leaning against the cambered groove, the impact guide element reciprocates under the support of the waist drum wheel, the power impact element is used for driving the impact head to impact, the buffer break-off prevention mechanism is arranged on the power impact element, the buffer break-off prevention mechanism isolates an impact counteraction break-off force through buffer, the guide rolling body supporting element and the impact guide element are in close fit with the waist drum wheel to impact the tooth frame, correct the impact direction of the impact head through rolling friction and prevent the impact head from rotating, and the power impact element is not used for guiding the impact head and is not broken off by the break-off force.

188. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises a guide mechanism and an impact driving mechanism, wherein the impact driving mechanism comprises a crank impact driving mechanism, the crank impact driving mechanism comprises a power impact element, the power impact element comprises a connecting rod, the buffer break-off prevention mechanism is arranged on the connecting rod or between the connecting rod and the impact head, the guide mechanism comprises a guide rolling body supporting element and an impact guide element, the guide rolling body supporting element comprises an upper element of the

guide rolling body supporting element, and a lower element of the guide rolling body supporting element, the impact guide element is a U-shaped impact guide element, the U-shaped impact guide element comprises an upper element of the impact guide element, and a lower element of the impact guide element, a roller is arranged between the upper element of the guide rolling body supporting element and the lower element of the guide rolling body supporting element, the roller is arranged between the upper element of the guide rolling body supporting element and the upper element of the impact guide element and is arranged between the lower element of the guide rolling body supporting element and the lower element of the impact guide element, the roller is in close fit with the U-shaped impact guide element and the guide rolling body supporting element to enable the roller to support the U-shaped impact guide element to reciprocate through rolling friction, control the reciprocating direction of the U-shaped impact guide element and correct the impact direction of the impact head, the U-shaped impact guide element and the impact head are connected or separated, the power impact element is used for driving the impact head to impact, and the power impact element is not used for guiding the impact head and is not broken off by the break-off force.

189. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the impact driving mechanism comprises a crank impact driving mechanism, wherein the crank impact driving mechanism comprises a power impact element, the guide mechanism comprises a linear bearing, the impact guide element is installed on the linear bearing, the power impact element and the impact head are connected or separated, the power impact element is used for driving the impact head to impact in a reciprocating manner, the power impact element is not used for guiding the impact head, and the guide mechanism is used for correcting the impact direction of the impact head.

190. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the reciprocating impact part comprises an impact power box, a guide mechanism, an impact driving mechanism and an impact head, wherein the impact power box is used for supporting the guide mechanism, the guide mechanism comprises an impact guide element, a friction body and a friction body supporting element, the friction body comprises a rolling body or a suspension body, the rolling body comprises a guide rolling body and/or a power rolling body, the suspension body comprises a guide suspension body or a power suspension body, the suspension body comprises a magnetic suspension body or a liquid suspension body or an air suspension body, the guide supporting element comprises a guide rolling body supporting element or a guide suspension body supporting element, the impact power box and the friction body supporting element are separated or separately connected or integrated, the end part of the impact guide element is stretched out from the impact power box to be connected with the impact head, the impact head is arranged at one end of the impact guide element, the impact guide element and the impact head are connected or integrated, the impact driving mechanism comprises a crank impact driving mechanism, the crank impact driving mechanism comprises a power impact element, a power supporting element, the impact power box and the power supporting element are separately connected or are integrated, the power supporting element and the guide supporting element are separated or separately connected or integrated, the power supporting element comprises a power rolling body supporting element or a power suspension body supporting element, the impact guide element and the power impact element are separated or separately connected or integrated, the power impact element is arranged in the impact power box, the power impact element and the impact head are connected or separated movably, the power impact element is used for driving the impact head to

impact, the friction body is arranged between the guide supporting element and the impact guide element to form the guide mechanism, the friction body, the friction body supporting element and the impact guide element are in close fit to support the impact head to impact through rolling friction or suspension friction, and the guide mechanism is used for correcting the impact direction of the impact head and preventing the impact driving mechanism from being damaged by the break-off force and/or the impact counterforce.

191. The equipment for converting rotary motion into reciprocating impact motion according to claim 76, characterized in that, the lifting mechanism comprises a rocker arm lifting mechanism, wherein the impact power box is arranged at the front part of the rocker arm lifting mechanism, the crank impact driving mechanism comprises a transmission gear, crank connecting rods are arranged at the two sides of the transmission gear, the crank connecting rod at one side is used for at least driving one impact head to impact, the crank connecting rods at the two sides of the transmission gear are used for simultaneously impacting or alternatively impacting, guide supporting elements, impact guide elements, friction bodies are arranged at more than two end parts of the impact power box, the friction bodies are arranged between the guide supporting elements and the impact guide elements to form a multipoint impact head supporting structure, the impact power box and the guide supporting elements are separately connected or are integrated, more than two impact guide elements are stretched out from the impact power box to be connected with the impact head, the connecting rod and the impact head are connected or separated or integrated, the break-off prevention mechanism is arranged at one end or two ends of the connecting rod, the connecting rod is used for driving the impact head to reciprocate, and the more than two impact guide elements are used for correcting the impact direction of the impact head.

192. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the walking part or the machine body comprises a rotary disk, wherein the rotary disk is arranged at the upper part of the walking part and the lower part of the machine body, the impact head is arranged on the rotary disk and/or on the rocker arm, the rocker arm is arranged on the machine body and/or on the rotary disk, the walking part is used for driving the rotary disk to walk, and the rotary disk is used for driving the impact head to impact and/or excavate and load at multiple positions.

193. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the machine body comprises a rack, wherein the rack comprises a material excavating and loading device, the material excavating and loading device comprises a bucket or an excavator grab, and the material excavating and loading device is used for carting the material.

194. The equipment for converting rotary motion into reciprocating impact motion according to claim 192, characterized in that, the rotary disk comprises an inner rotary disk and an outer rotary disk, the rack comprises an operating chamber, the operating chamber is arranged on the inner rotary disk, an inner rotary disk rocker arm is arranged on the inner rotary disk, one end of the inner rotary disk rocker arm is connected with the inner rotary disk, the other end thereof is connected with the impact head and/or the bucket and/or the excavator grab, an outer rotary disk rocker arm is arranged on the outer rotary disk, one end of the outer rotary disk rocker arm is connected with the outer rotary disk, and the other end thereof is connected with the impact head and/or the bucket and/or the excavator grab.

195. The equipment for converting rotary motion into reciprocating impact motion according to claim 78, characterized in that, the crank impact driving mechanism comprises an expansion piece of the crank impact driving mechanism, and/or the

material excavating and loading device comprises an expansion piece of the material excavating and loading device, wherein the expansion piece of the crank impact driving mechanism or the expansion piece of the material excavating and loading device is used for preventing mutual interference when the crank impact driving mechanism or the material excavating and loading device is at work.

196. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the impact head comprises a multifunctional combined impact head, and the multifunctional combined impact head is used for impacting, crushing, stacking and carting the material.

197. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the guide mechanism comprises a rolling friction guide mechanism or a suspension friction guide mechanism or a sliding friction guide mechanism.

198. The equipment for converting rotary motion into reciprocating impact motion according to claim 197, characterized in that, the sliding friction guide mechanism comprises a wear-resistant guide element and a sliding friction guide bracket, wherein the wear-resistant guide element and the sliding friction guide bracket are separated or separately connected or integrated.

199. The equipment for converting rotary motion into reciprocating impact motion according to claim 198, characterized in that, the wear-resistant guide element comprises a high molecular material wear-resistant guide element or a copper base alloy wear-resistant guide element or an aluminum base alloy wear-resistant guide element or a ceramimetallurgical wear-resistant guide element or a ceramic wear-resistant guide element or a cast iron wear-resistant guide element or a cast steel wear-resistant guide element or a nylon wear-resistant guide element or a metal composite

material wear-resistant guide element or a non-metal composite material wear-resistant guide element or a composite material wear-resistant guide element.

200. The equipment for converting rotary motion into reciprocating impact motion according to claim 7, characterized in that, the impact driving mechanism comprises an eccentric shaft, a connecting rod, a power impact element and a material plate, wherein the eccentric shaft and/or the connecting rod is arranged in the impact power box, the connecting rod is hinged with the eccentric shaft, the other end of the connecting rod and the power impact element are separated or separately connected or integrated, the power impact element and the impact head are separated or separately connected or integrated, the material plate is arranged at one side and/or more than two side parts of the impact power box, the material plate and the impact power box are separated or separately connected or integrated, and the power impact element is used for driving the impact head to impact.

201. The equipment for converting rotary motion into reciprocating impact motion according to claim 197, characterized in that, the rolling friction guide mechanism comprises a roller, a roller guide element and a rolling body supporting element, wherein the roller is arranged on the rolling body supporting element or on the roller guide element, the power impact element and the rolling body supporting element are separated or separately connected or integrated, the roller is arranged on the side part of the power impact element or in the power impact element, the roller is used for correcting the power impact element to impact in a reciprocating manner through rolling friction, the power impact element and the impact head are connected movably or are integrated, the power impact element is used for driving the impact head to impact, and the roller guide element, the rolling body supporting element and the roller cooperate to correct the impact direction of the impact head.

202. The equipment for converting rotary motion into reciprocating impact motion according to claim 201, characterized in that, the roller guide element and the impact power box are separated or separately connected or integrated, the roller guide element and the rocker arm are integrated or separated or separately connected, and the roller guide element and the material plate are separated or separately connected or integrated.

203. The equipment for converting rotary motion into reciprocating impact motion according to claim 201, characterized in that, the roller is in clearance fit with the roller guide elements at the two sides of the roller, when the roller is in rolling friction with a roller guide element at one side, the roller is not in contact with a roller guide element at the other side, and the roller is limited by the roller guide elements at the two sides thereof to prevent the power impact element from swinging, so as to control the impact head to swing.

204. The equipment for converting rotary motion into reciprocating impact motion according to claim 197, characterized in that, the rolling friction guide mechanism comprises a rolling body, a rolling body supporting element and an impact guide element, wherein the rolling body is a waist drum wheel, the rolling body supporting element and the material plate are separated or separately connected or integrated, the impact guide element and the power impact element are integrated or separately connected, the power impact element and the impact head are integrated or separately connected, the waist drum wheel is arranged on the rolling body supporting element, a groove or a projection is arranged on the waist drum wheel, a projection or a groove is arranged on the corresponding power impact element, and the waist drum wheel is buckled with the power impact element to correct the impact direction of the power impact element through rolling friction and prevent the impact head from swinging.

205. The equipment for converting rotary motion into reciprocating impact motion according to claim 37 or 200, characterized in that, the impact power box and/or material plate comprises a protection plate stroke groove, the protection plate stroke groove is arranged along the surrounding or local part of the impact power box and/or material plate, a protection element comprises a protection plate, and the protection plate reciprocates in the protection plate stroke groove arranged along the surrounding or local part.

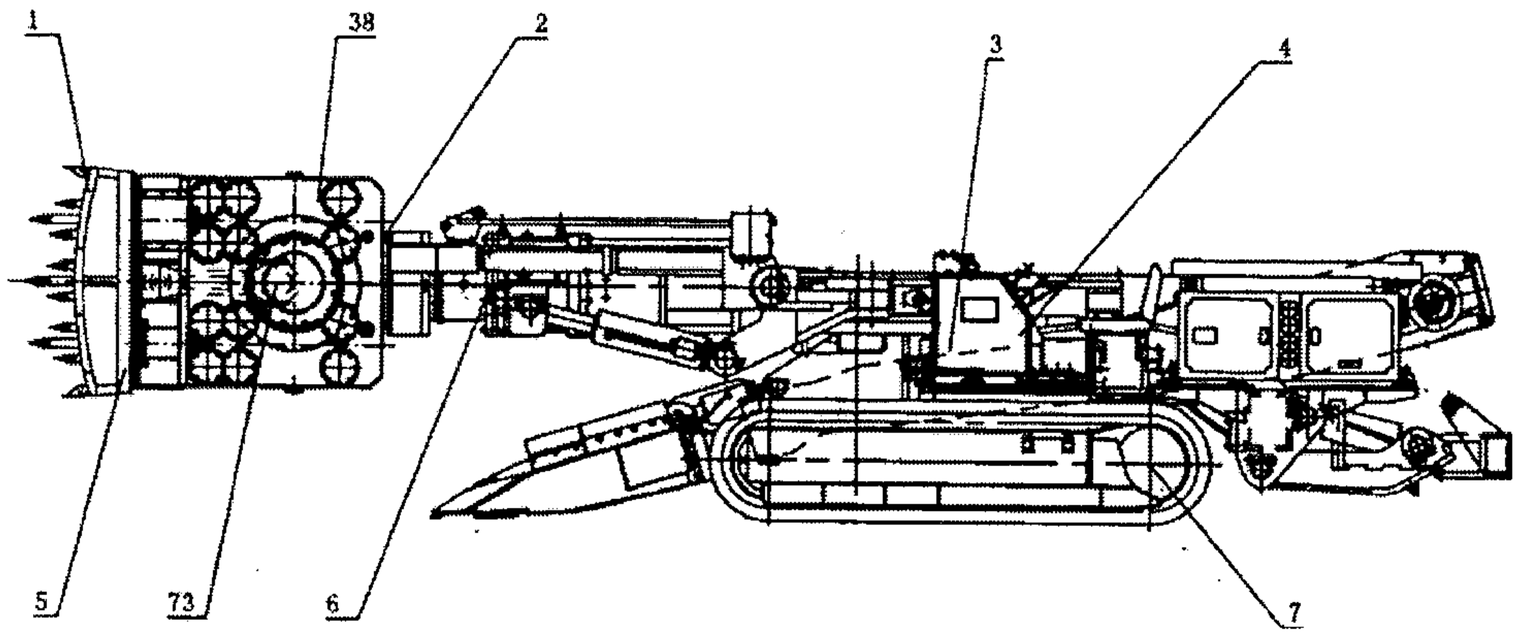


Fig. 1

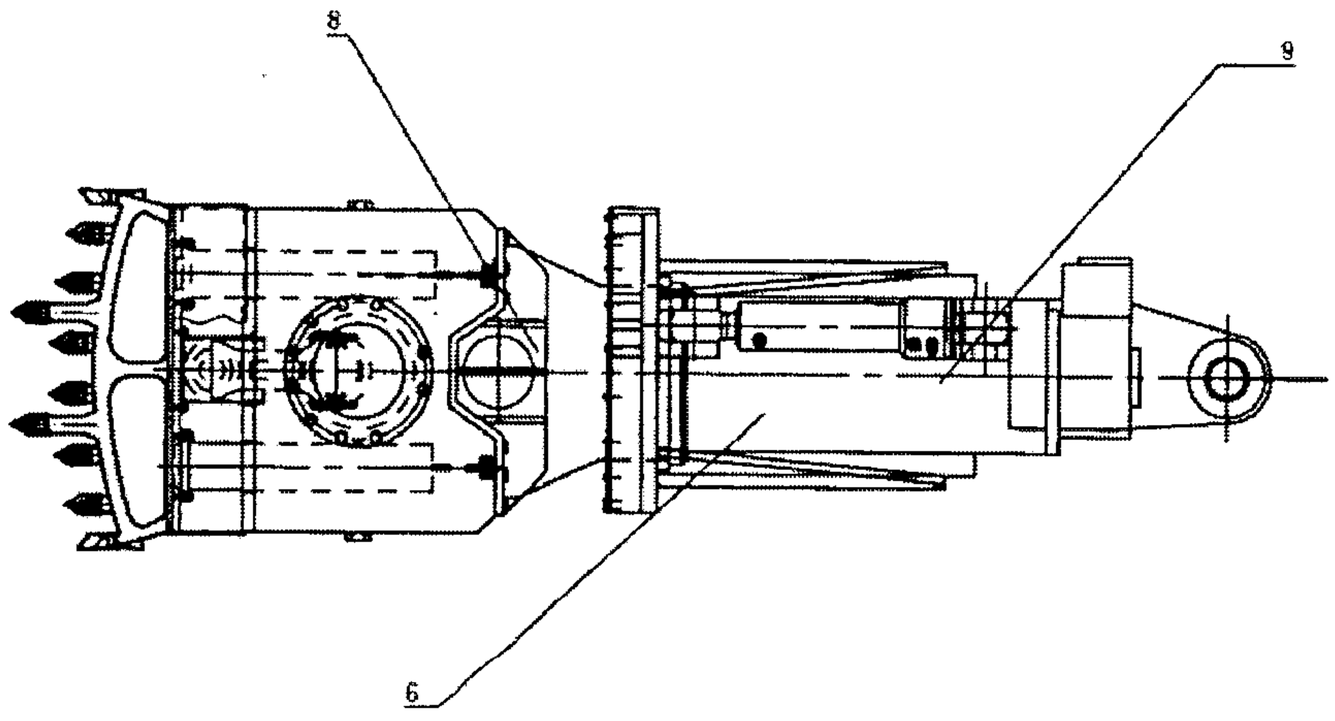


Fig. 2

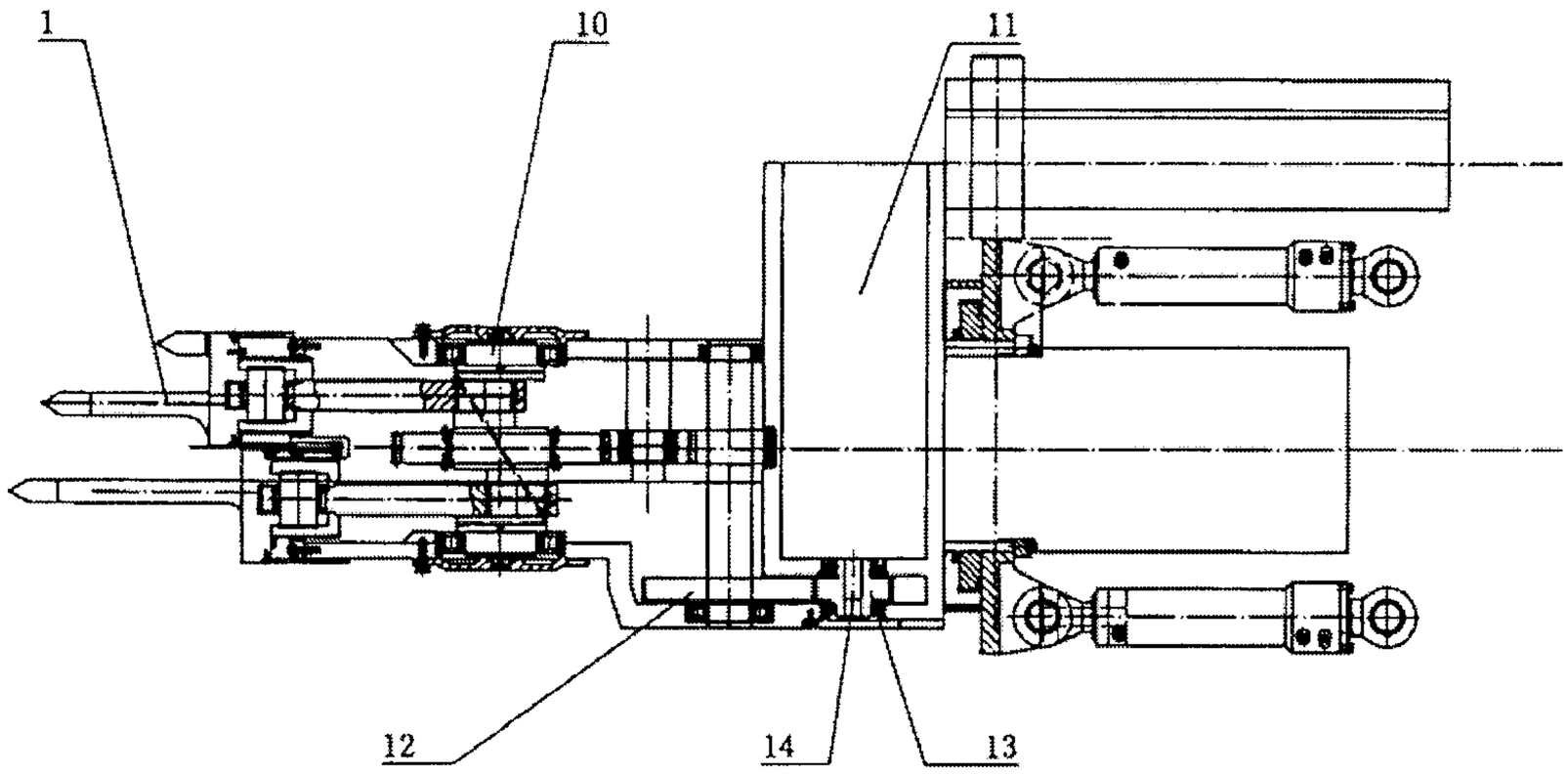


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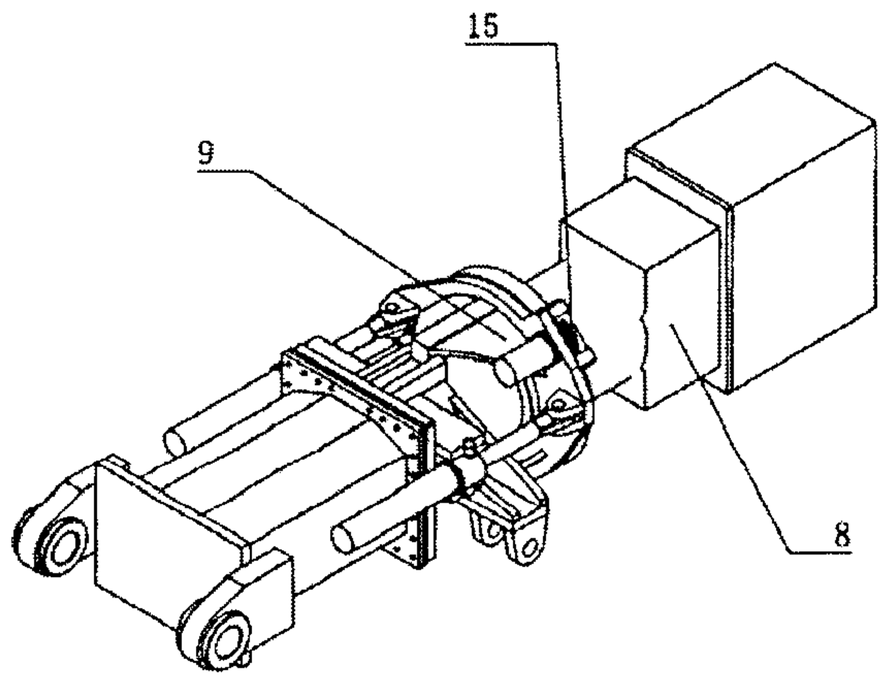


Fig. 4

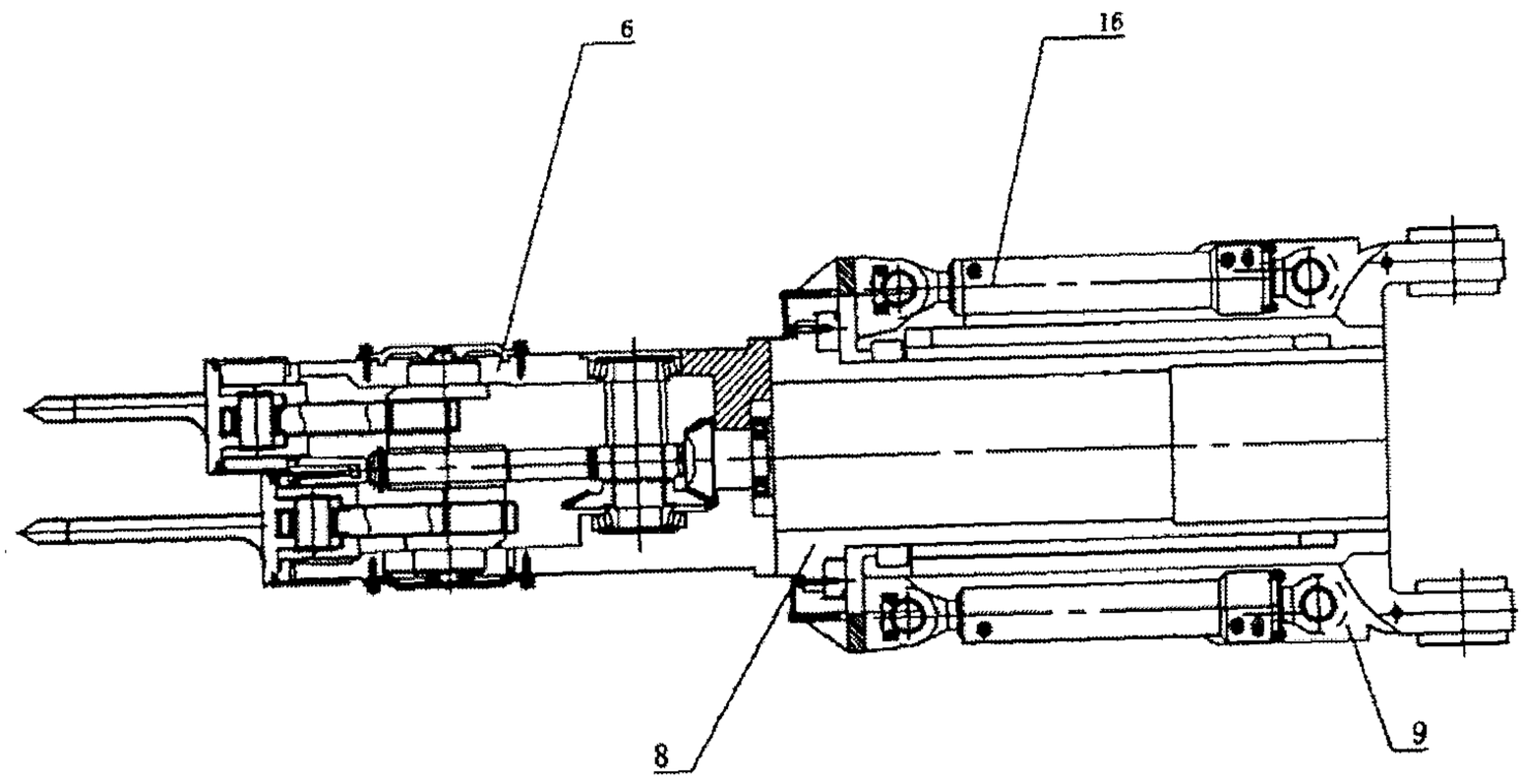


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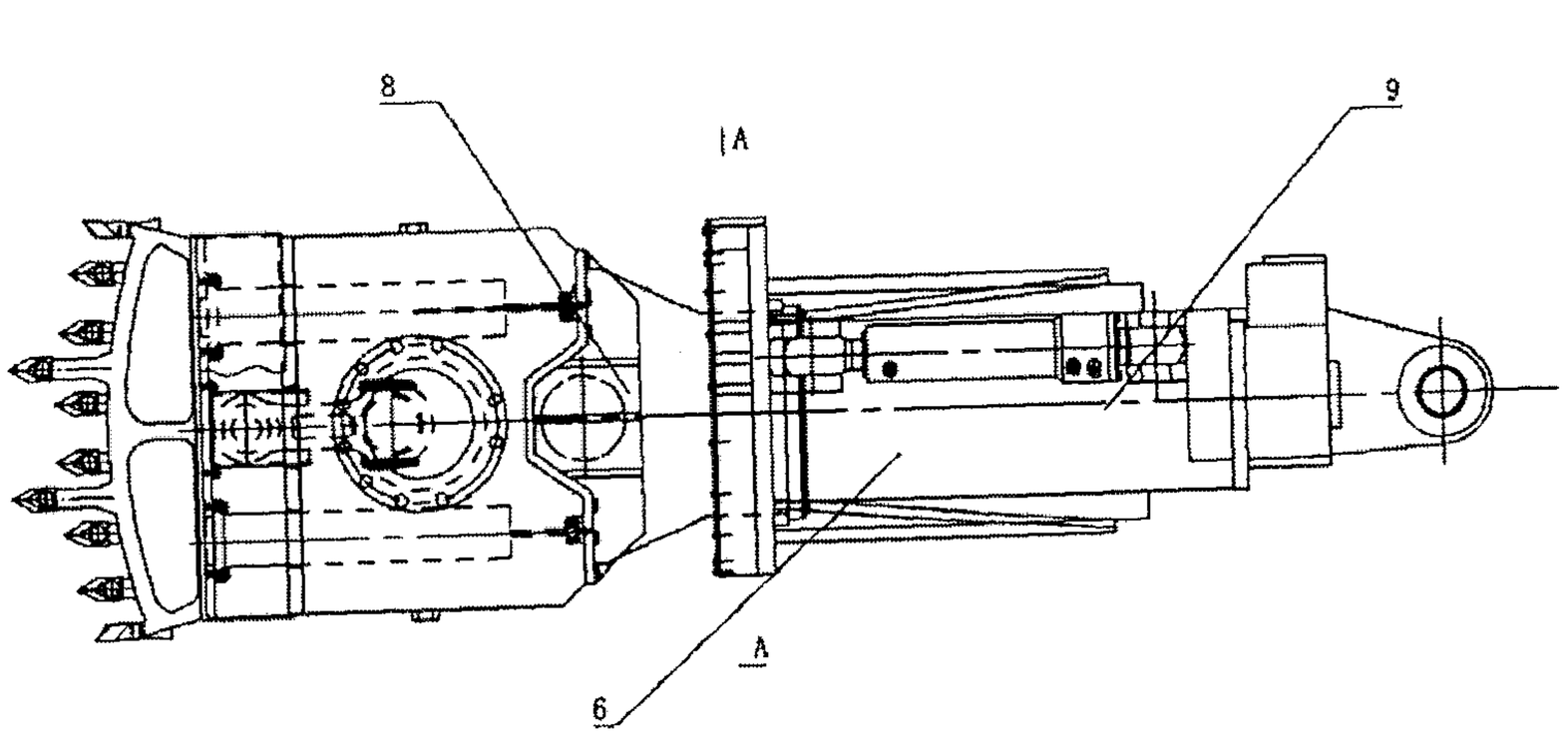


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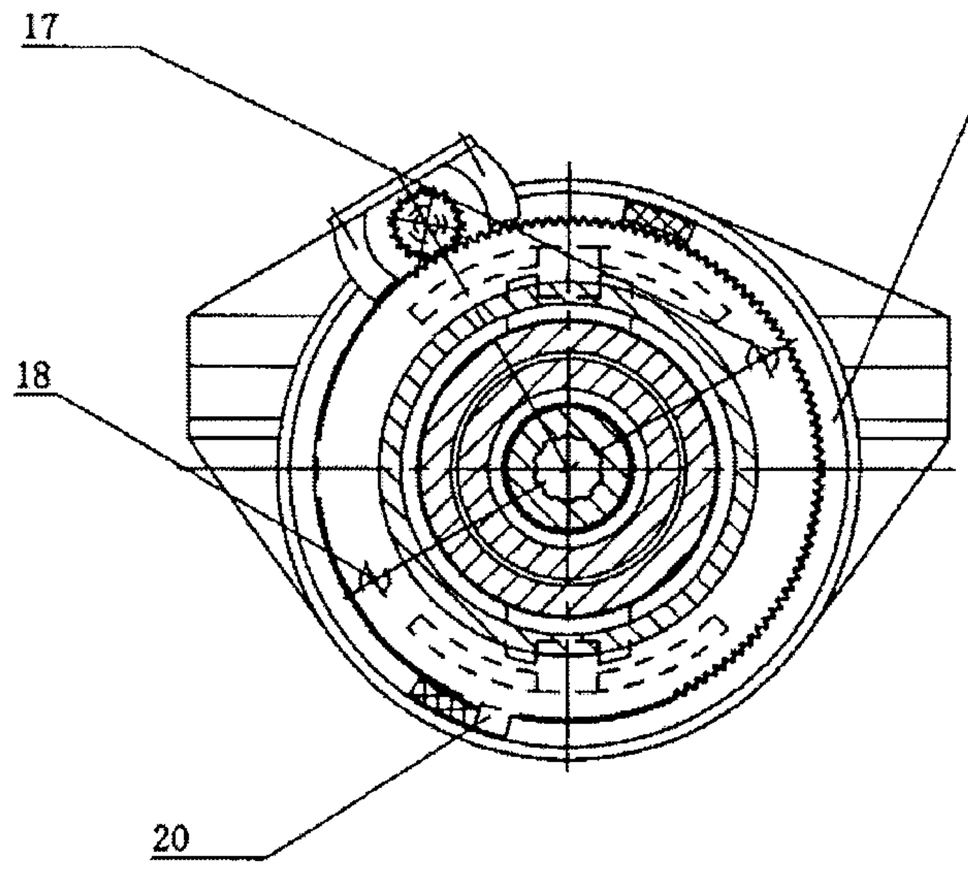


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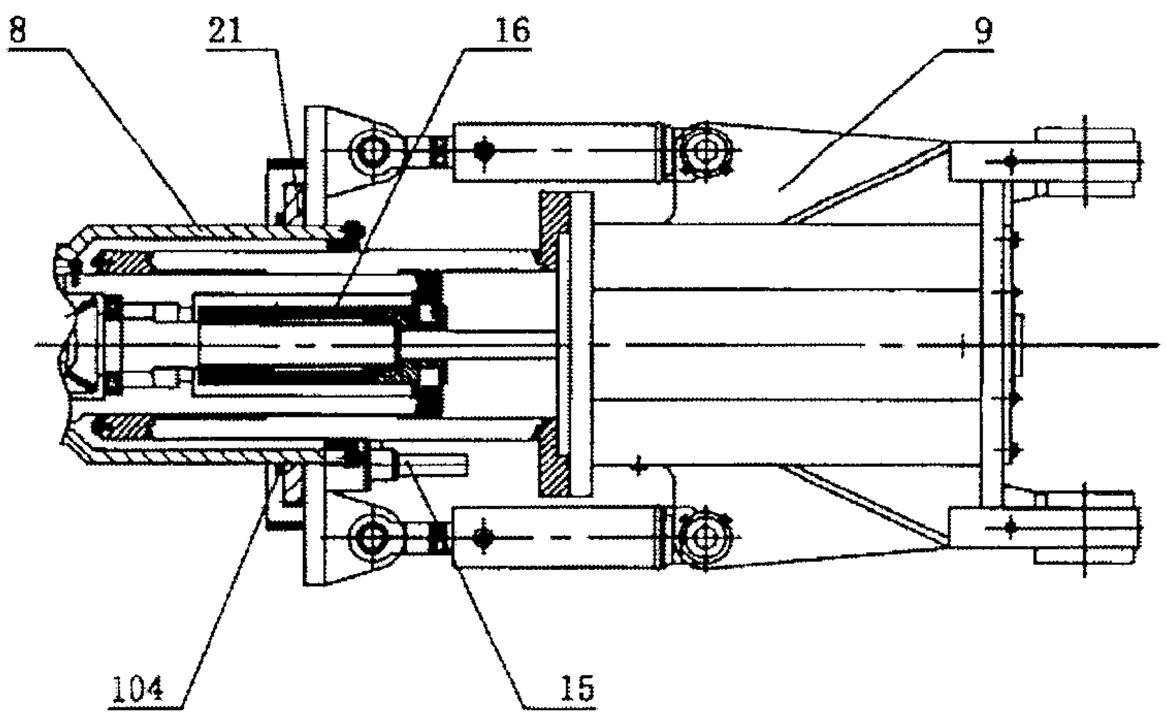


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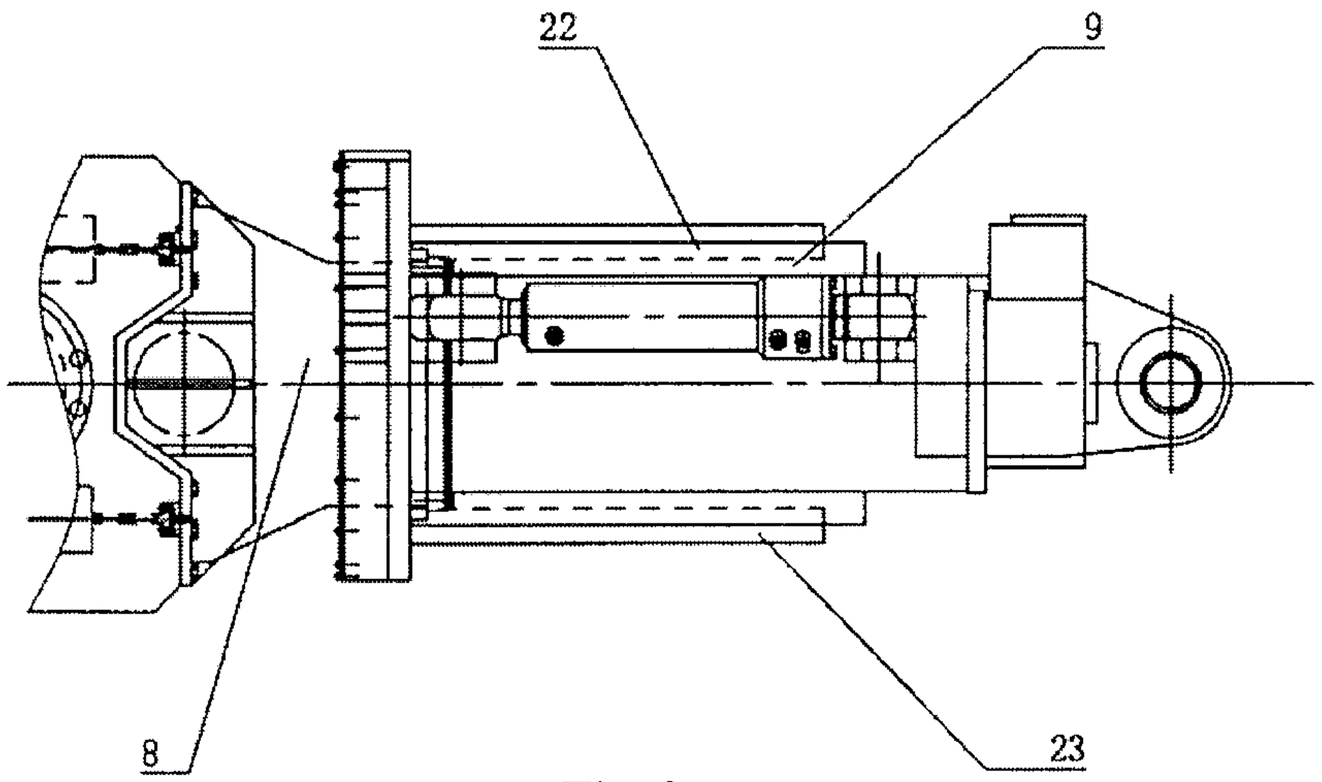


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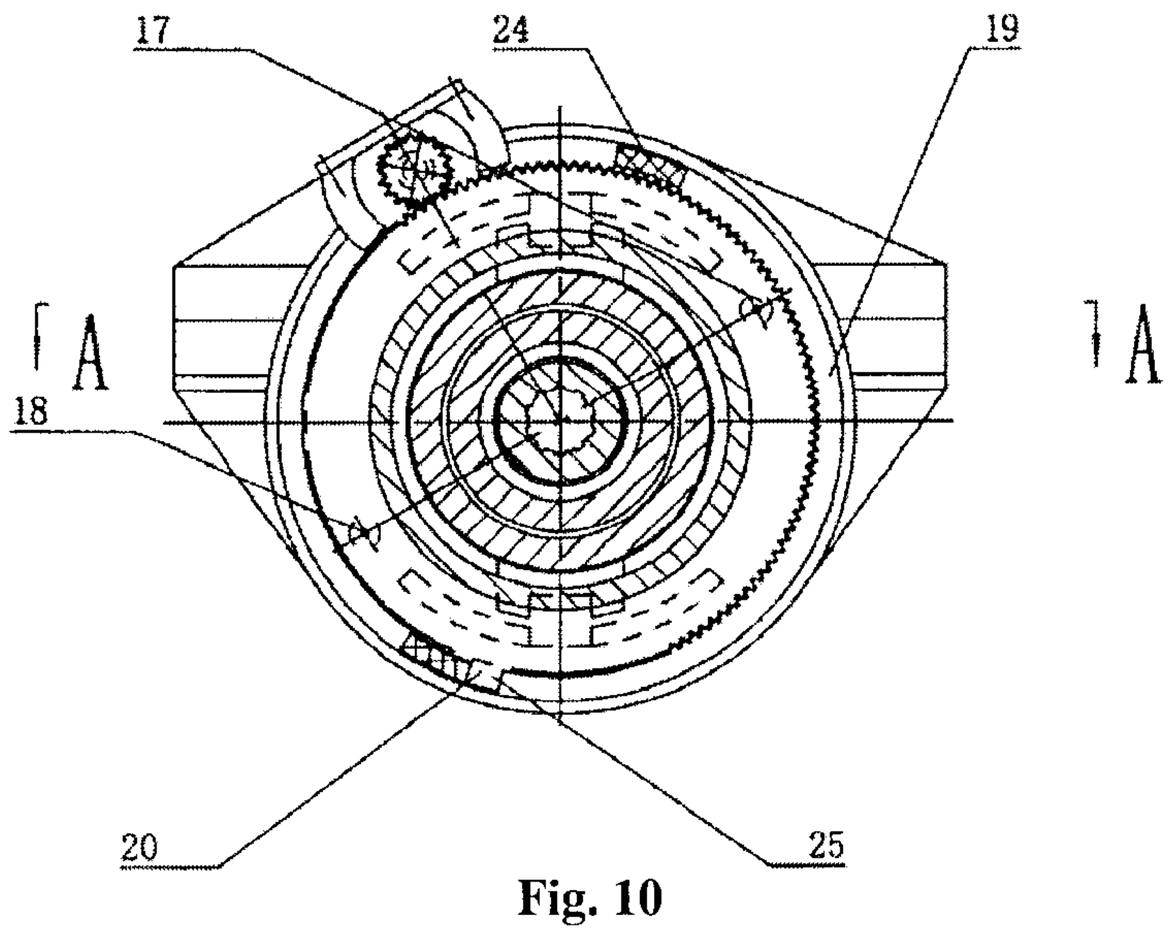


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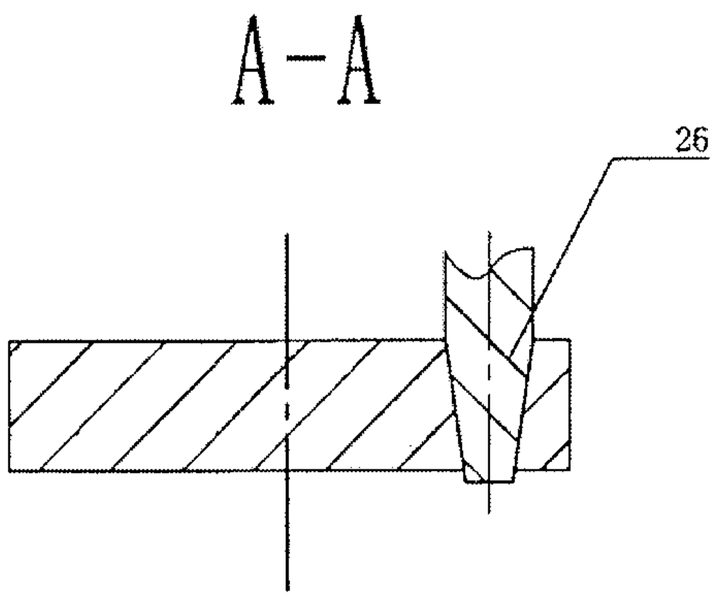


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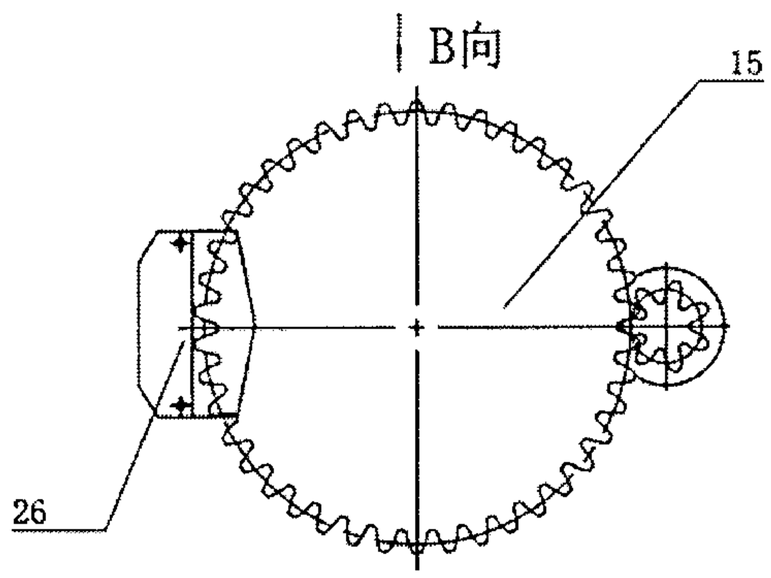


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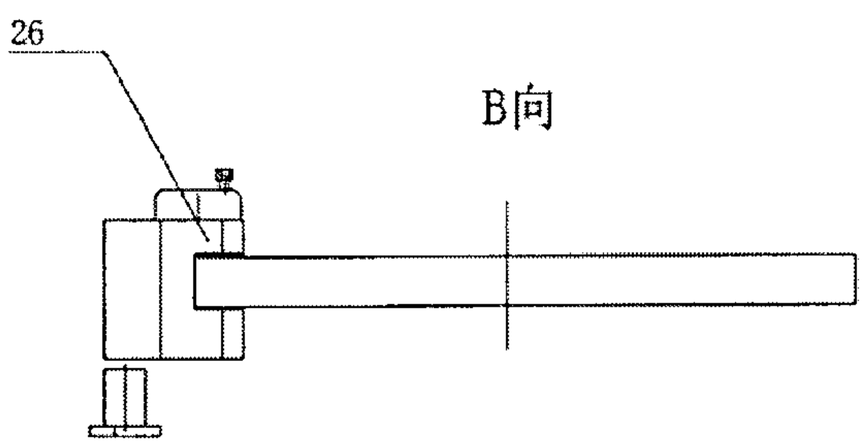


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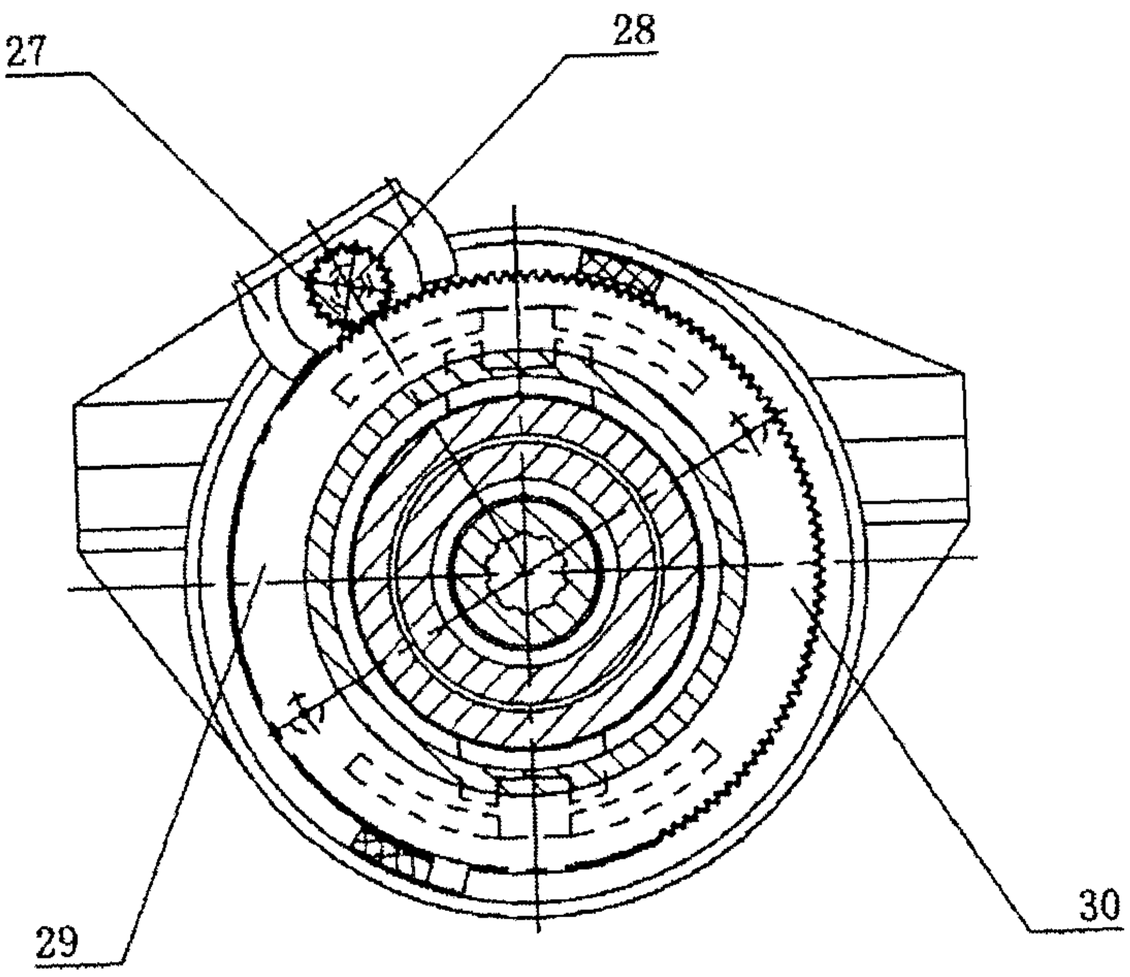


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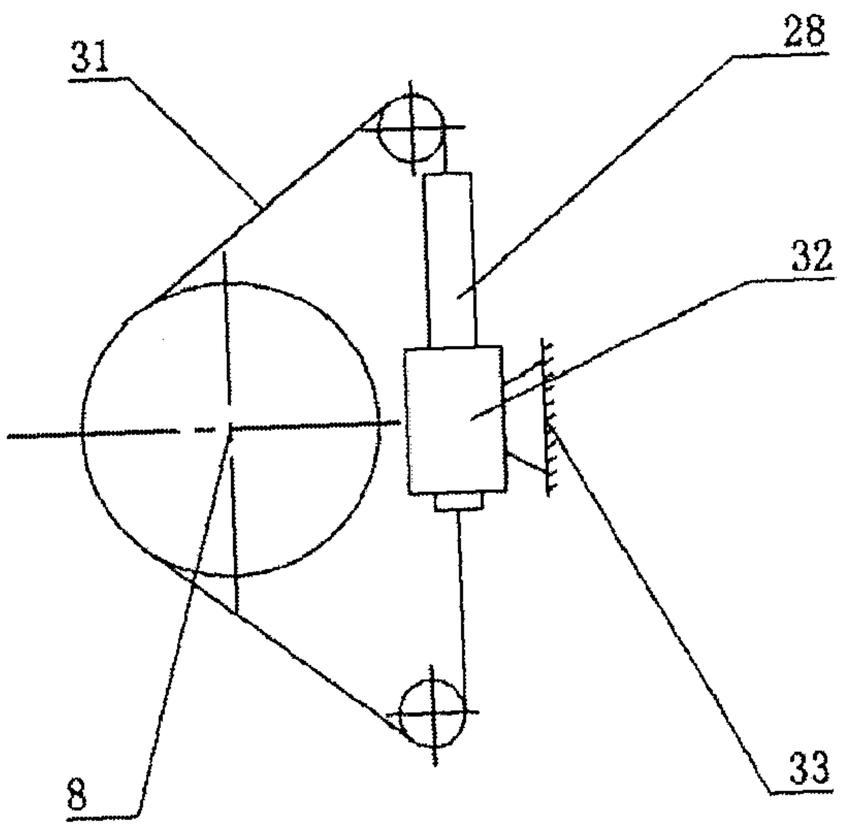


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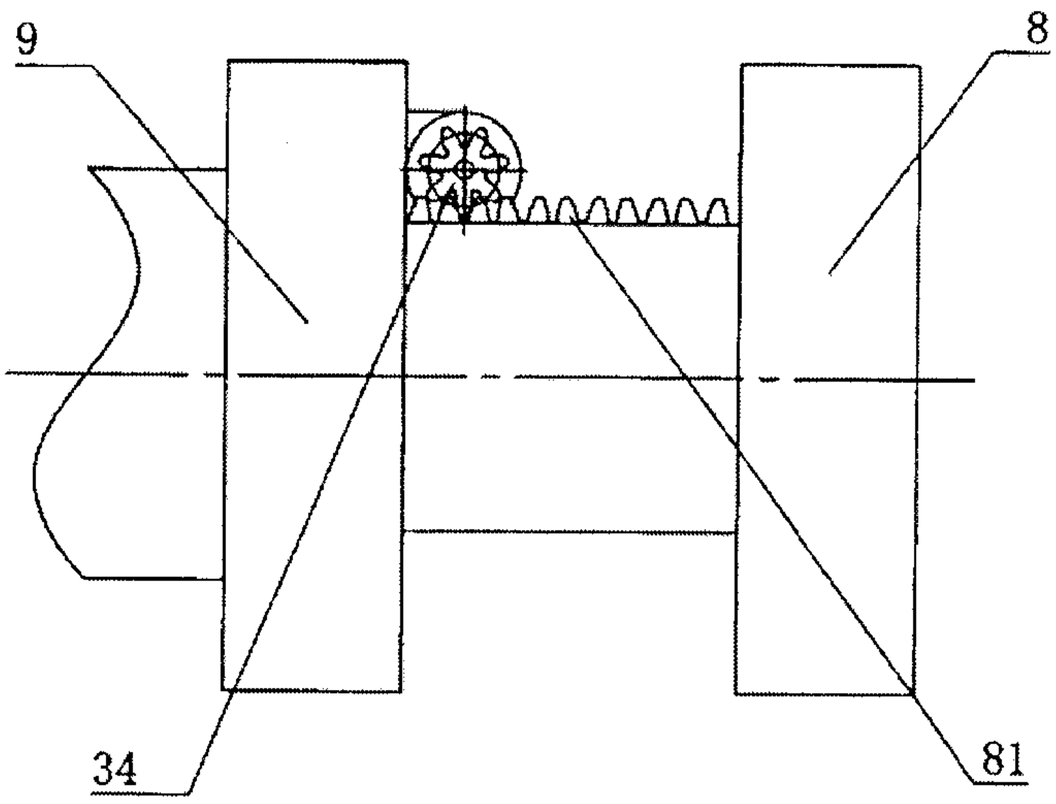


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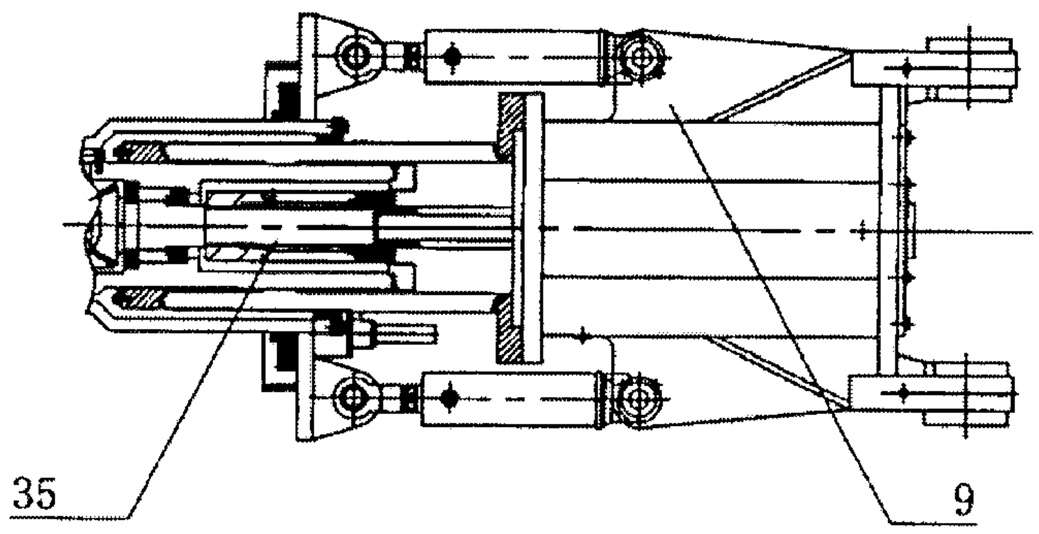


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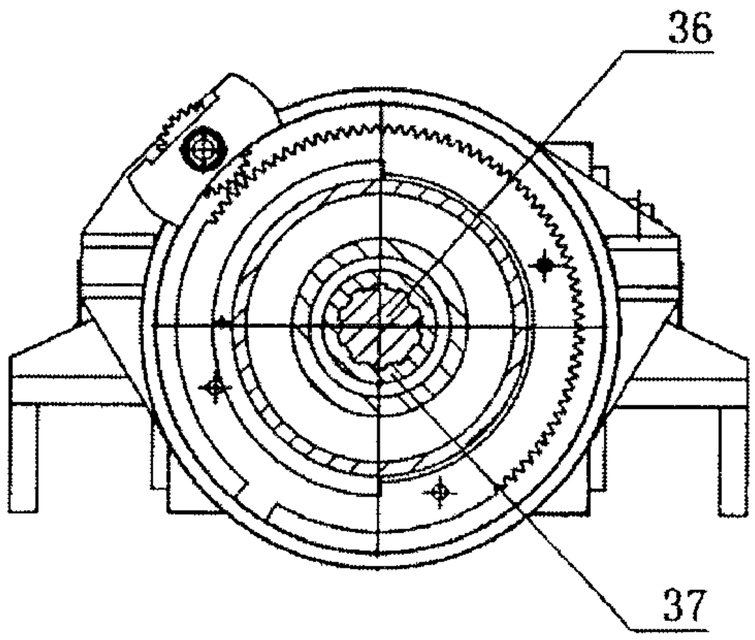


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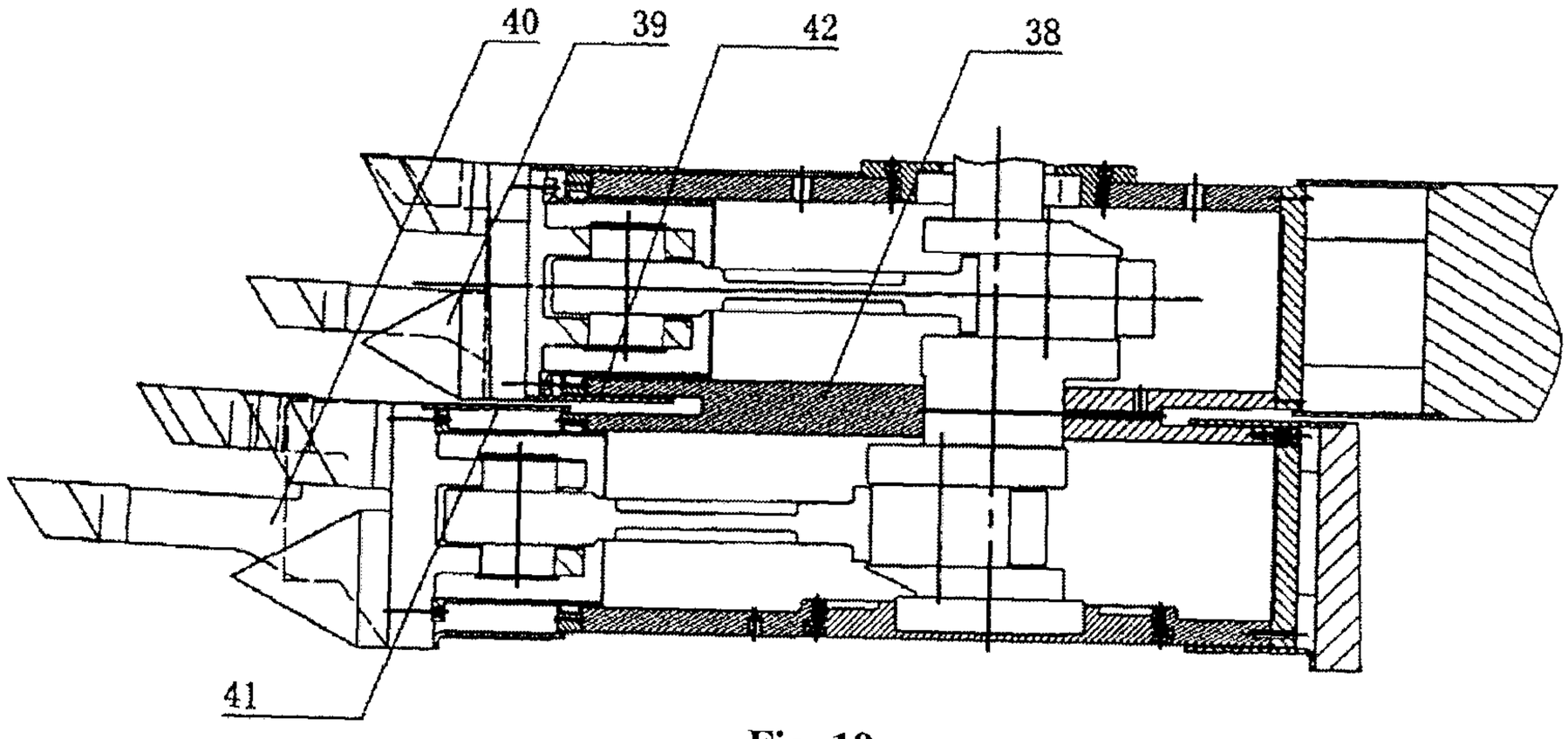


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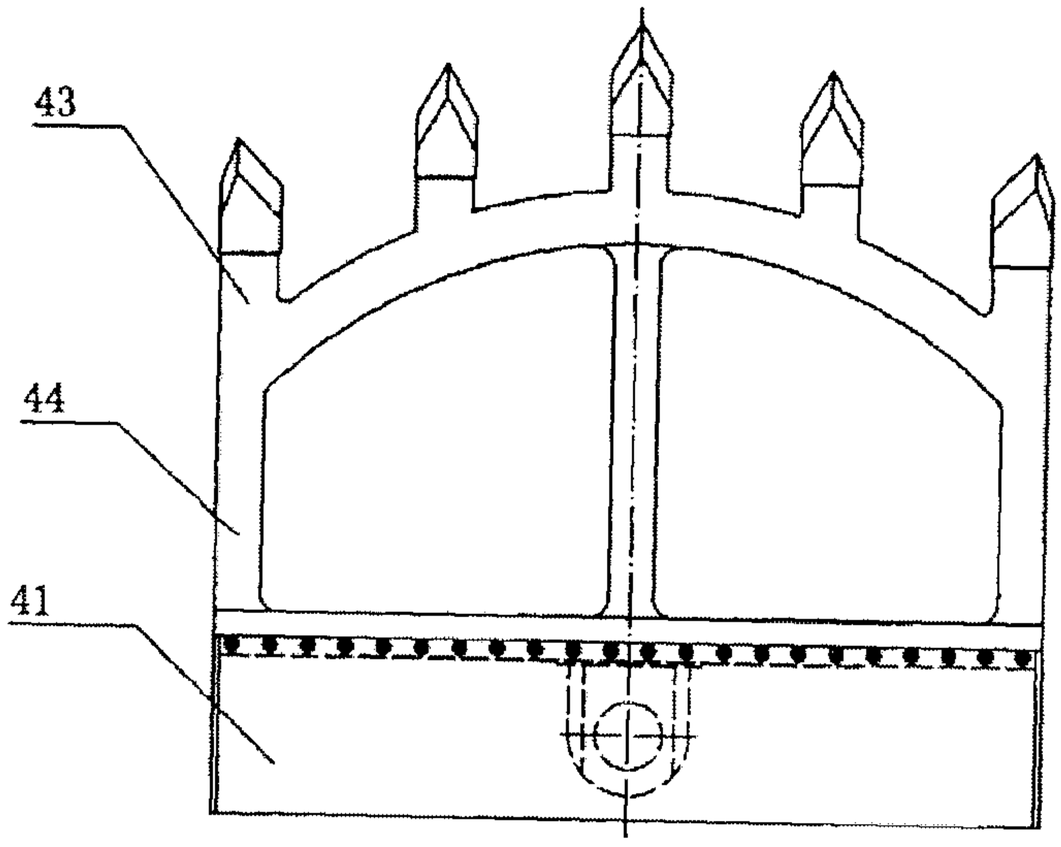


Fig. 20

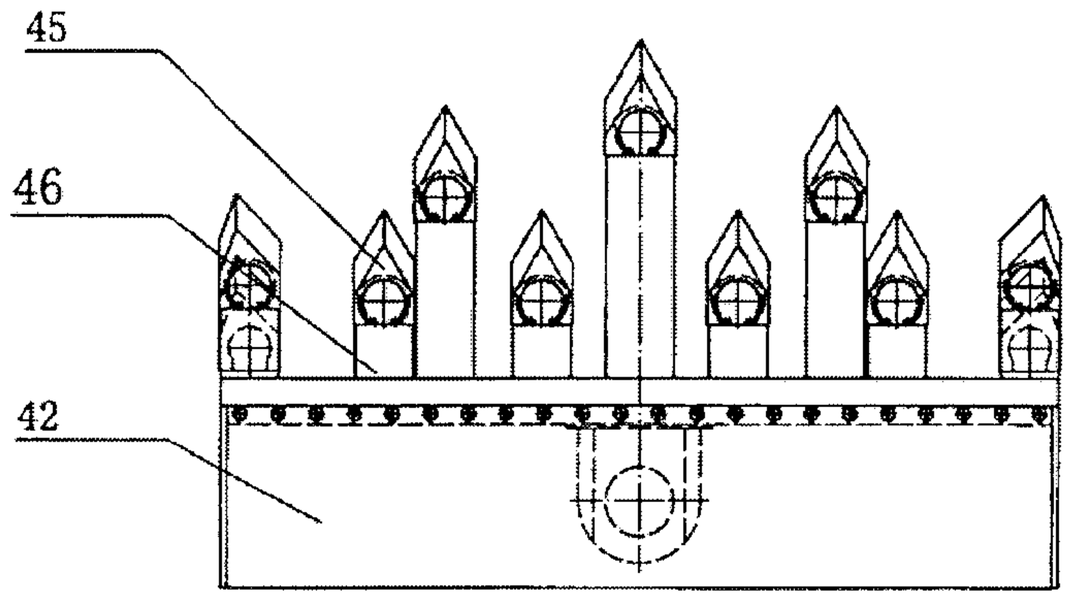


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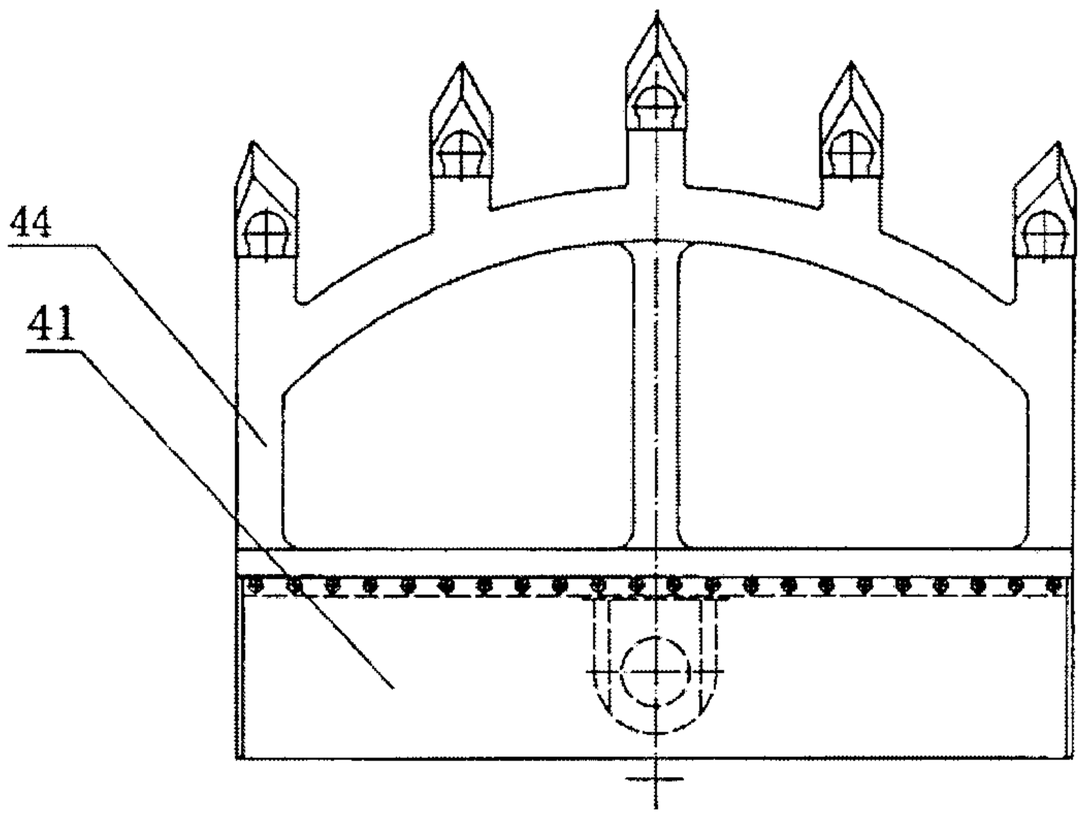


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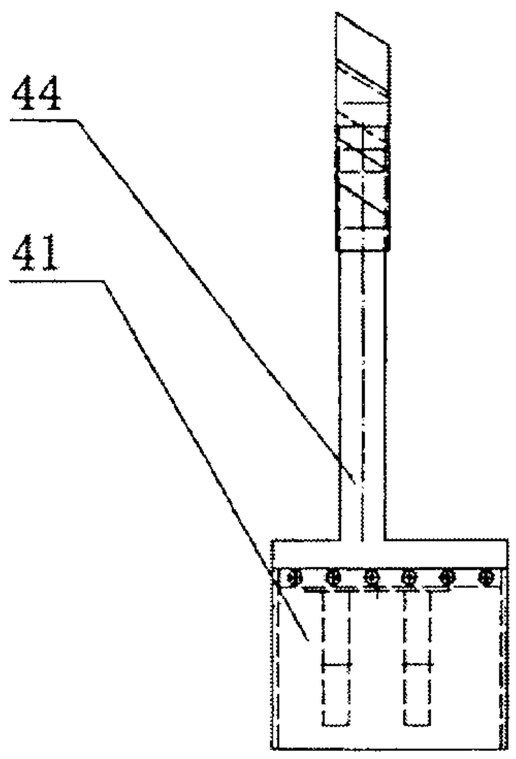


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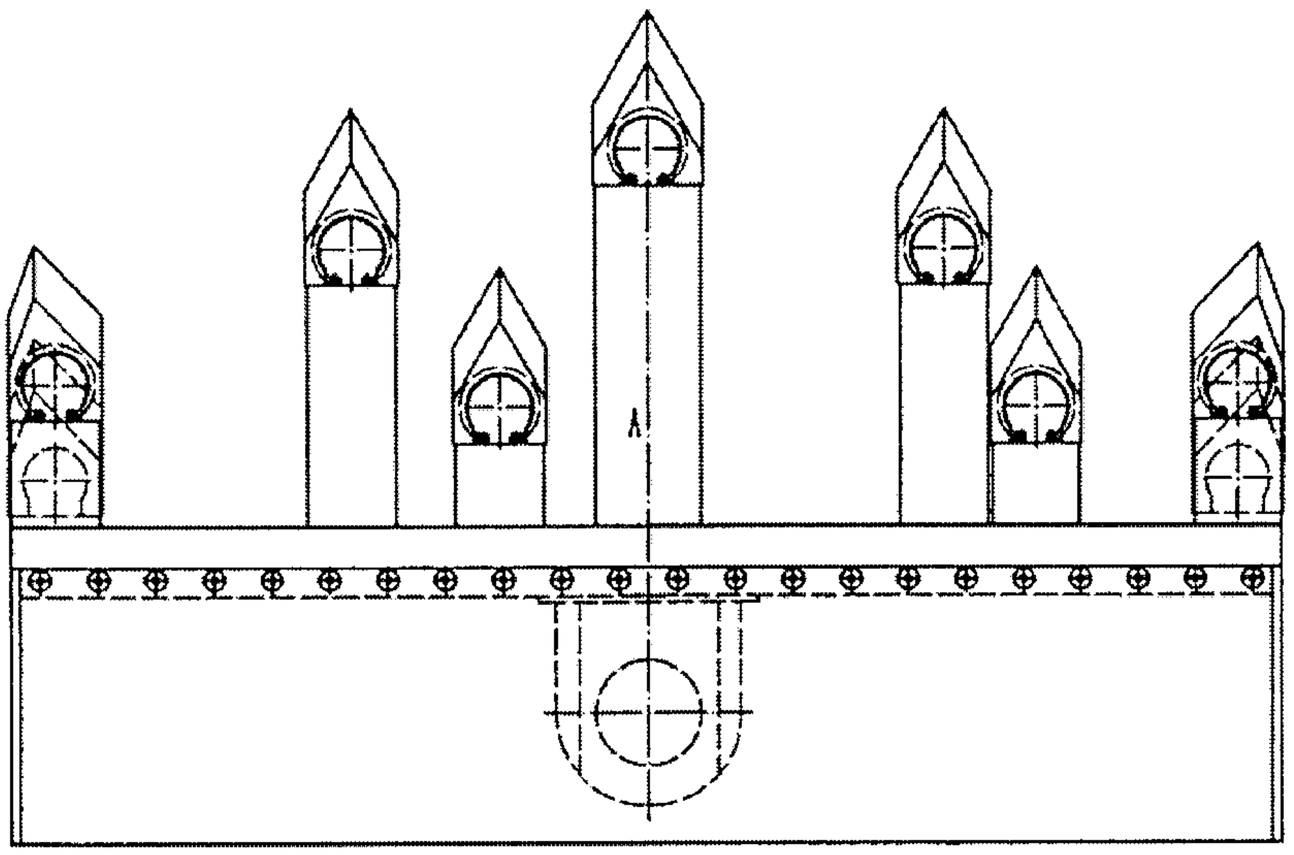


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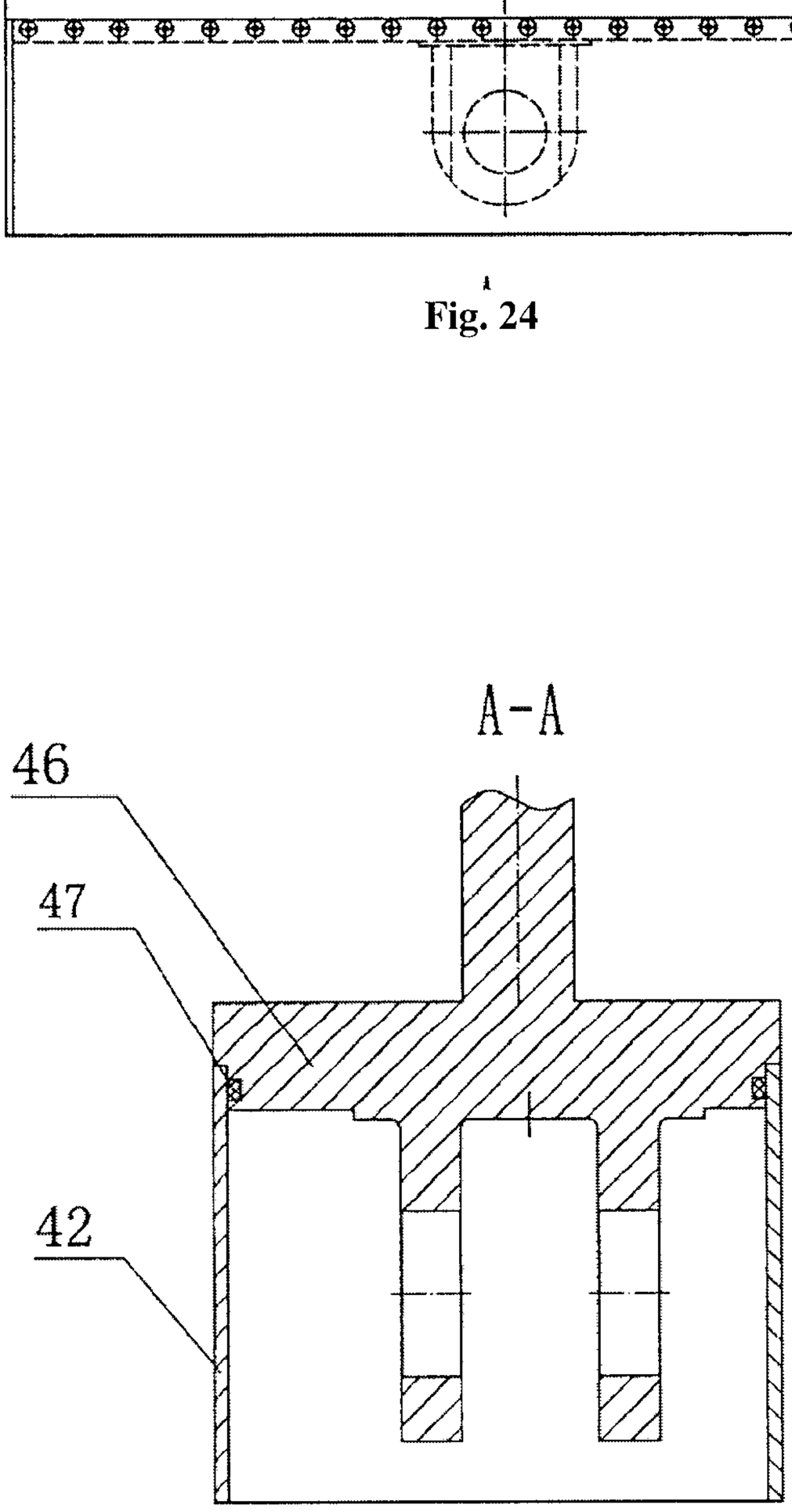


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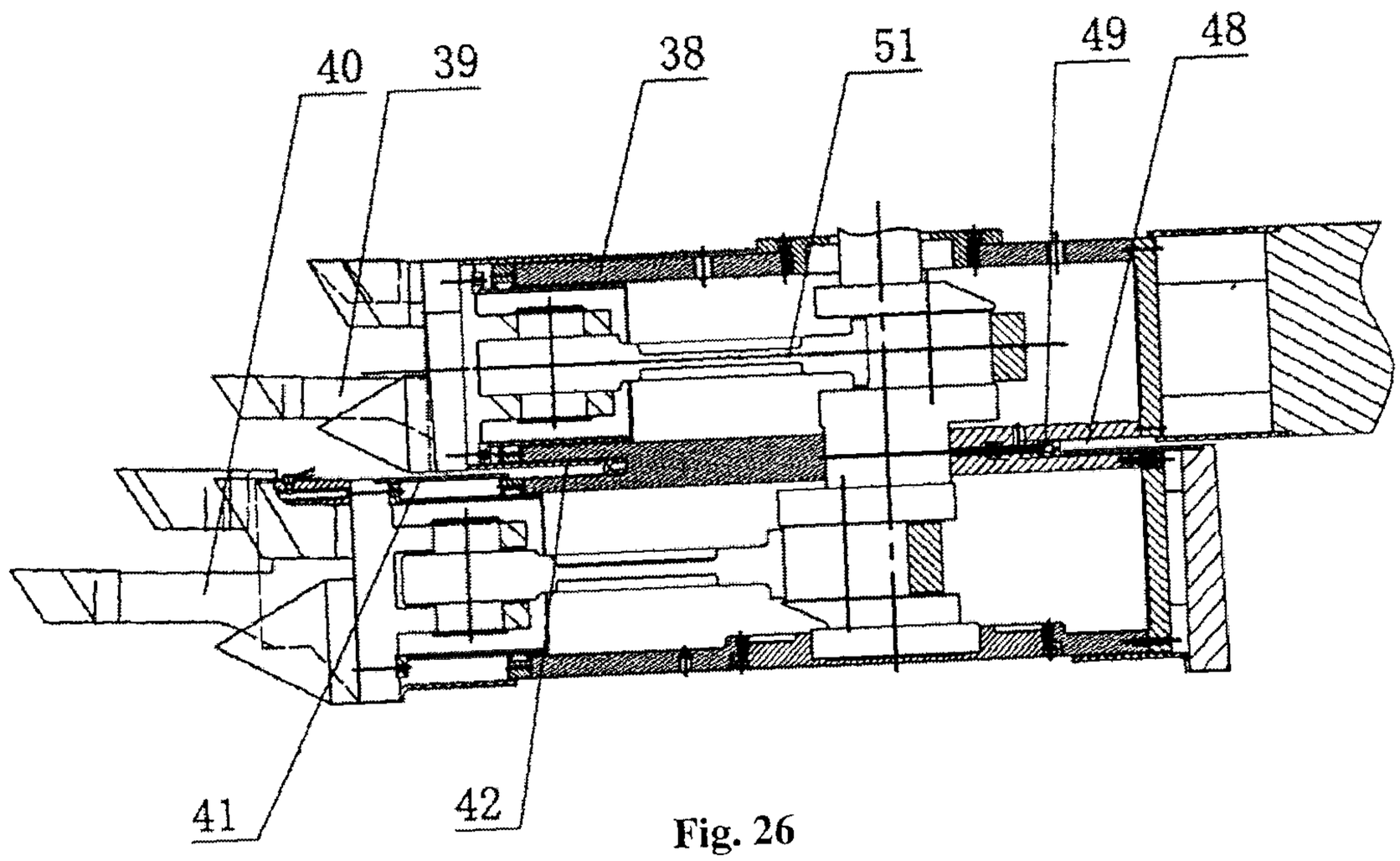


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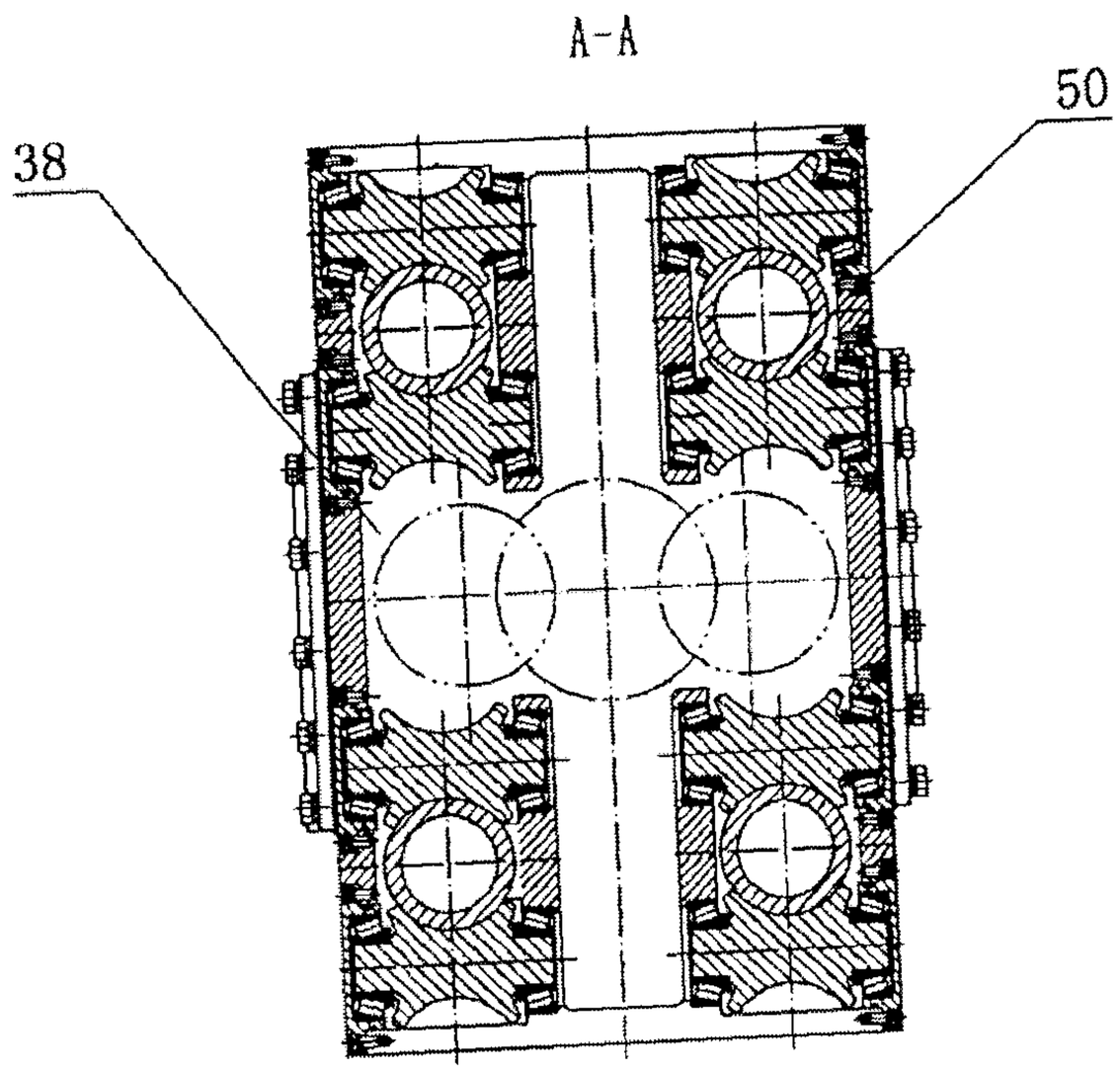


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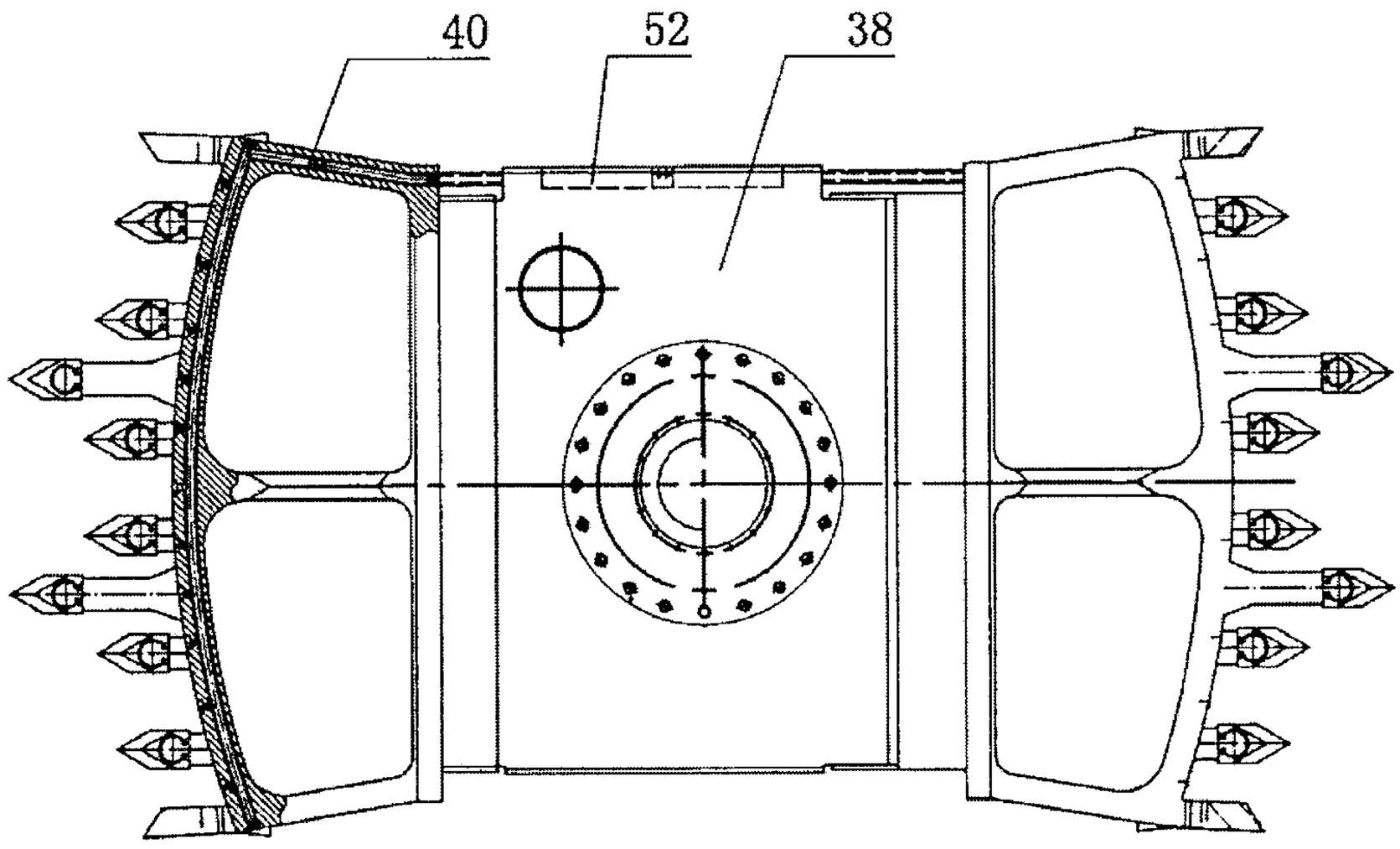


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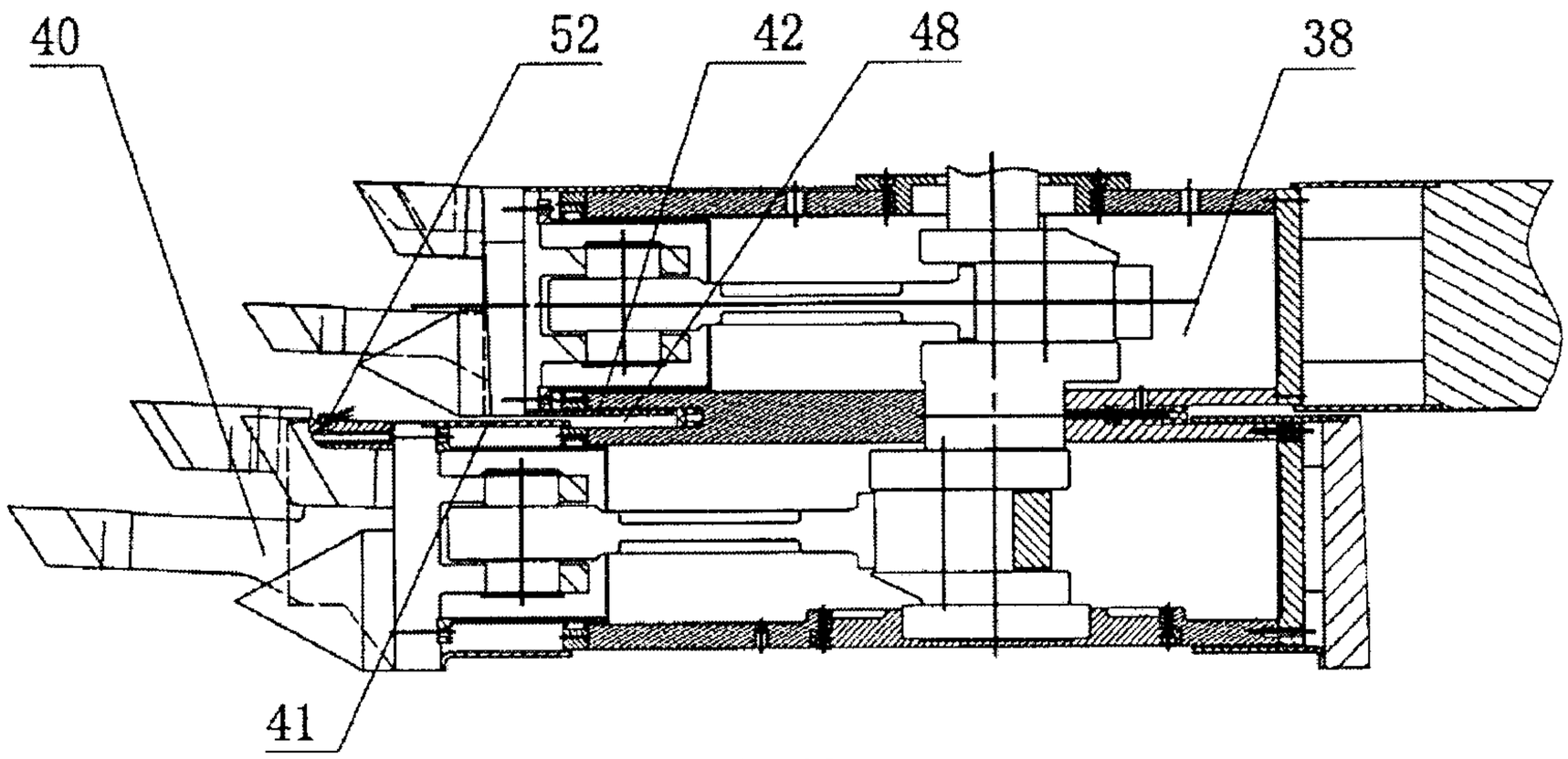


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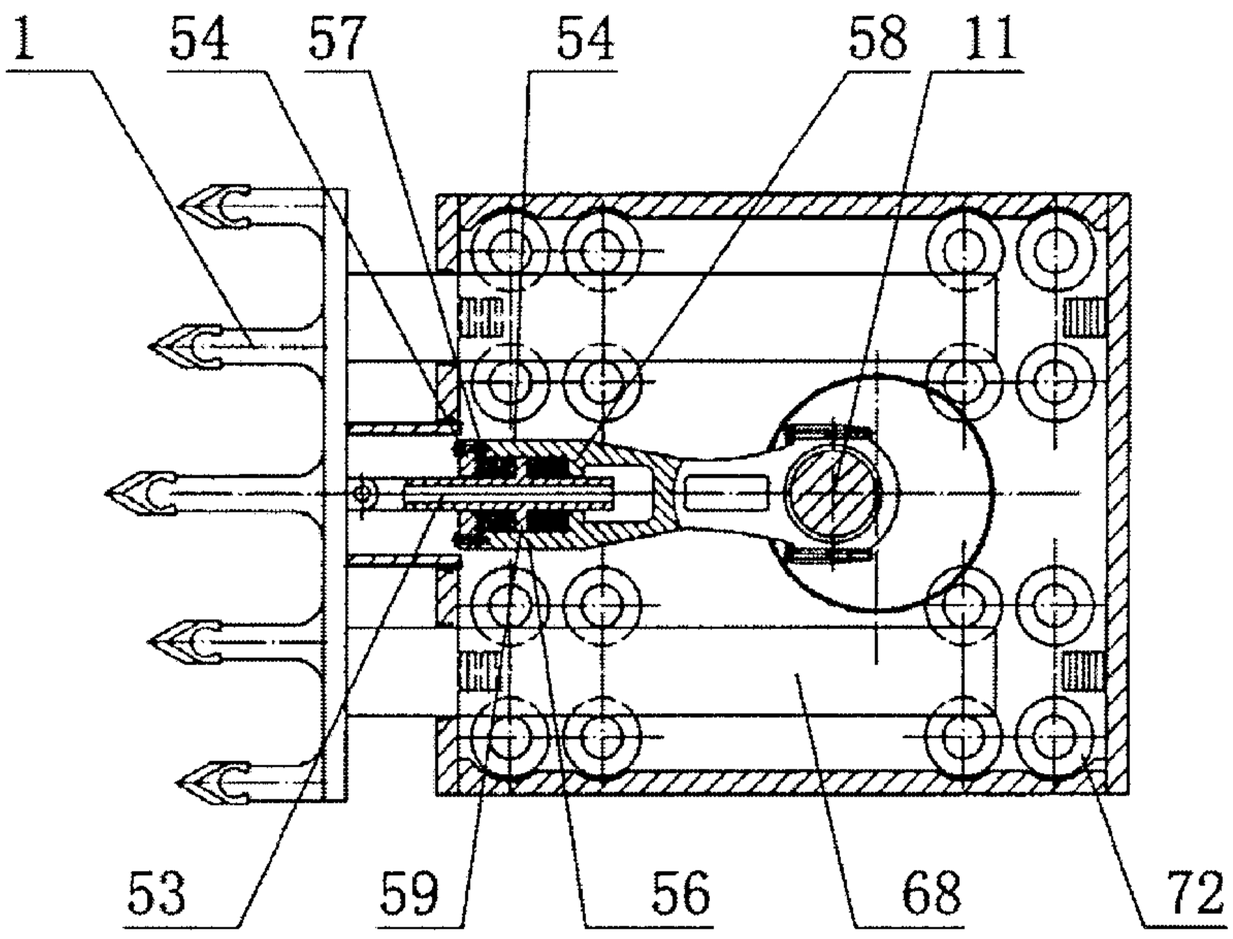


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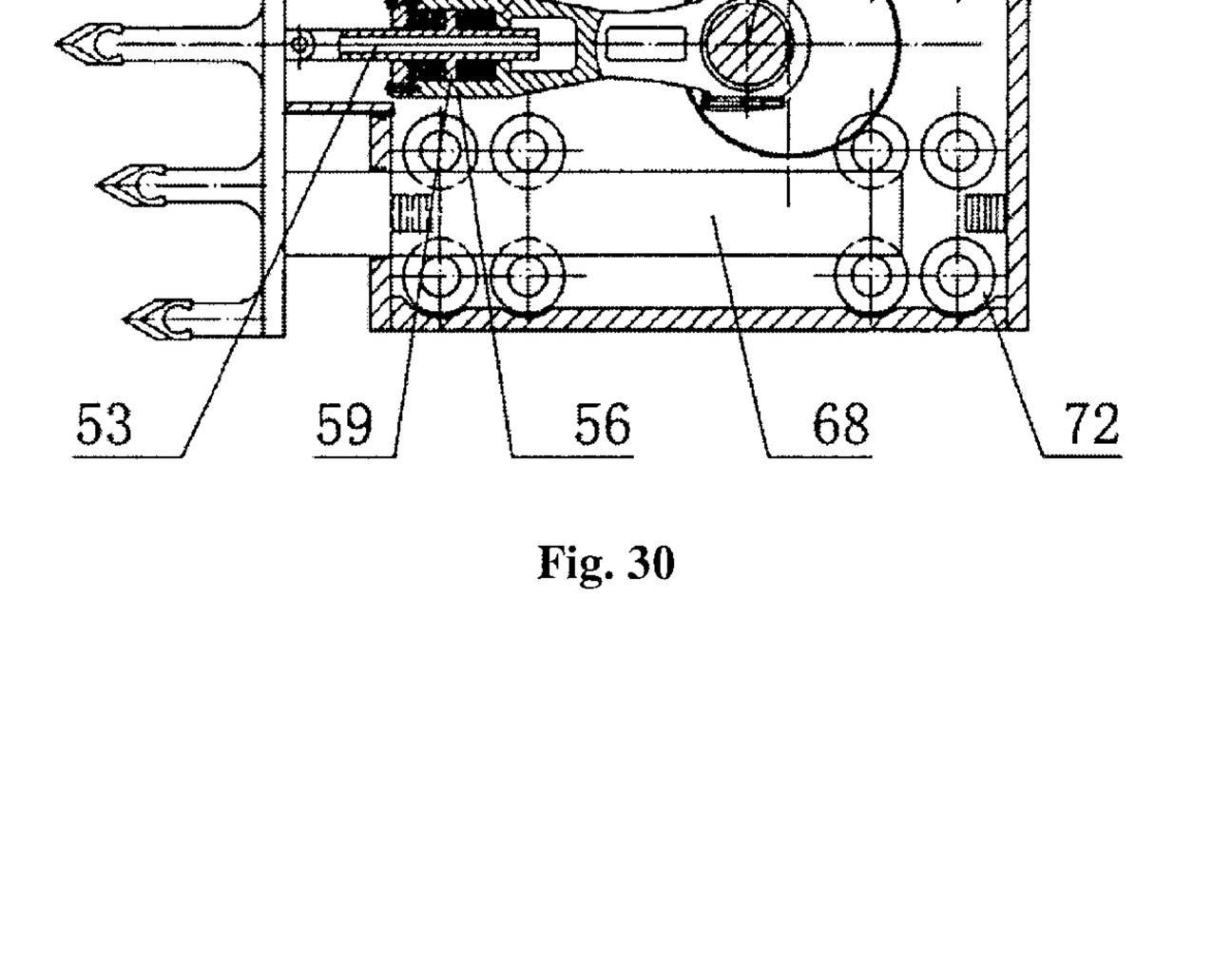


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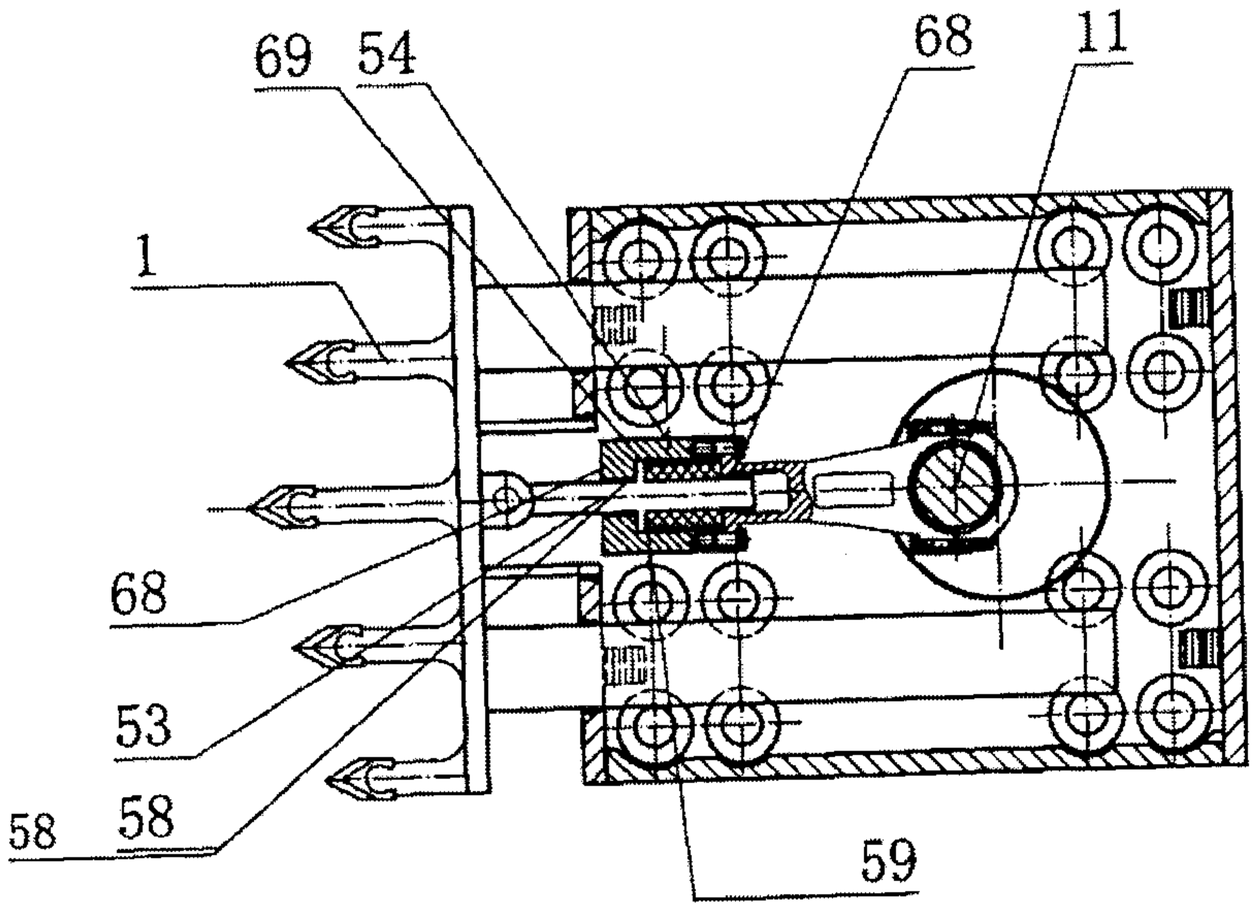


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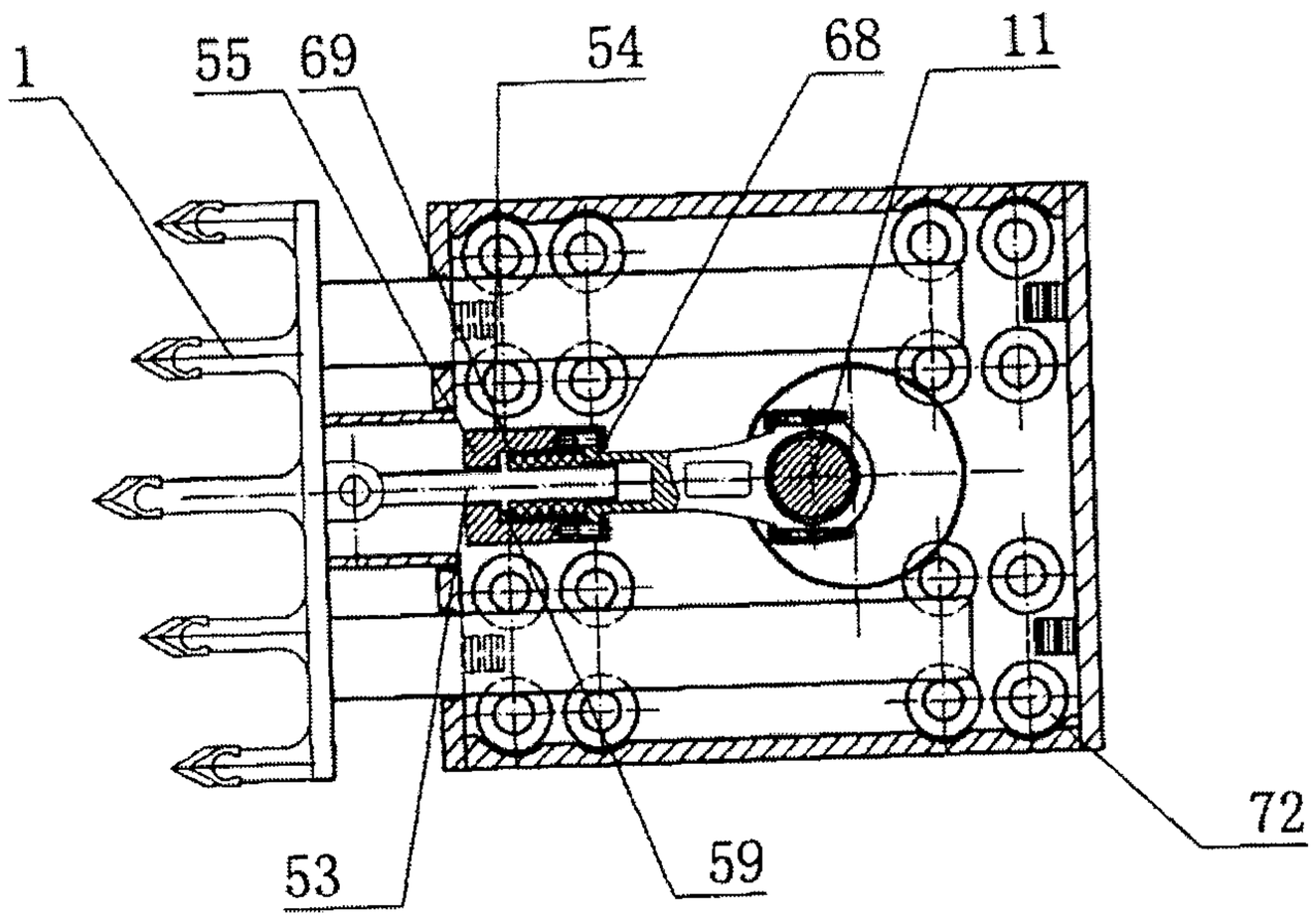


Fig. 33

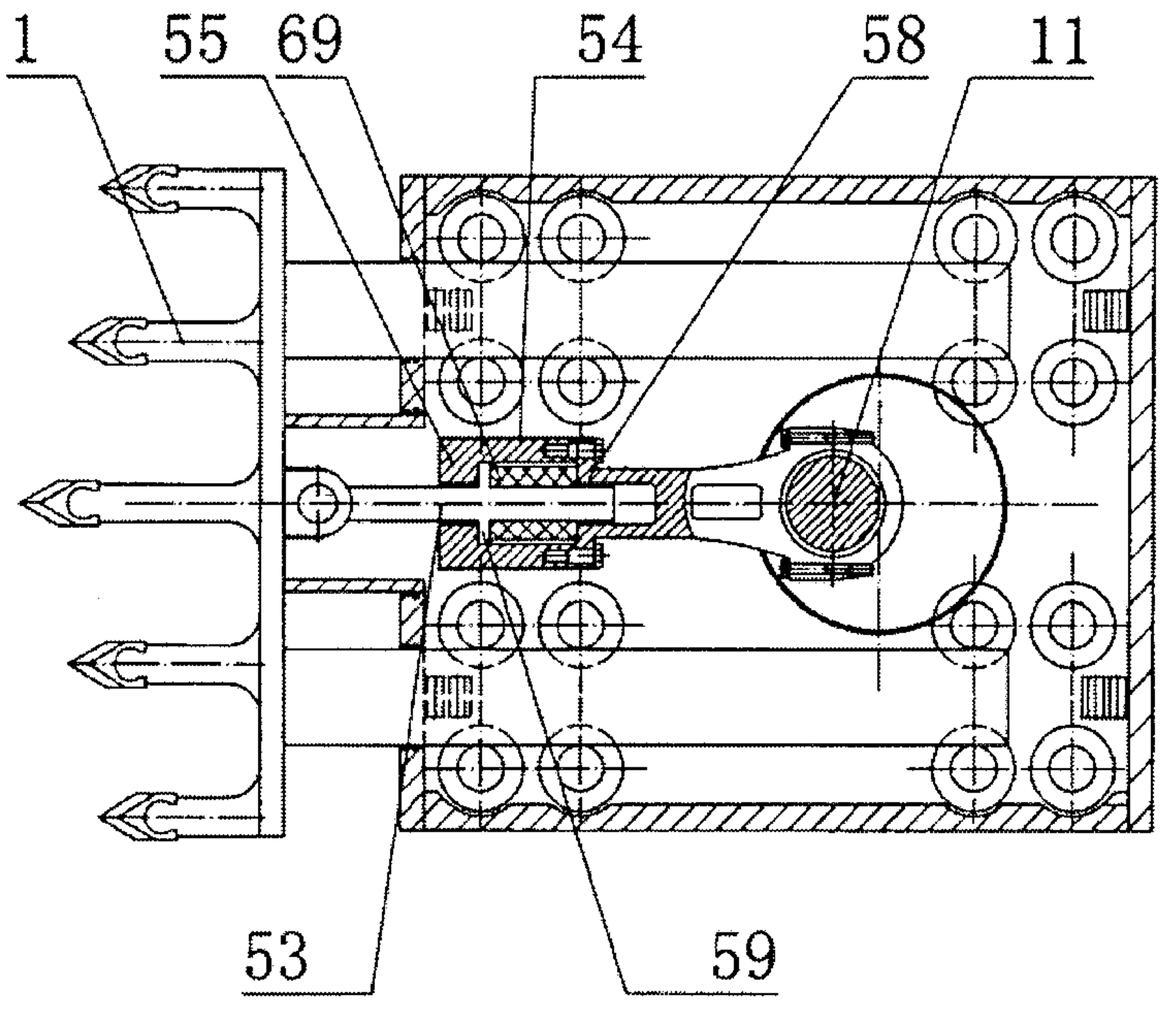


Fig. 34

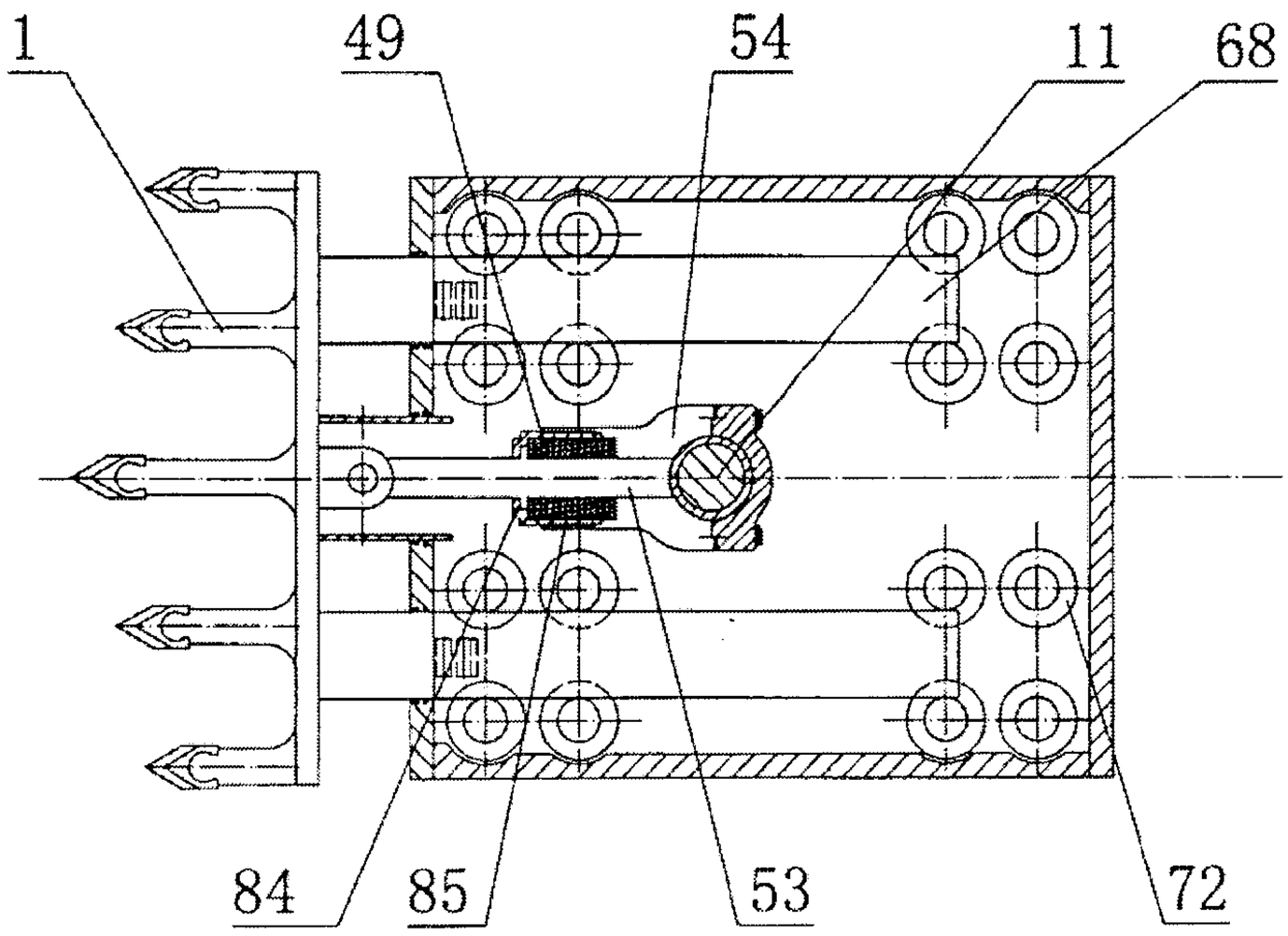


Fig. 35

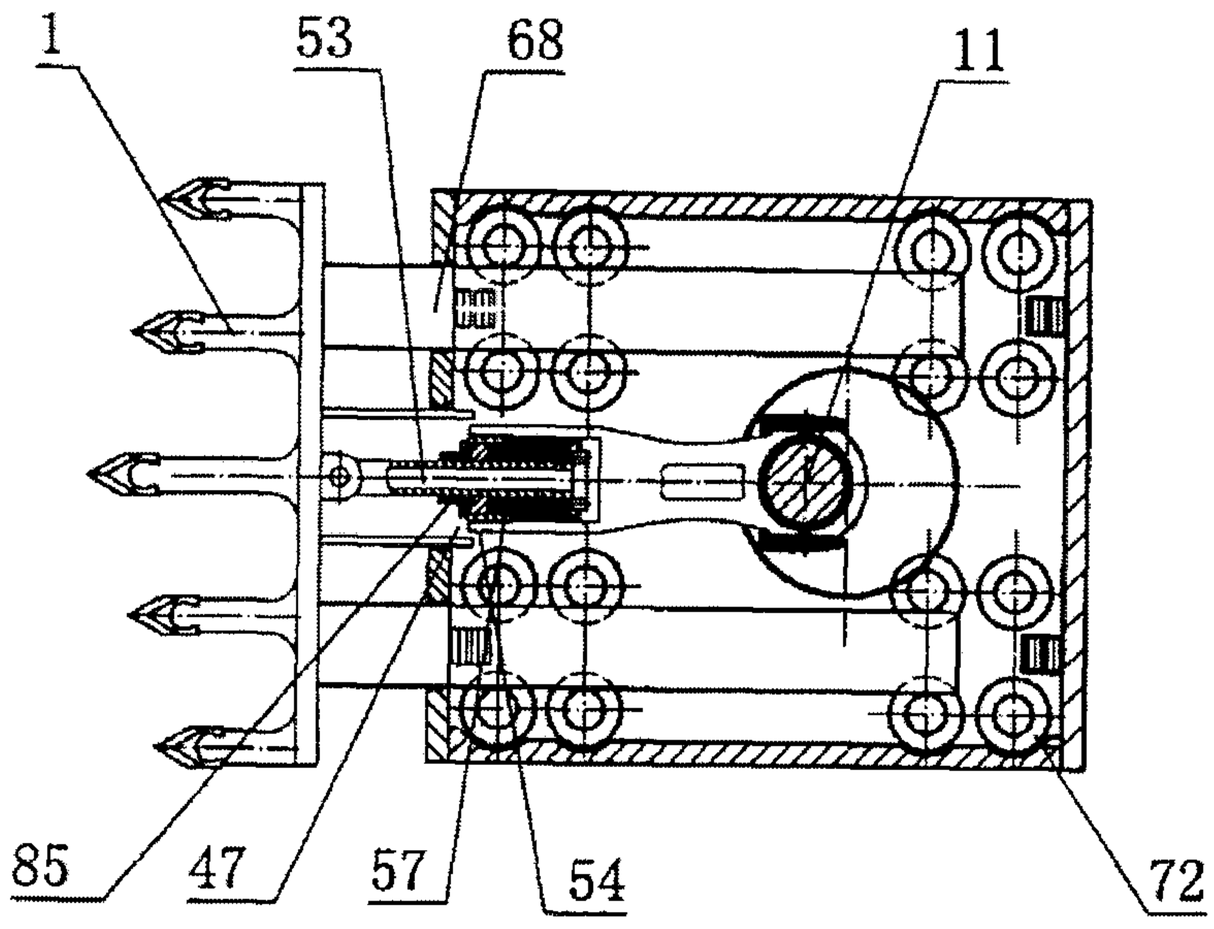


Fig. 36

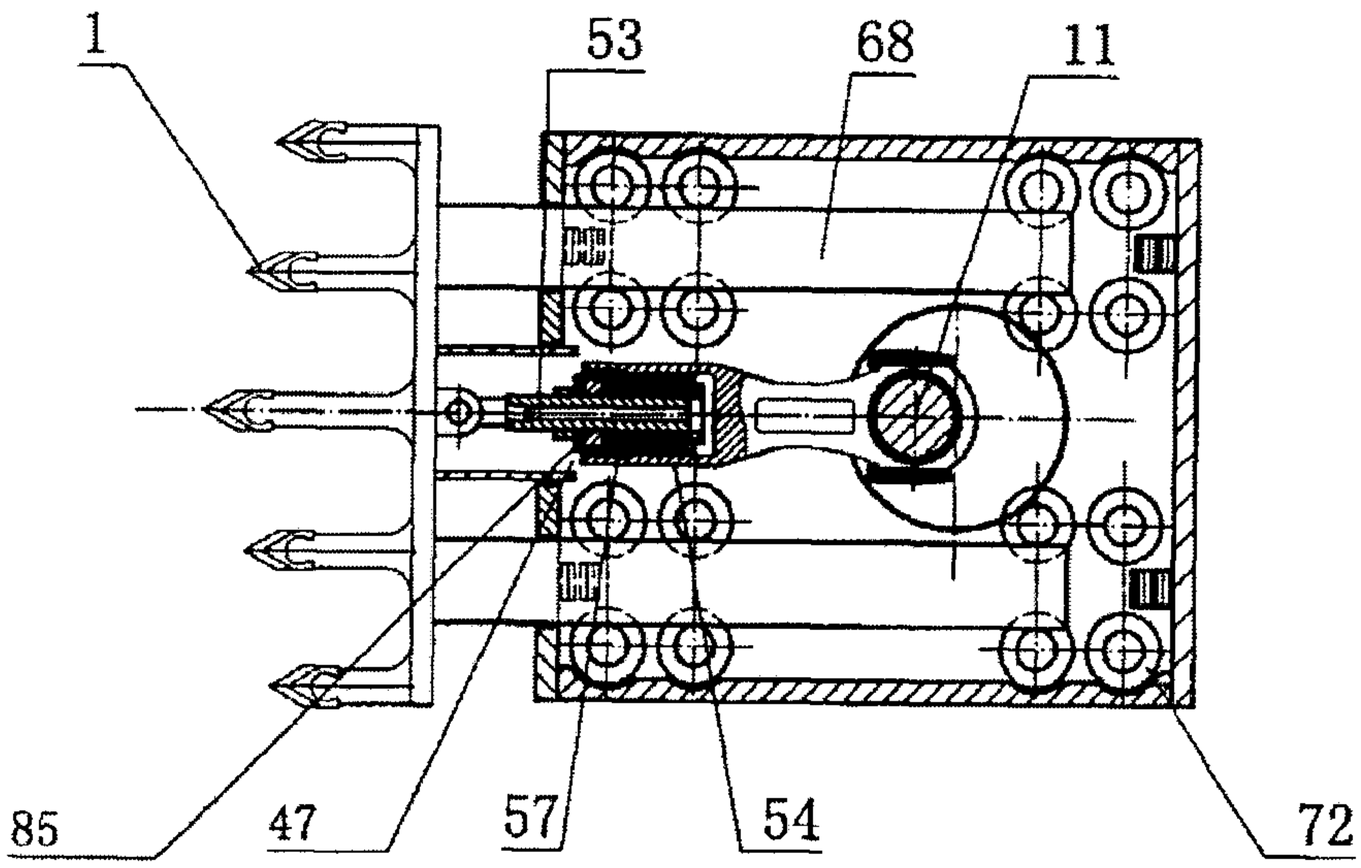


Fig. 37

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PCT/CN2013/000551

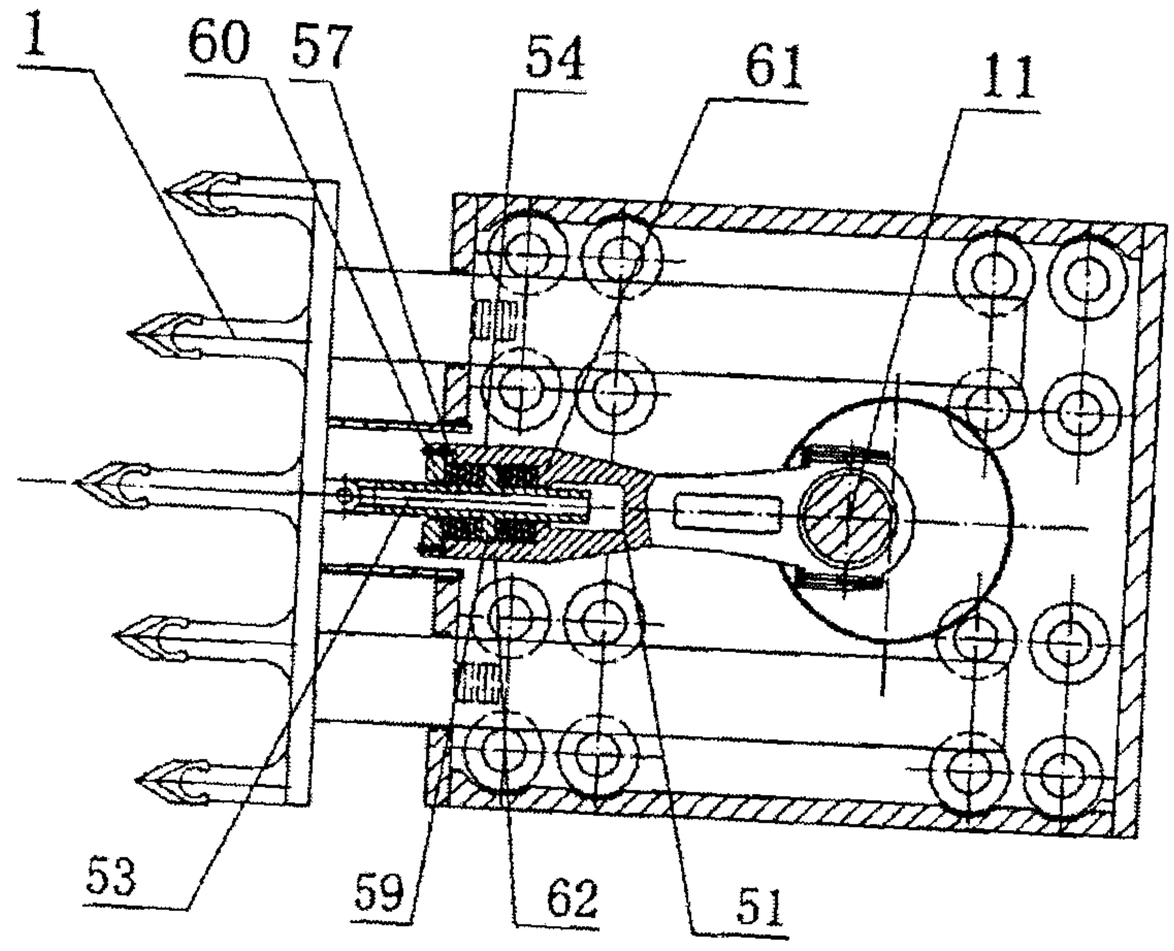


Fig. 38

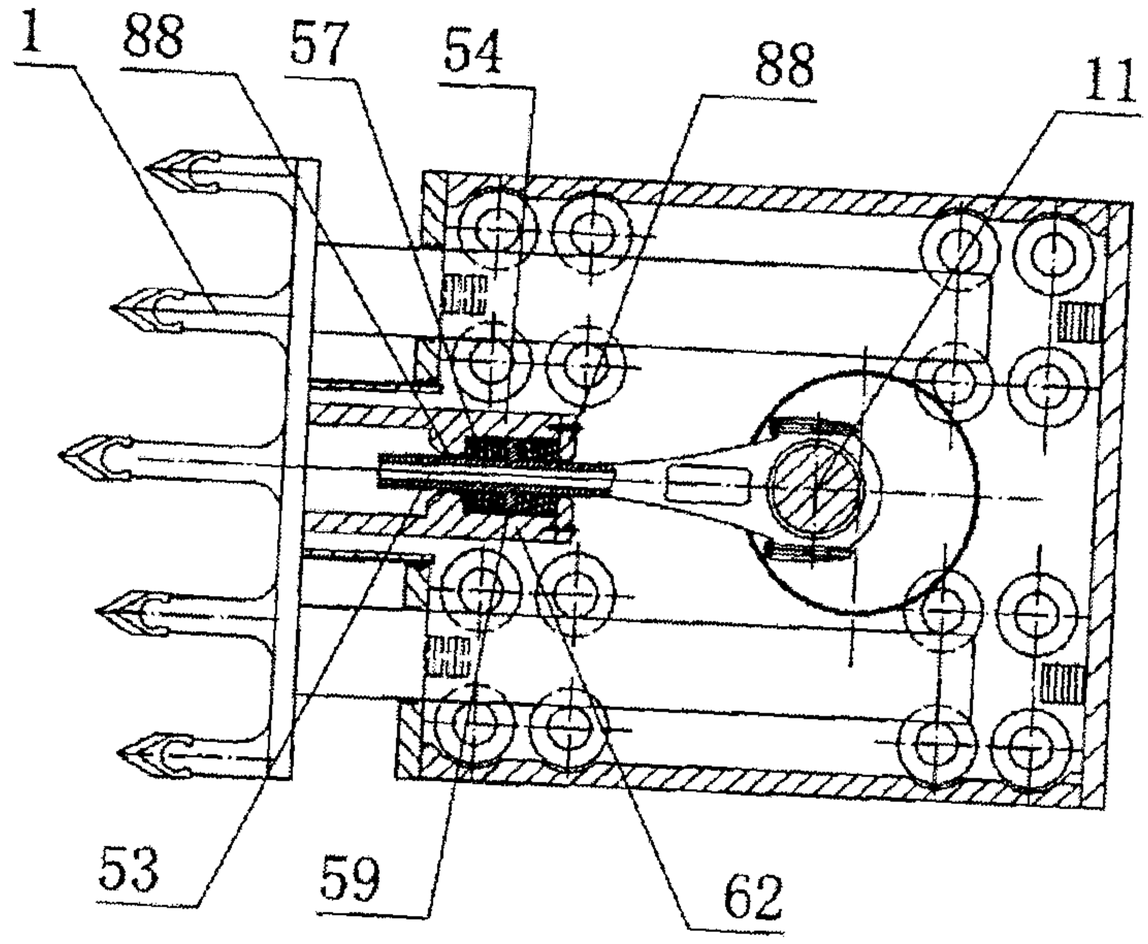


Fig. 39

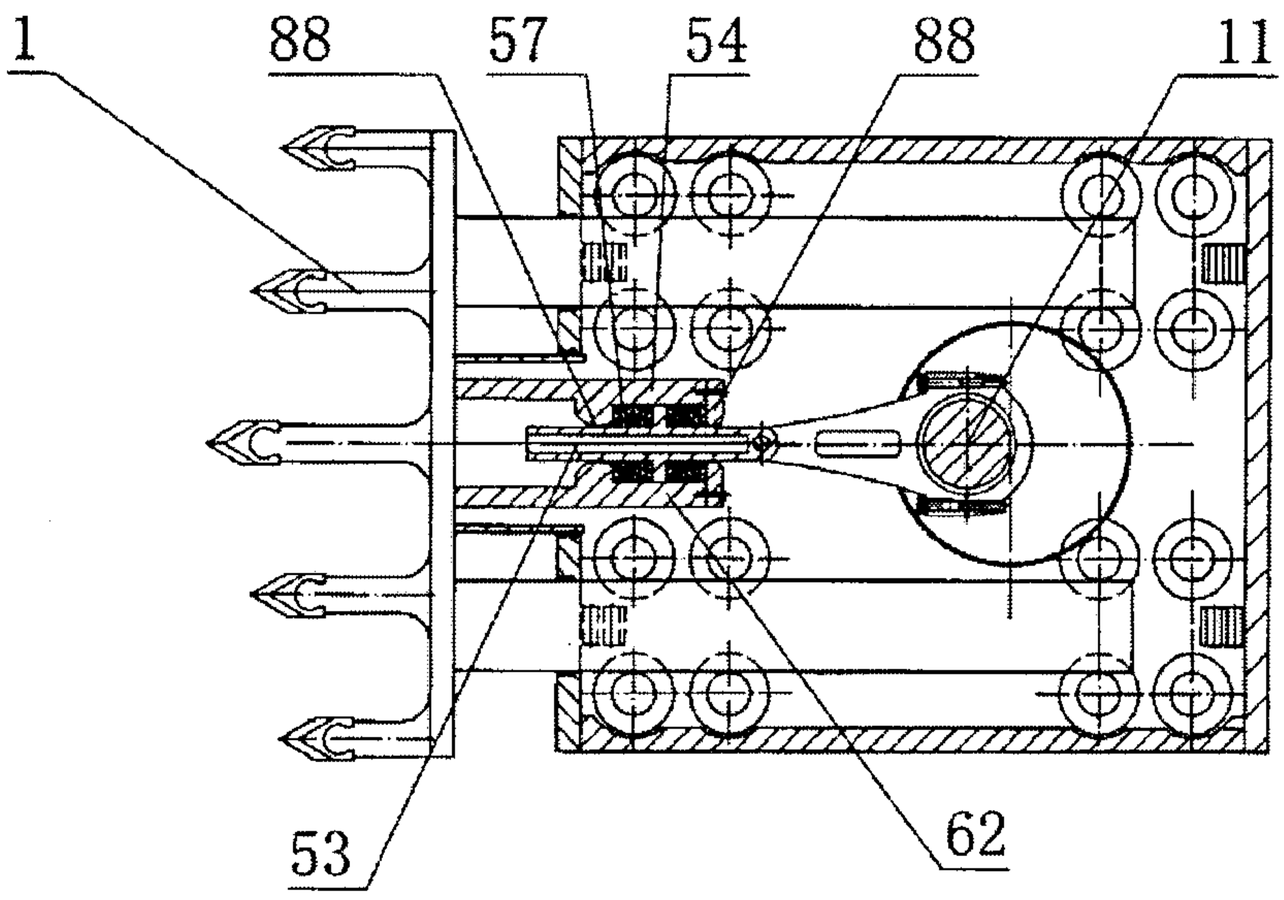


Fig. 40

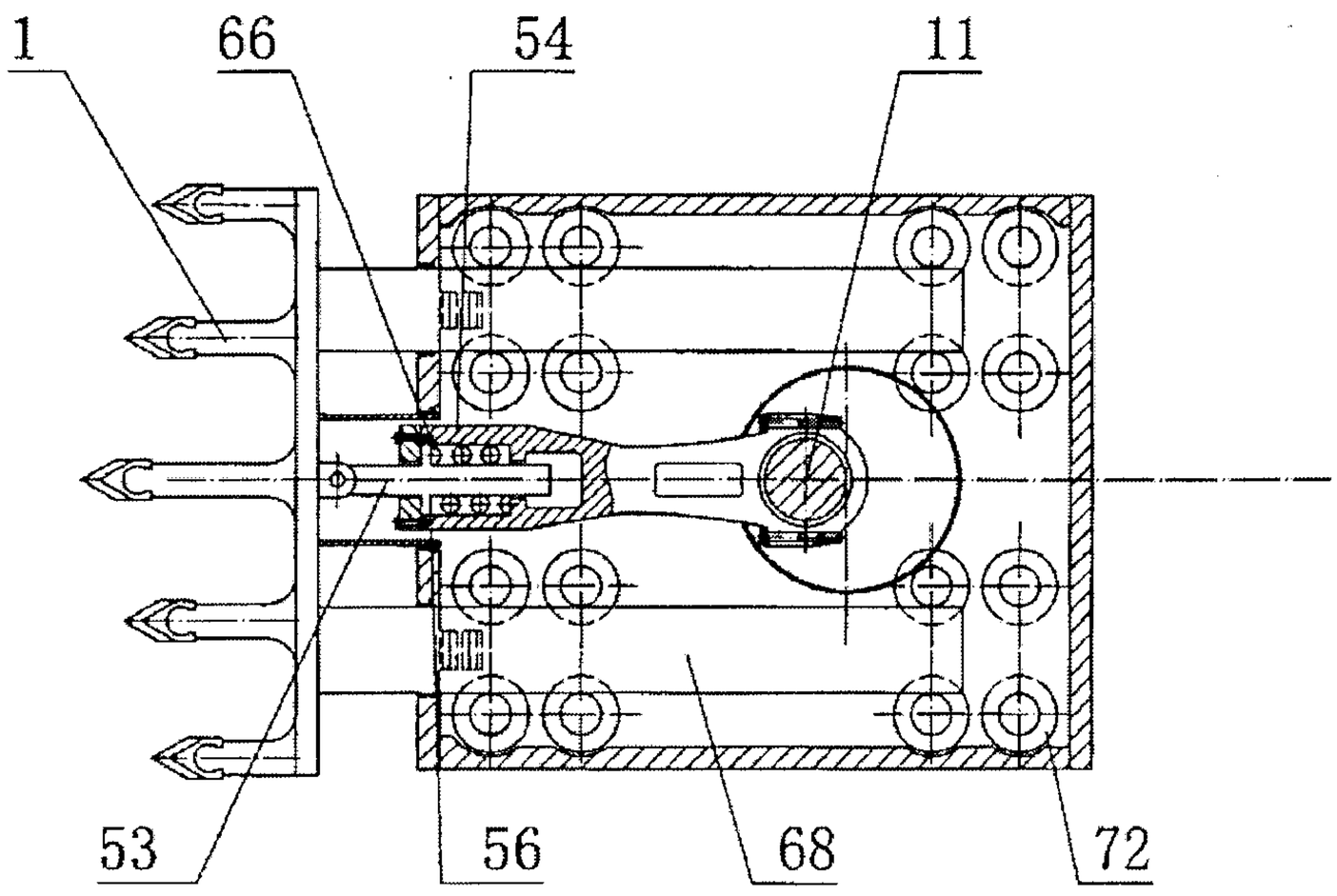


Fig. 41

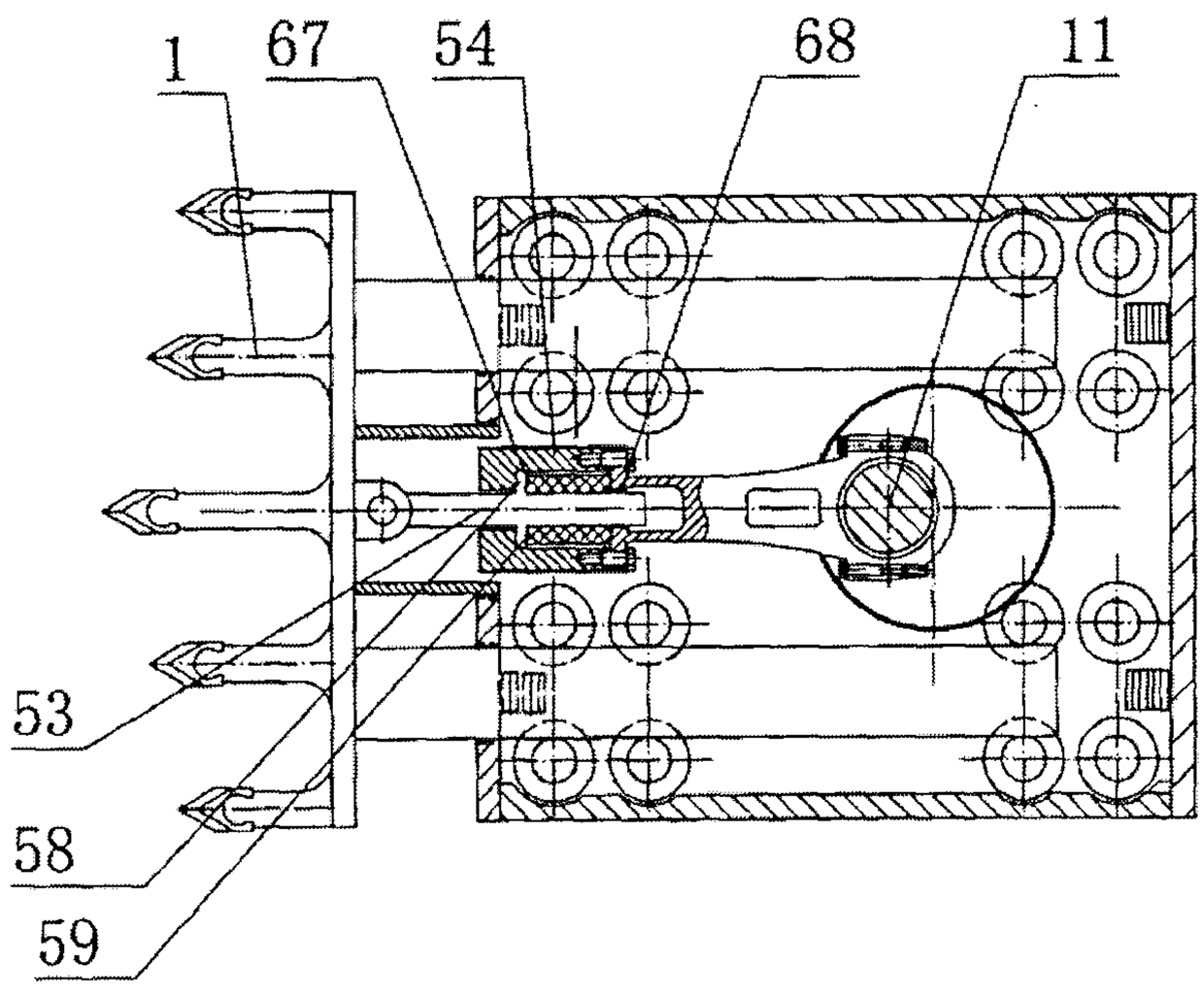


Fig. 42

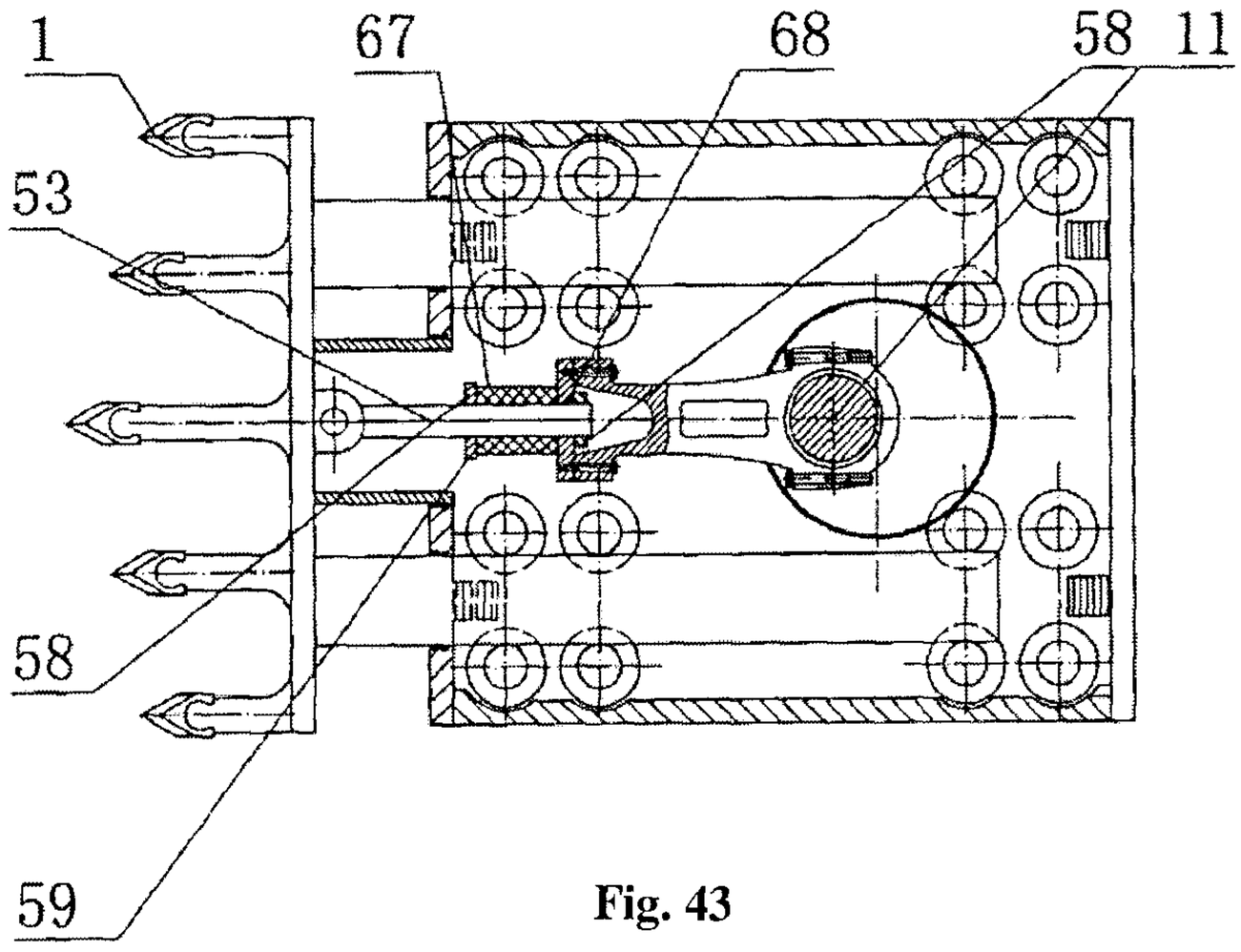


Fig. 43

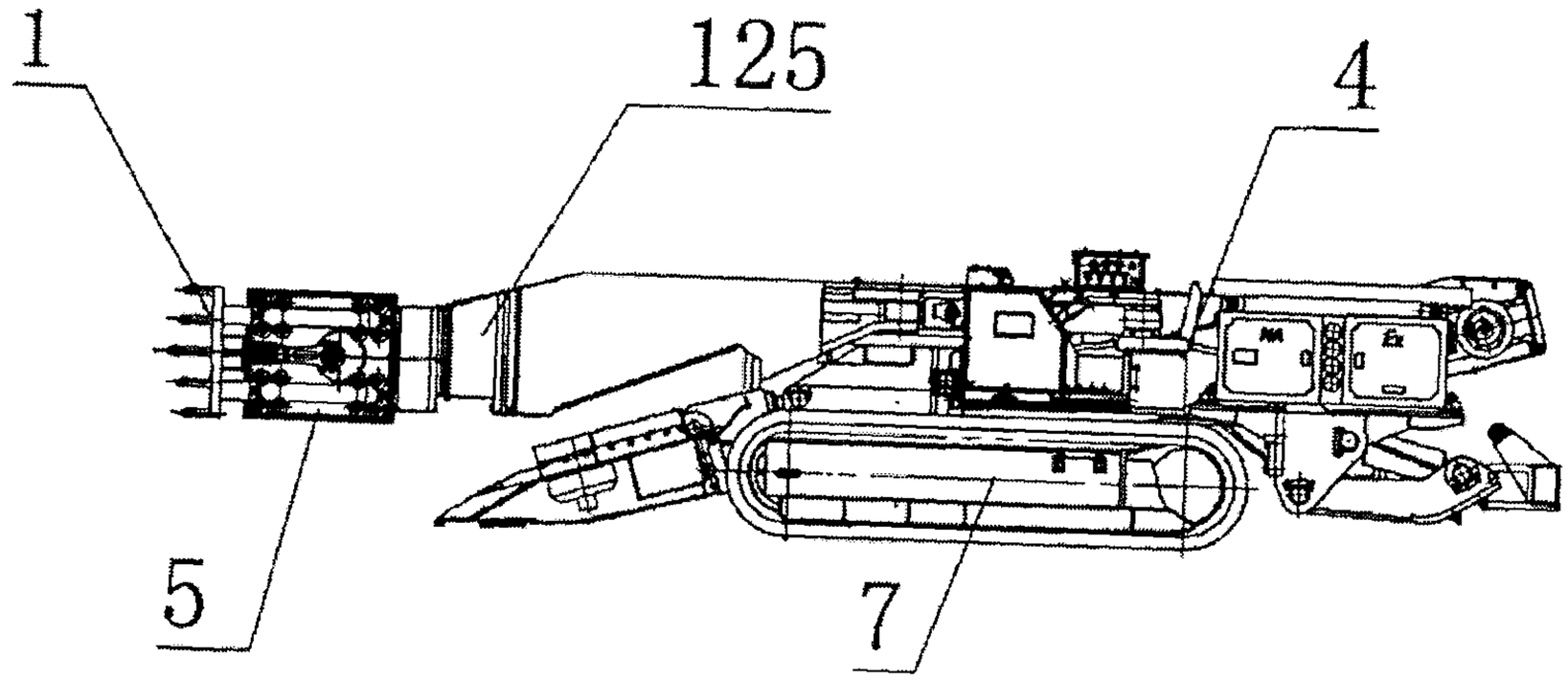


Fig. 44

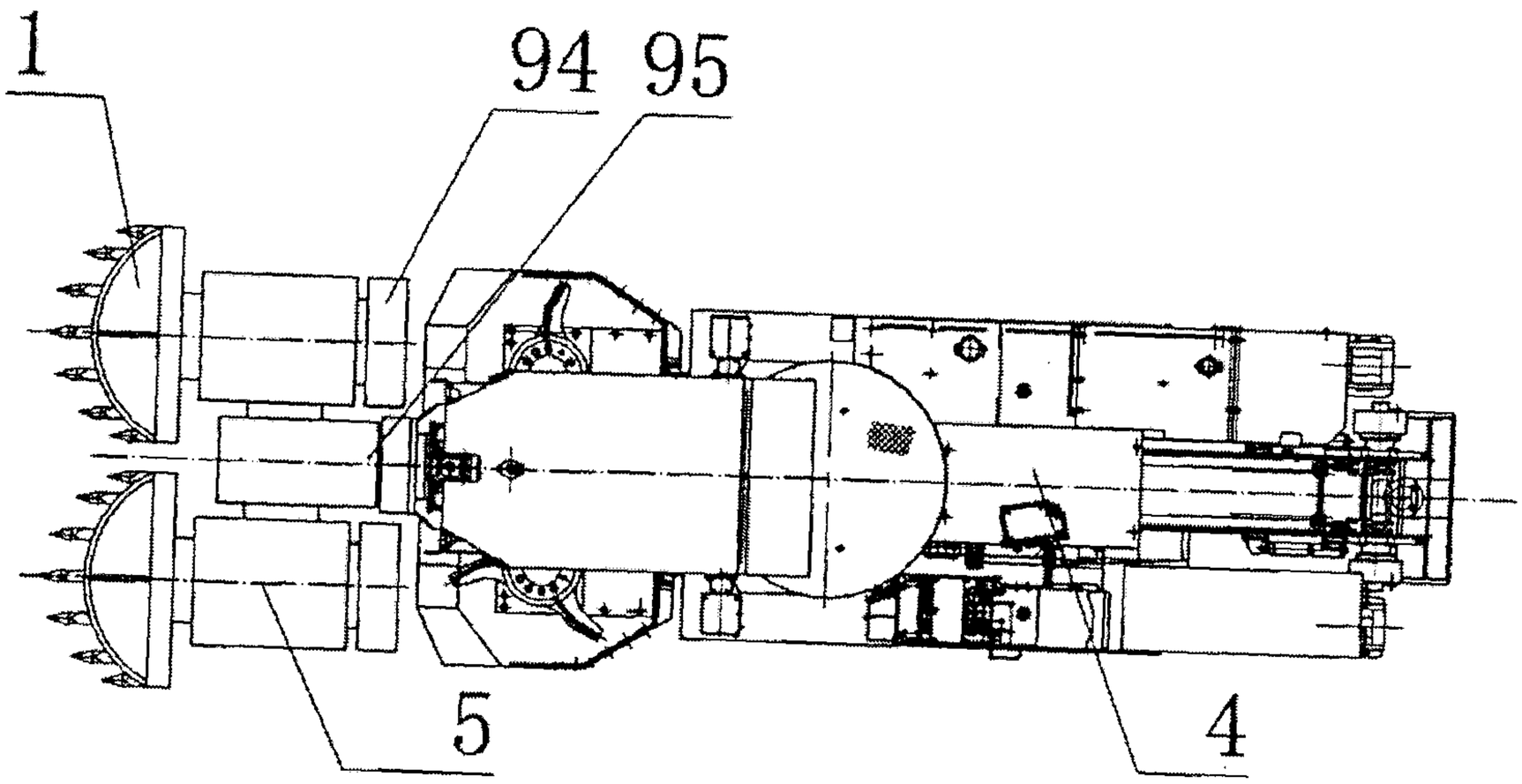


Fig. 45

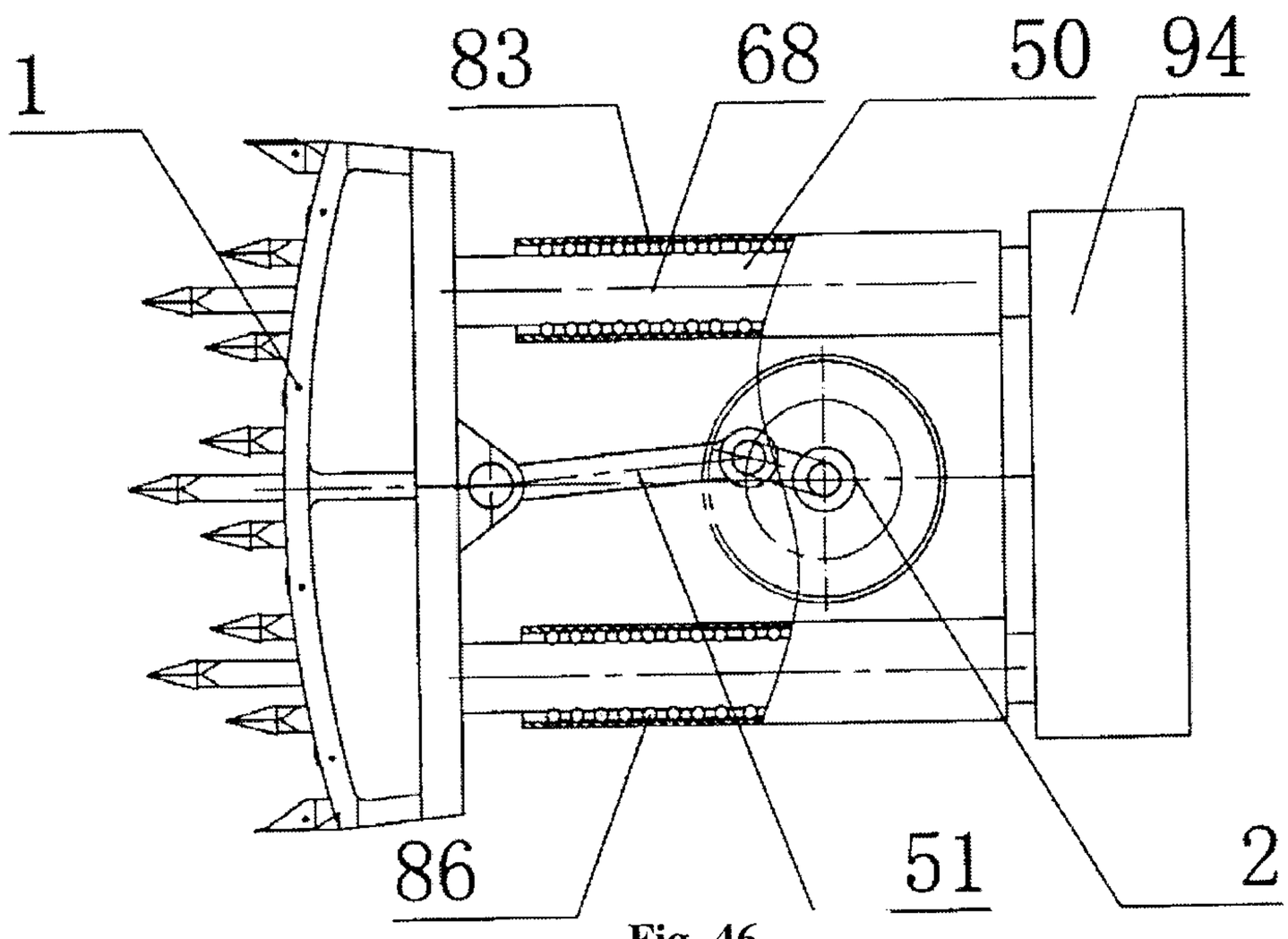


Fig. 46

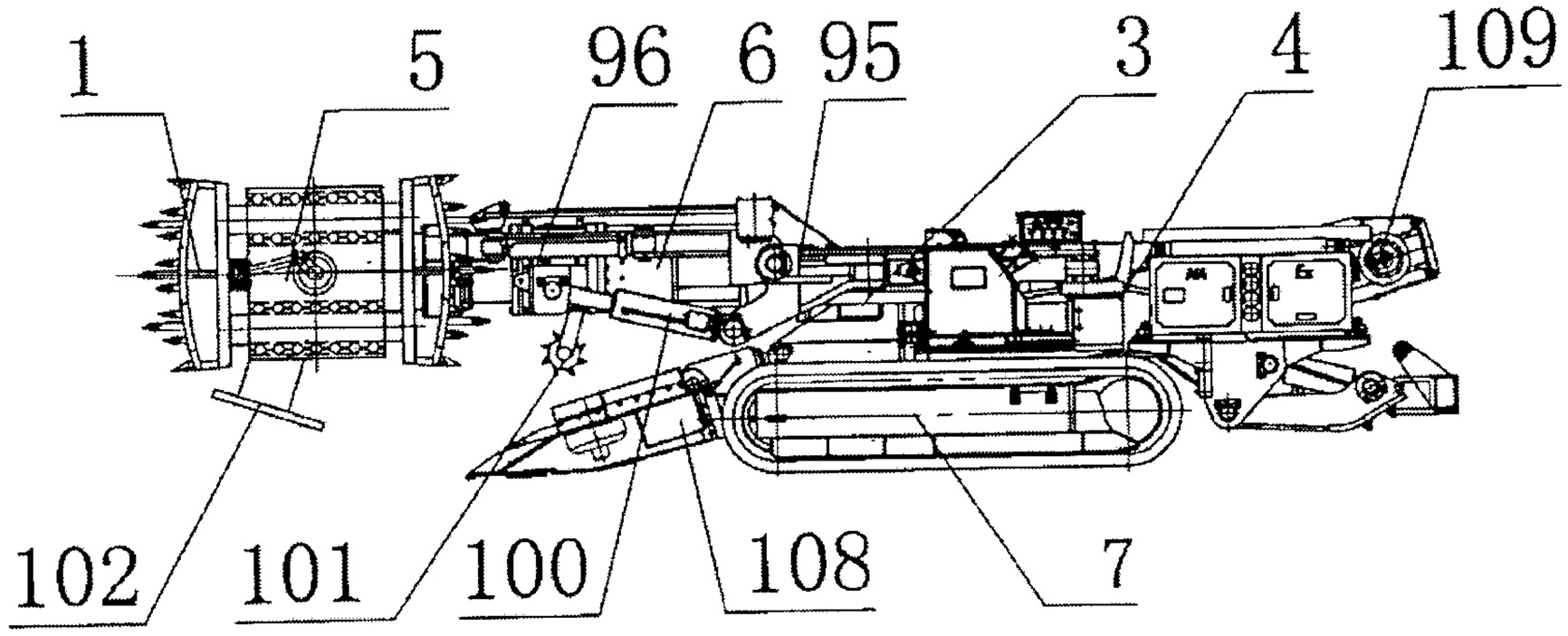


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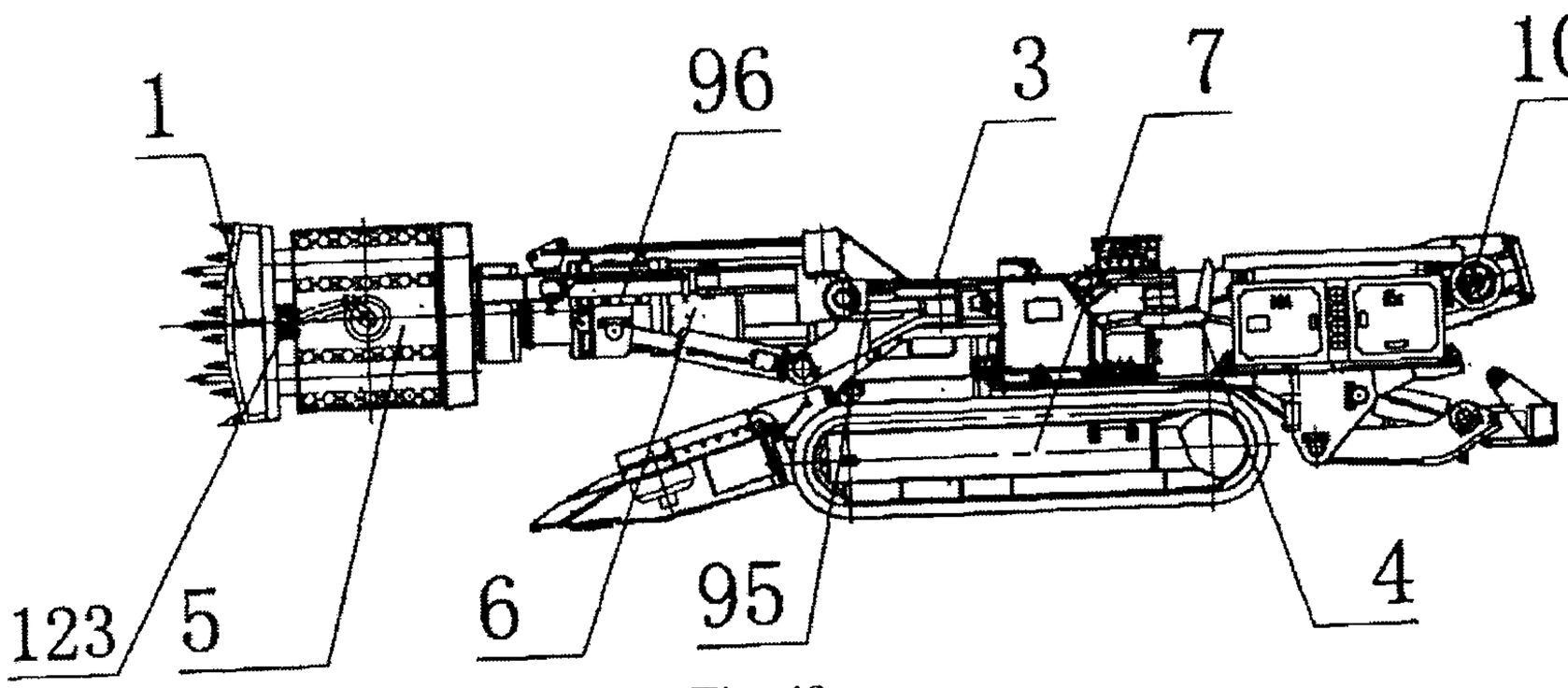


Fig. 48

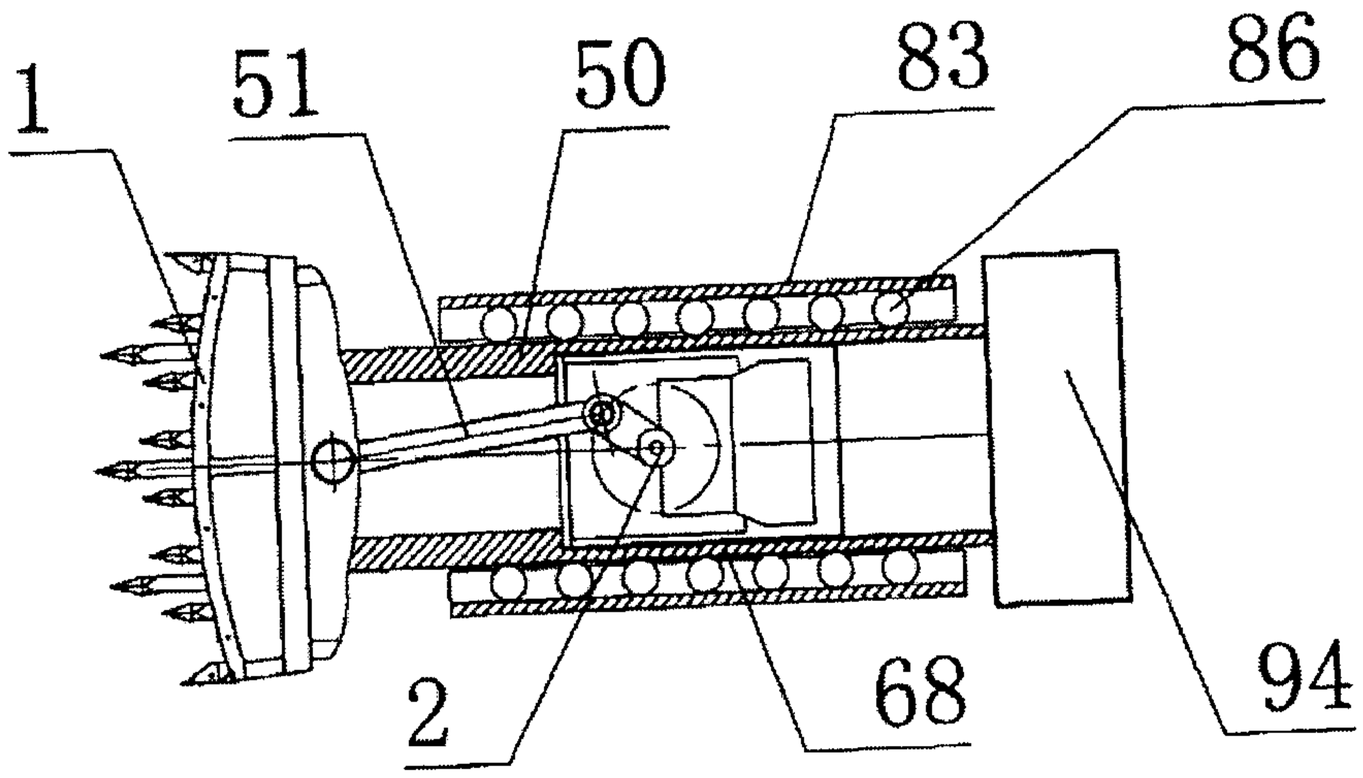


Fig. 49

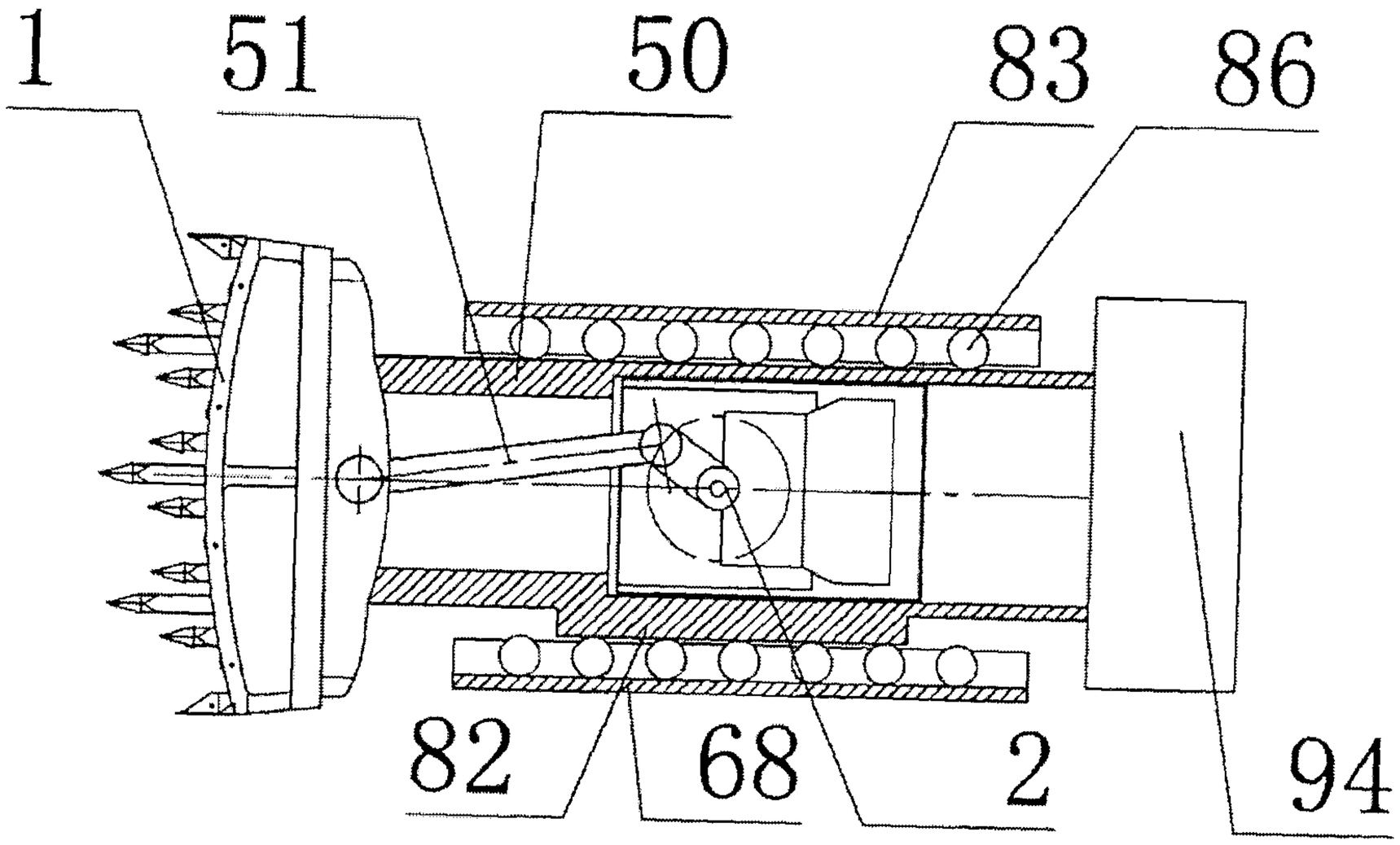


Fig. 50

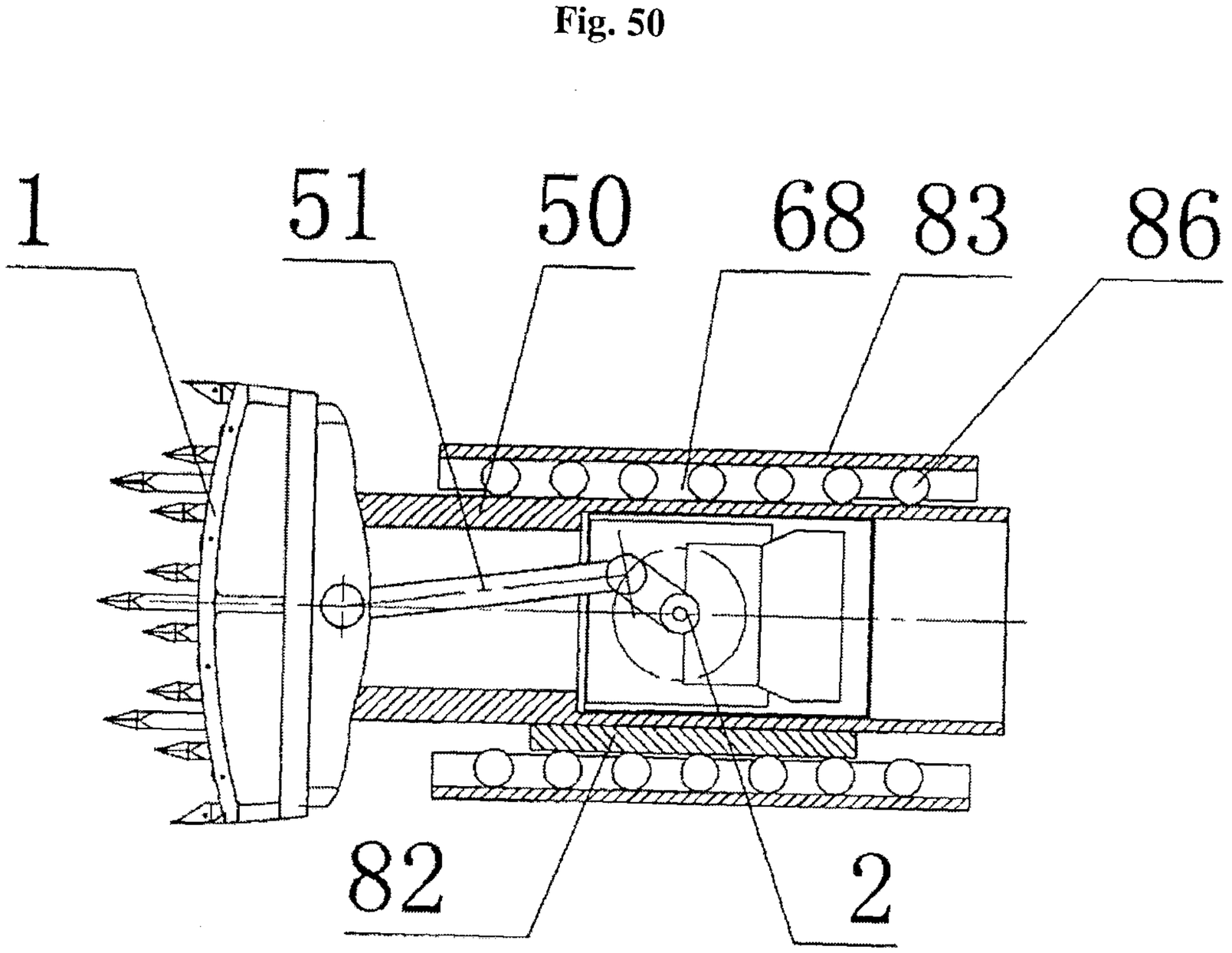


Fig. 51

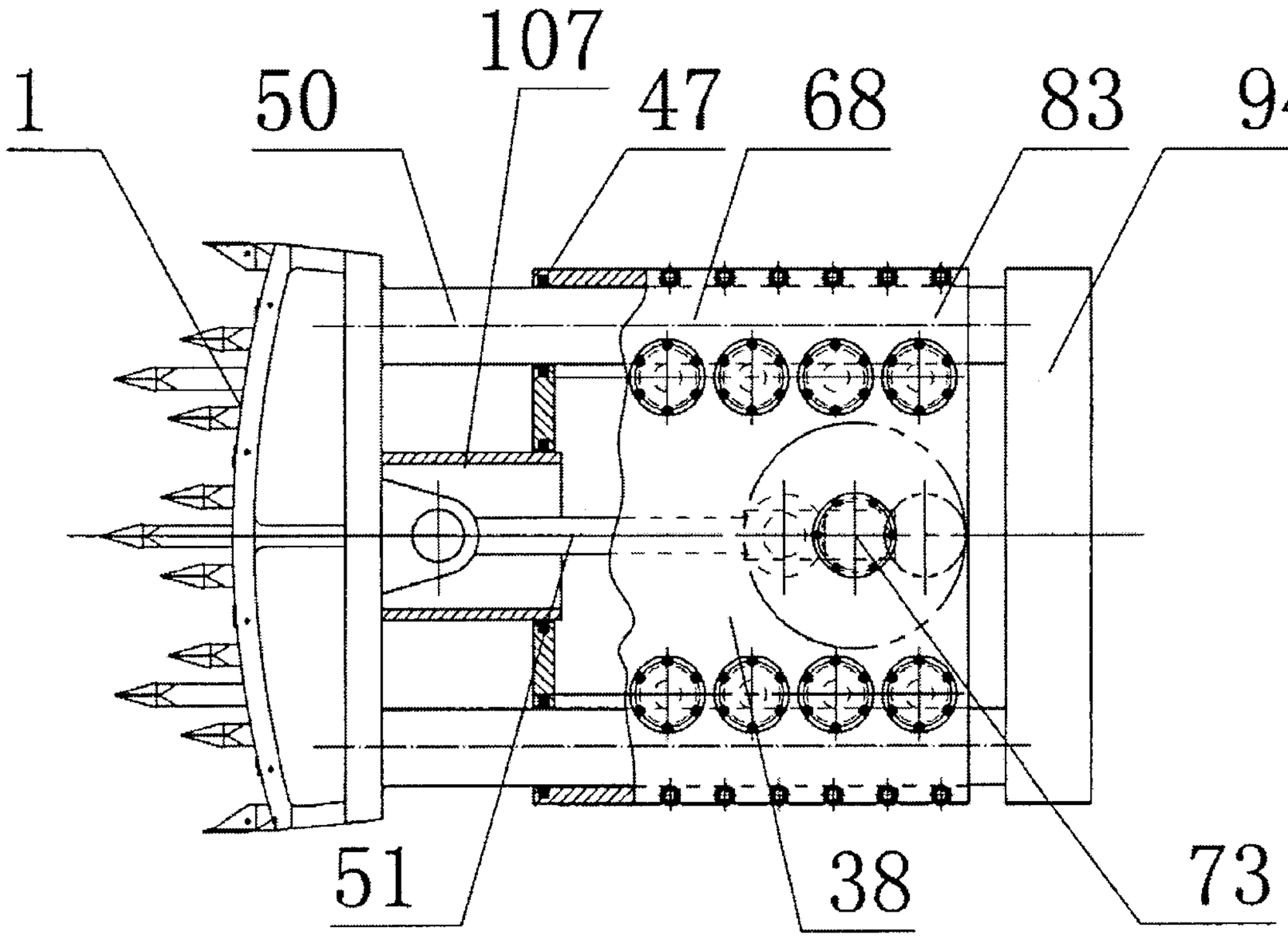


Fig. 52

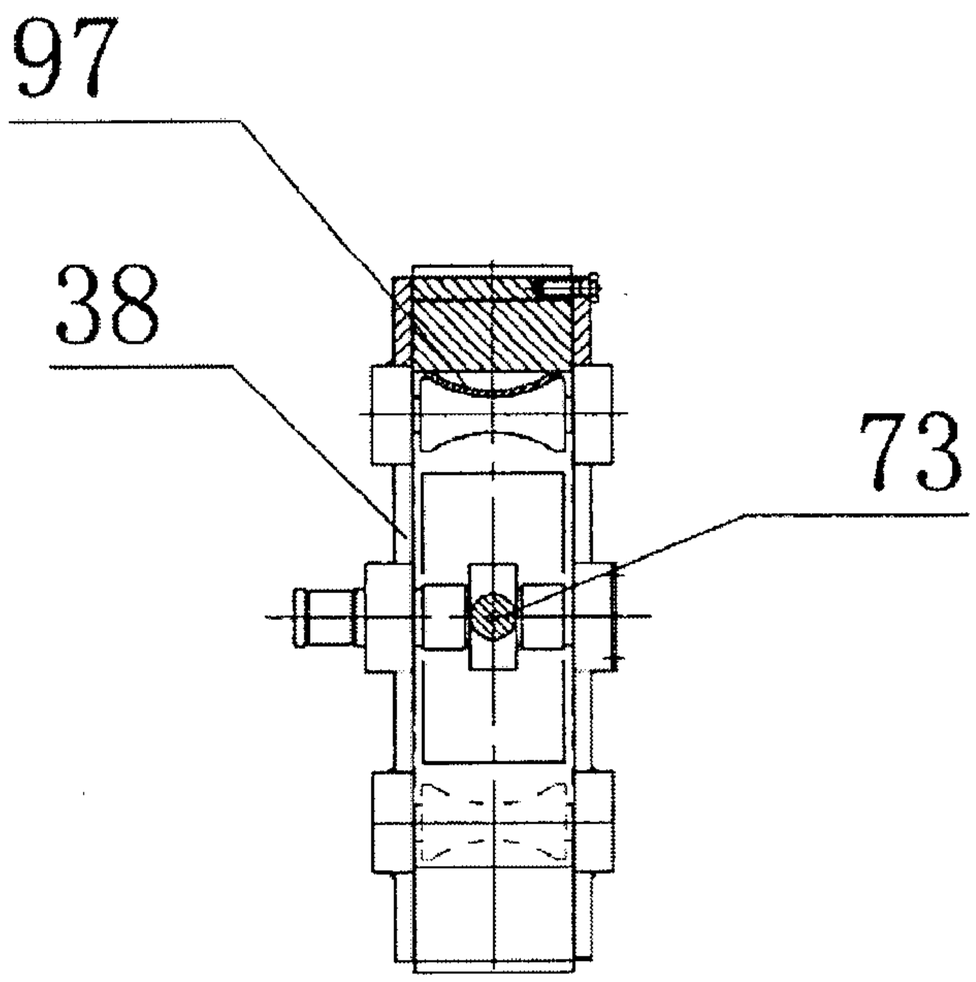


Fig. 53

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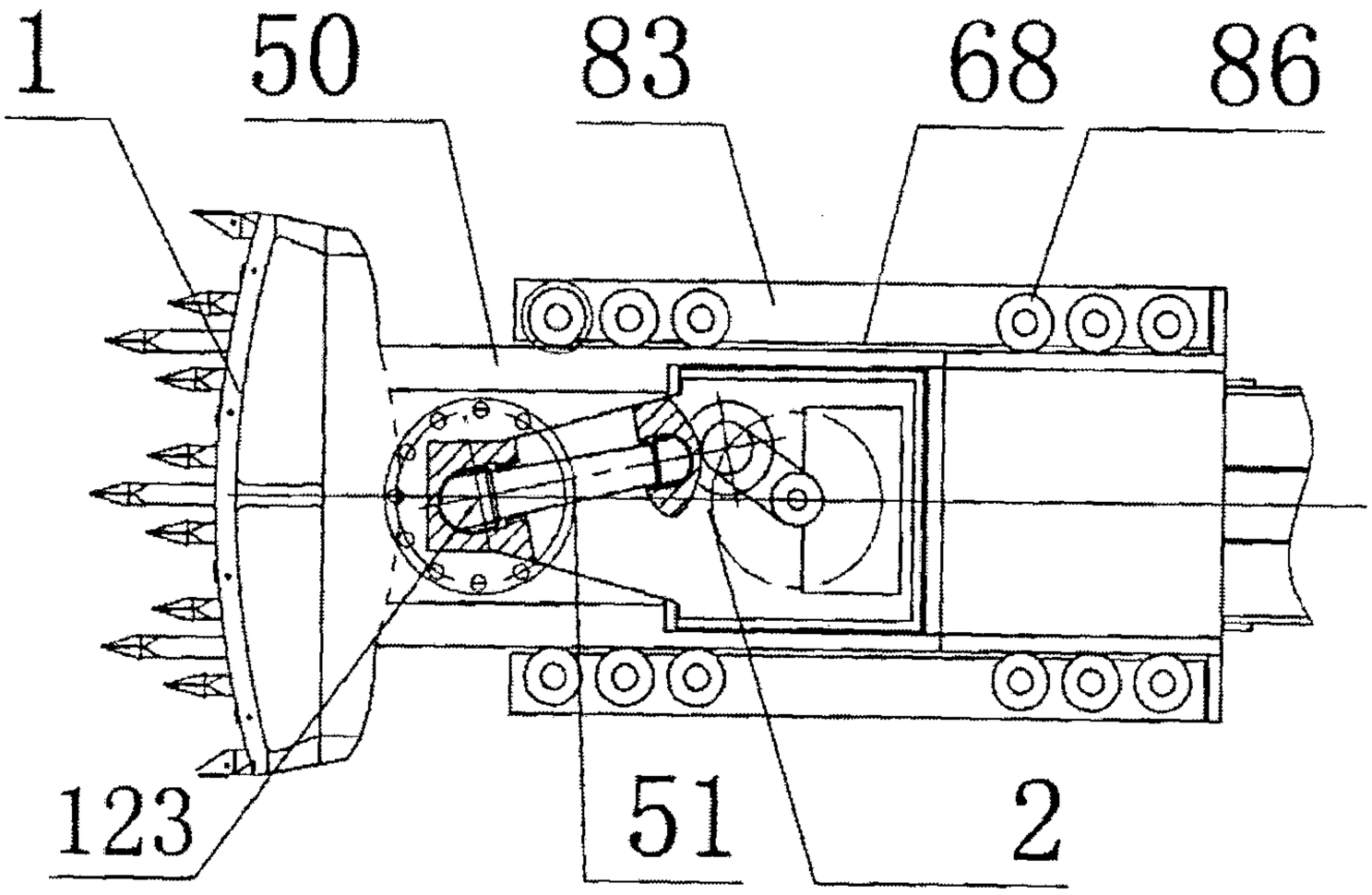


Fig. 54

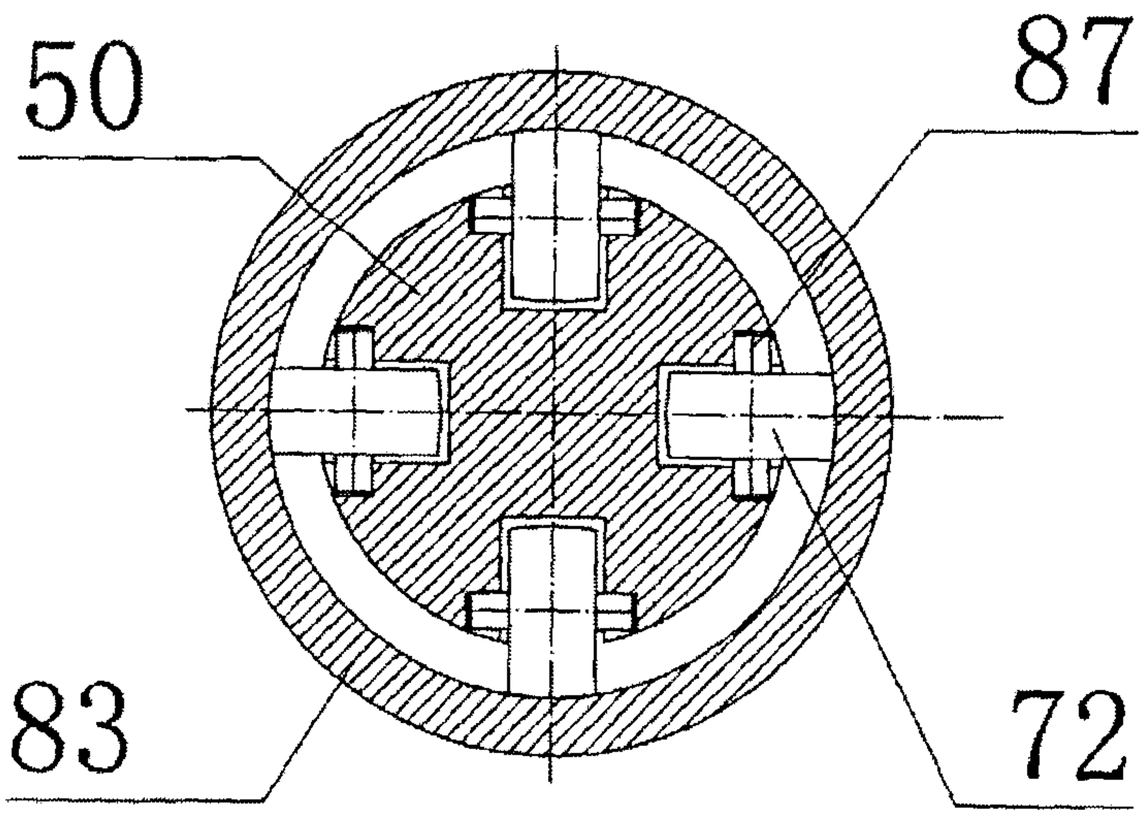


Fig. 55

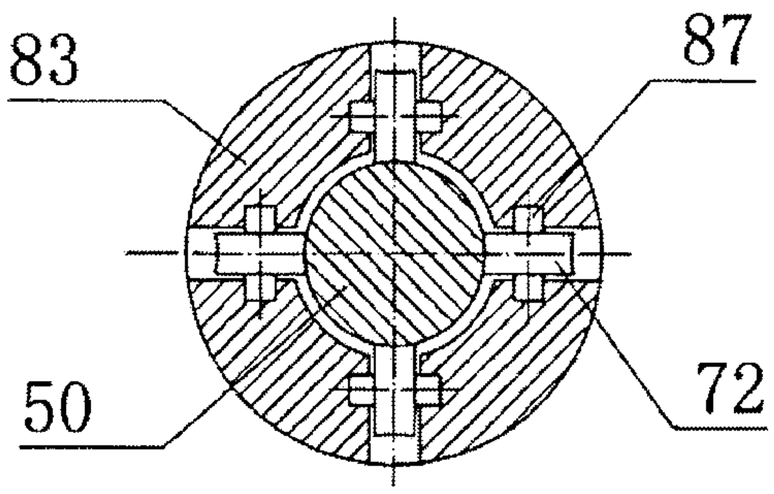


Fig. 56

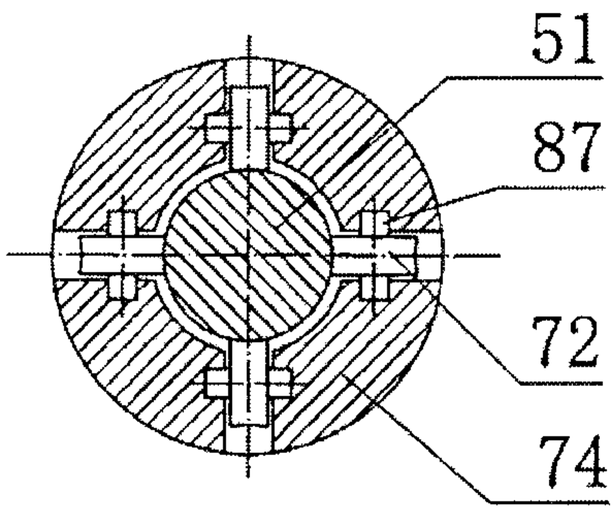


Fig. 57

Fig. 58

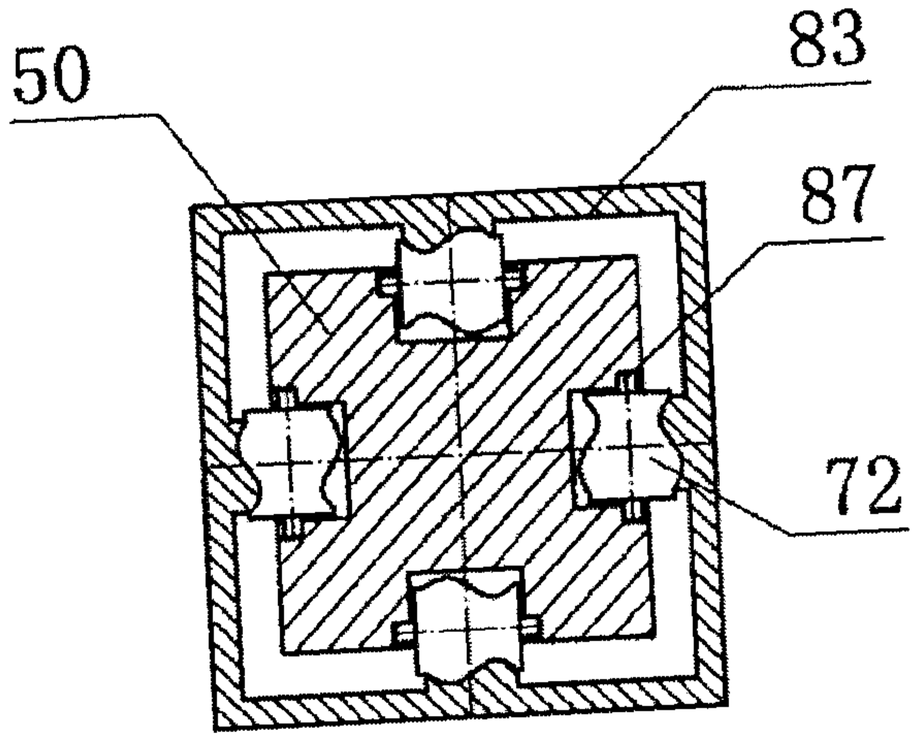


Fig. 59

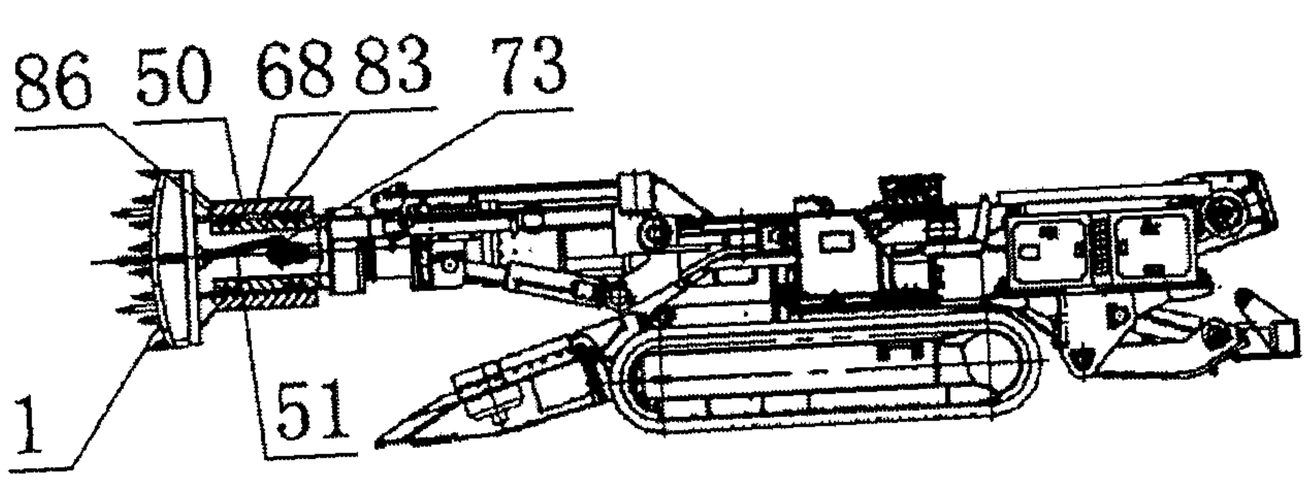


Fig. 60

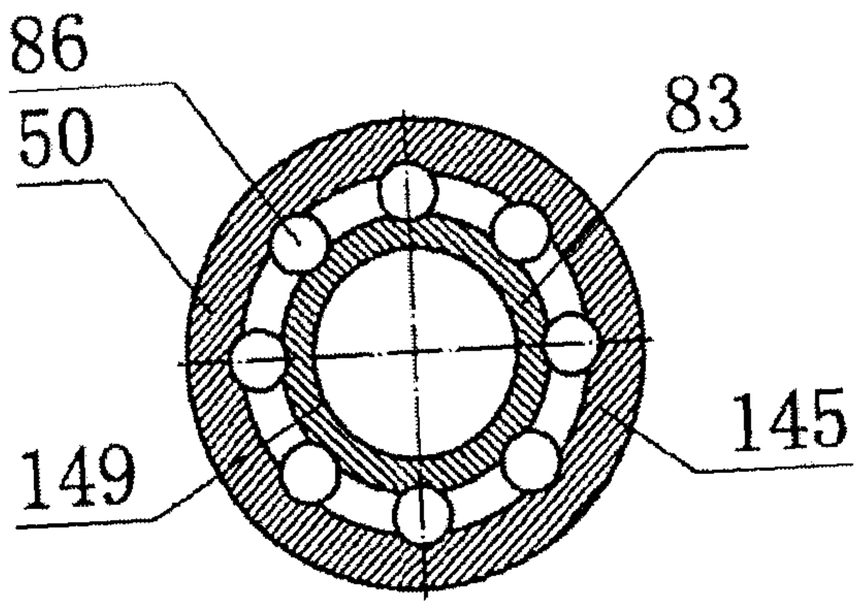


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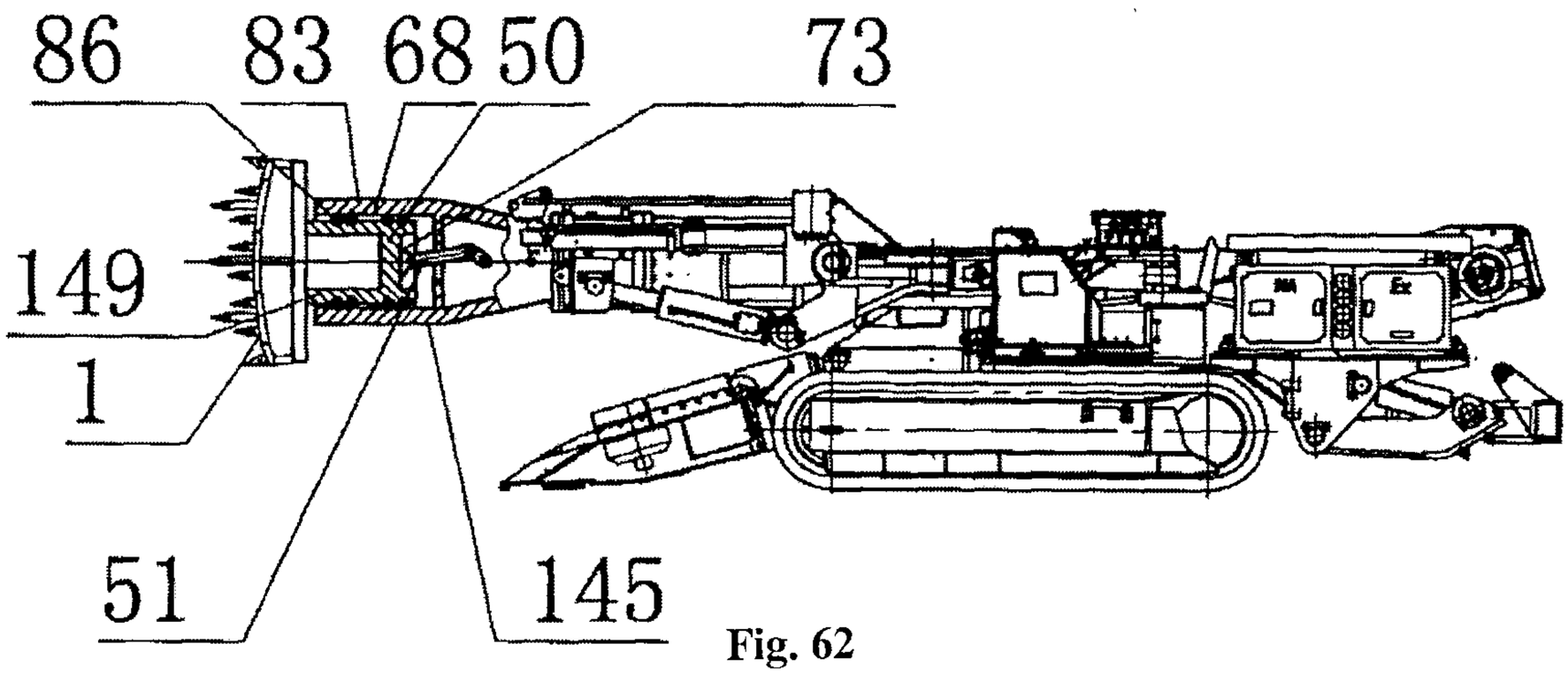


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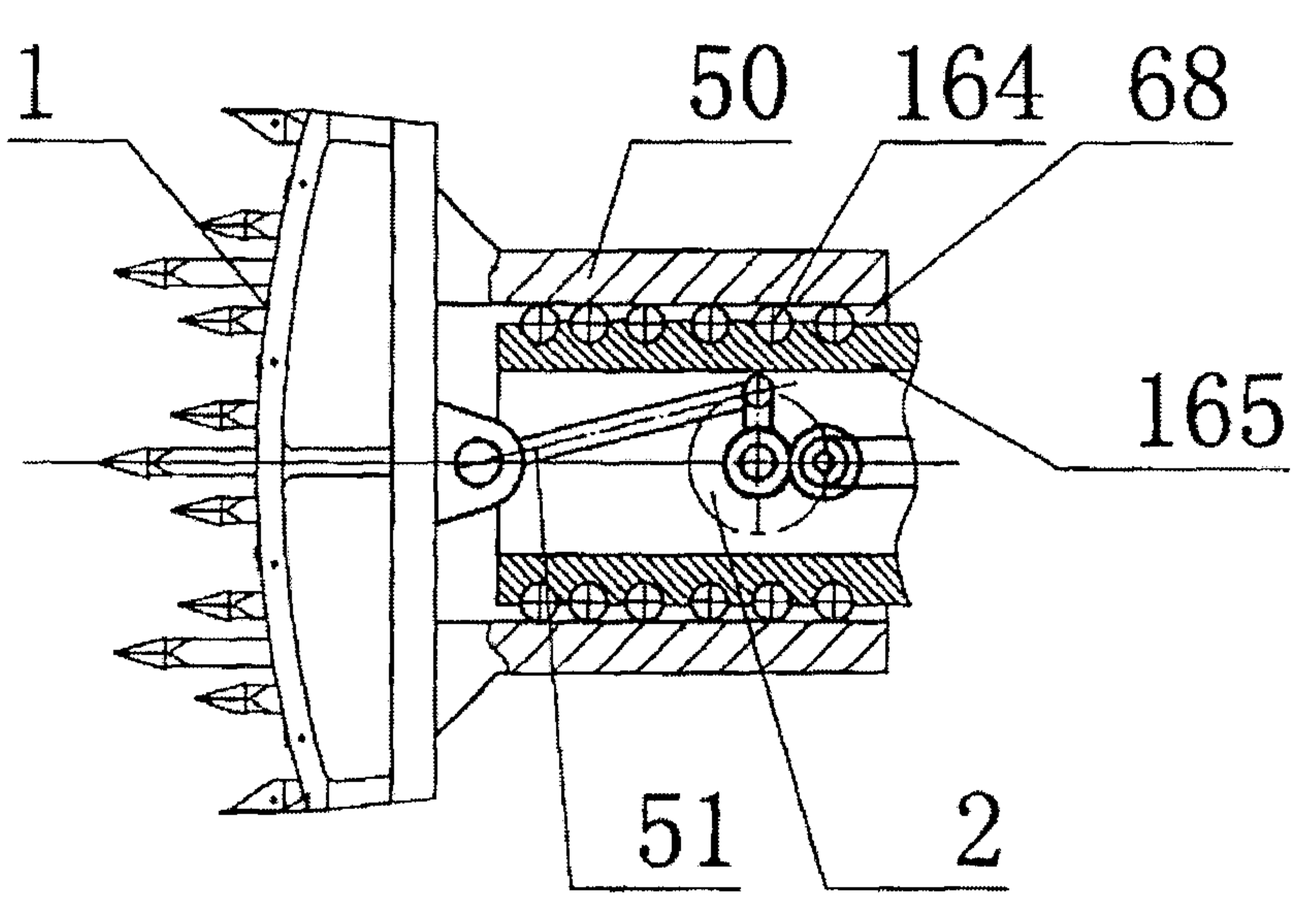


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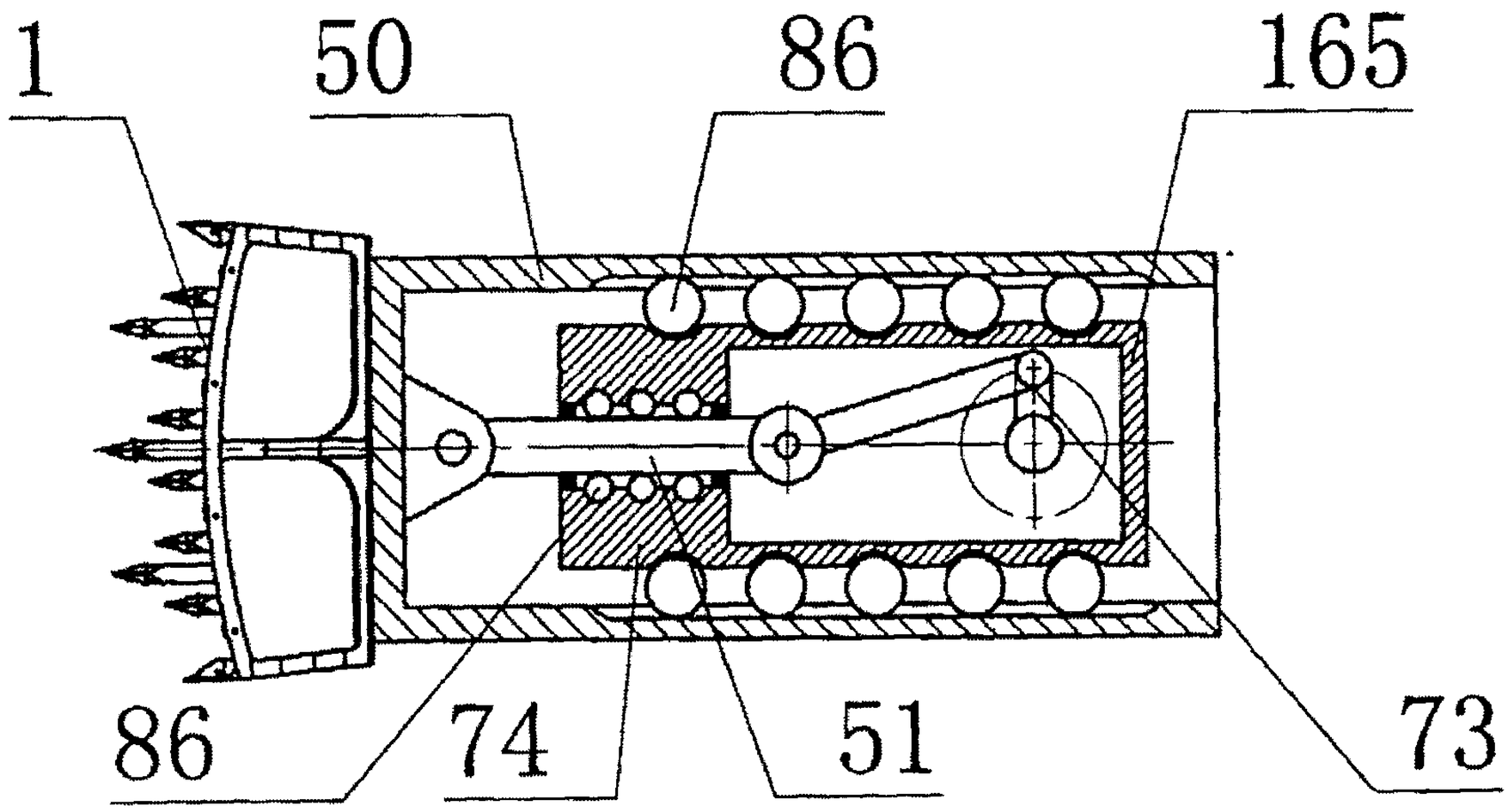


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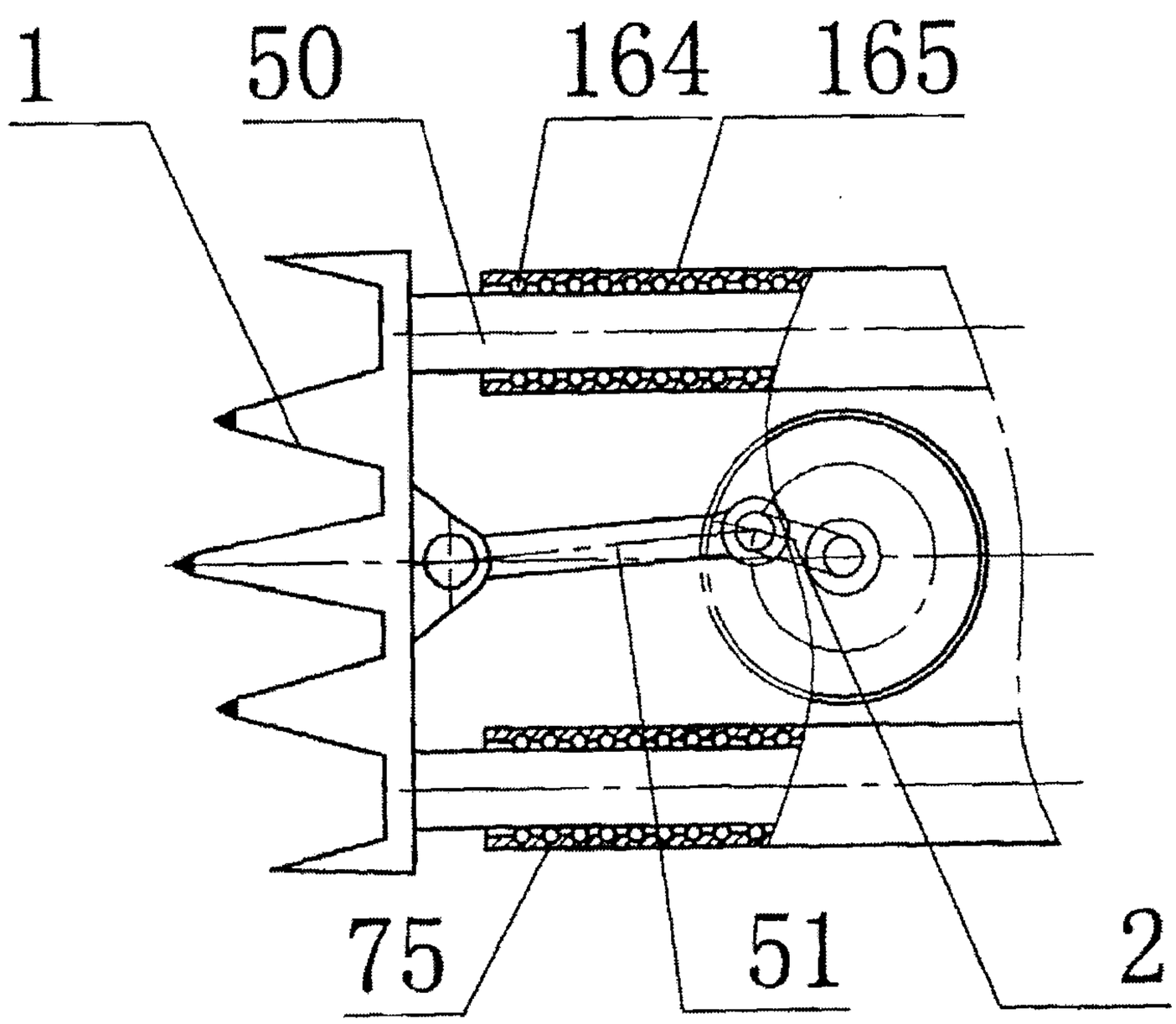


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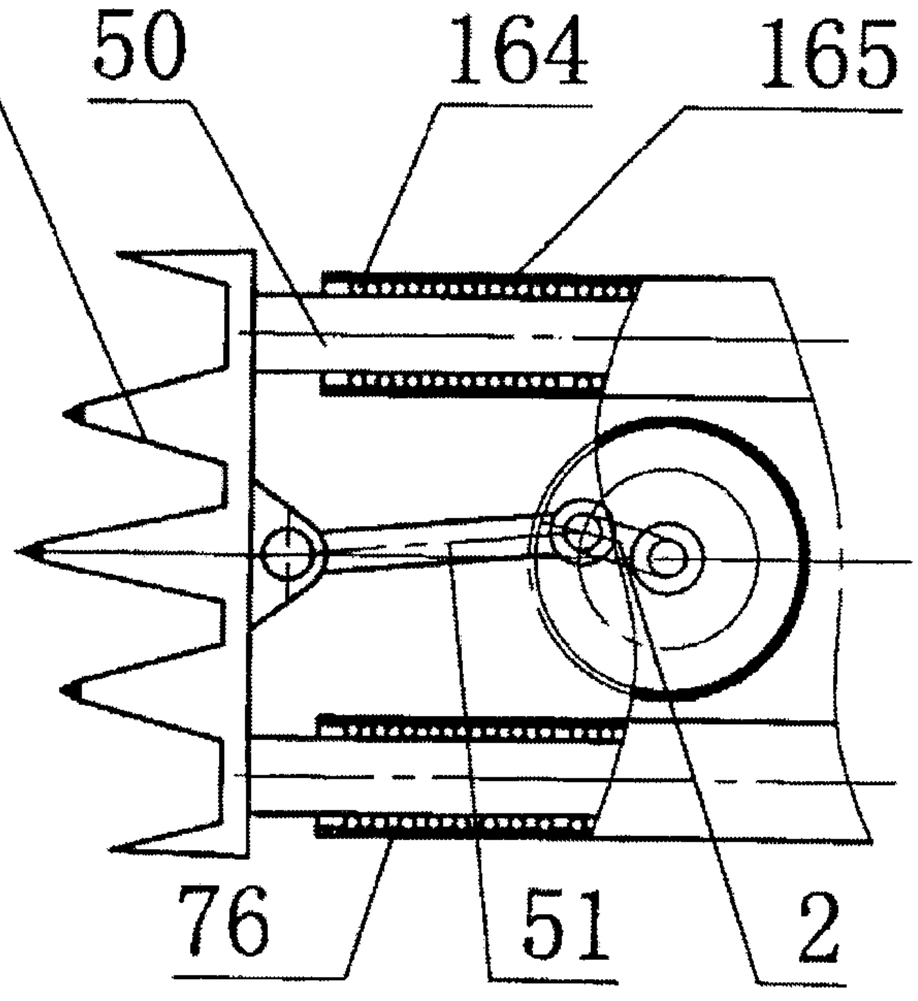


Fig. 66

Fig. 67

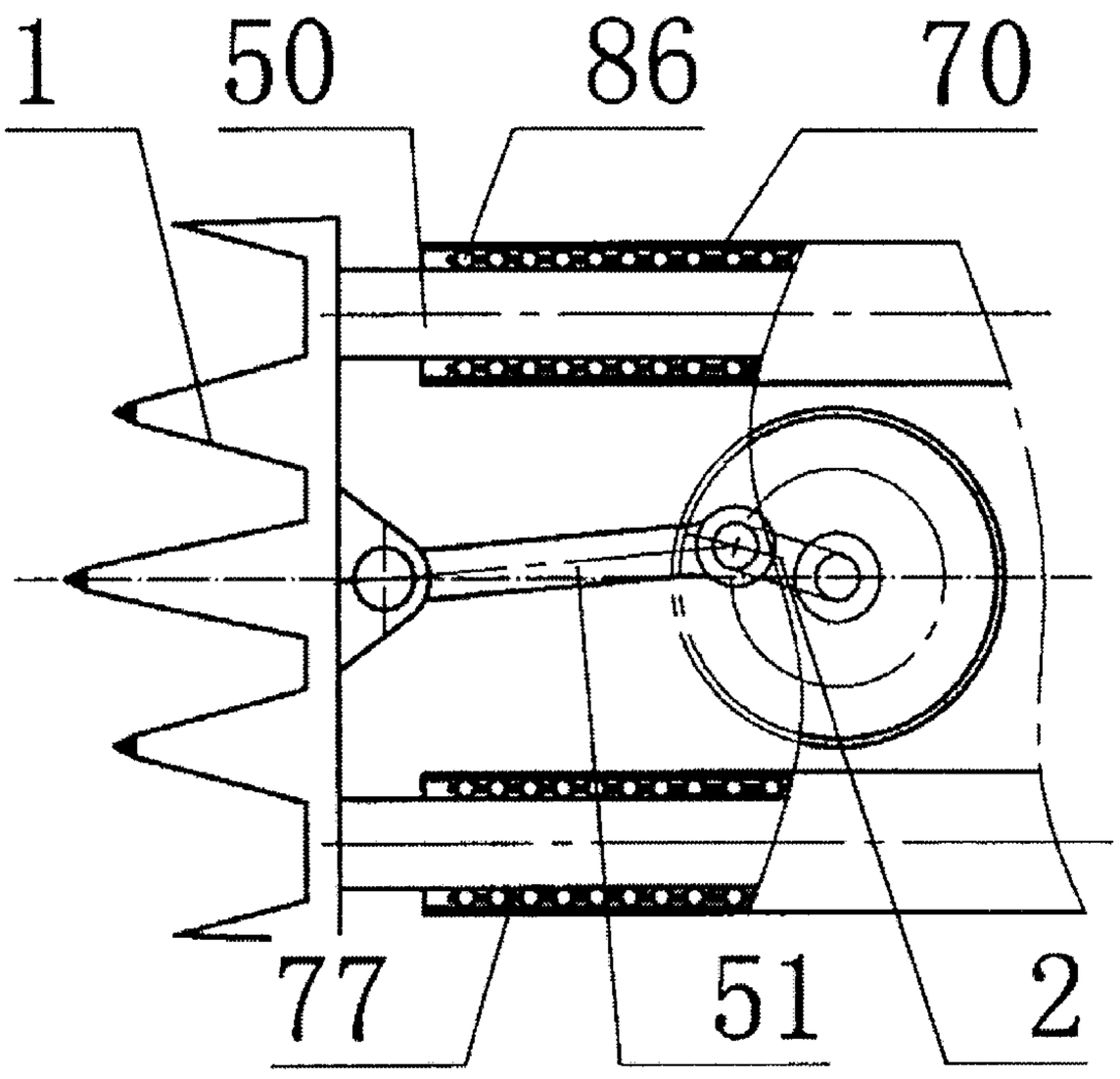


Fig. 68

Fig. 69

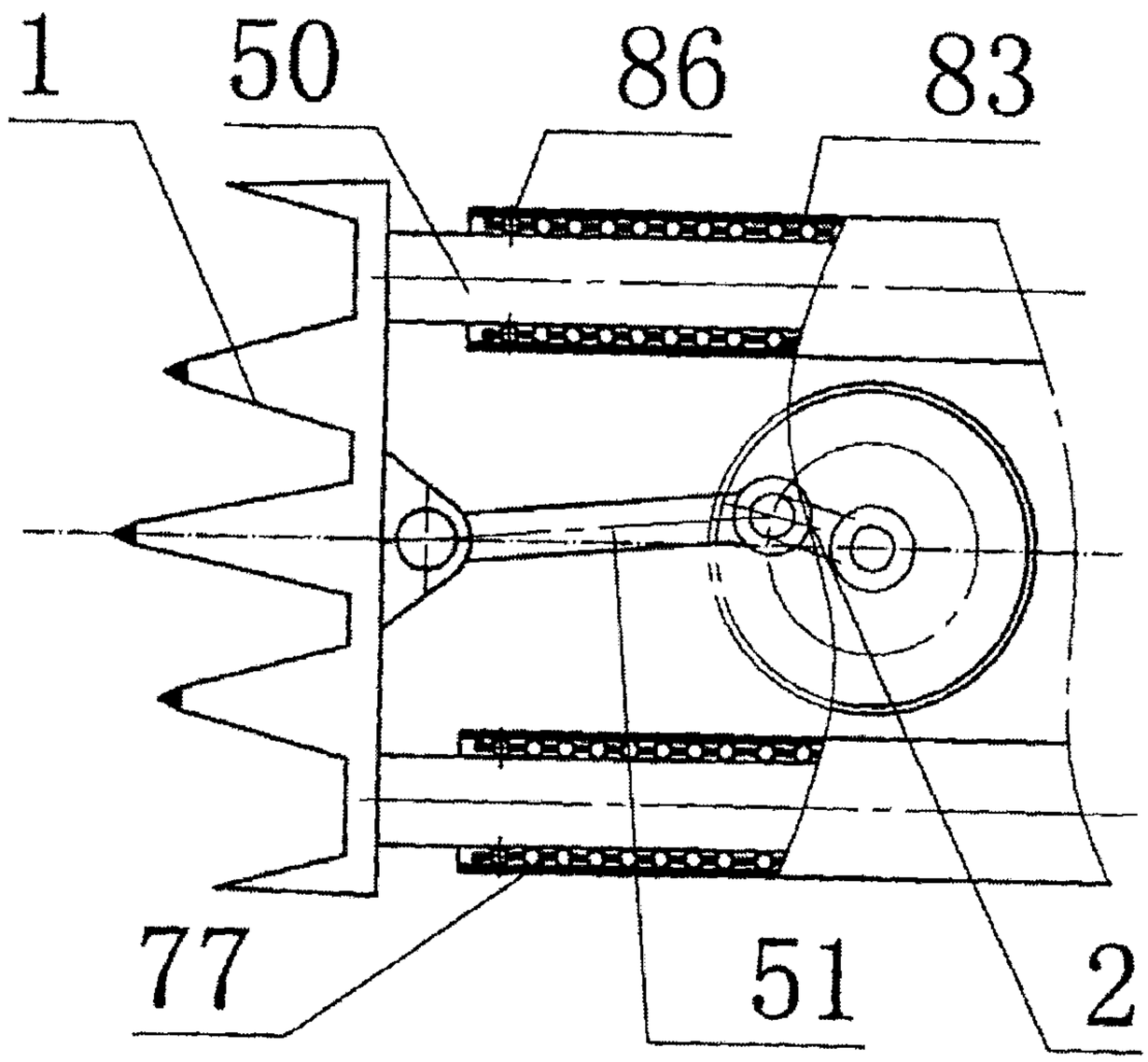


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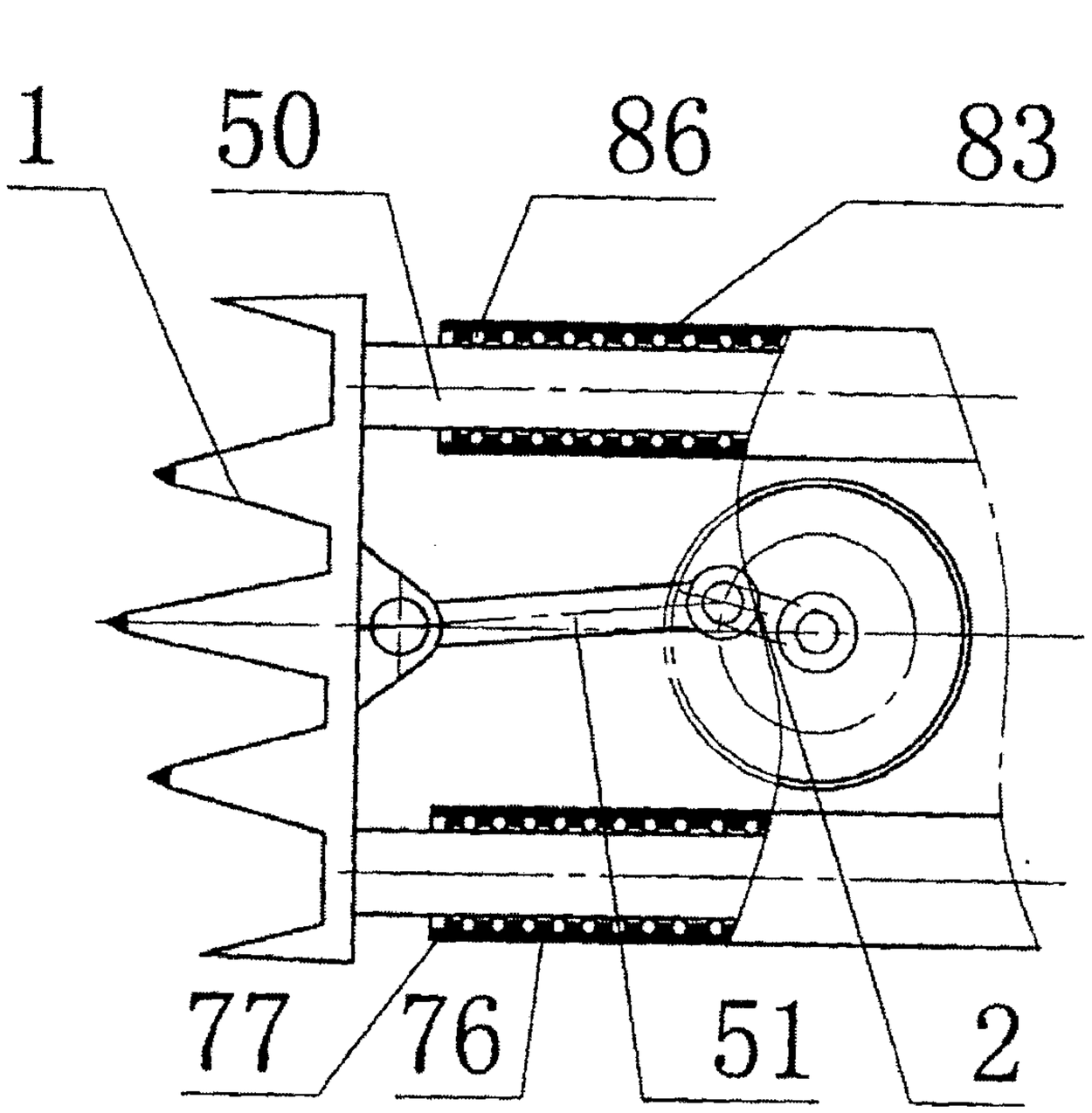


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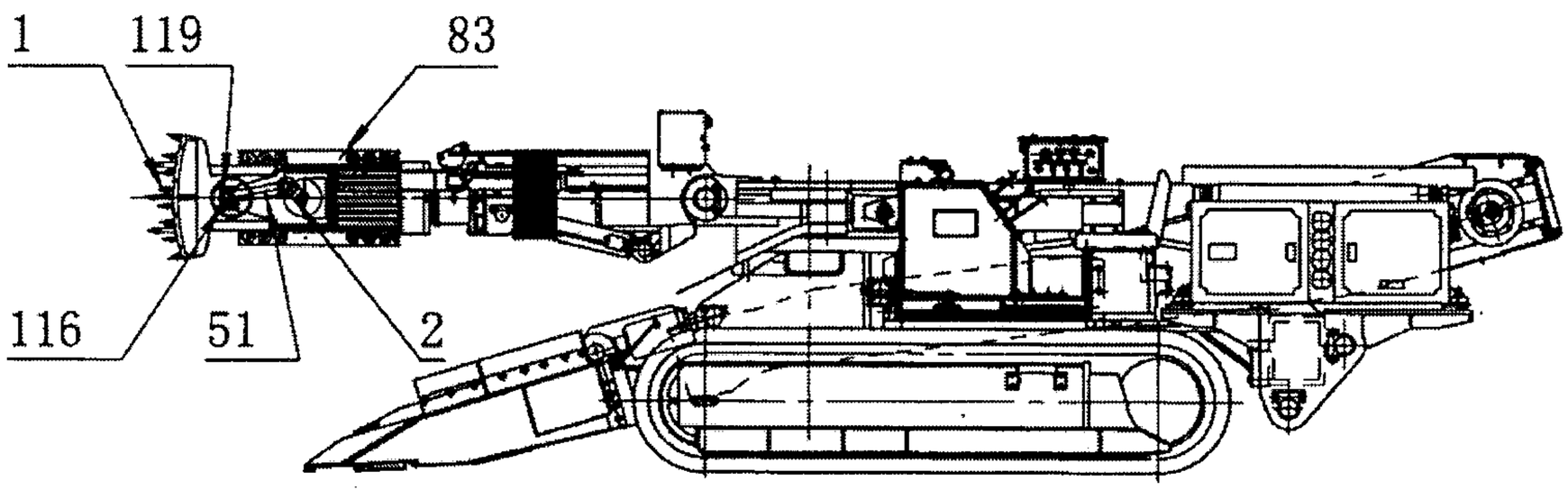


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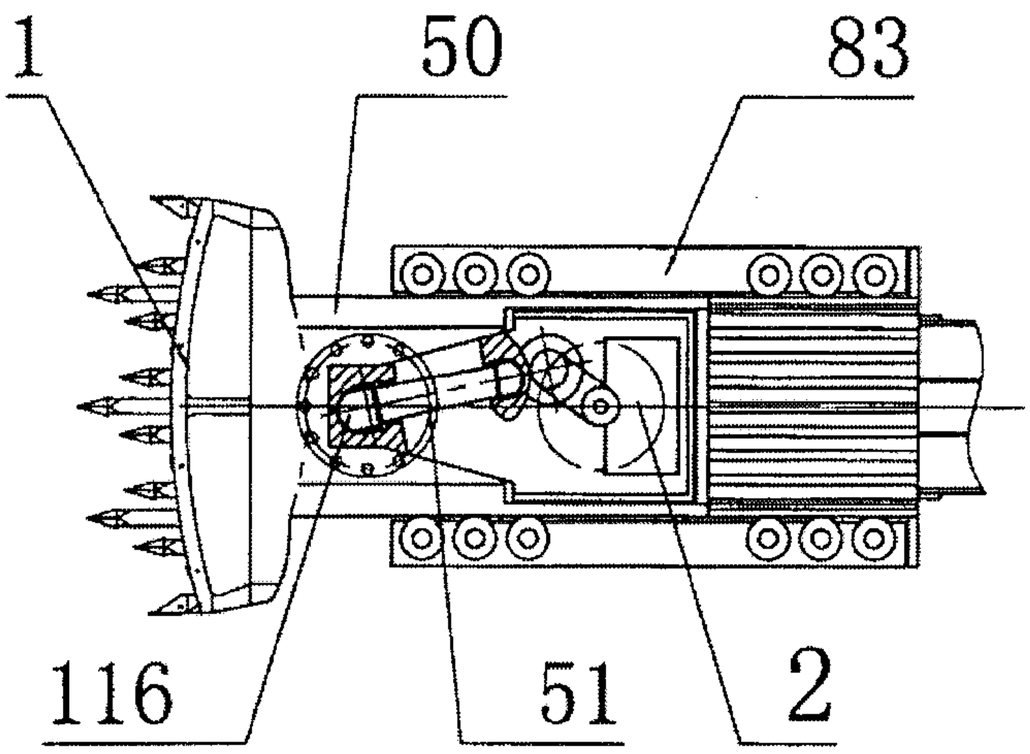


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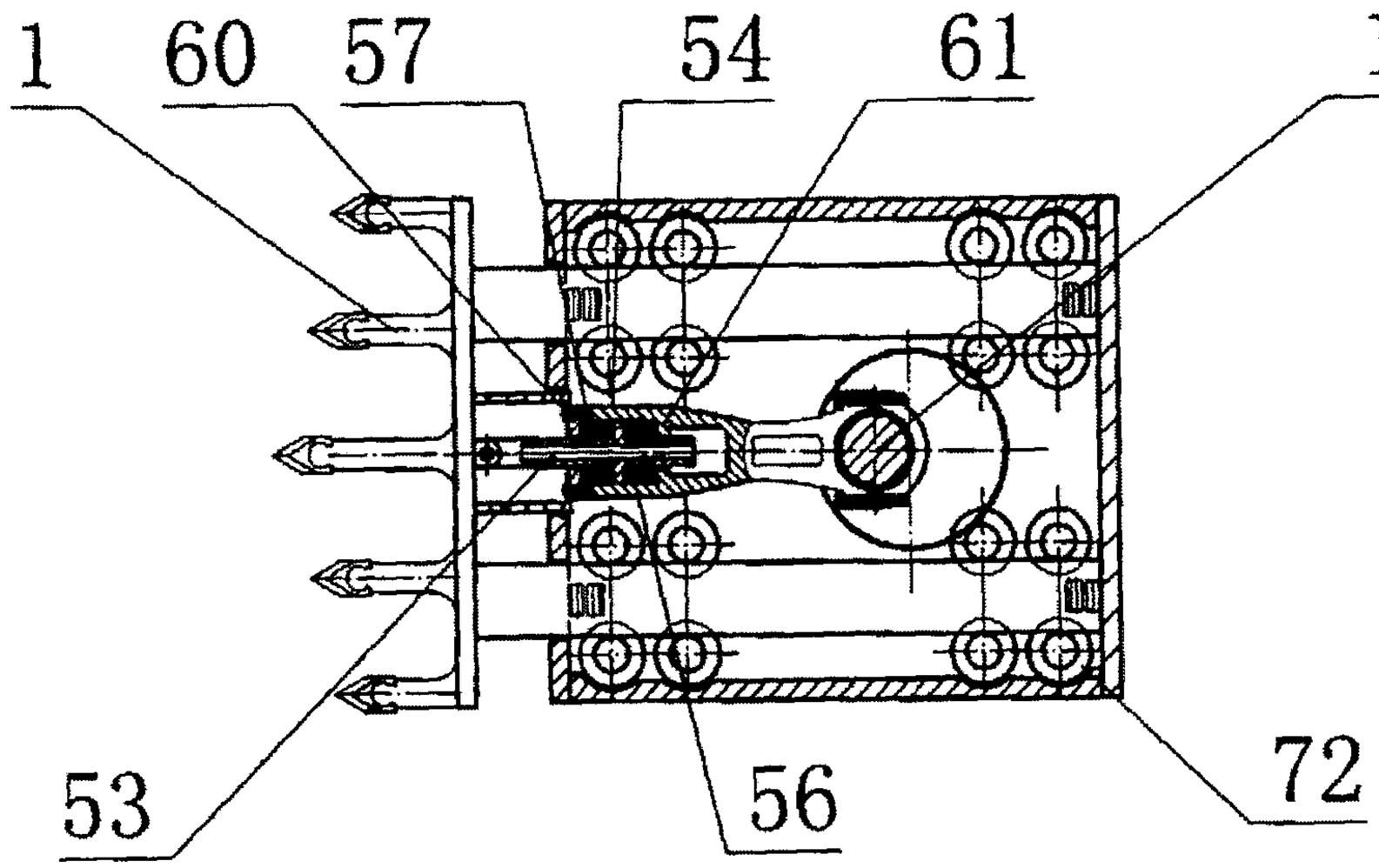


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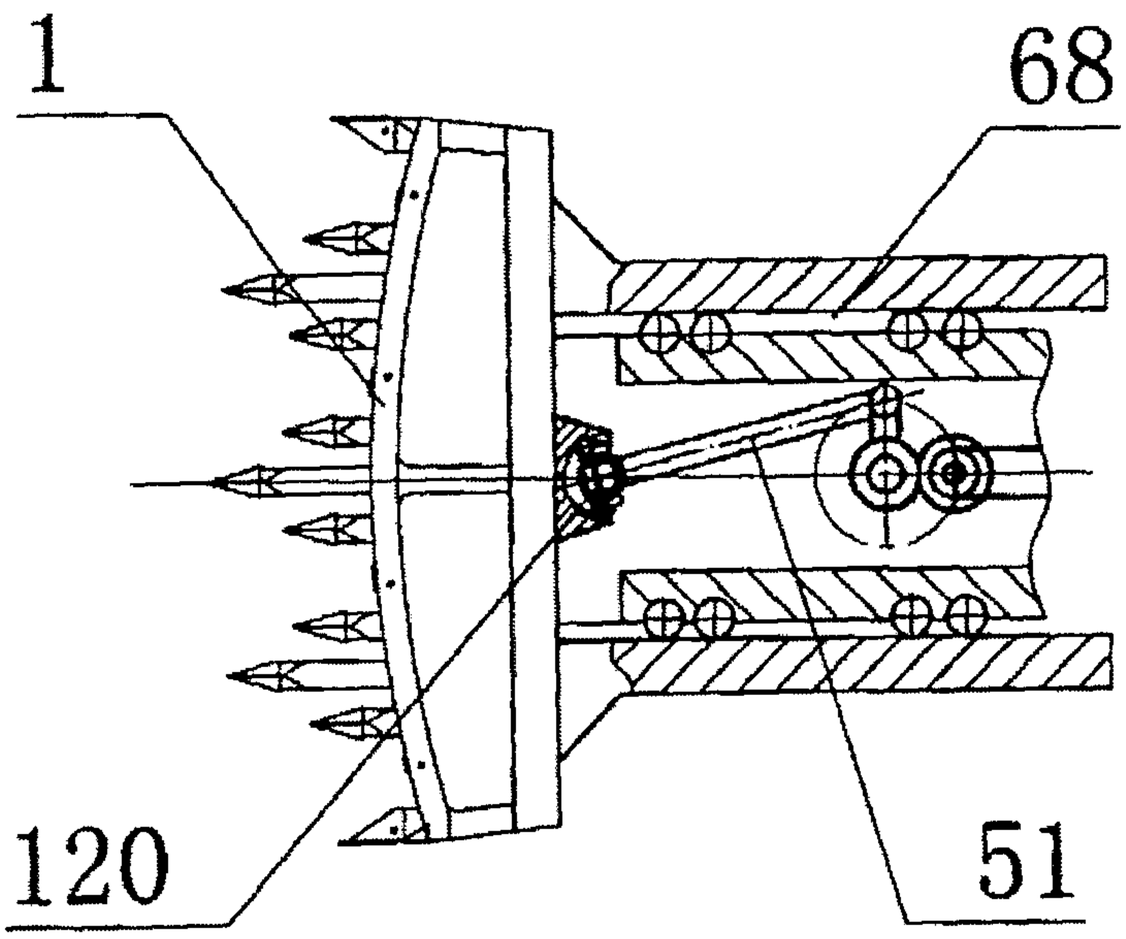


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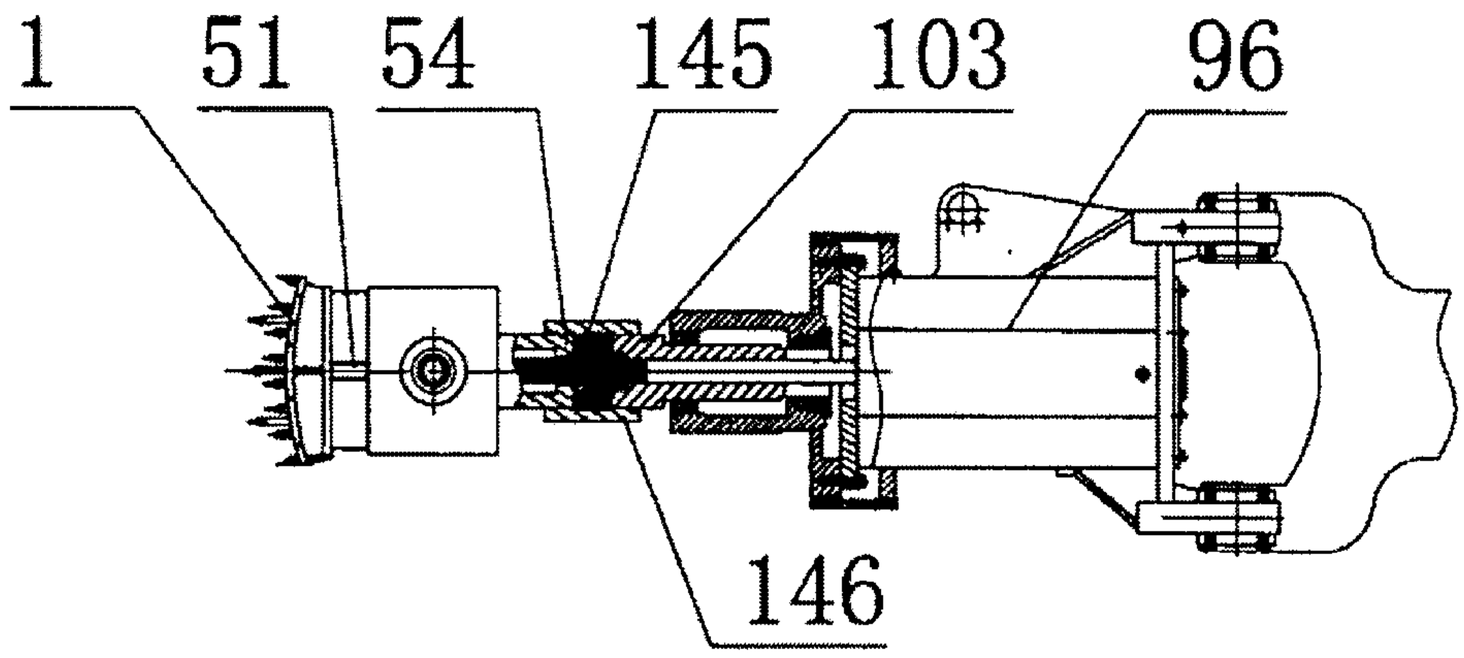


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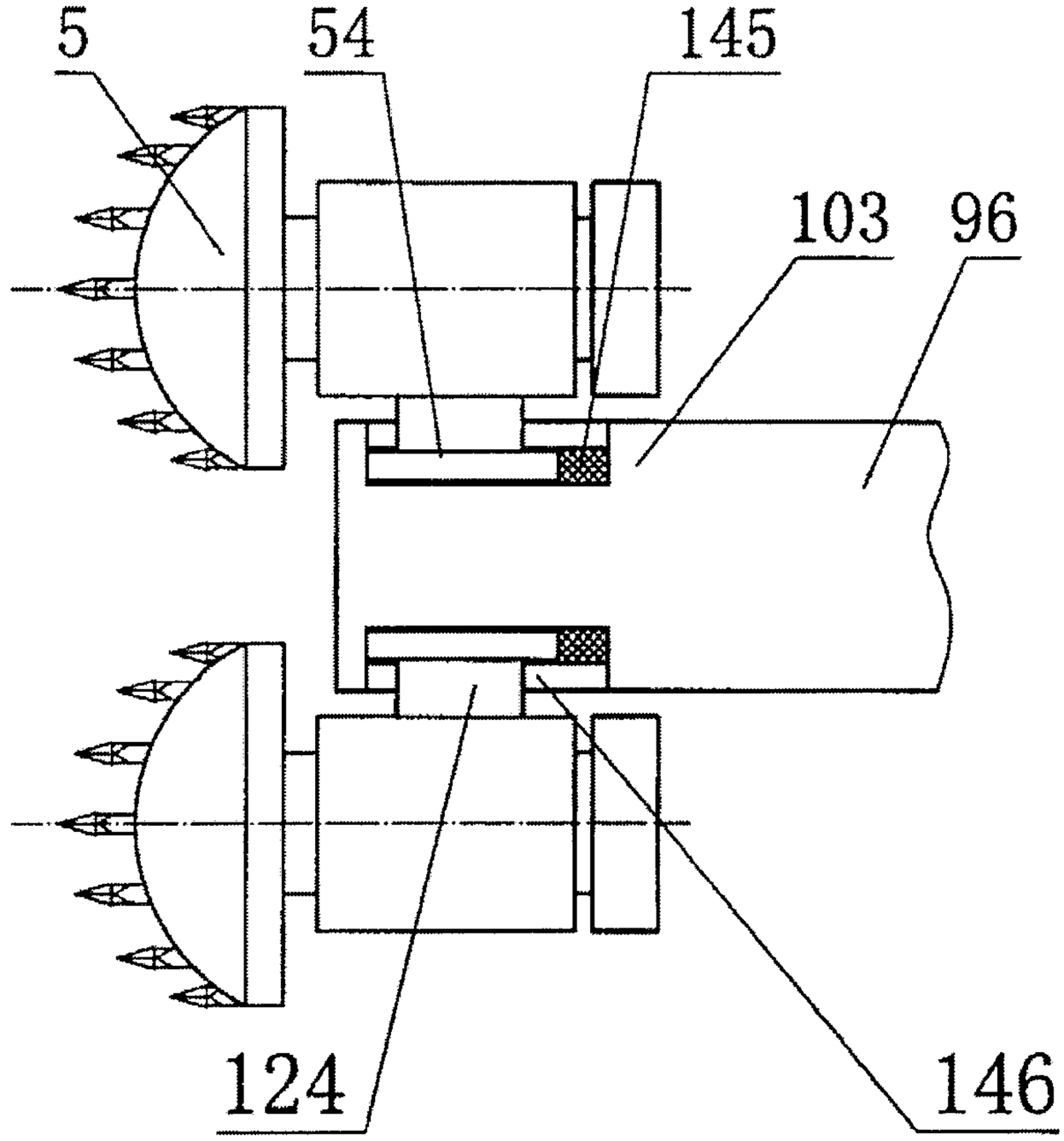


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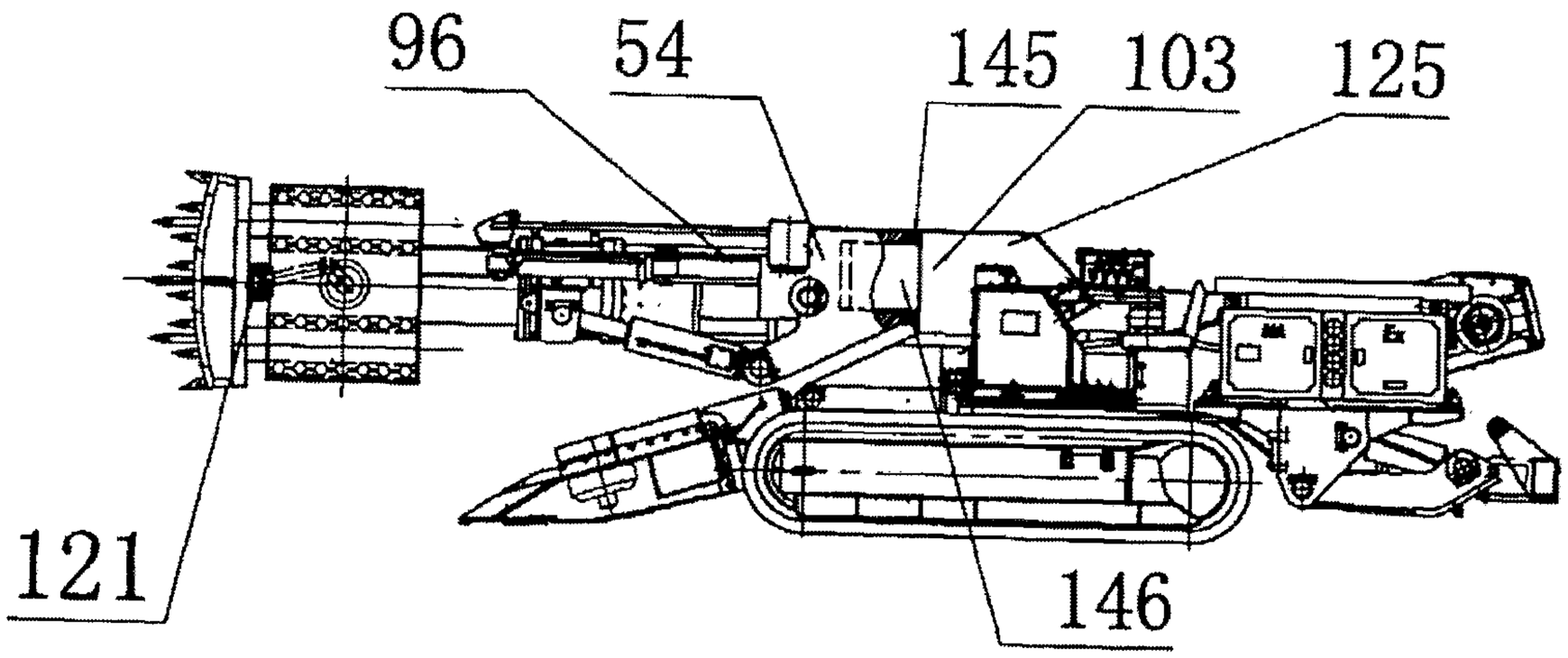


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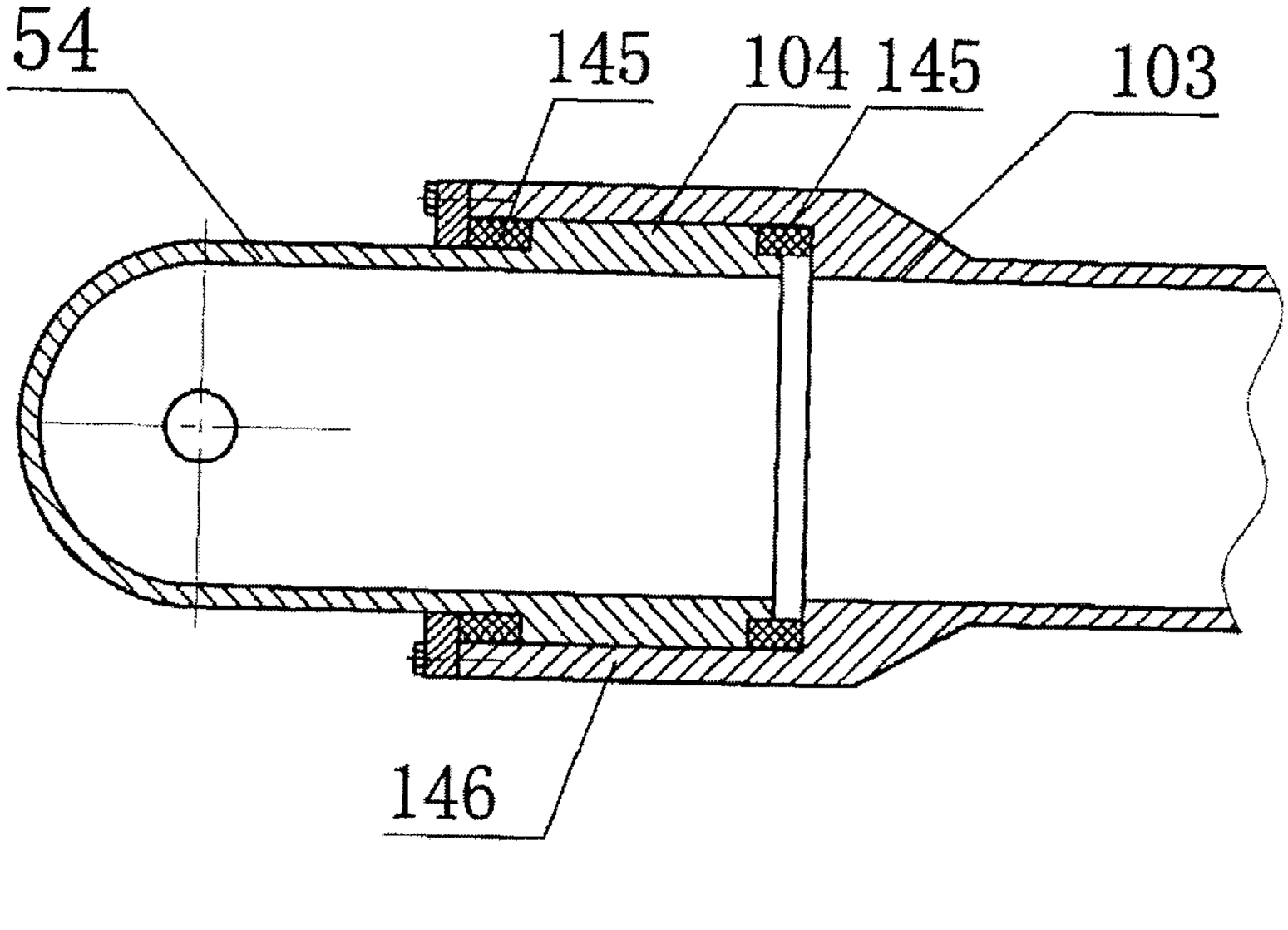


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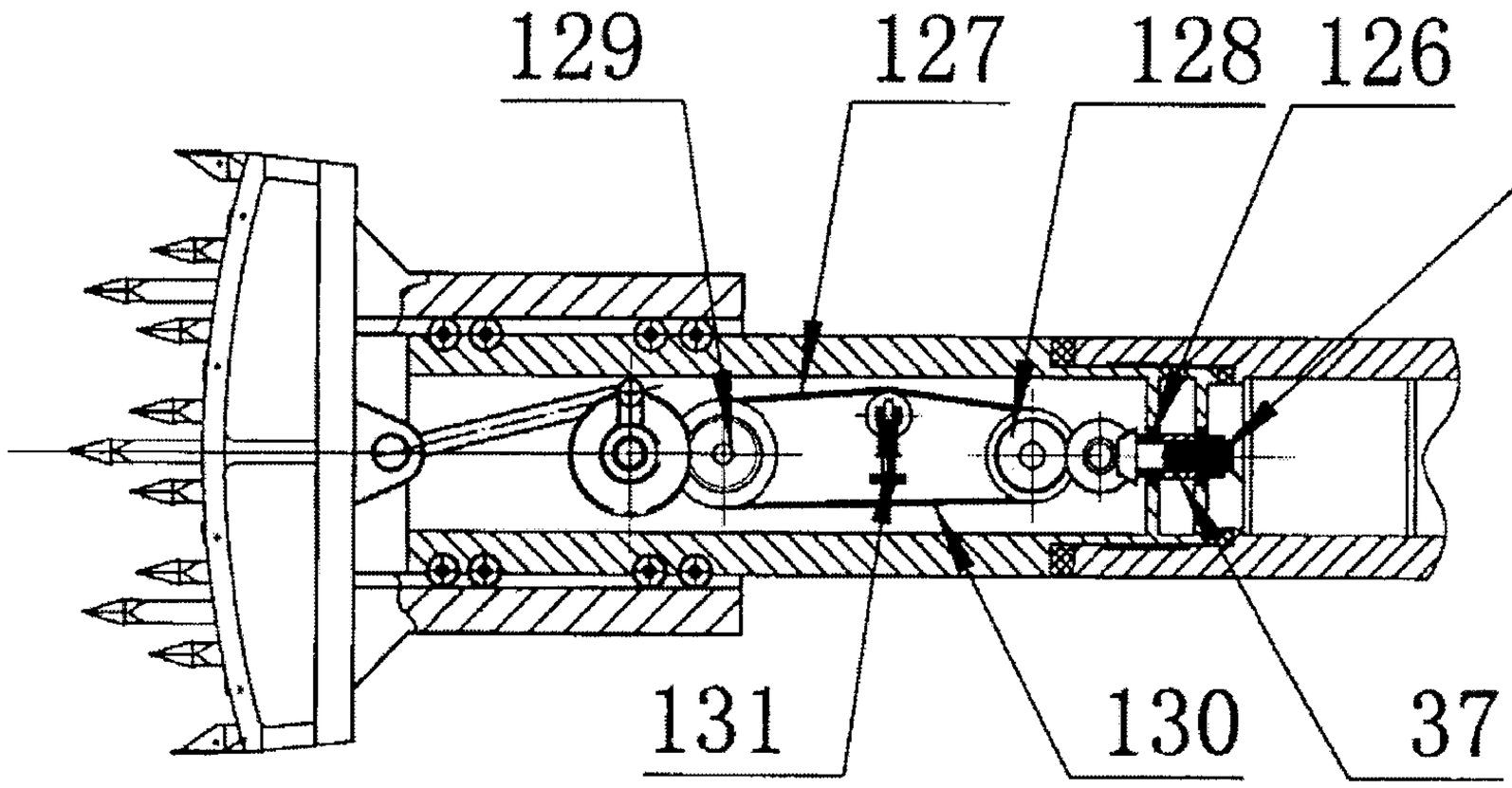


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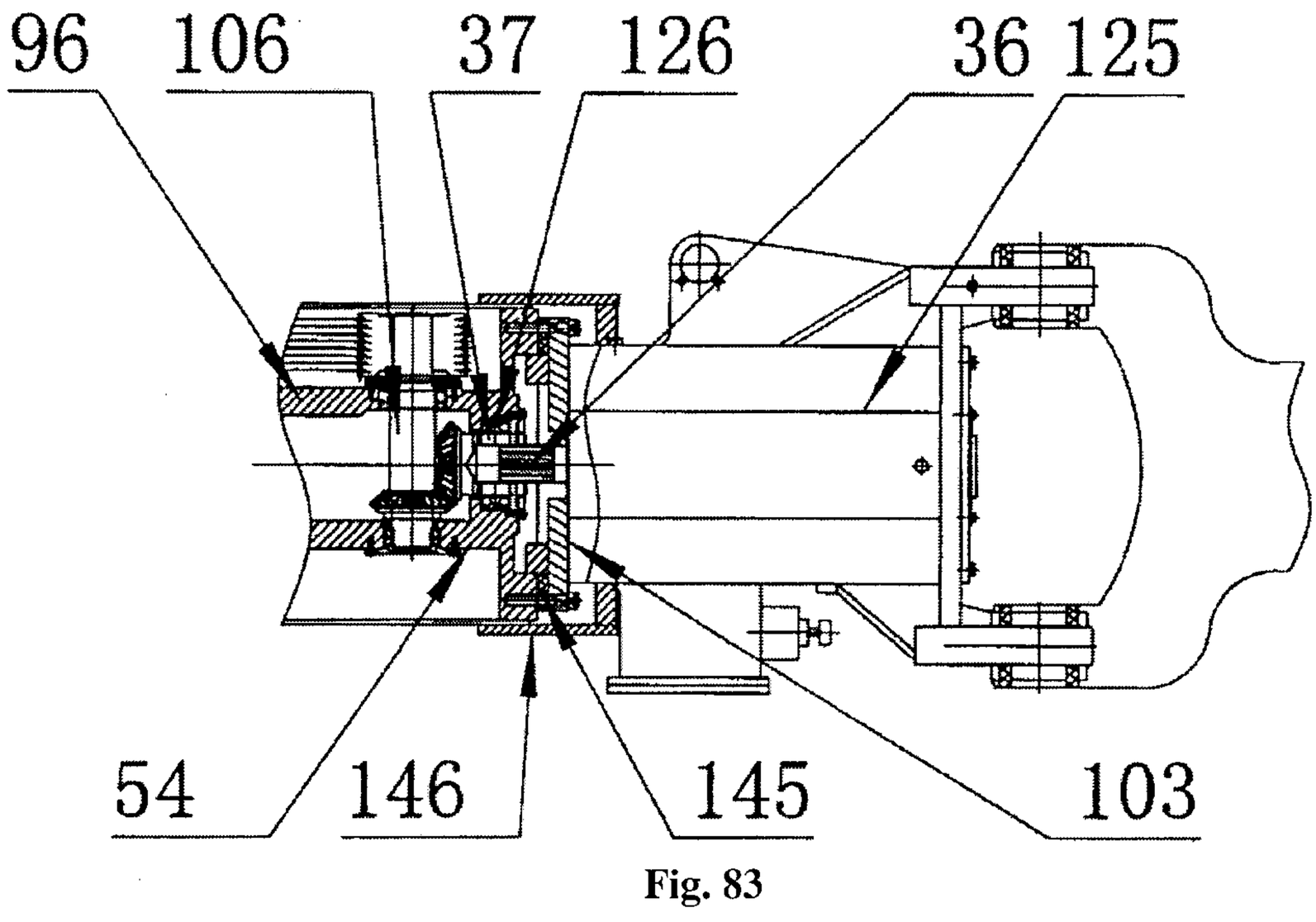


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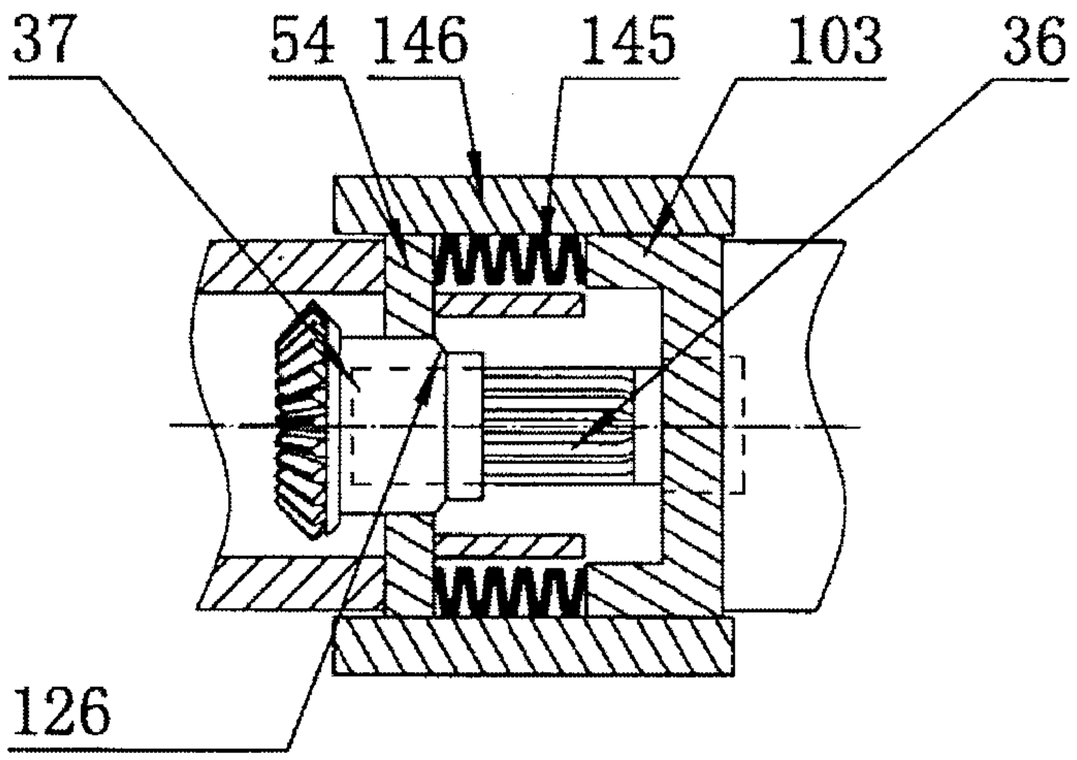


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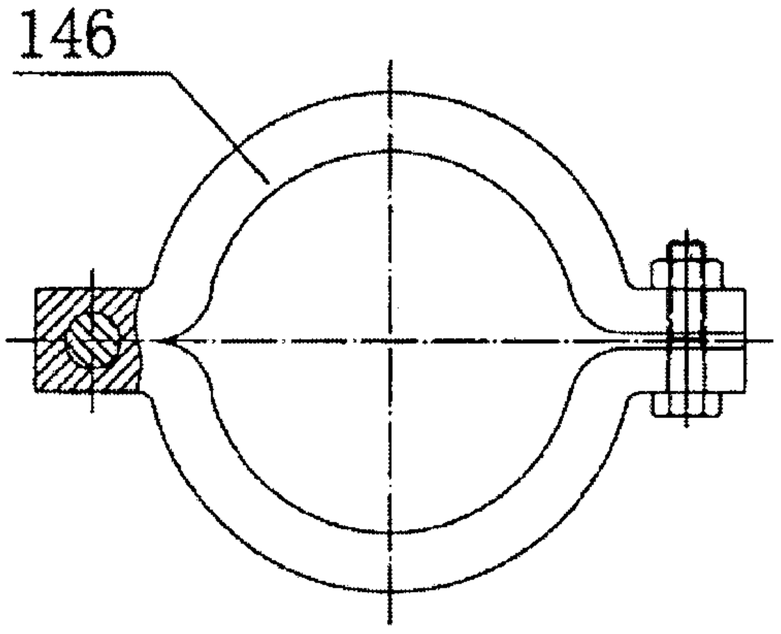


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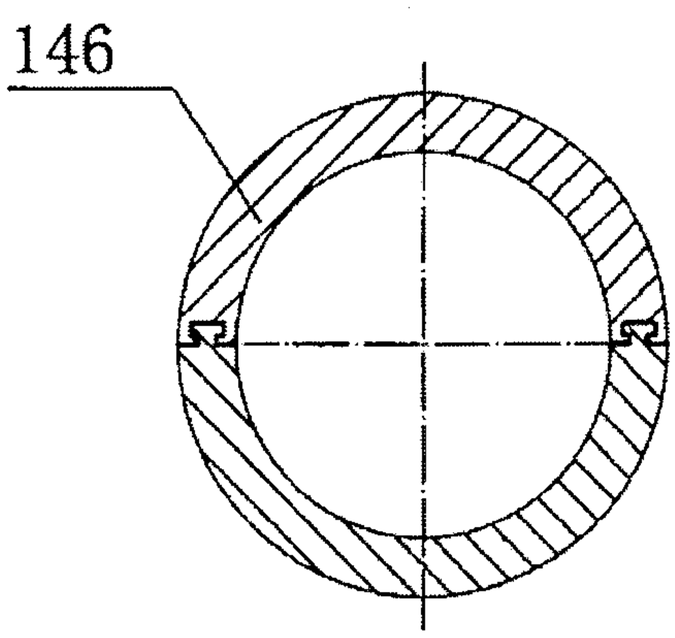


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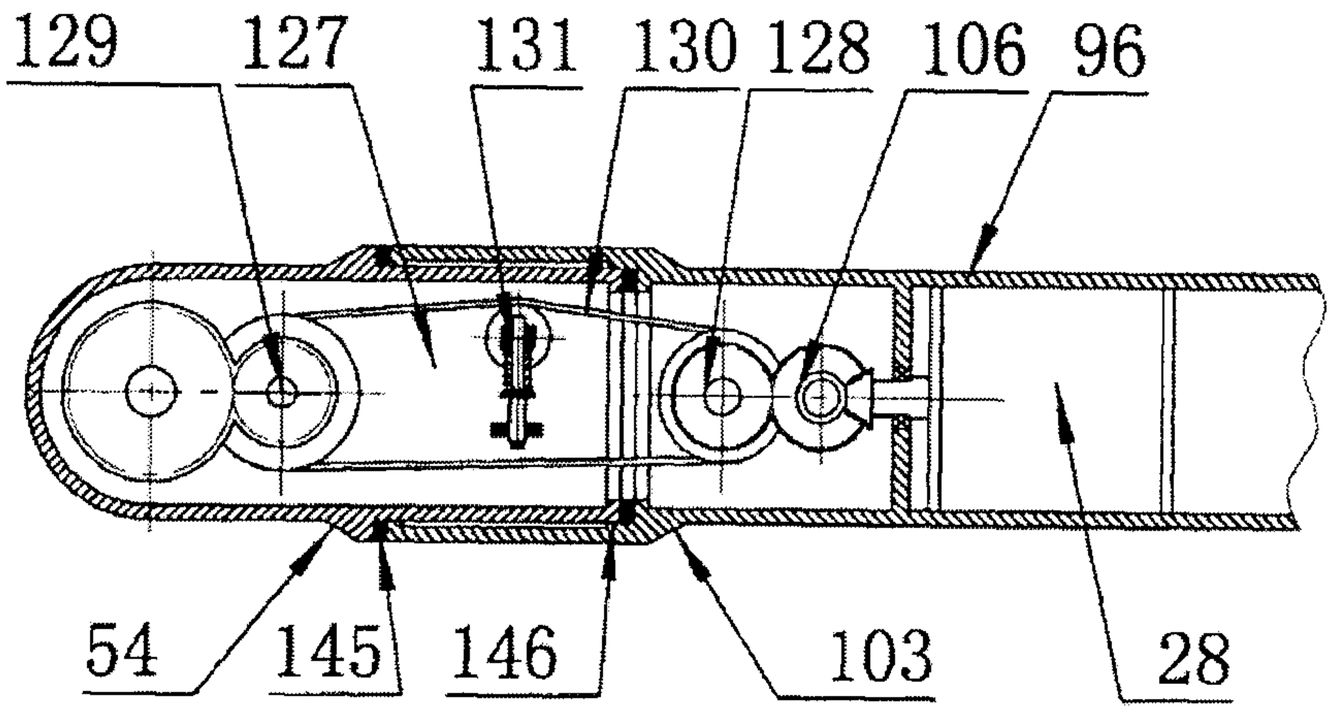

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Fig. 87

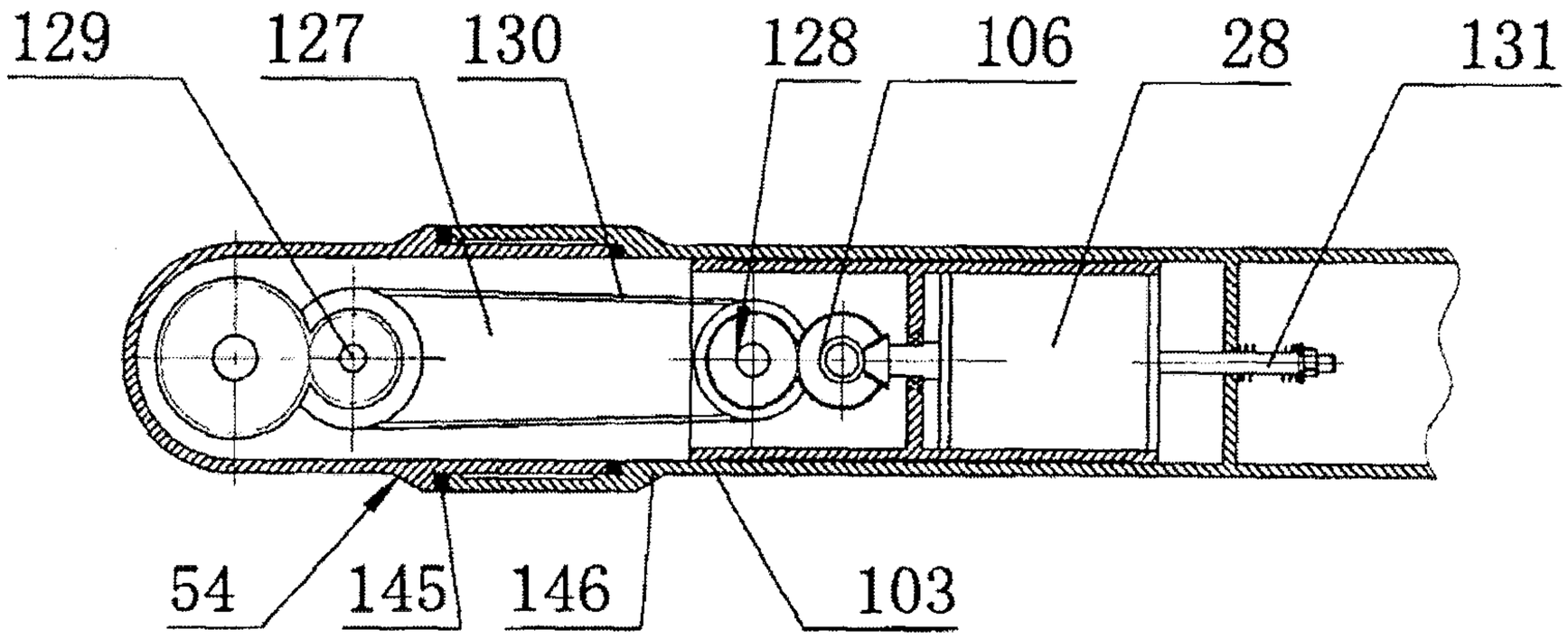

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Fig. 88

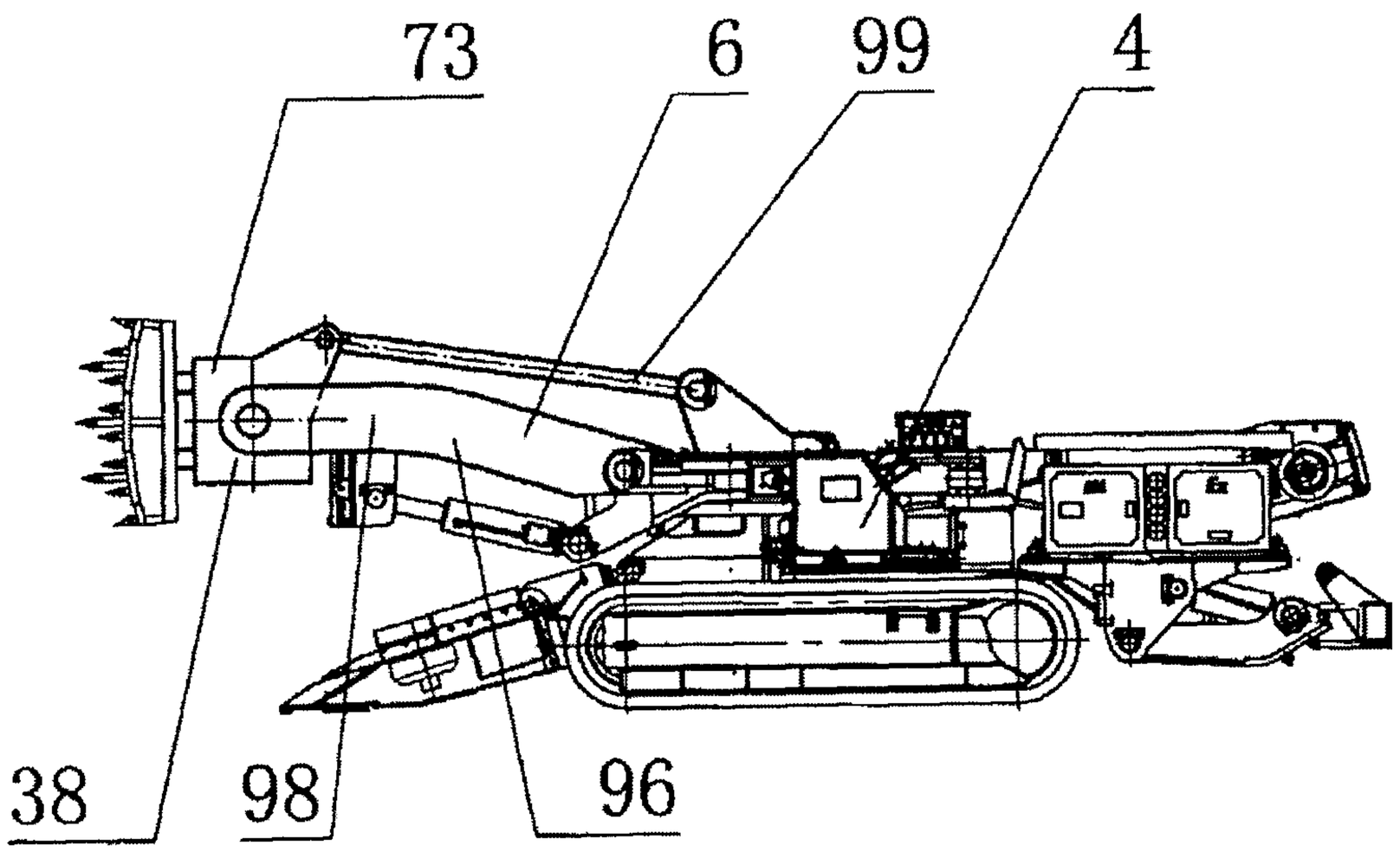


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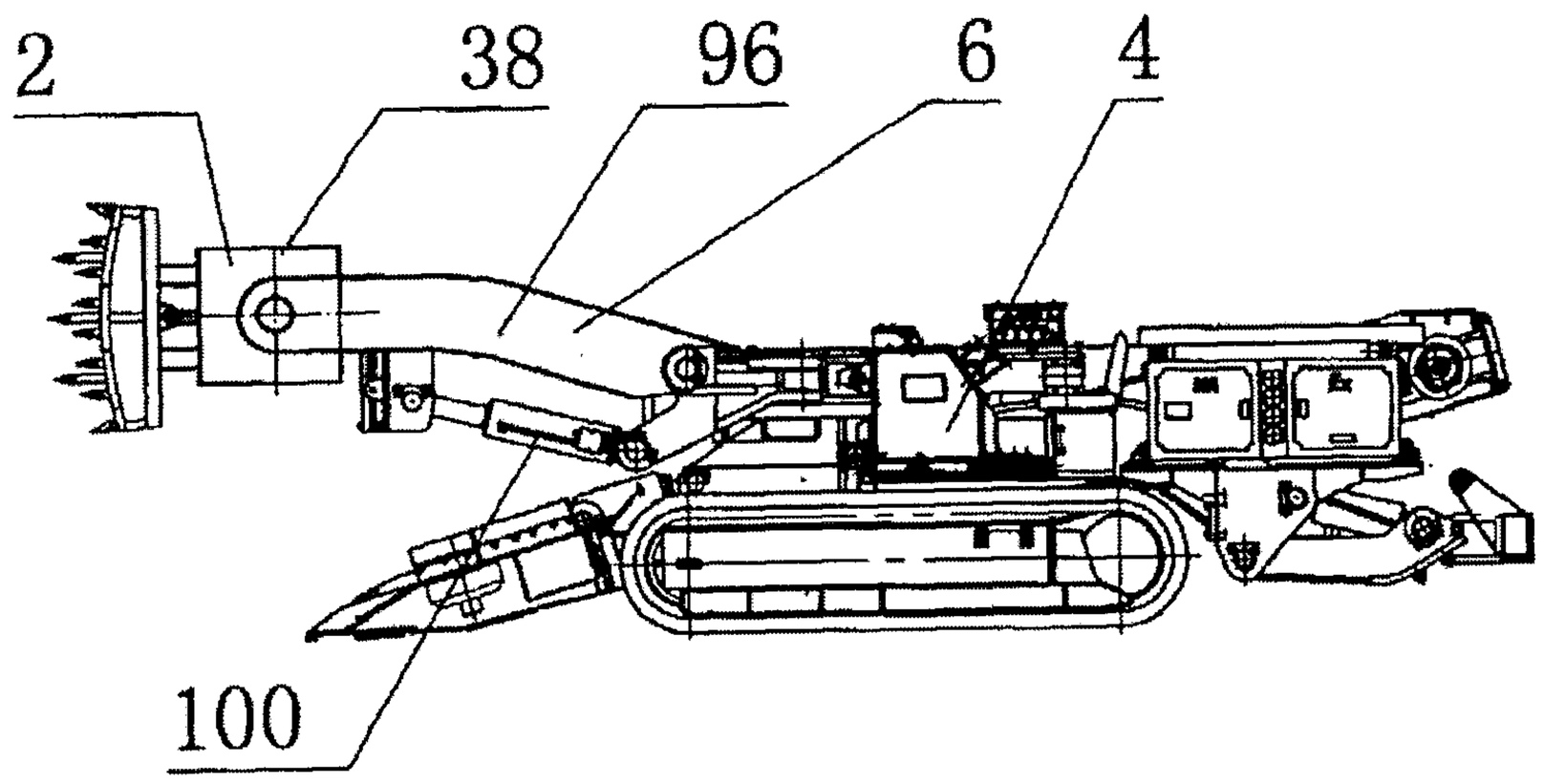


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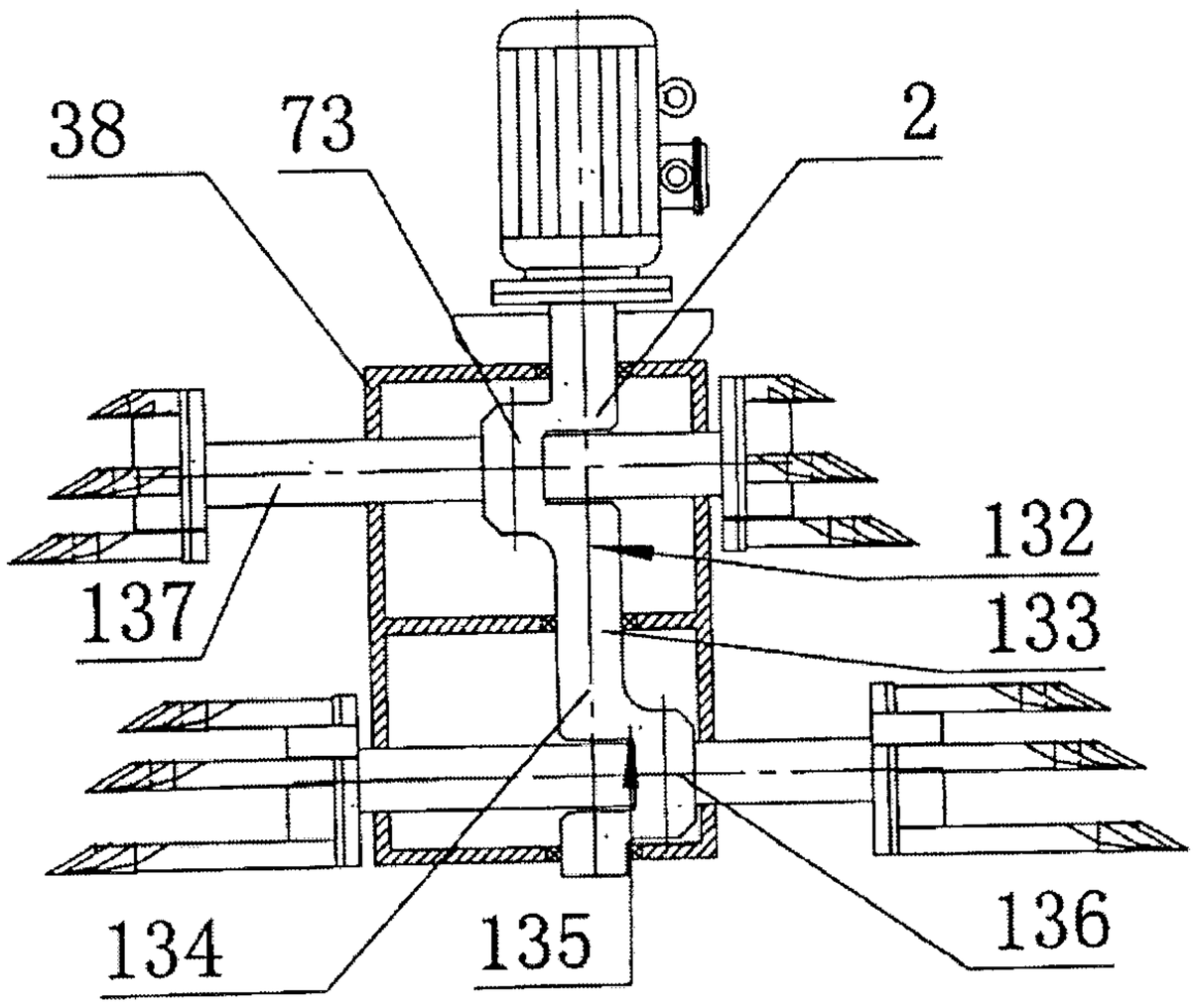


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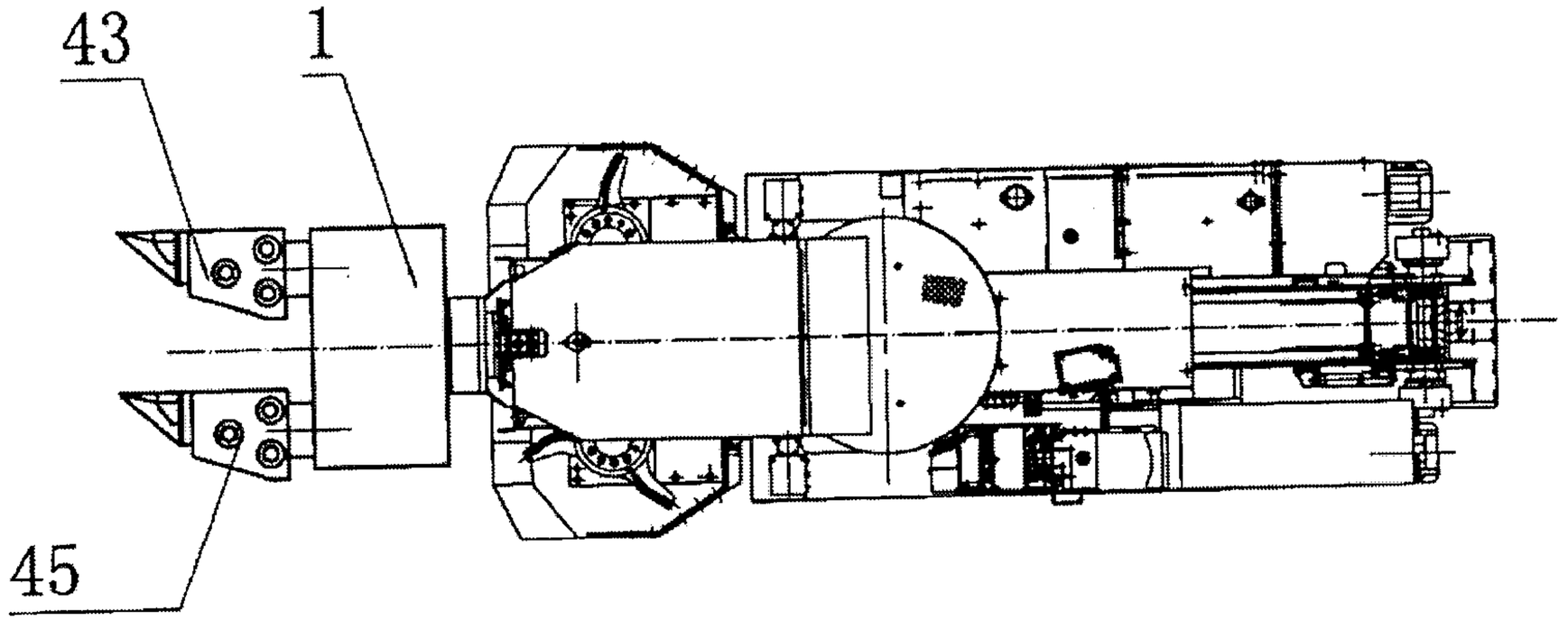


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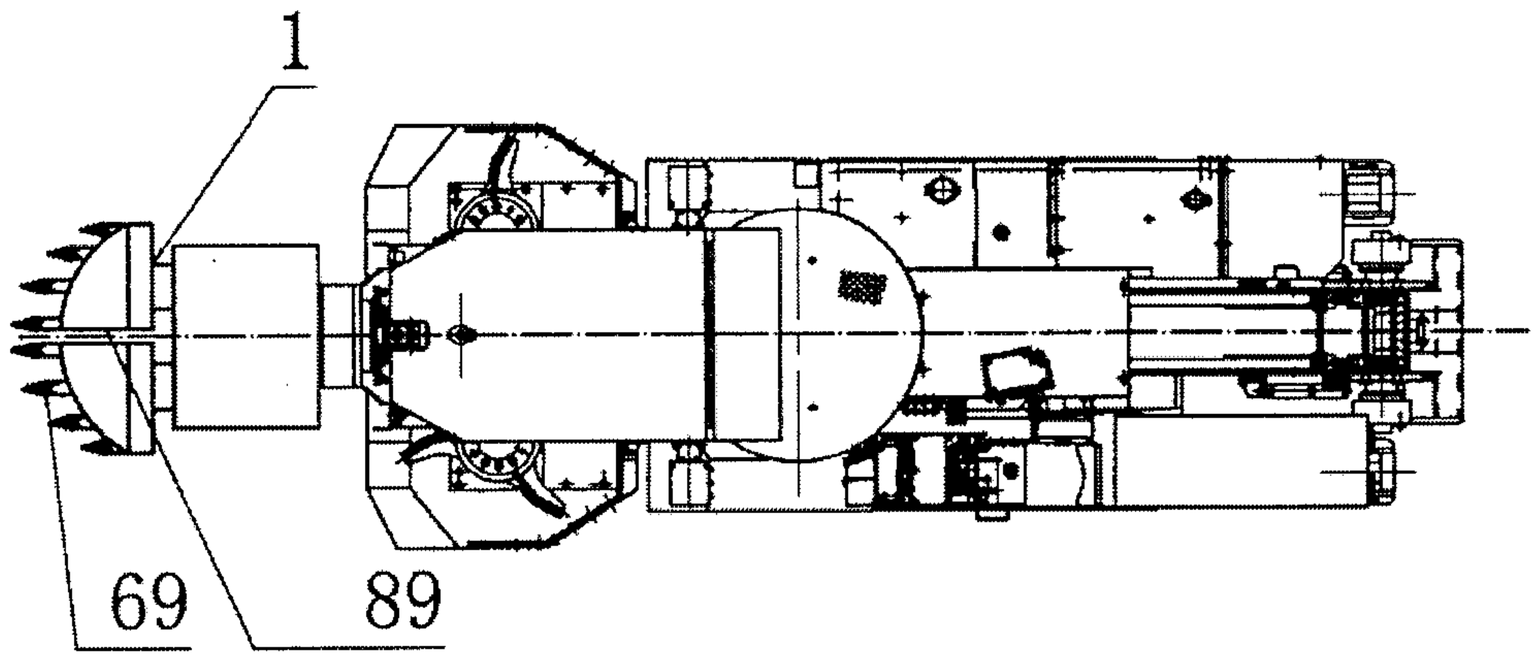


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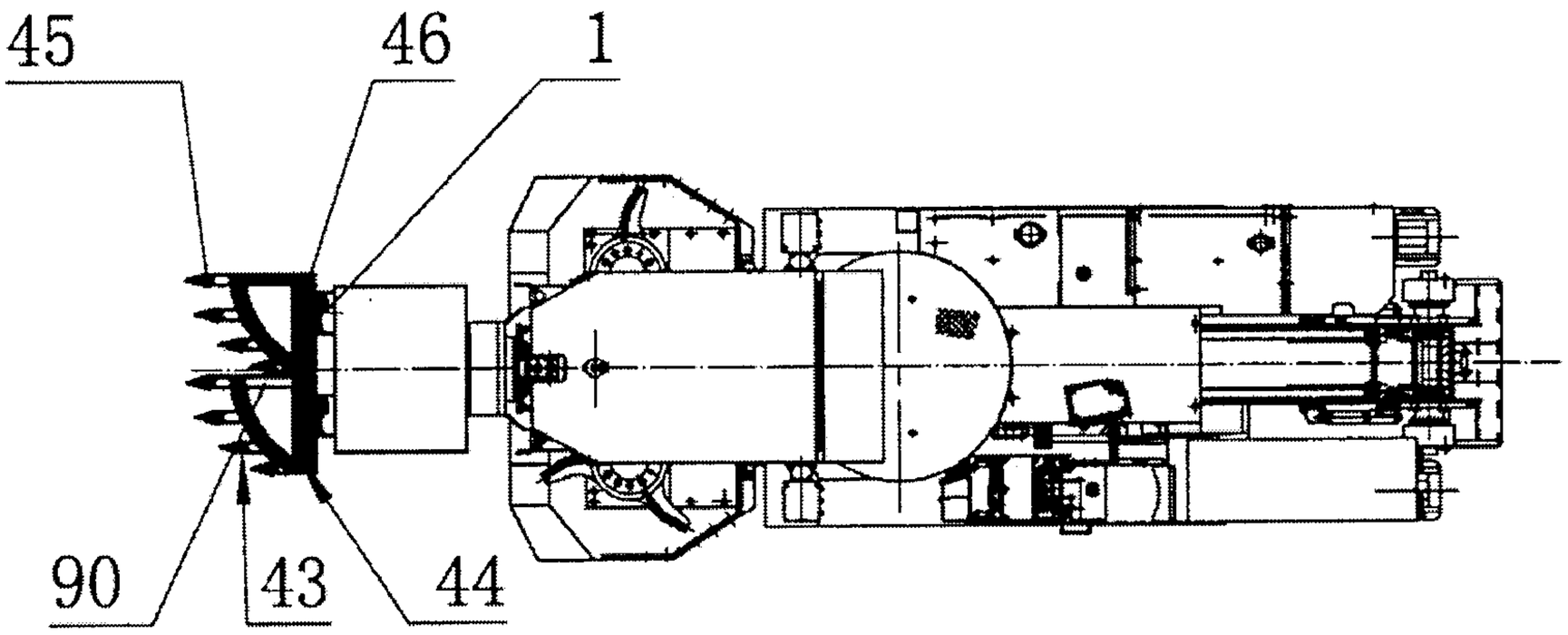


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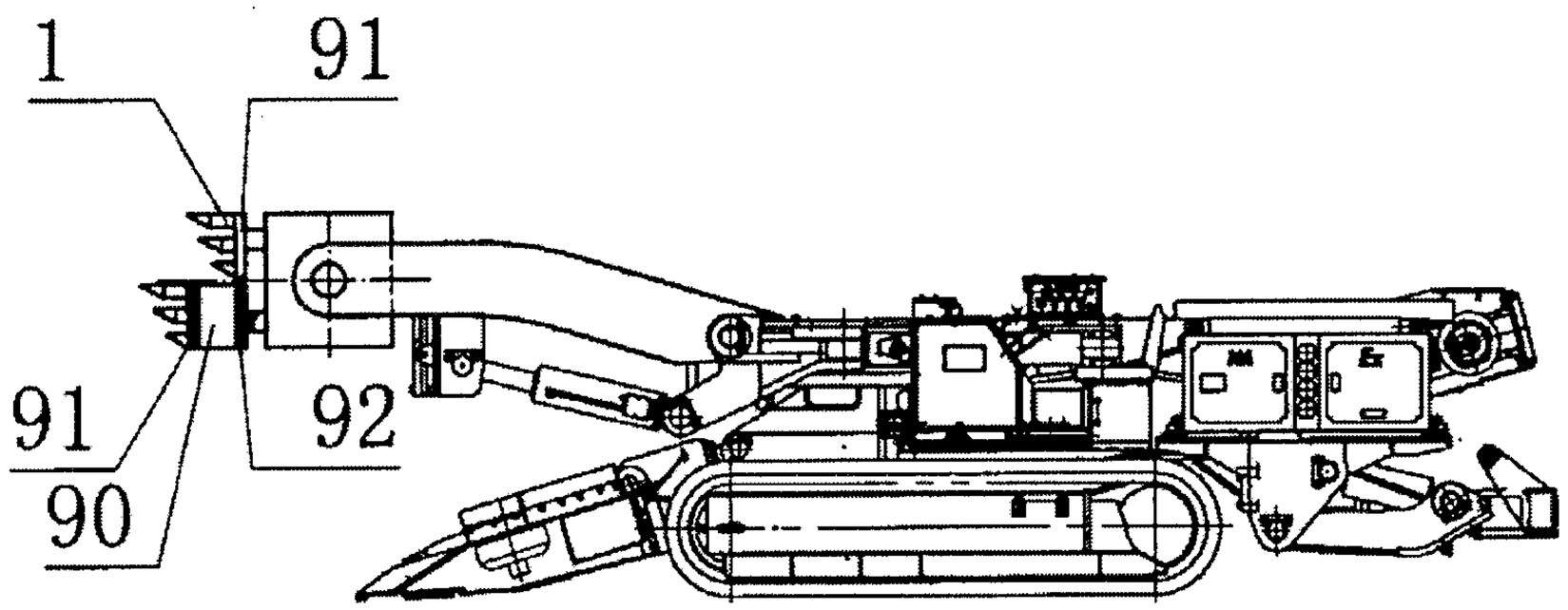


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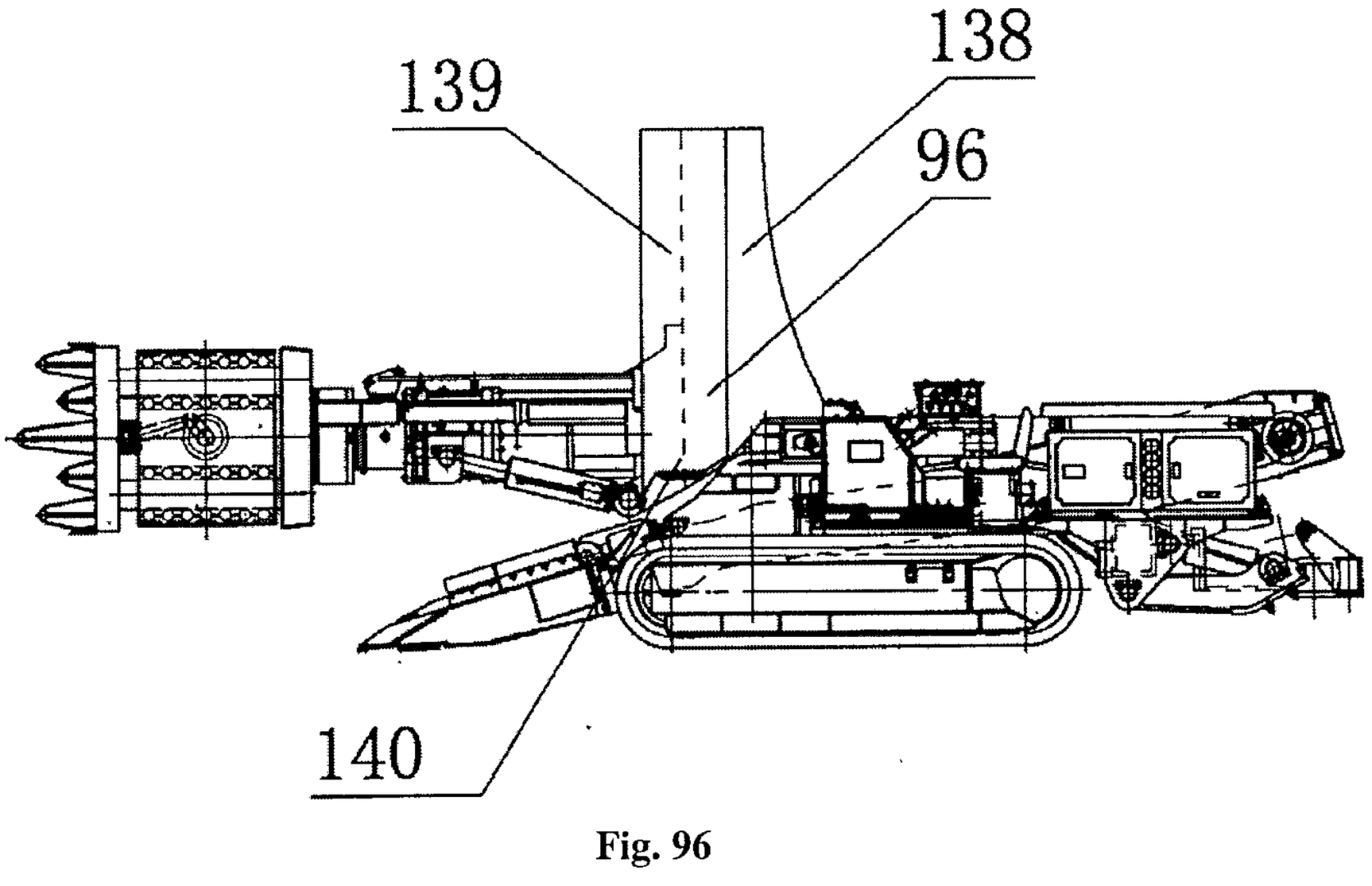


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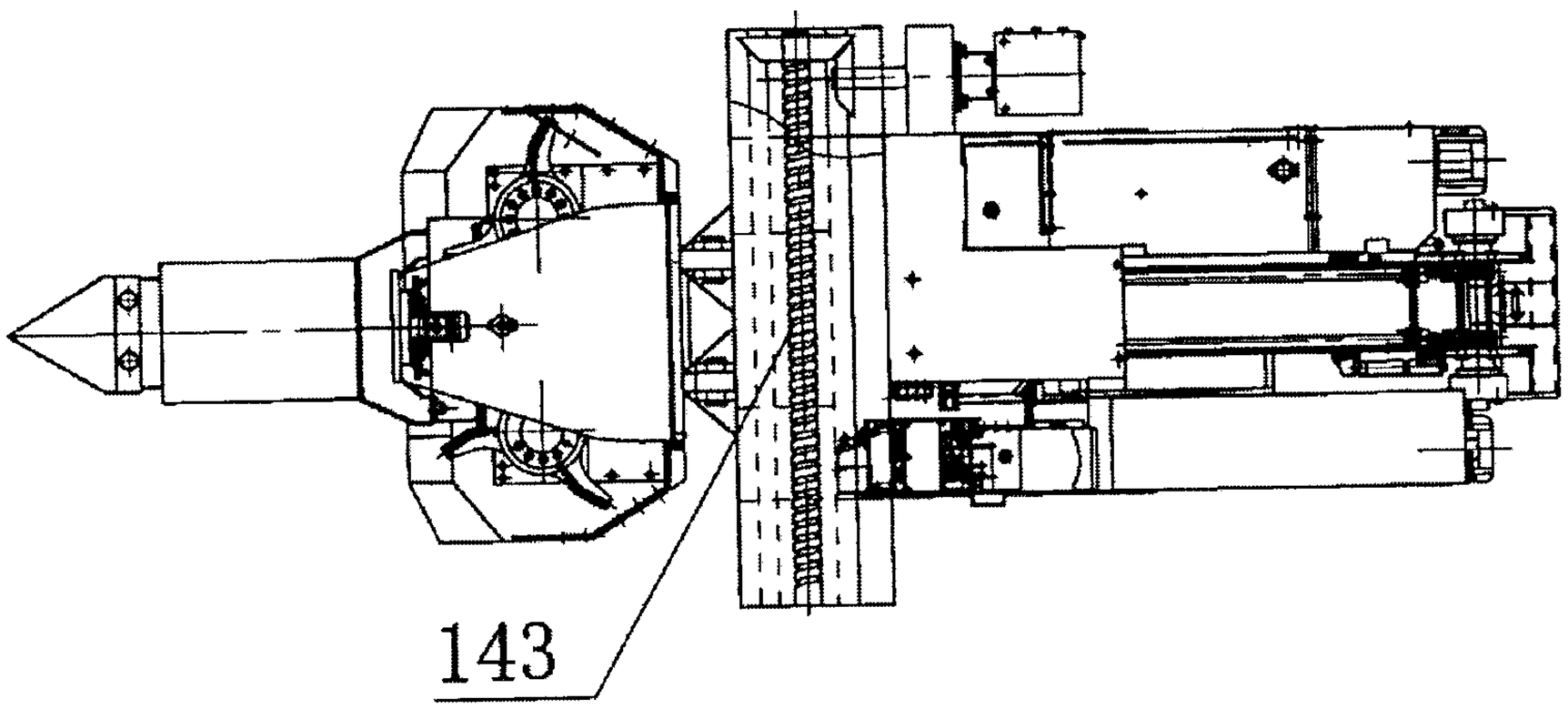


Fig. 97

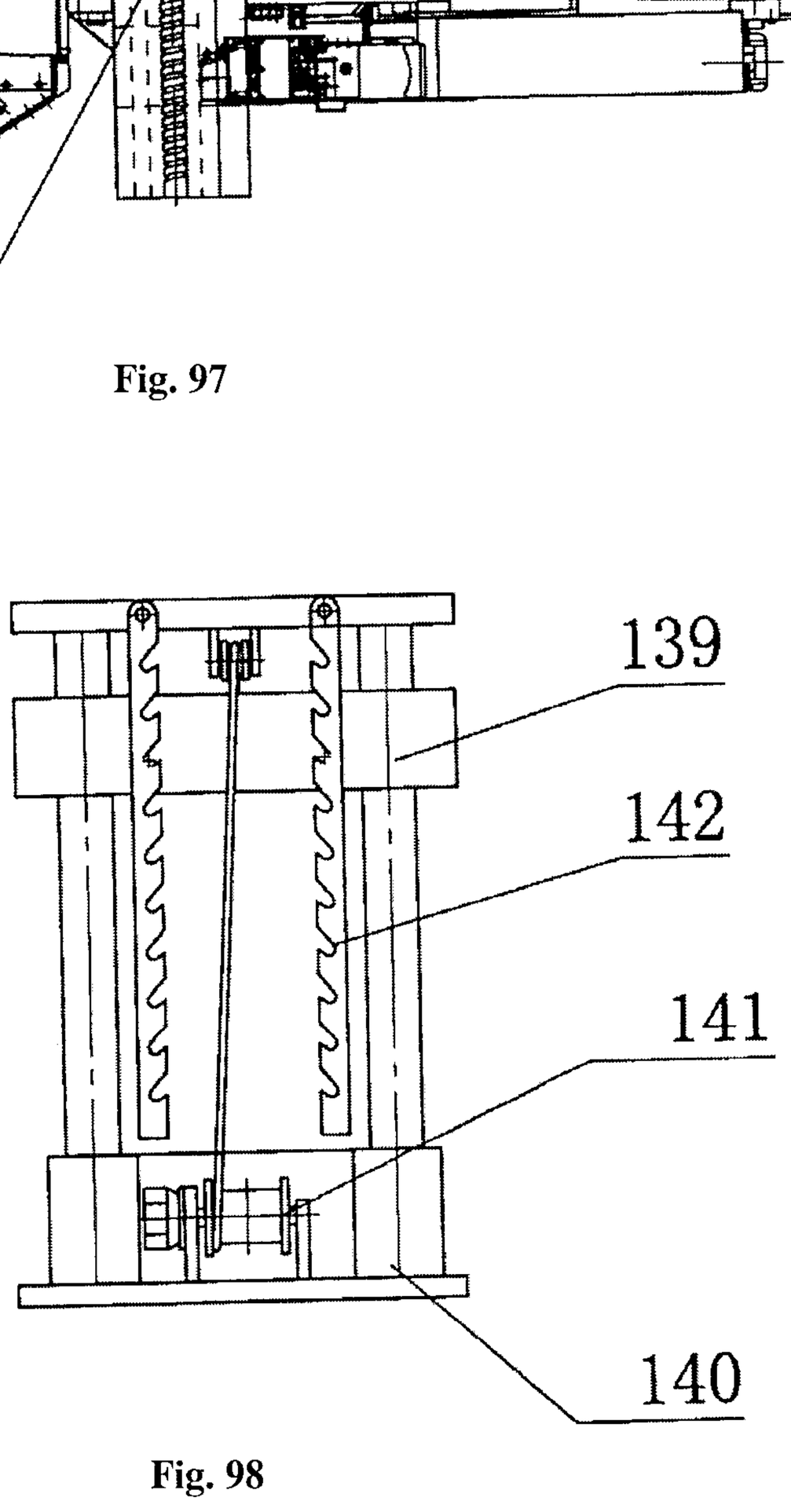


Fig. 98

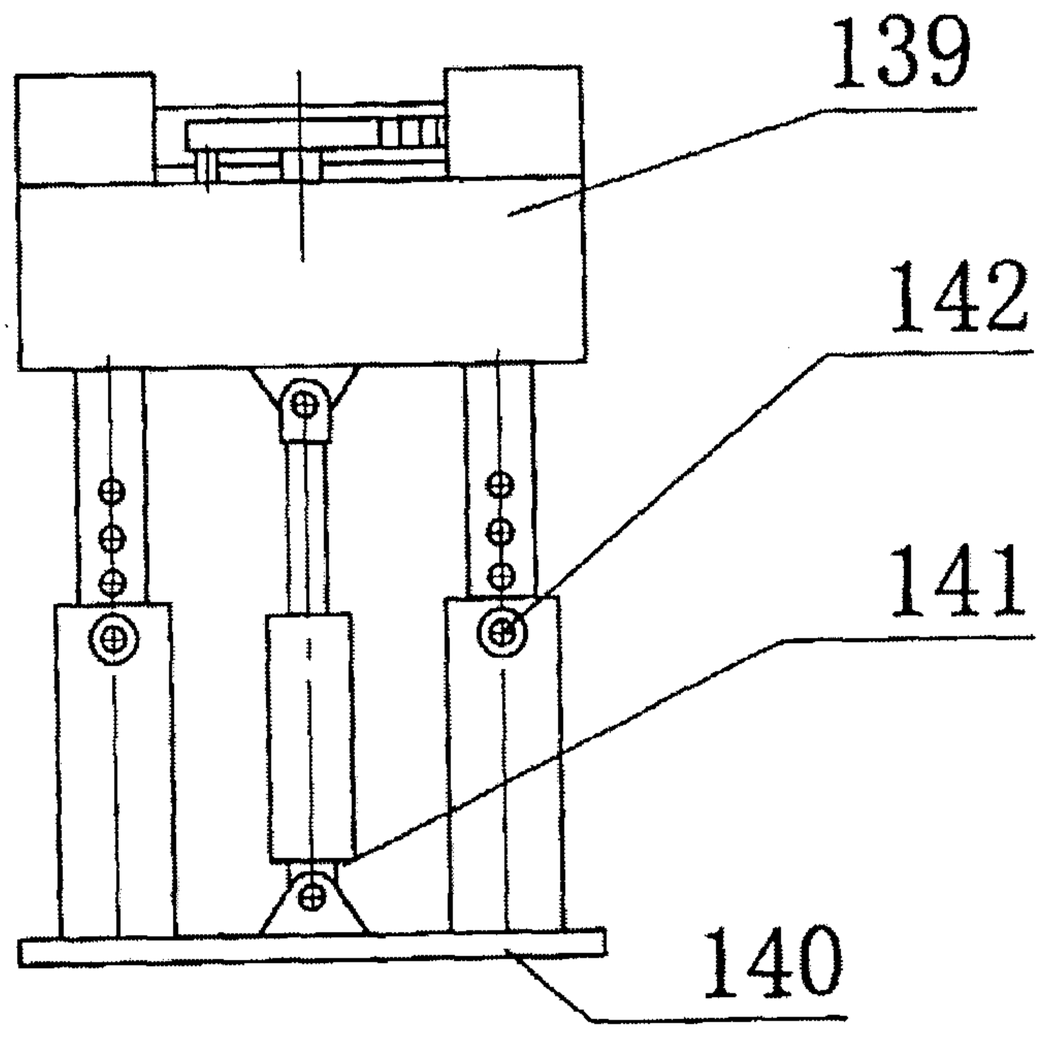


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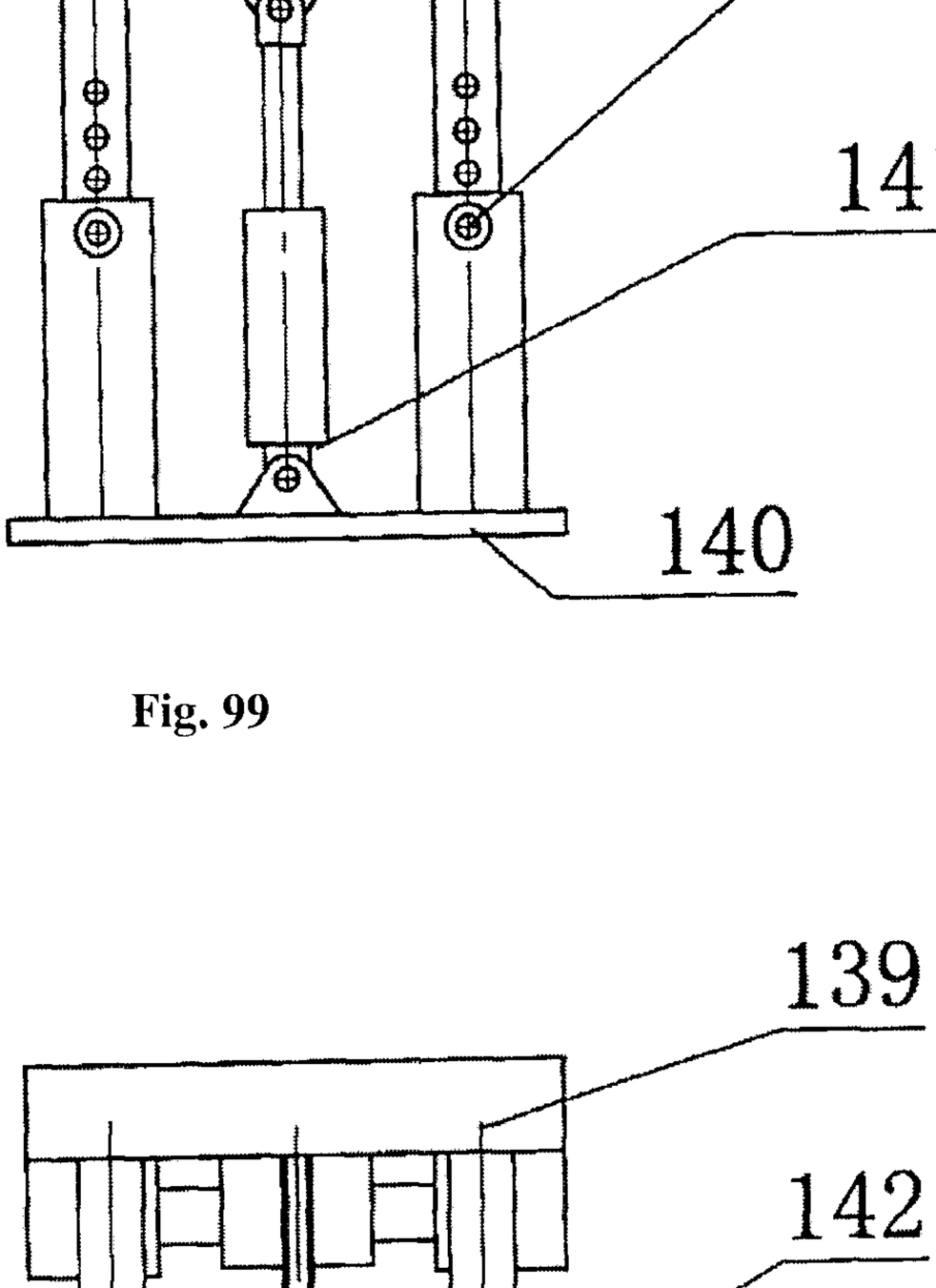


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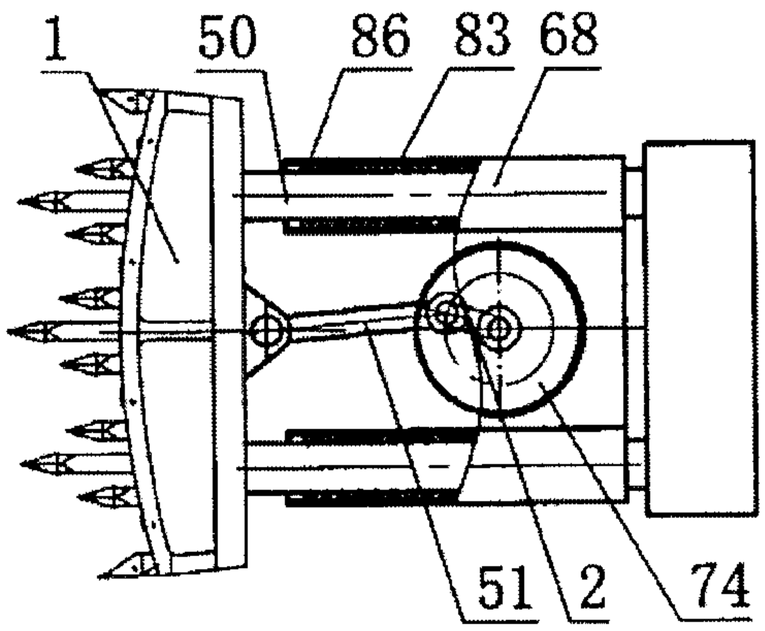


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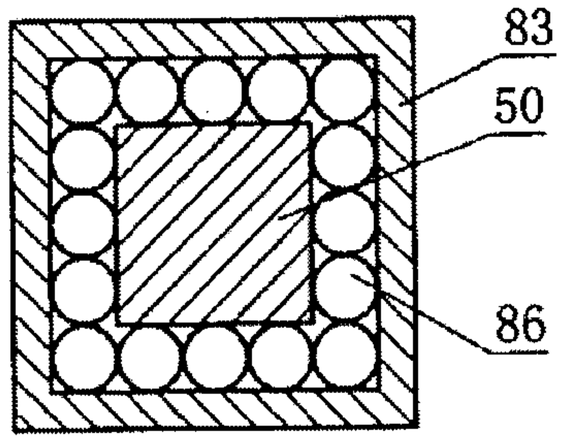


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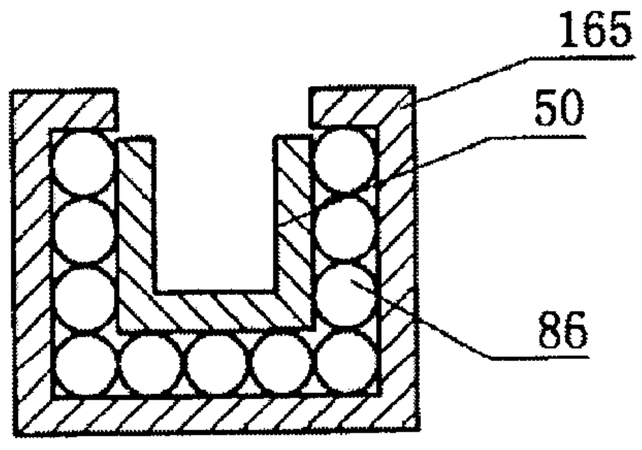


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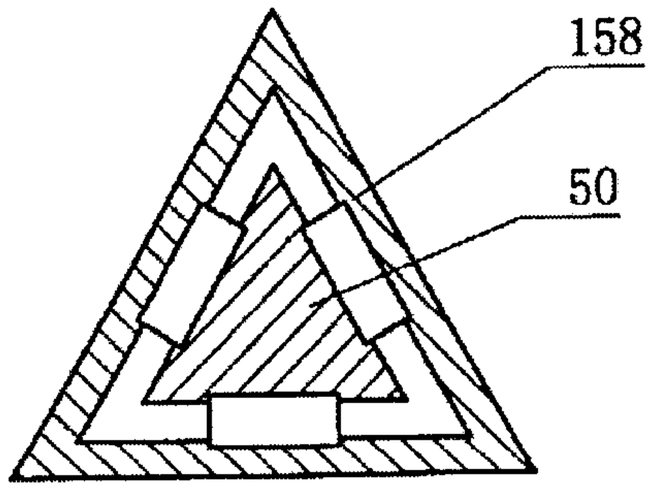


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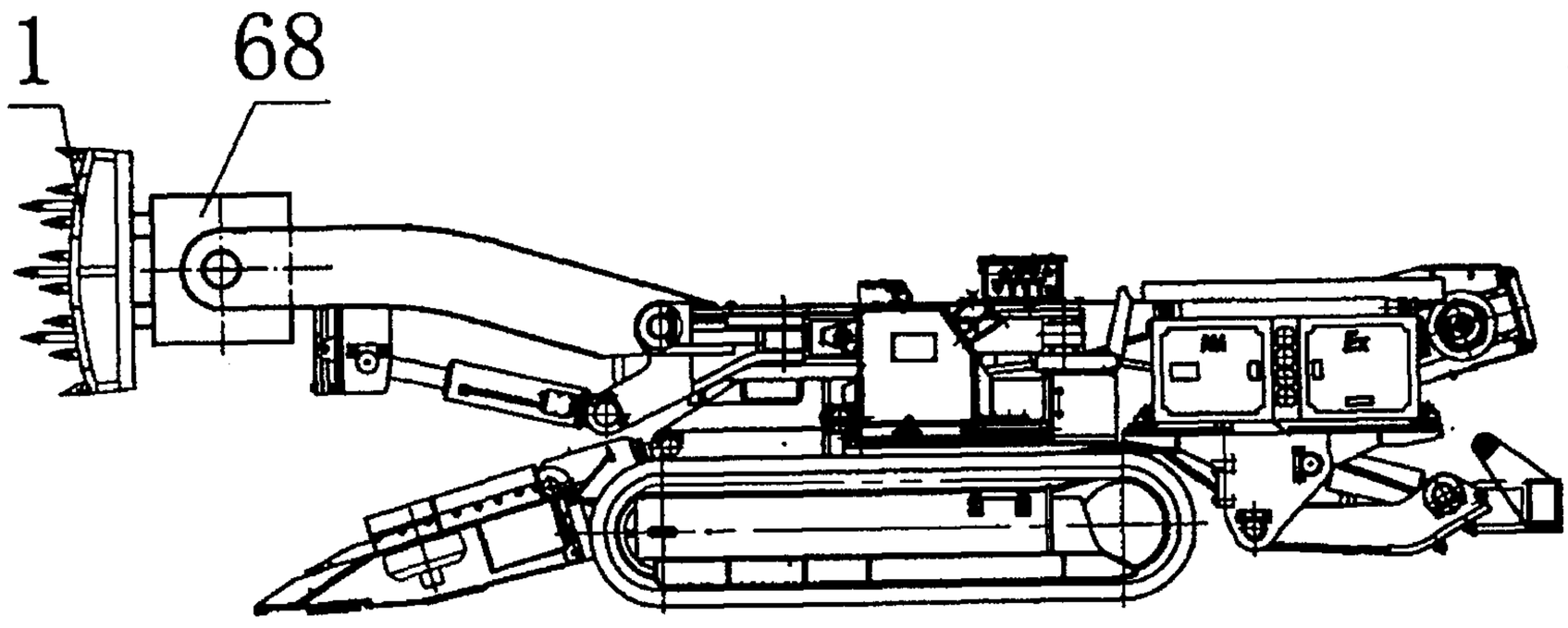


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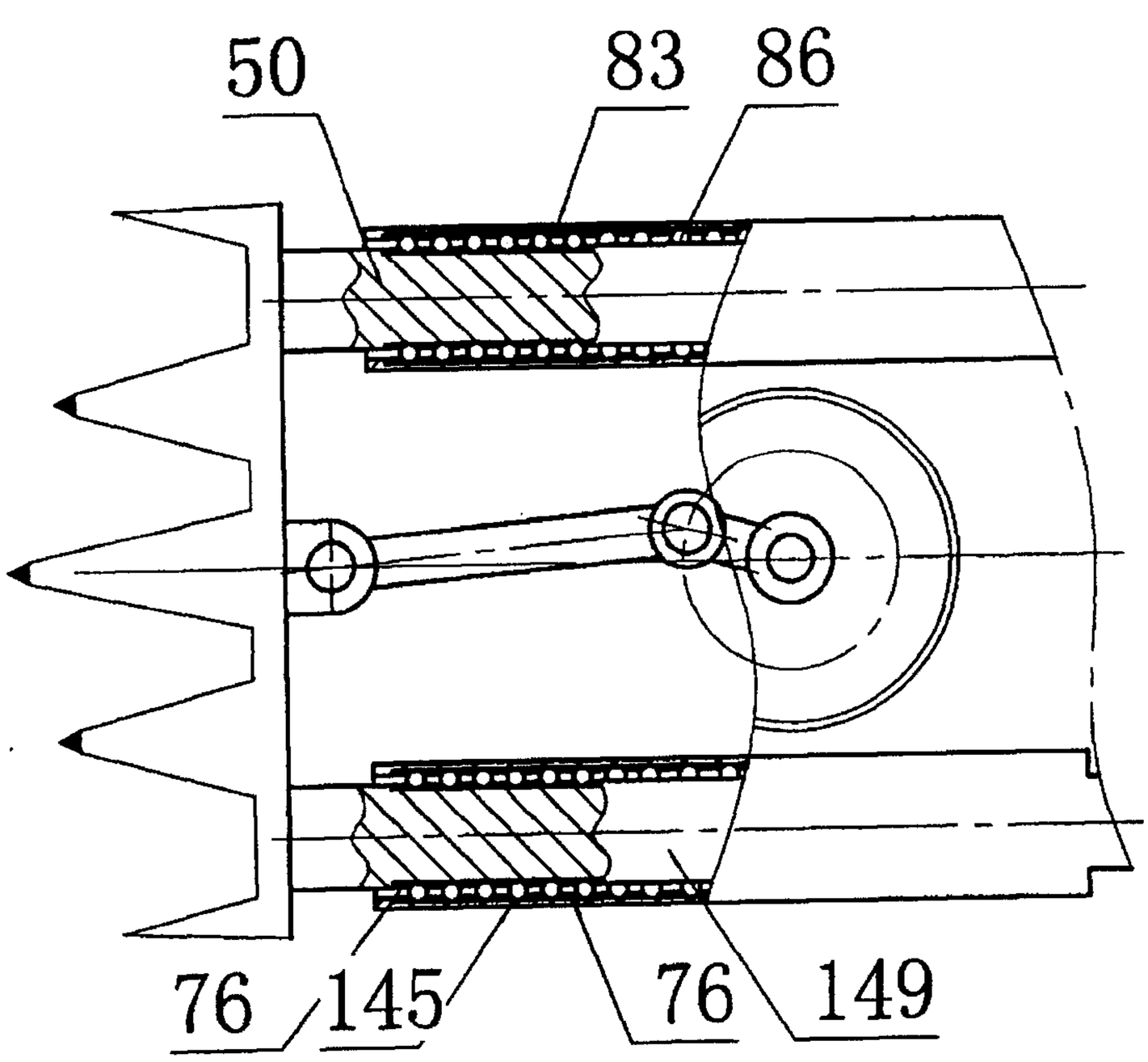


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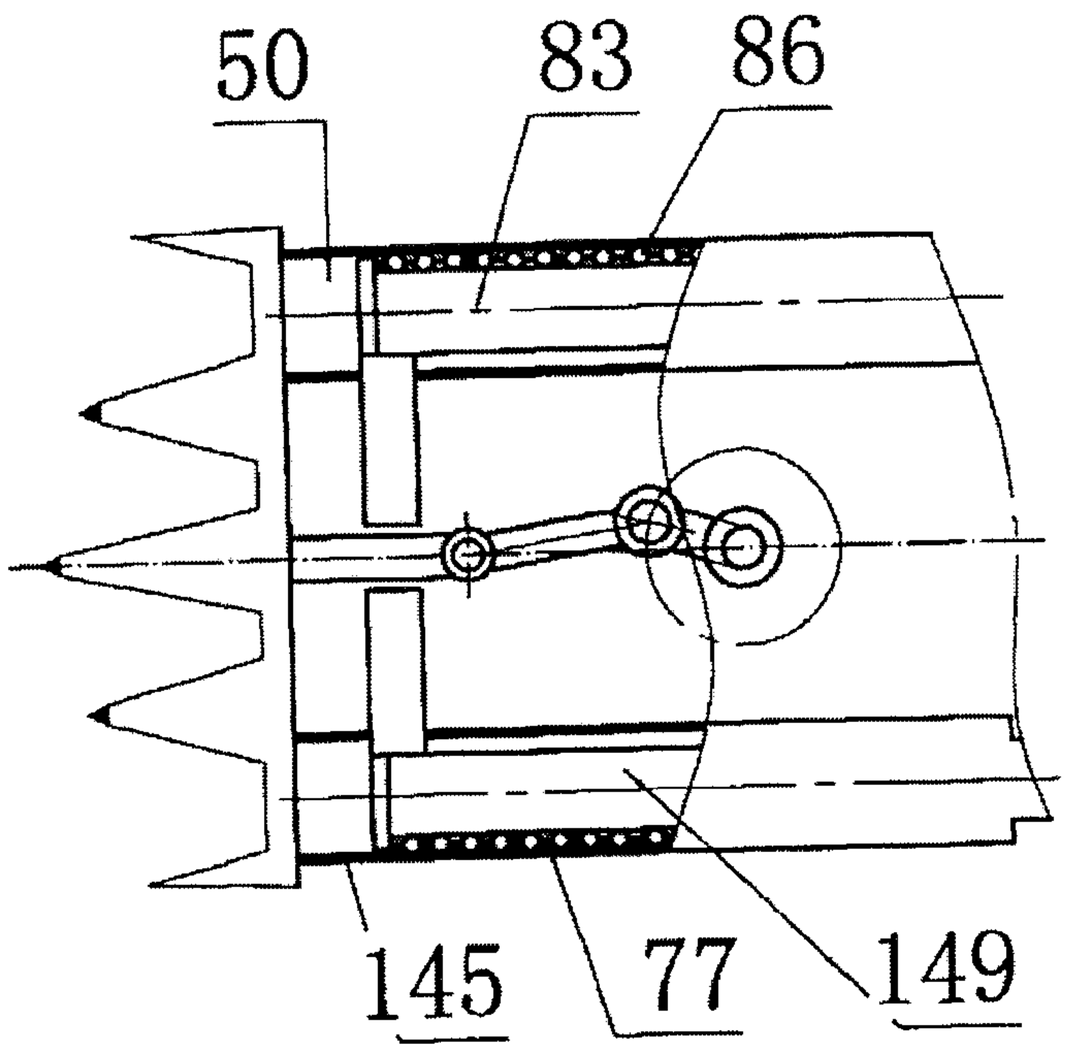


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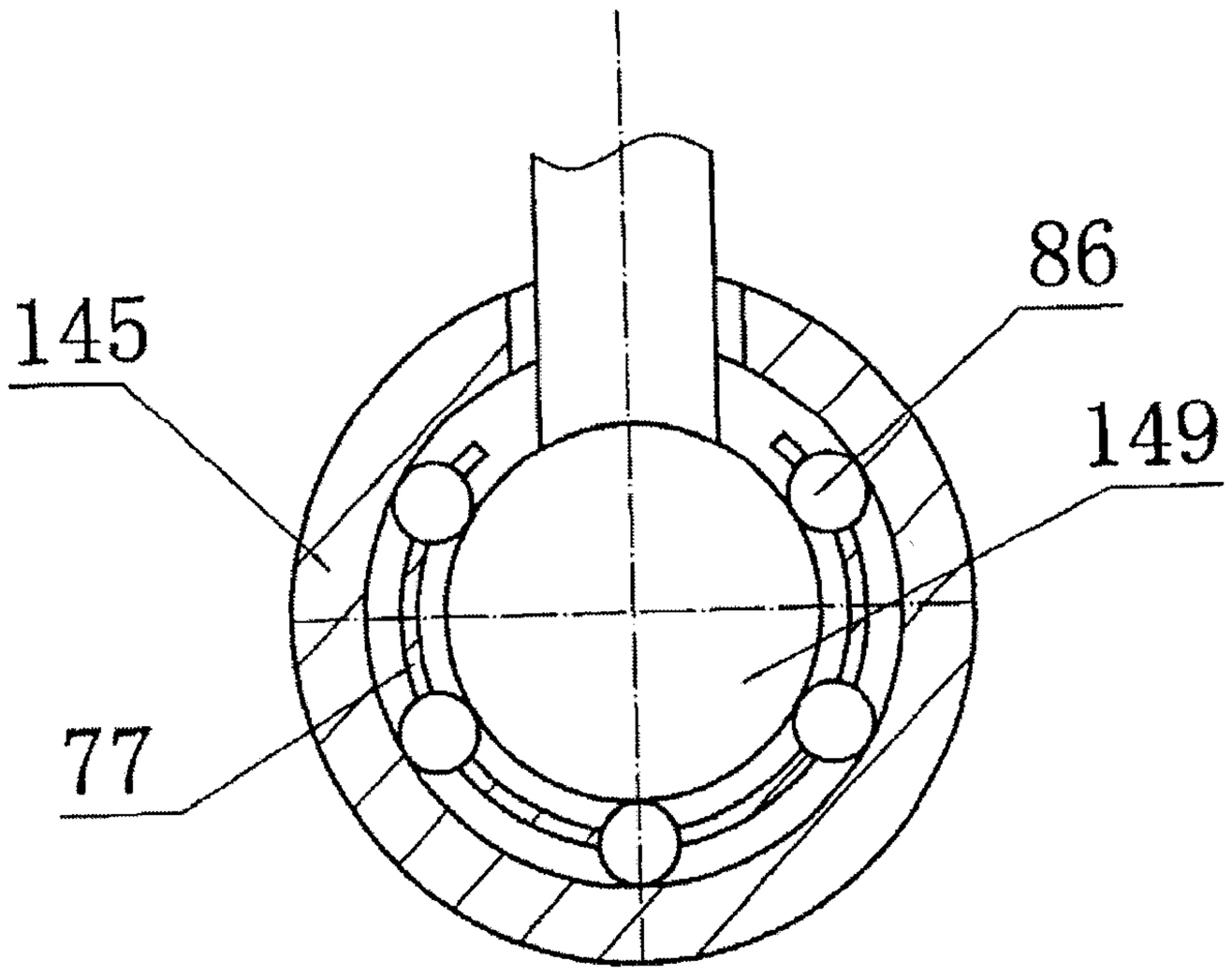


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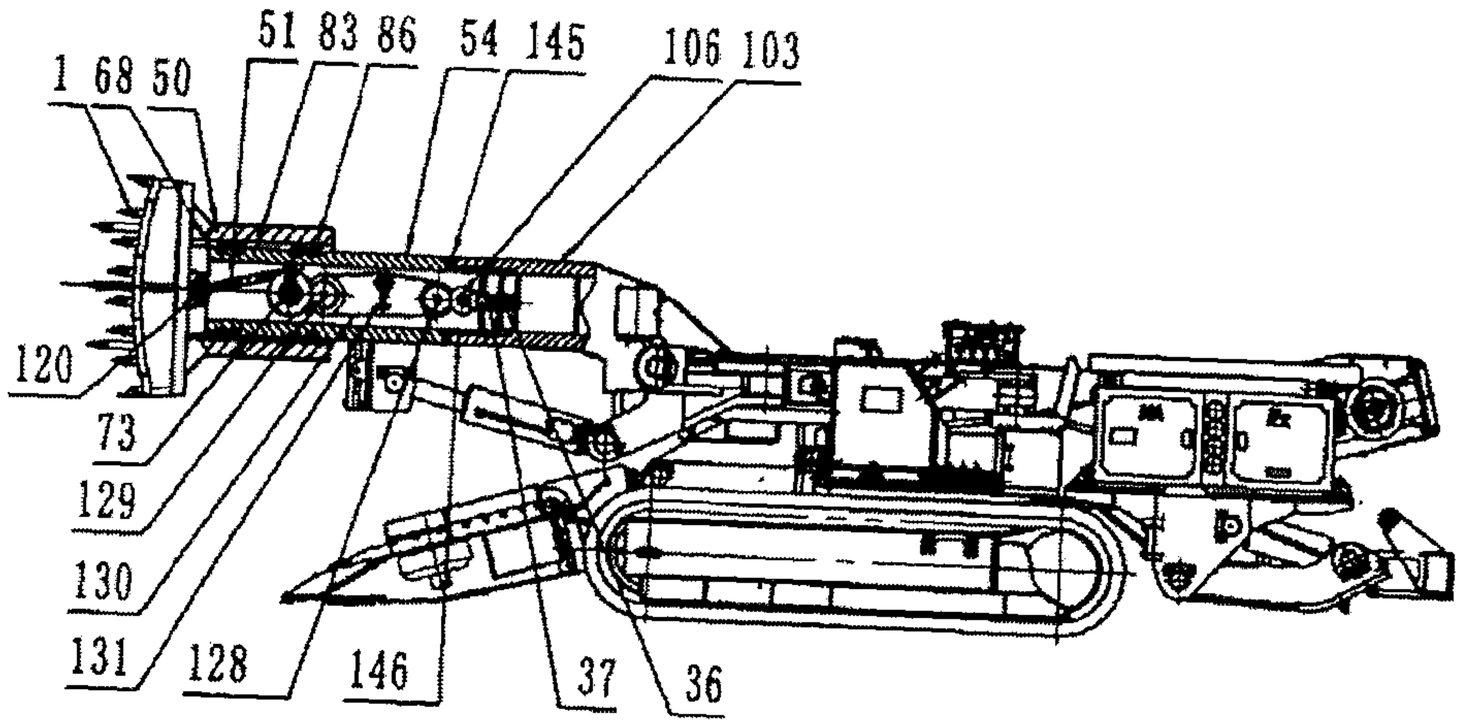


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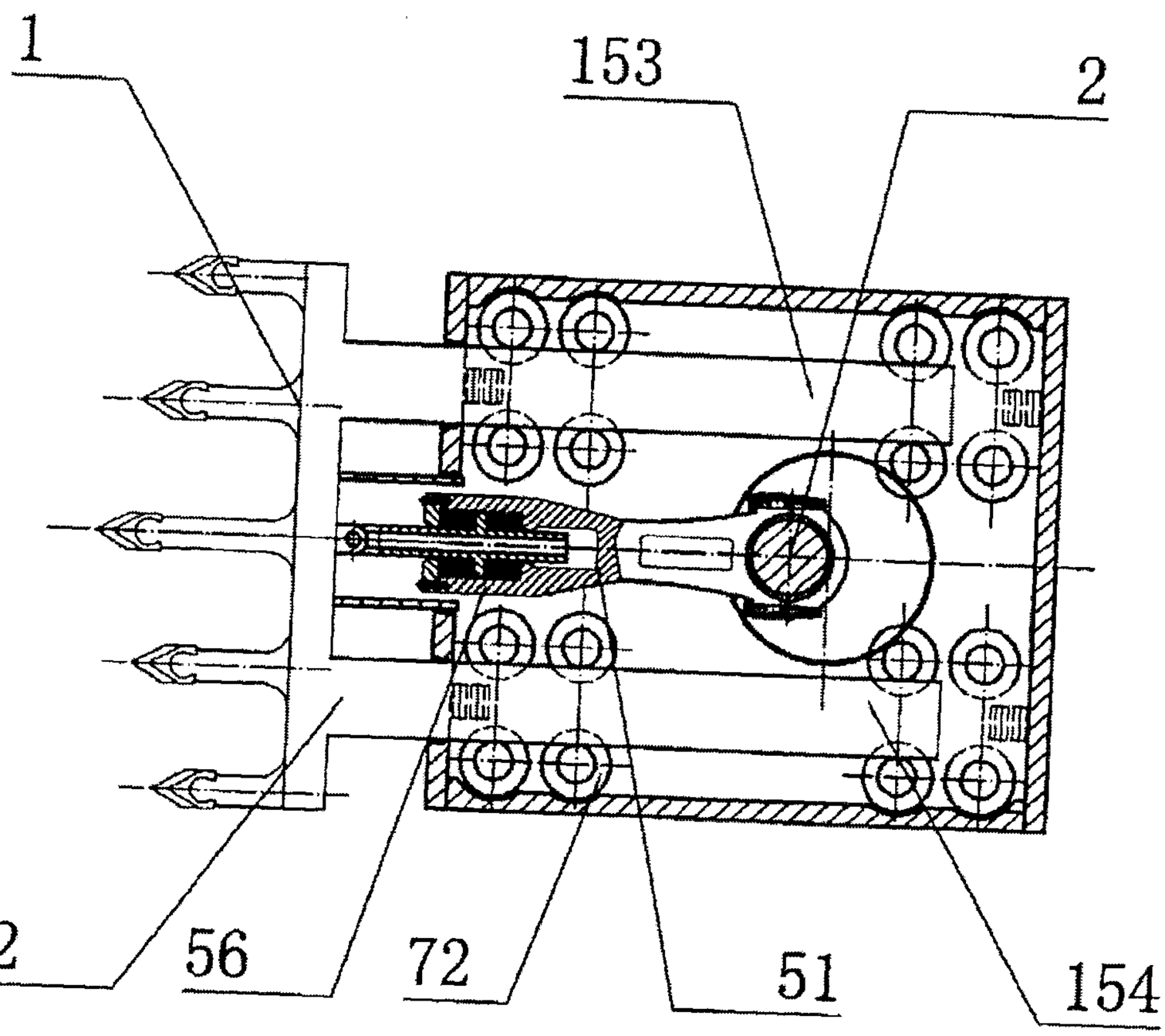


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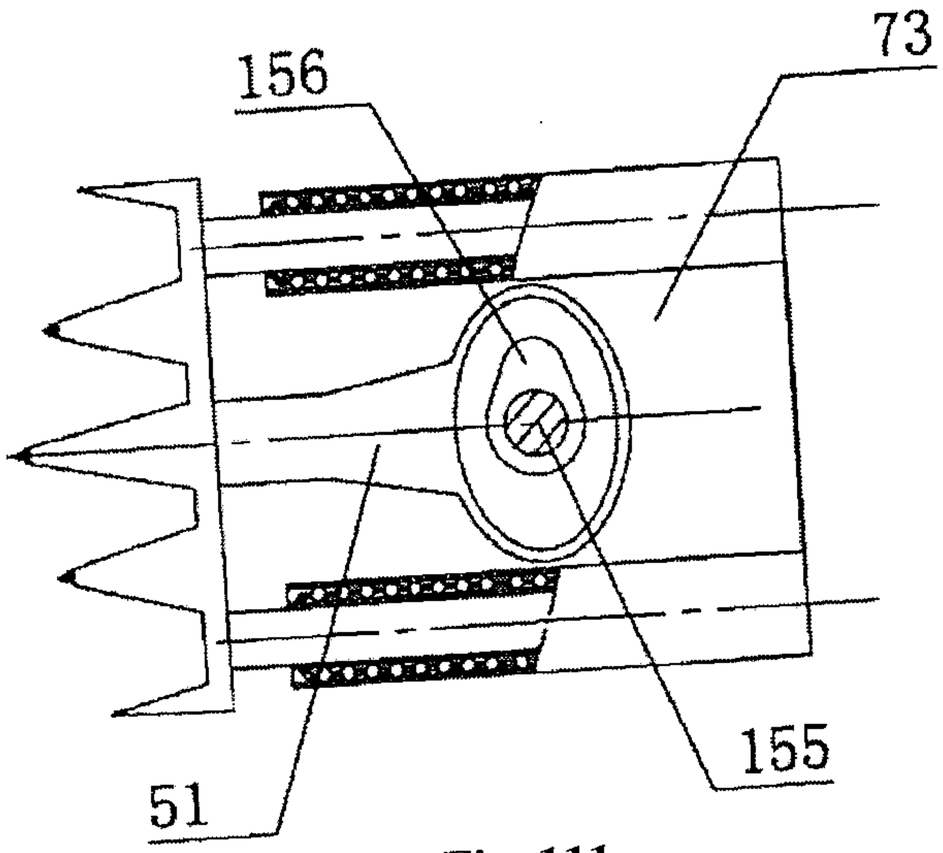


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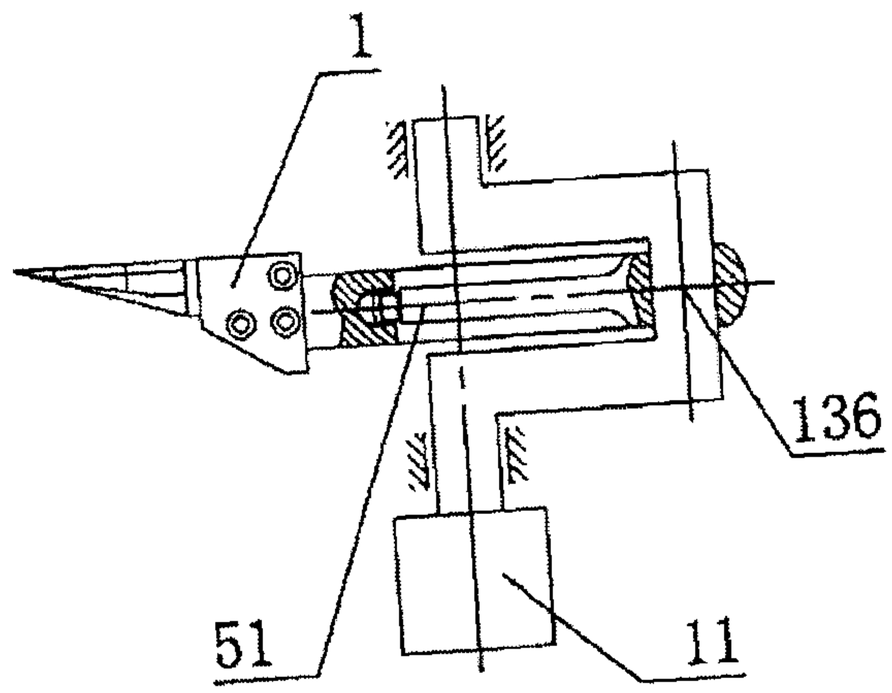


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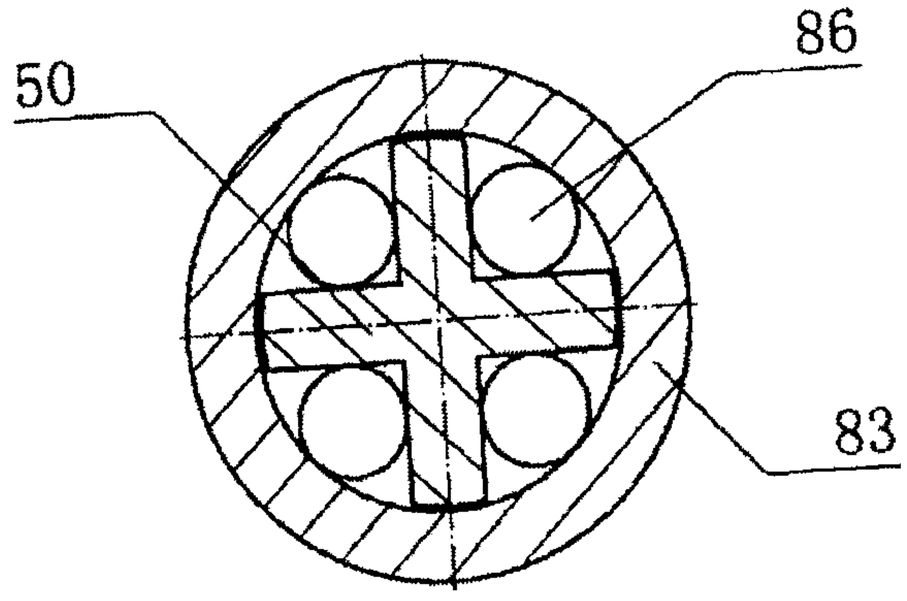


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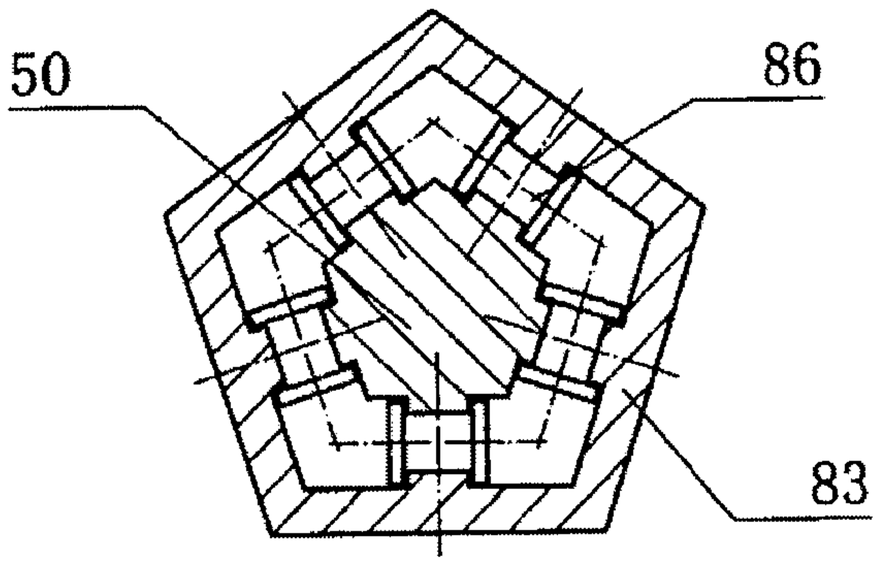


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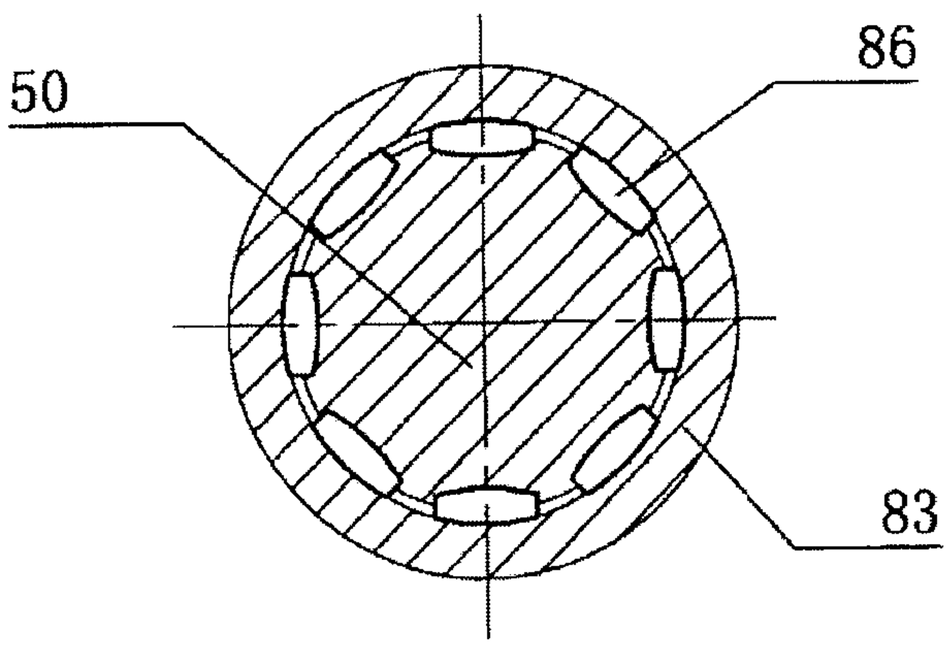


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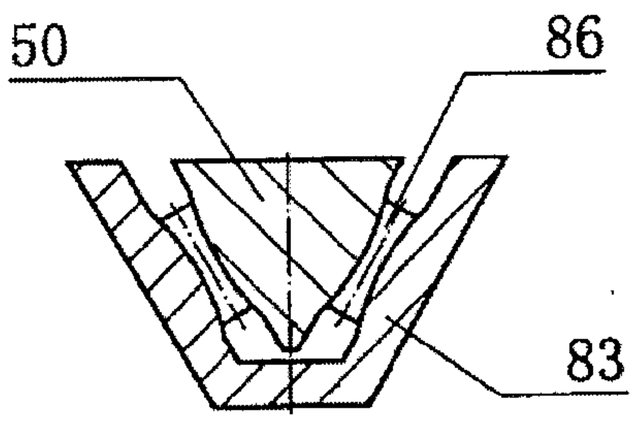


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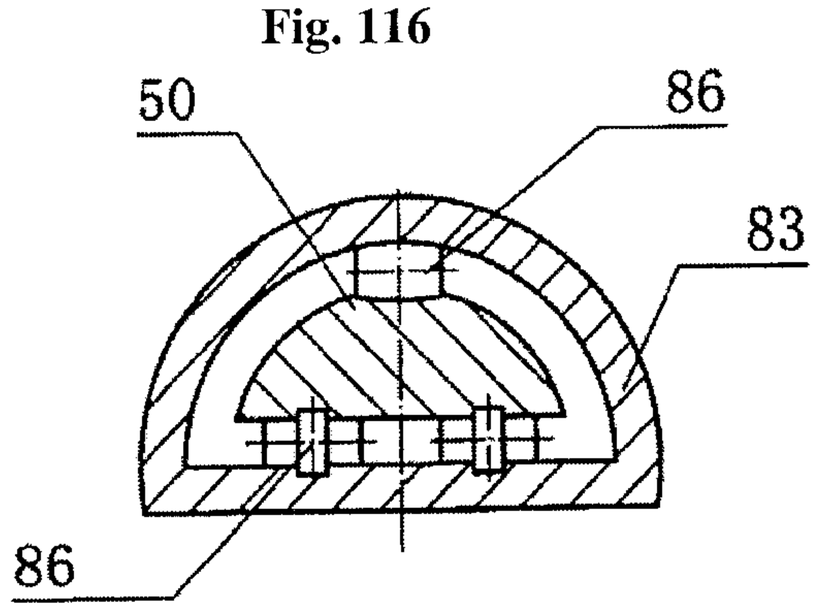


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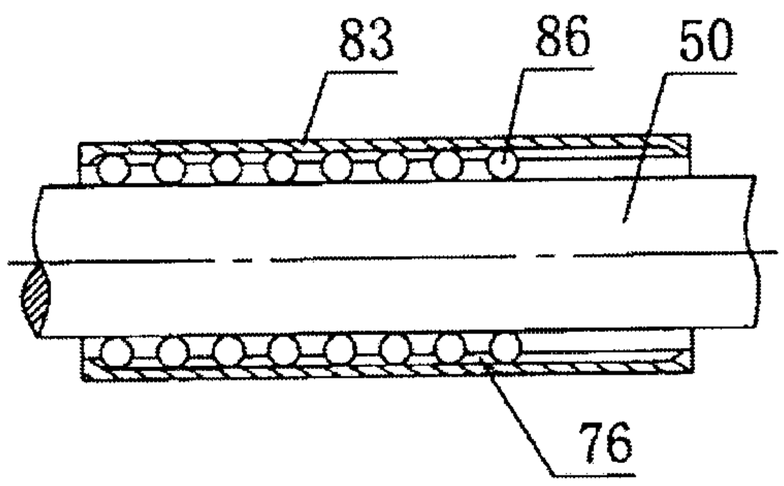


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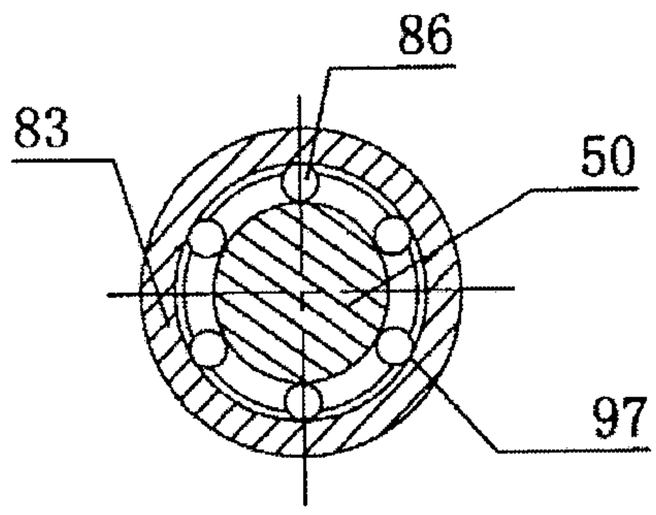


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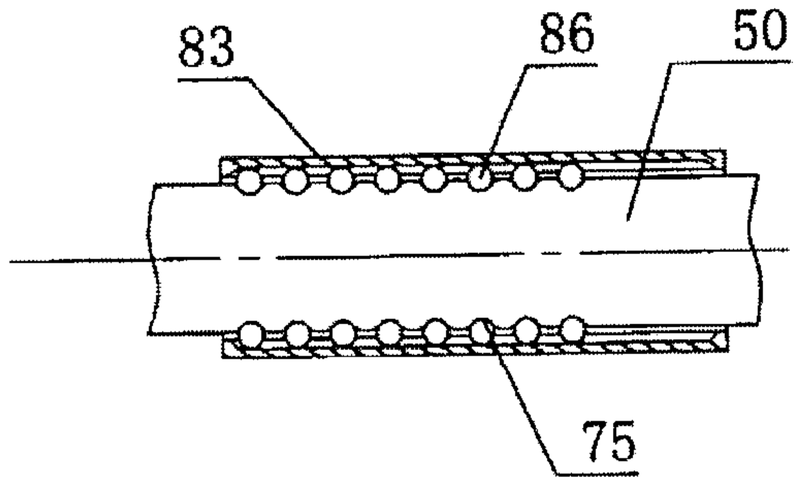


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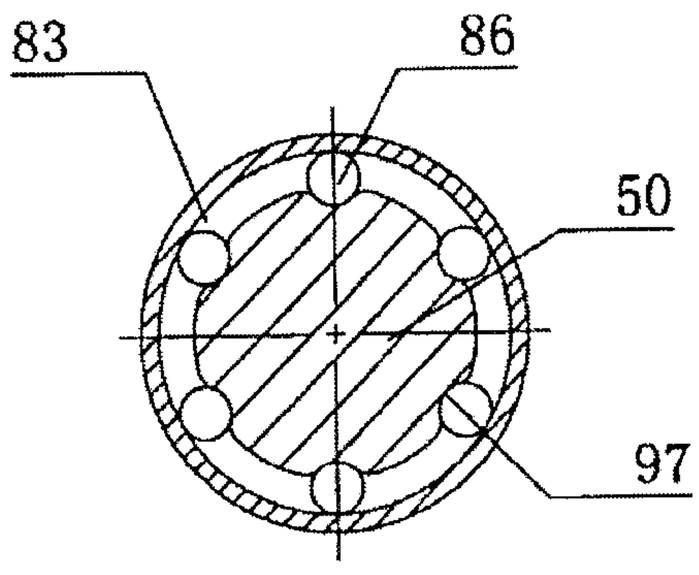


Fig. 121

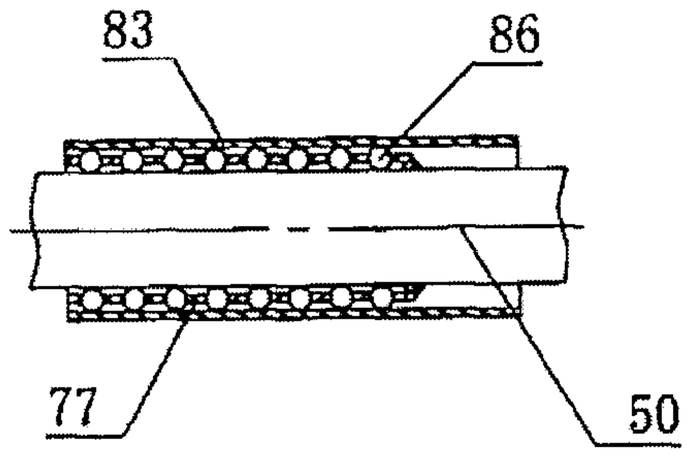


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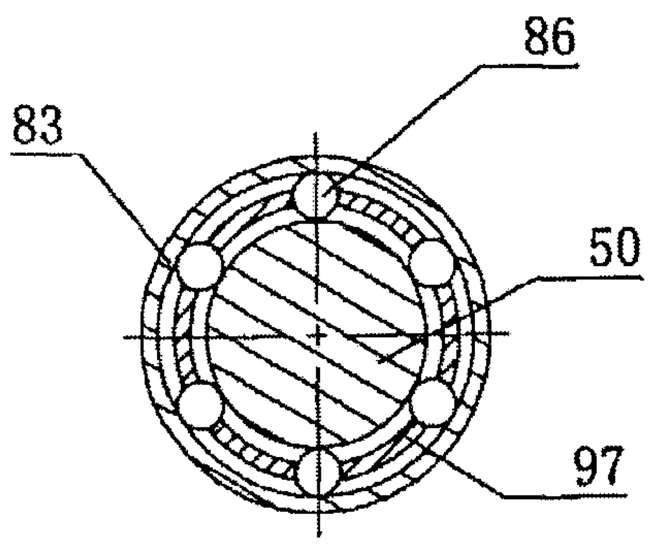


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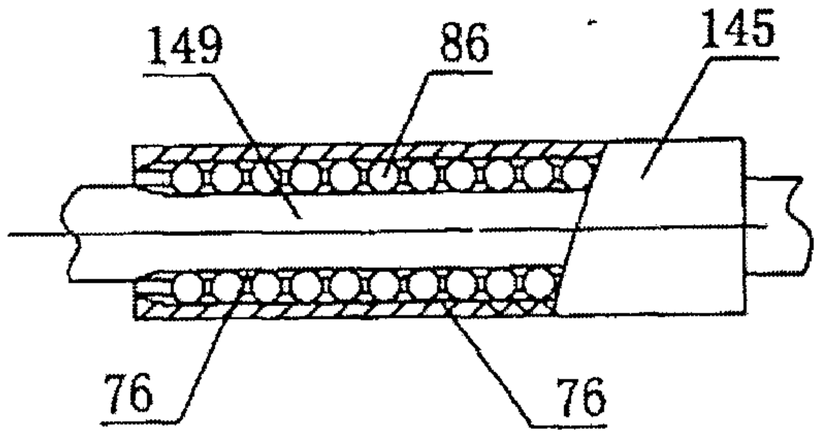


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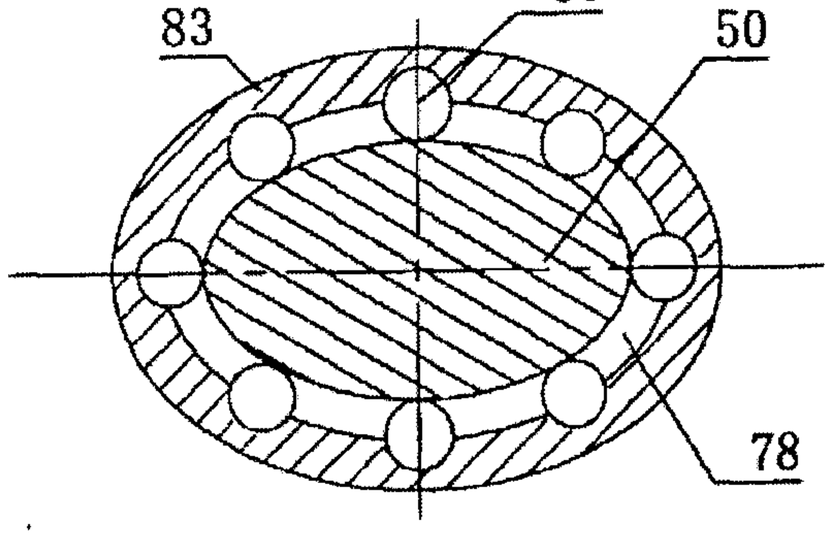


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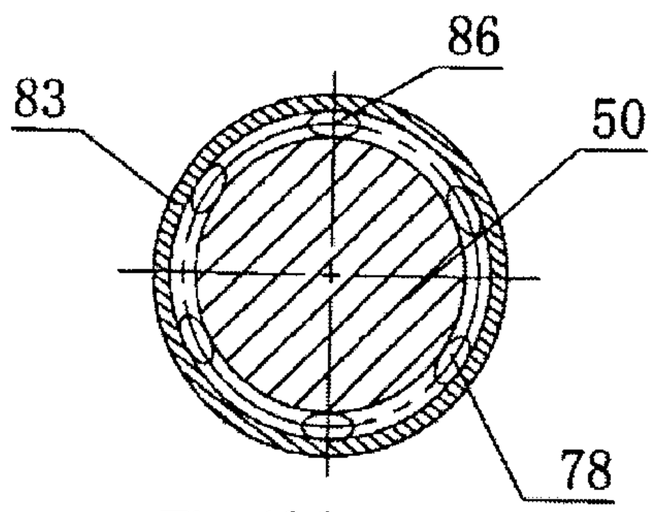


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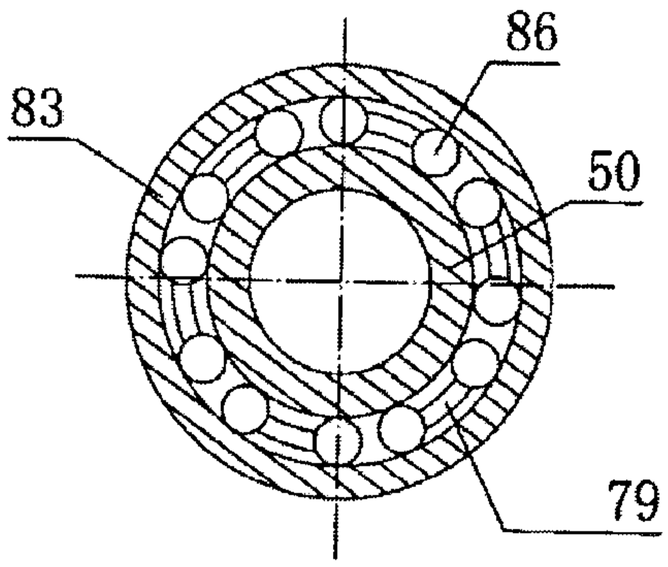


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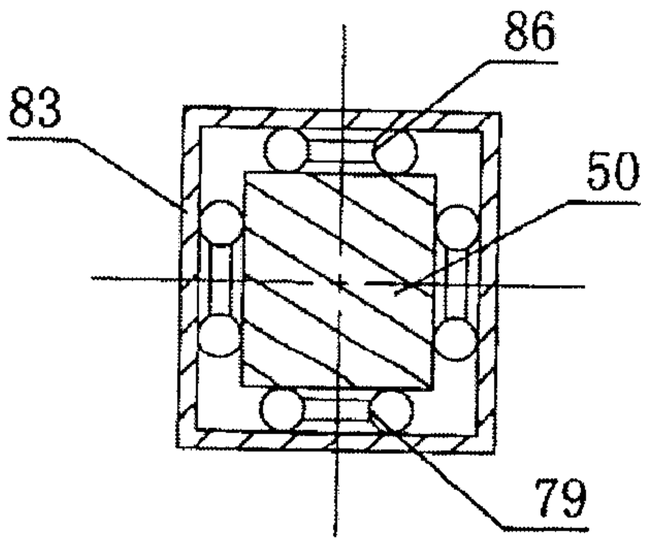


Fig. 128

Fig. 129

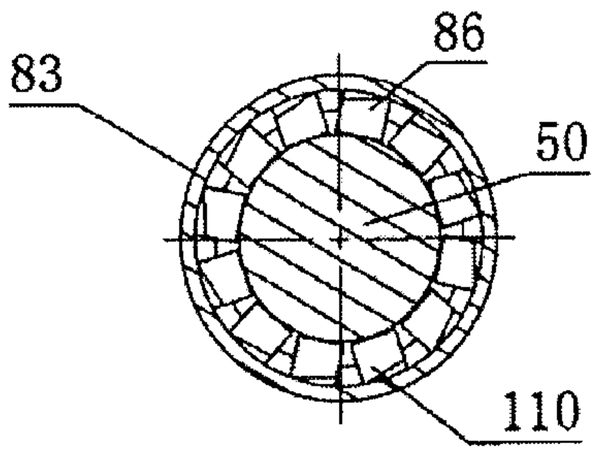


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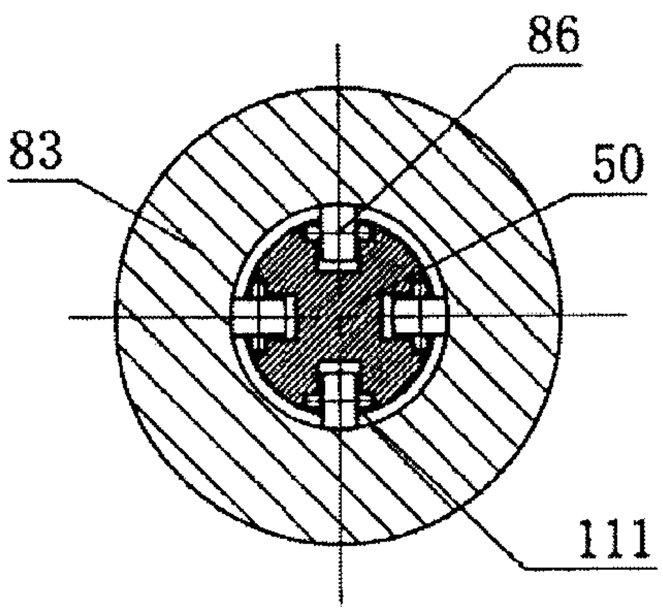


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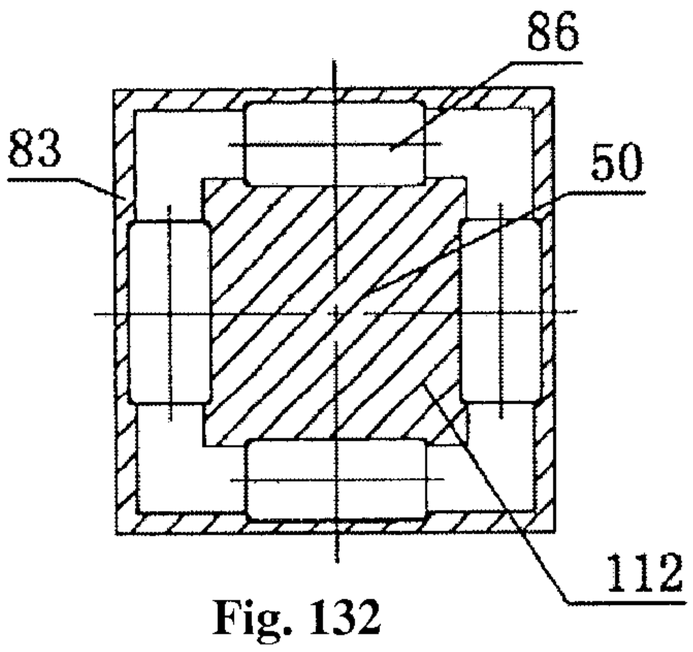


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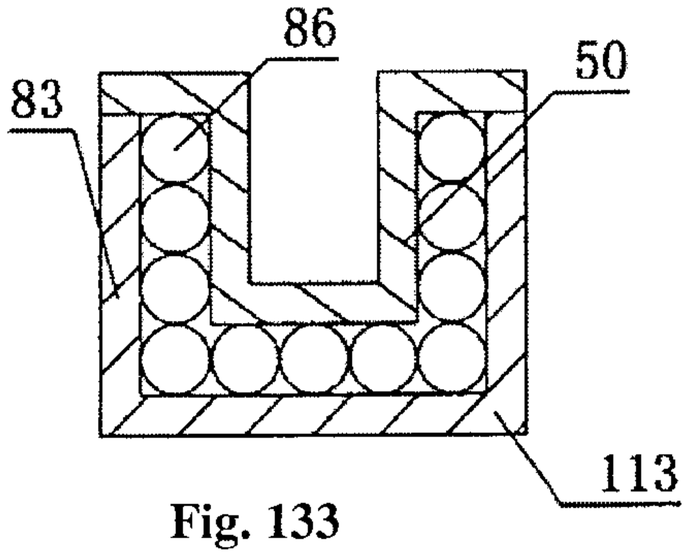


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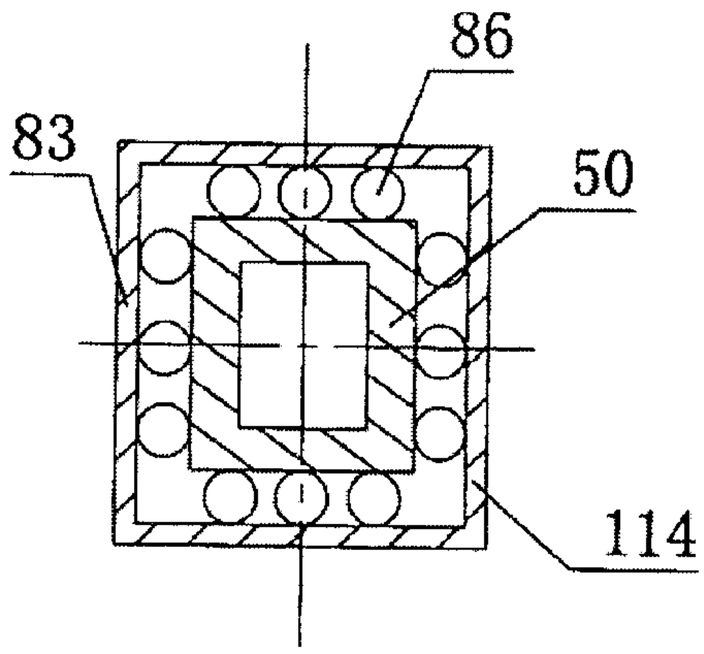


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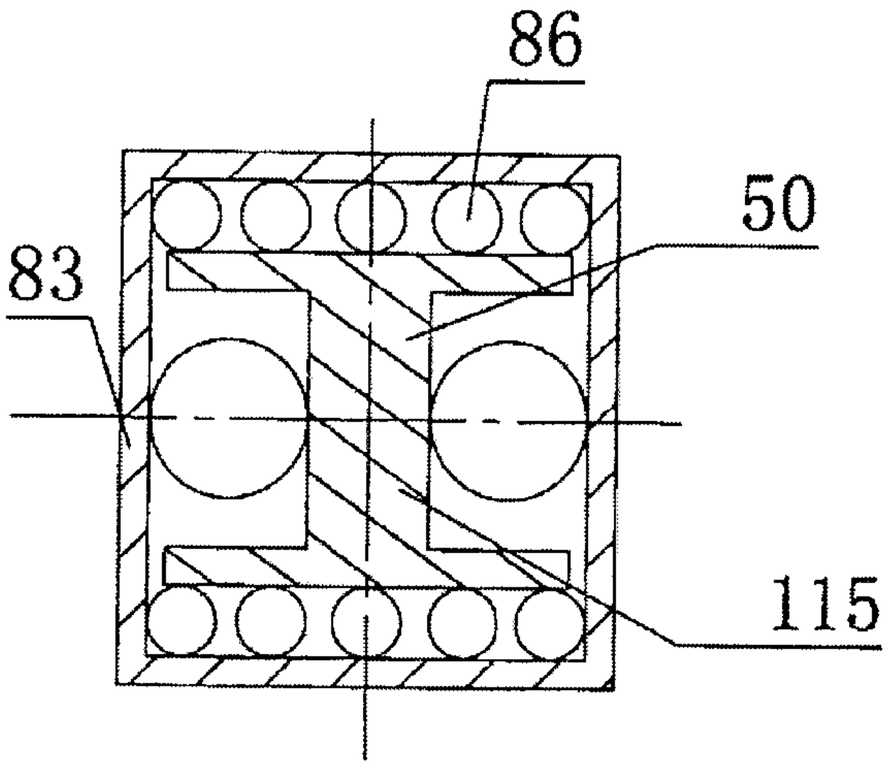


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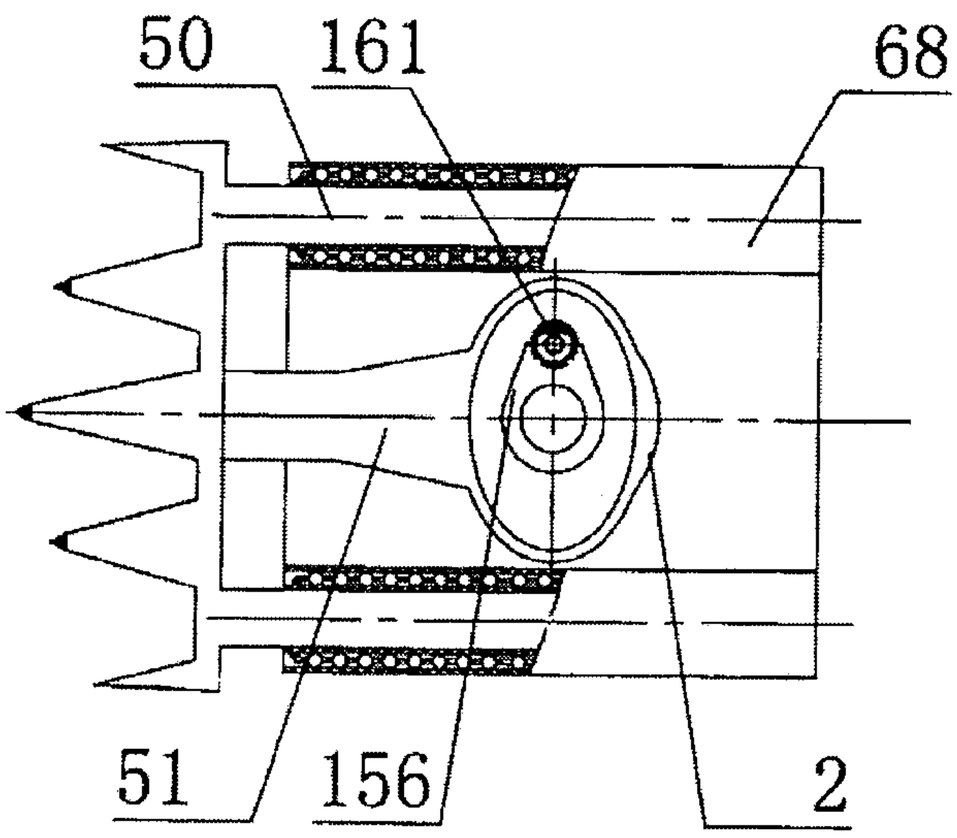


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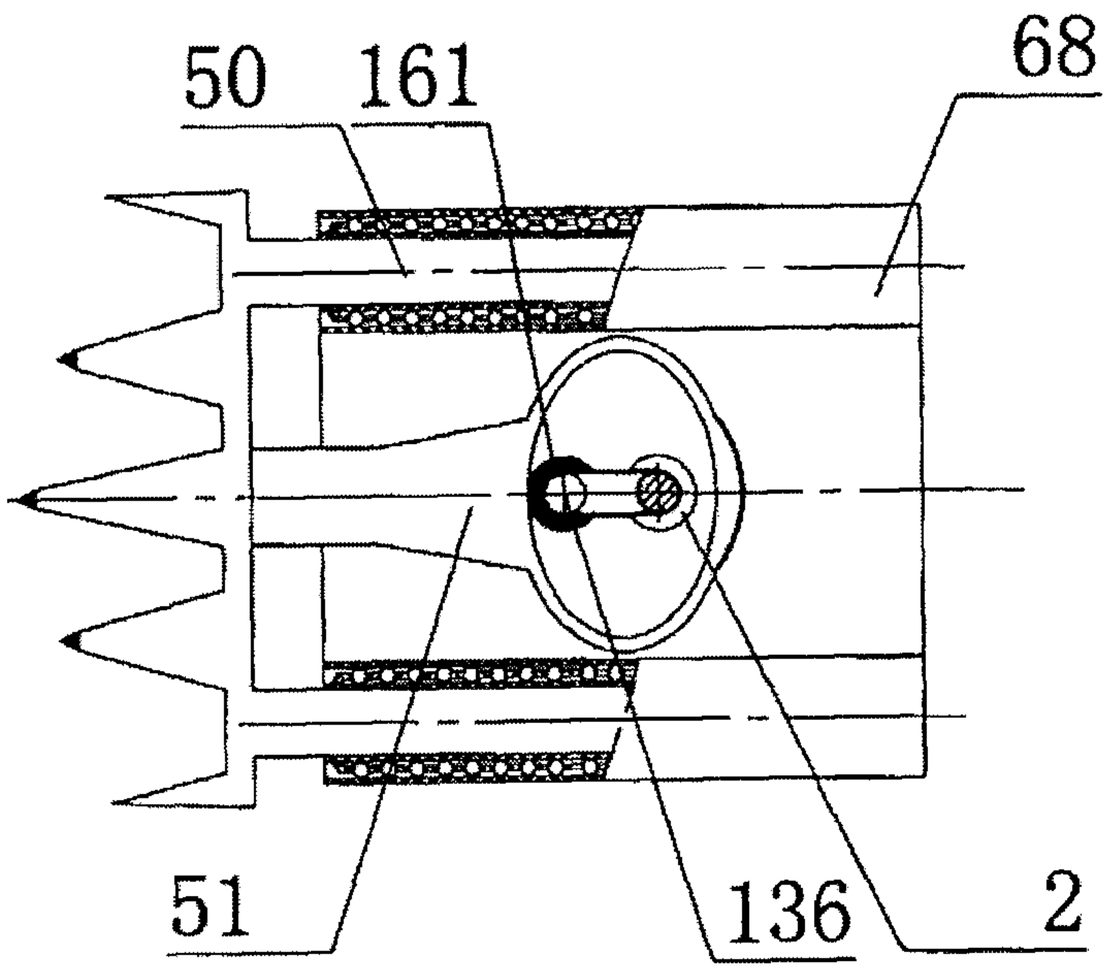


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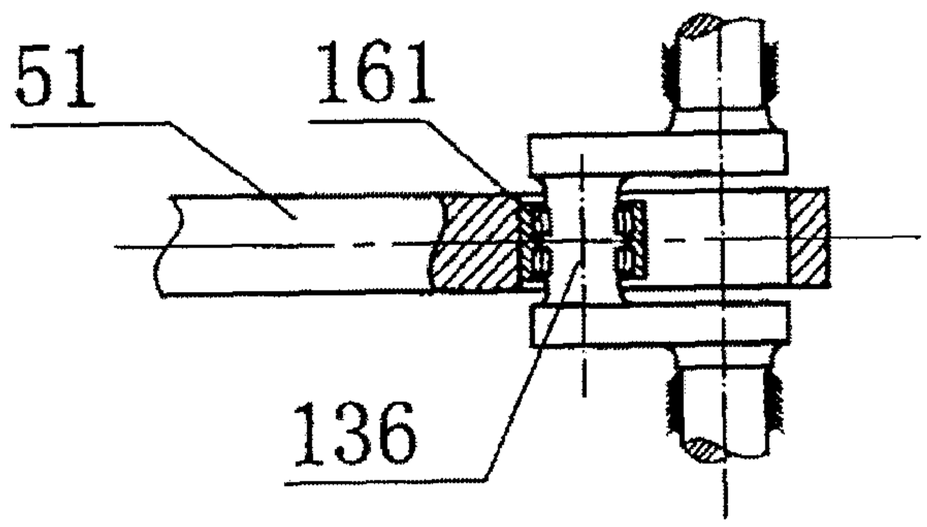


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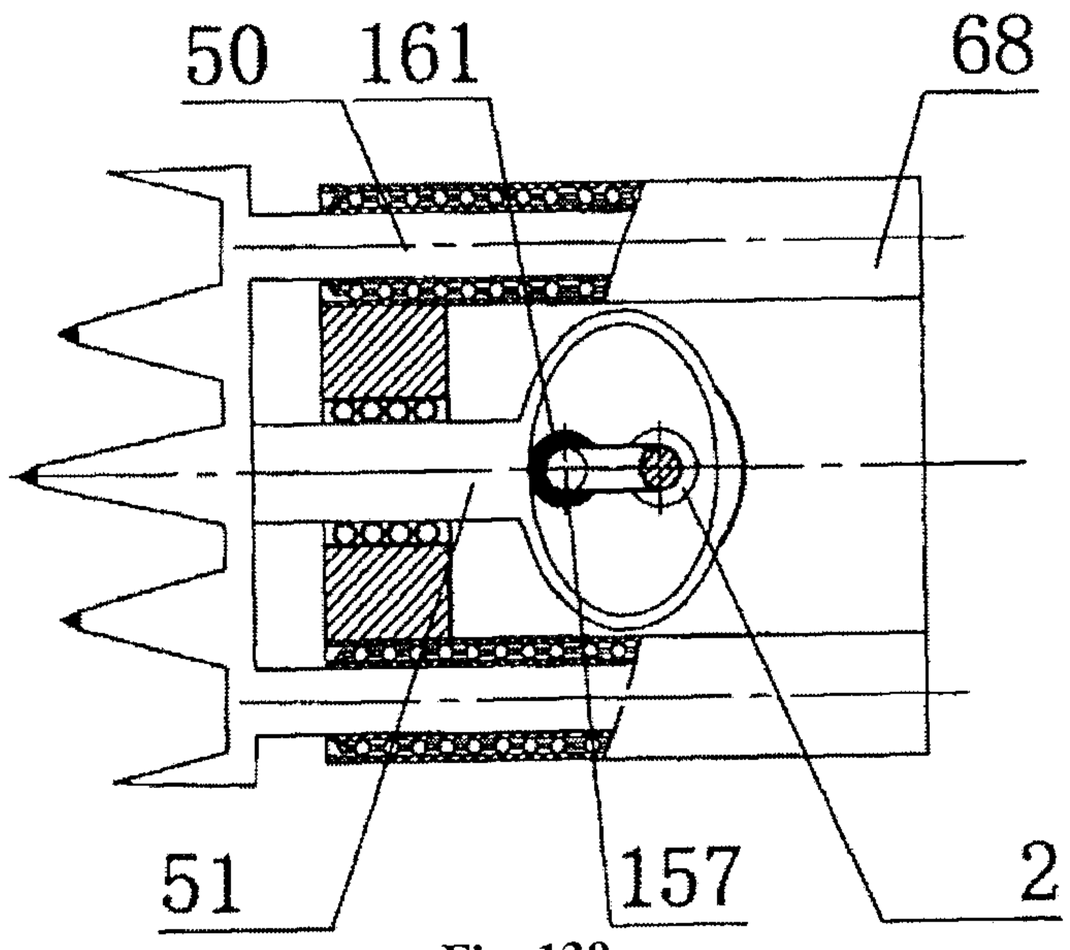


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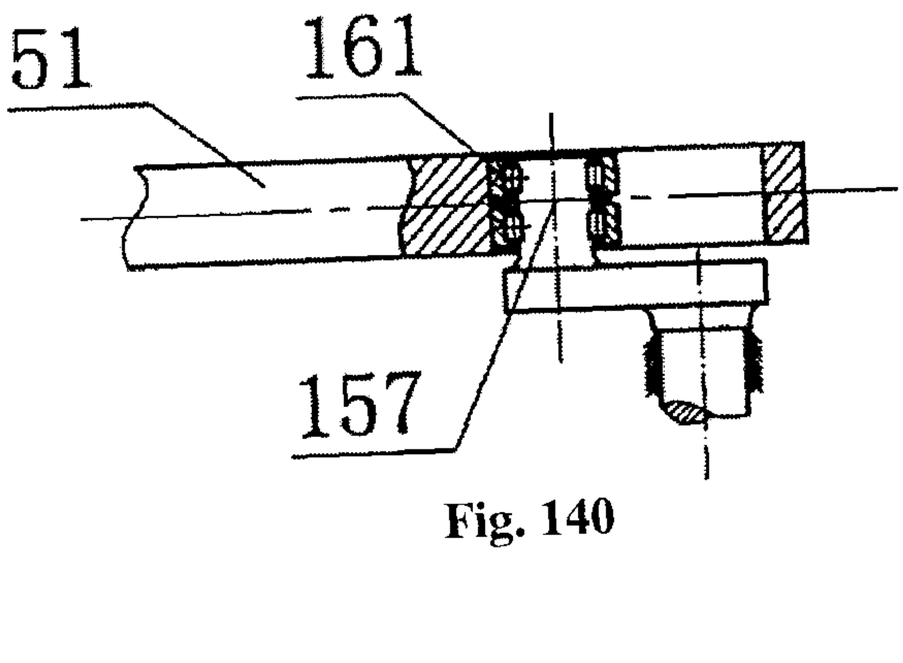


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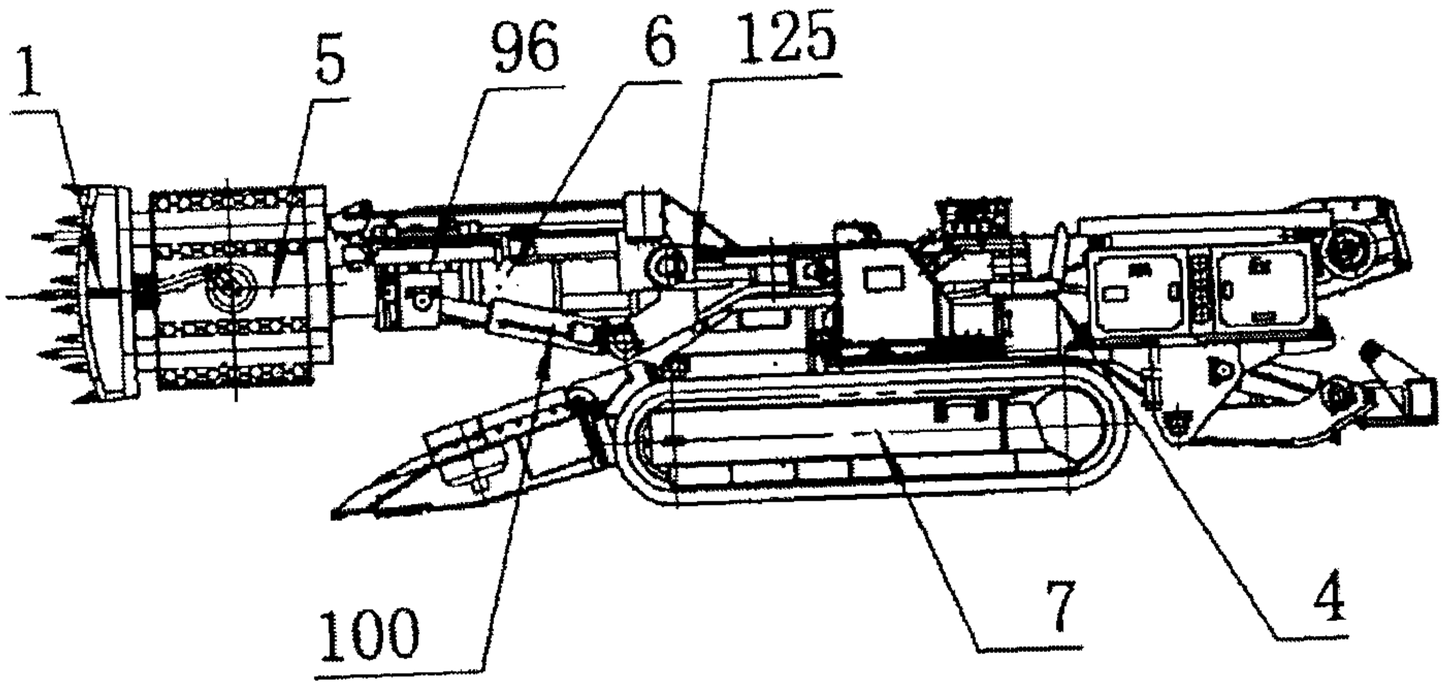


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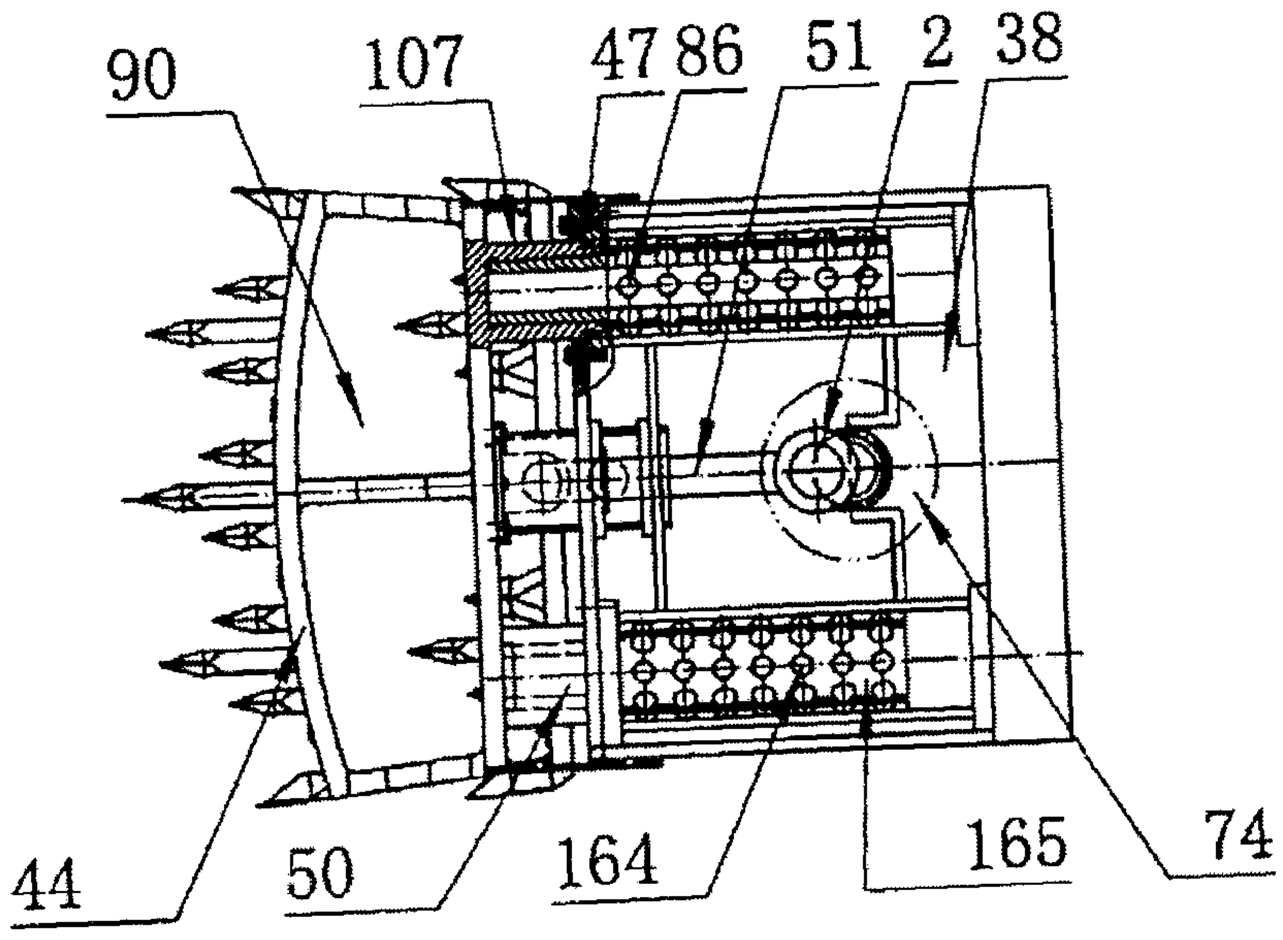


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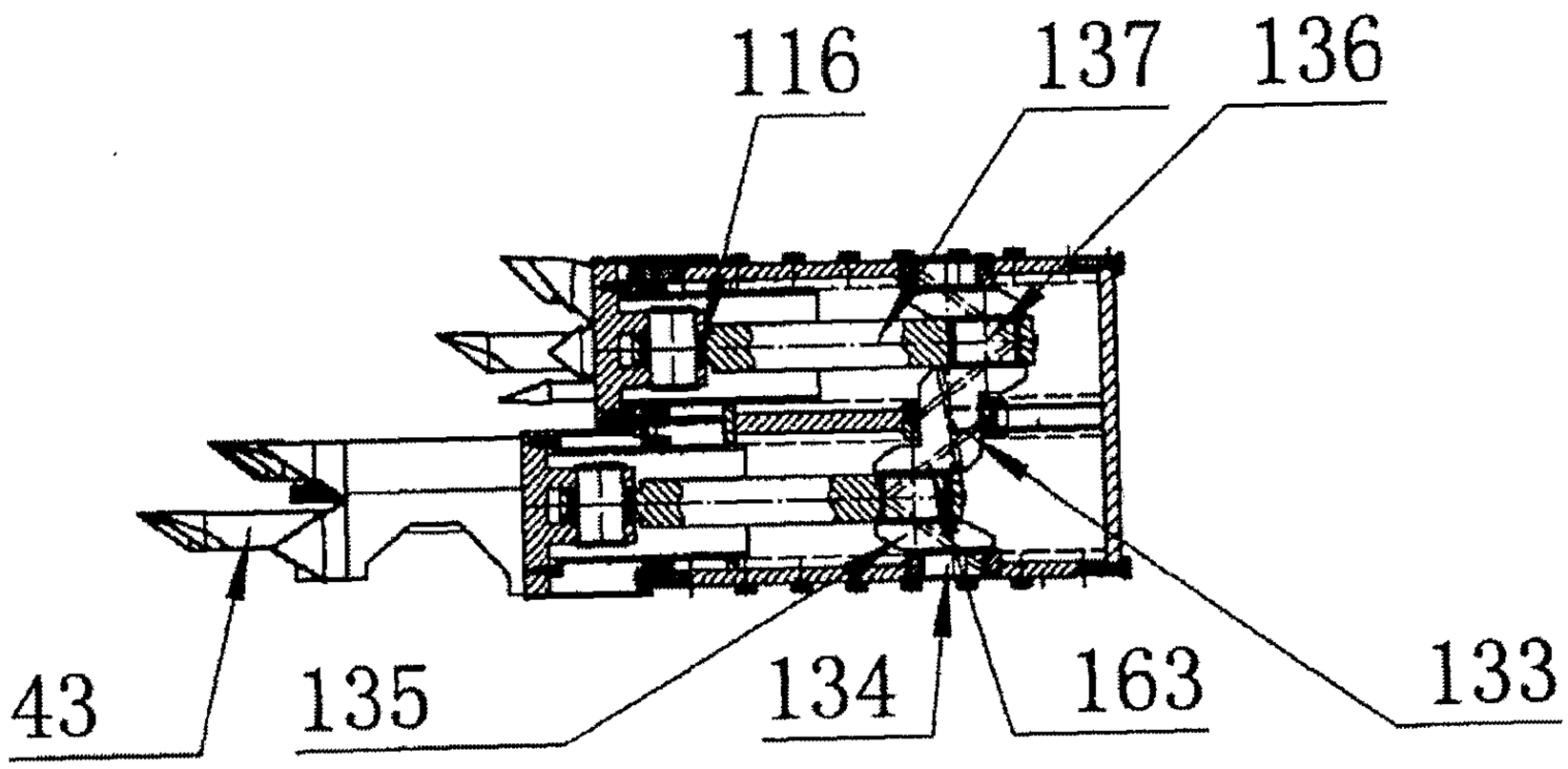


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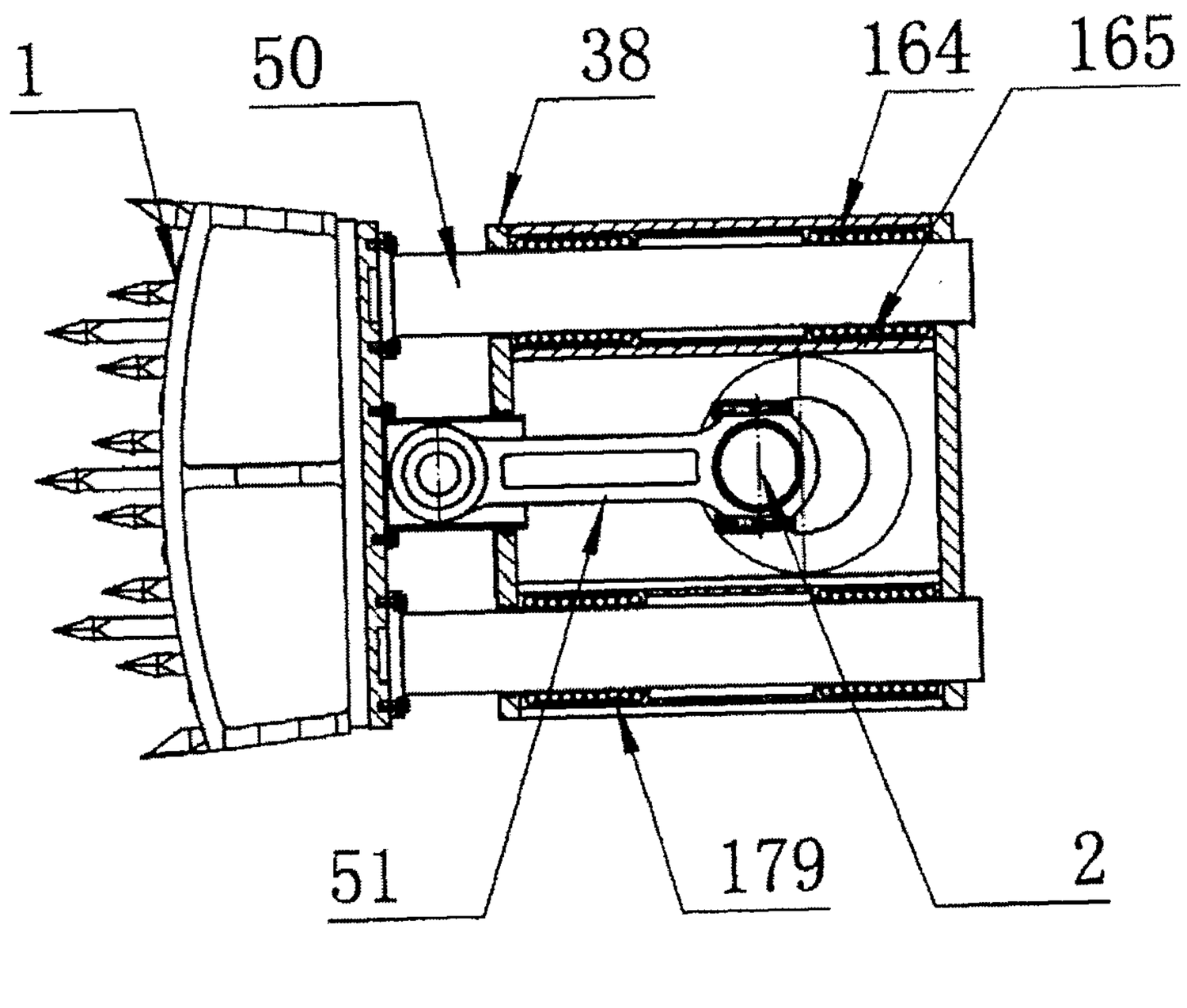


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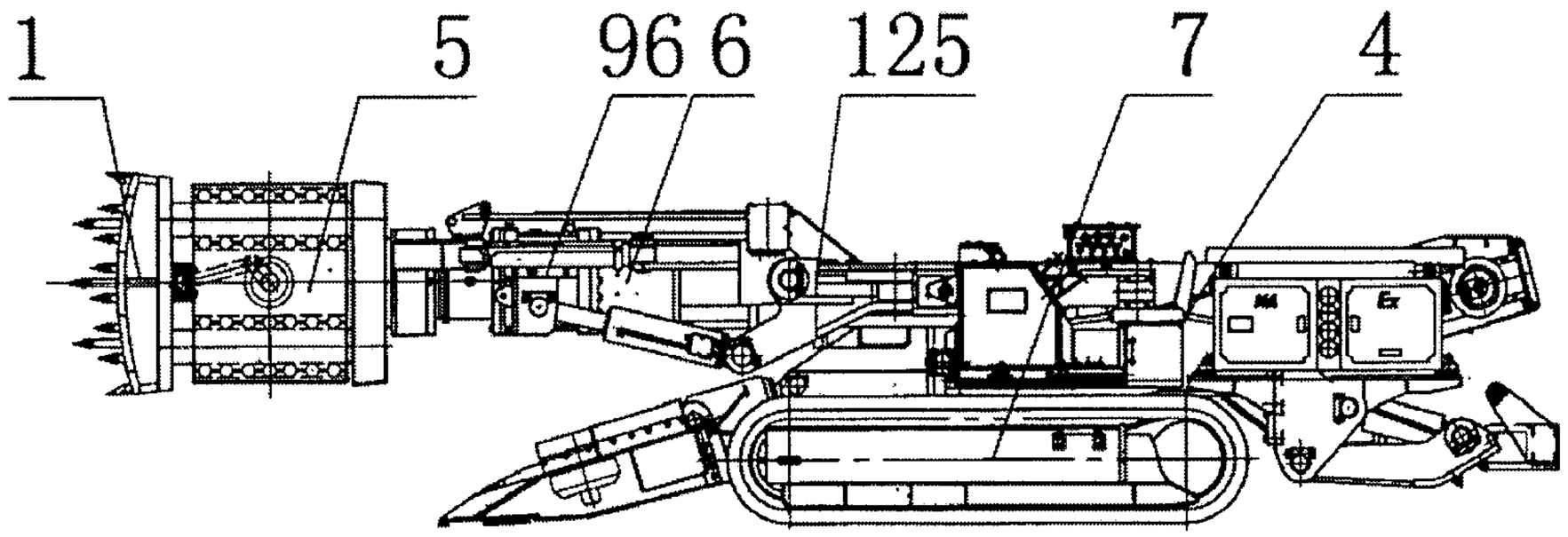


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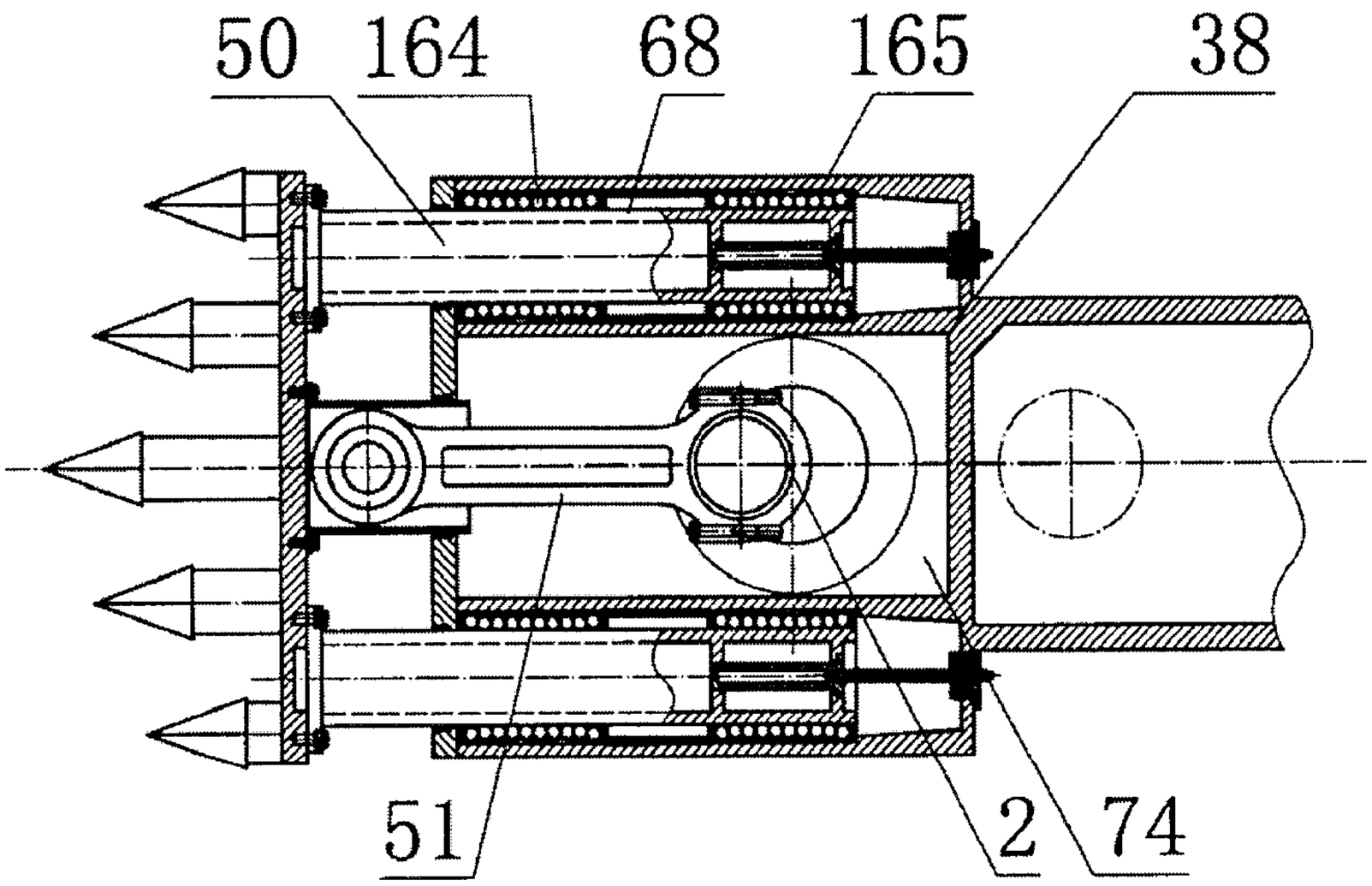


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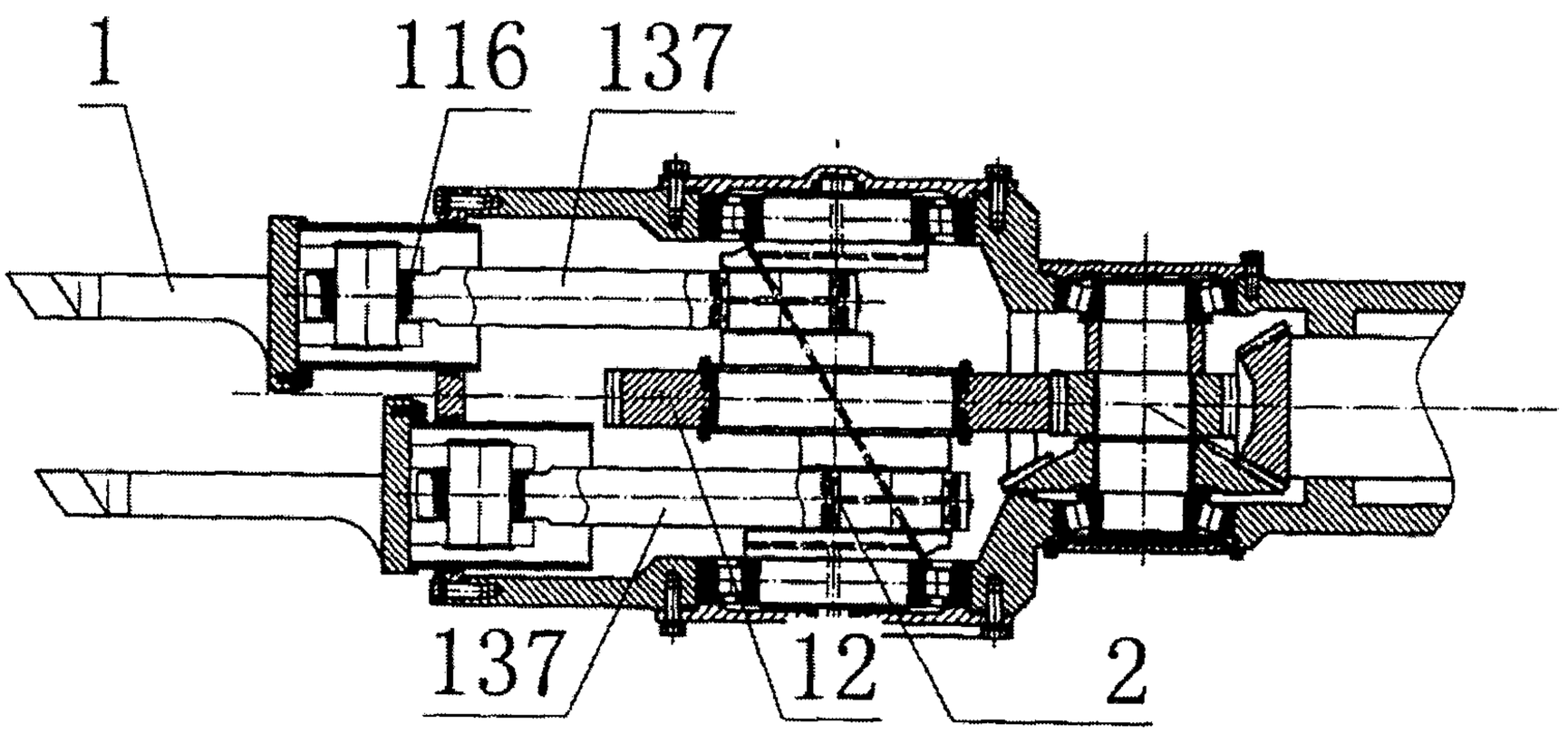


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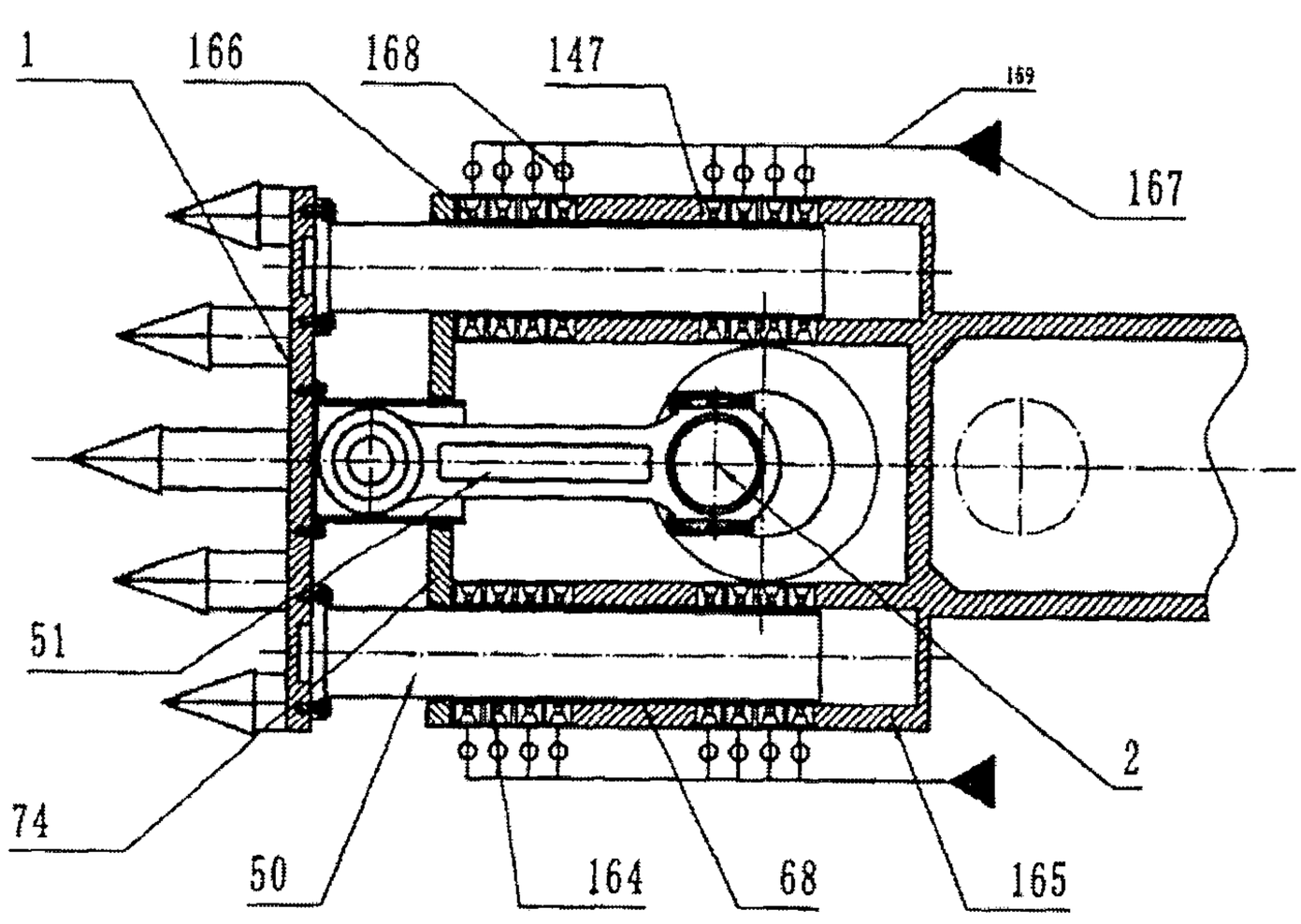


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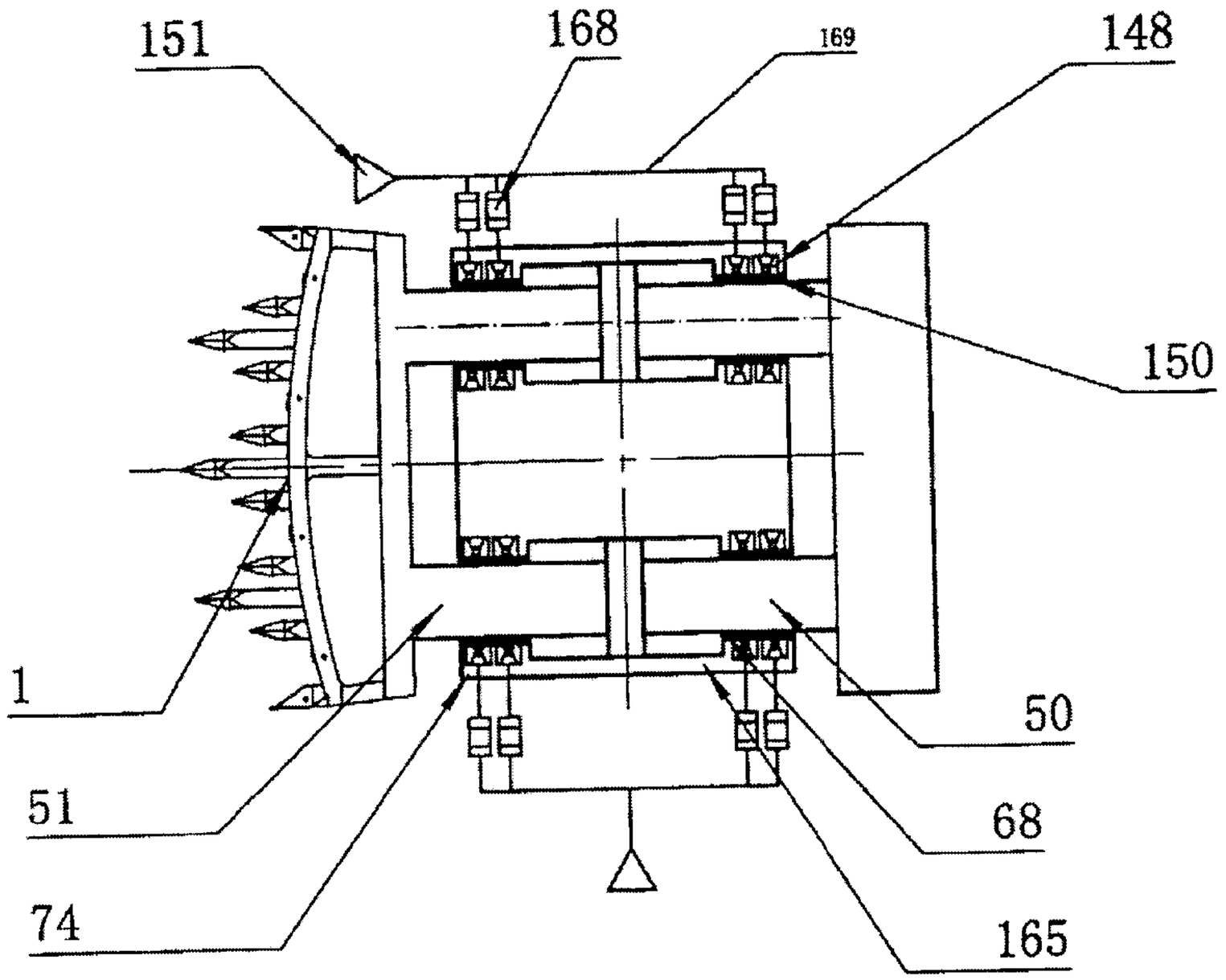


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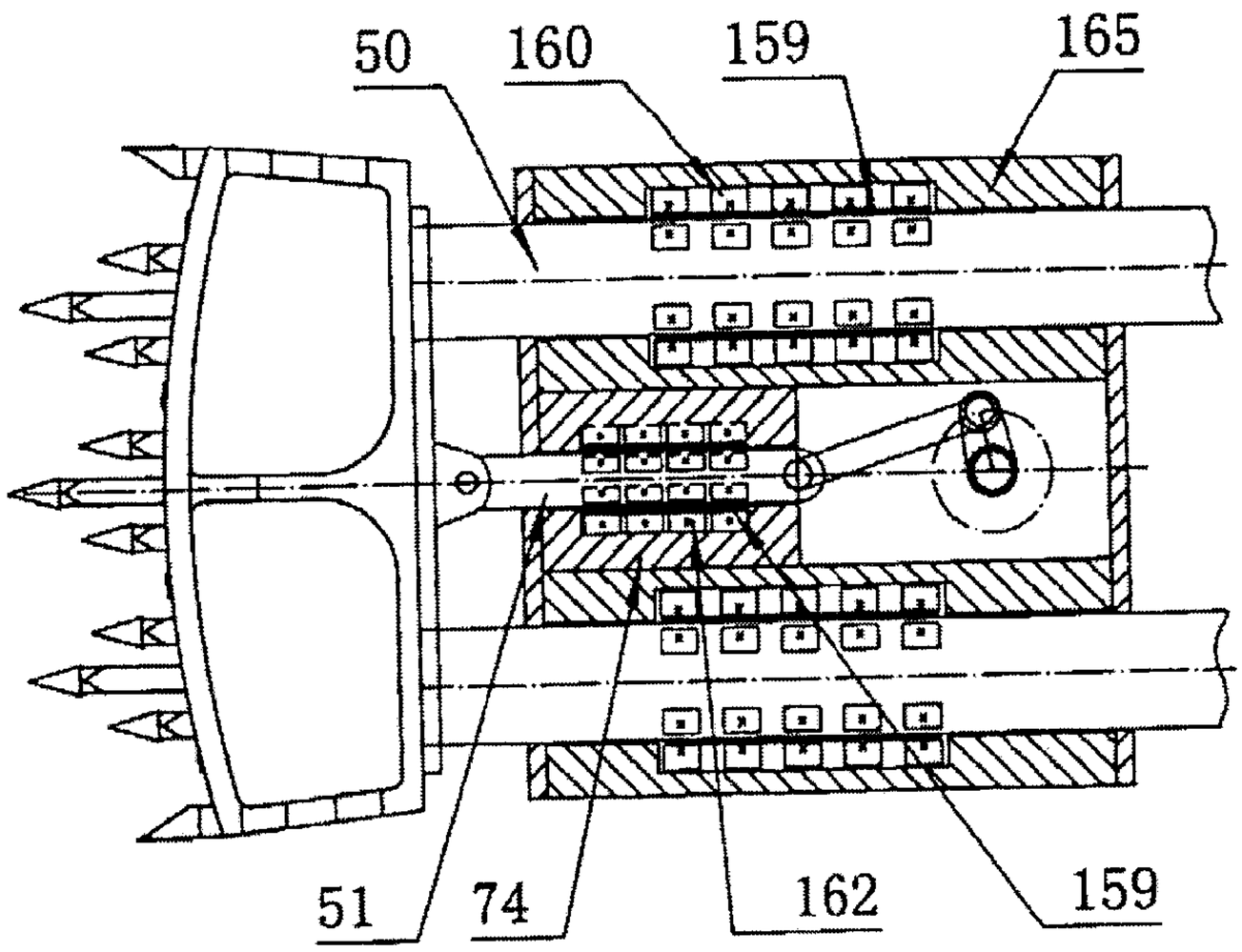


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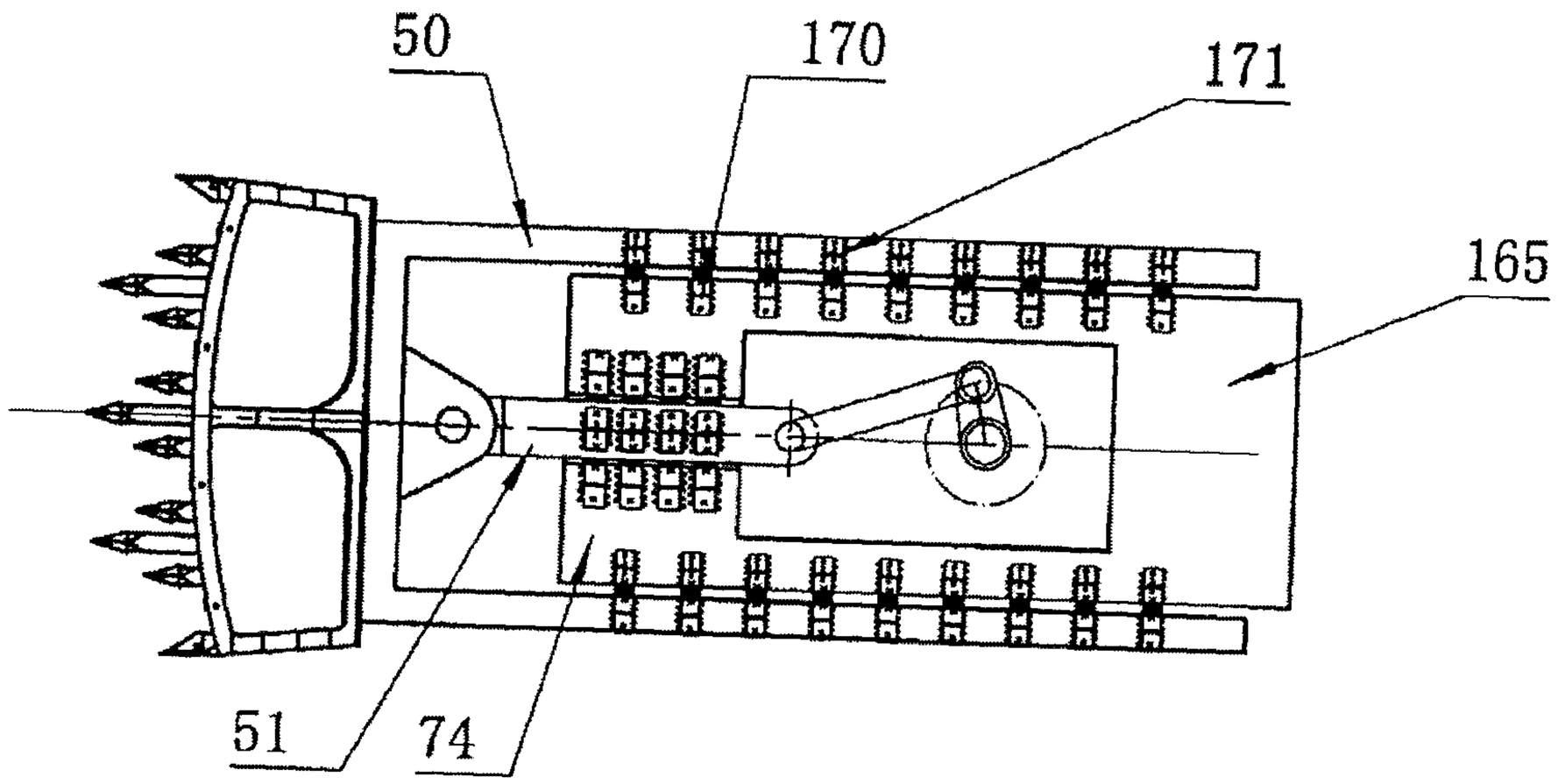


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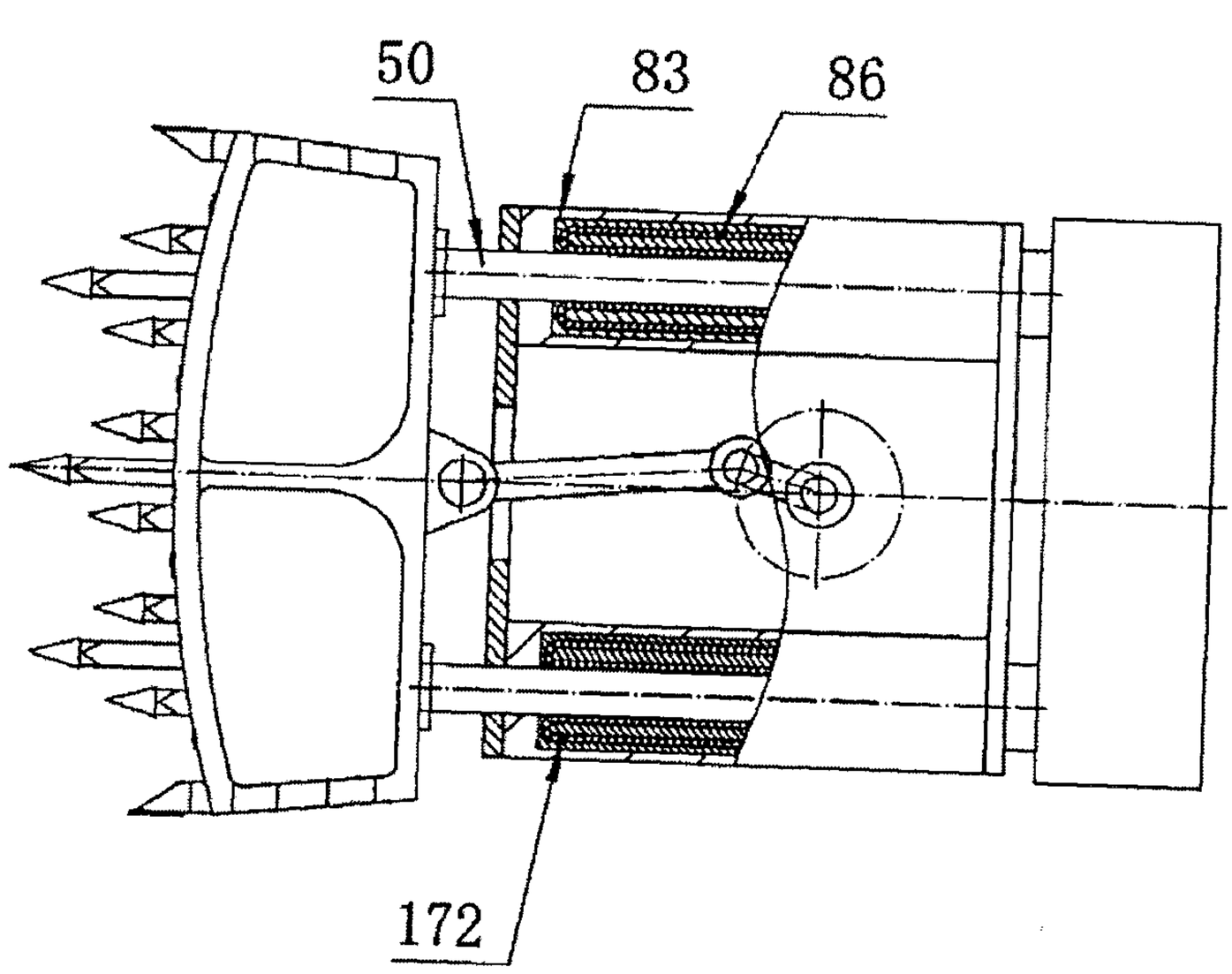


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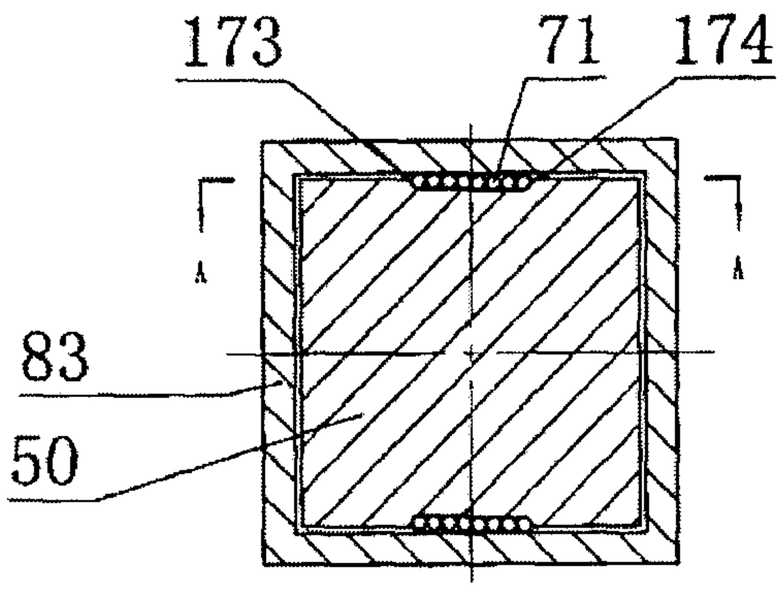


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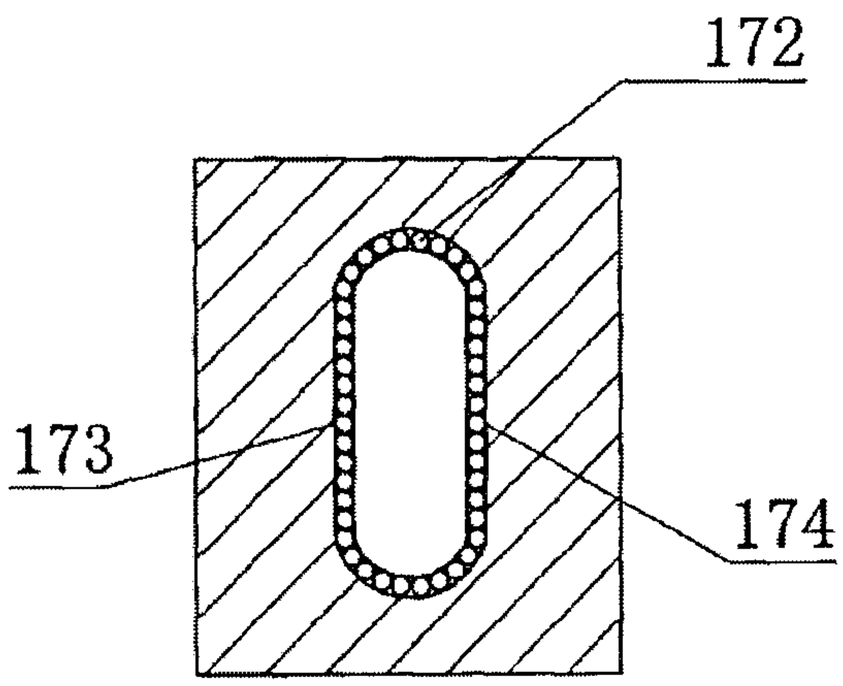


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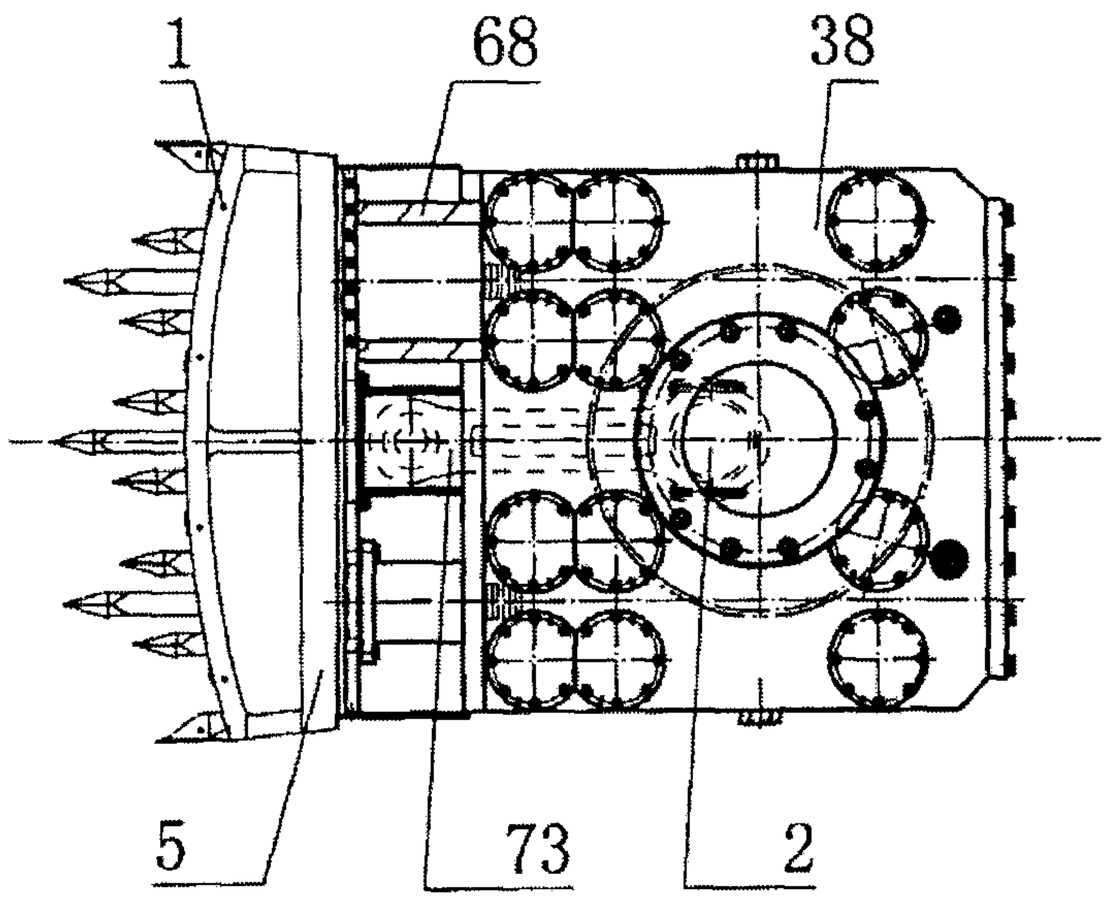


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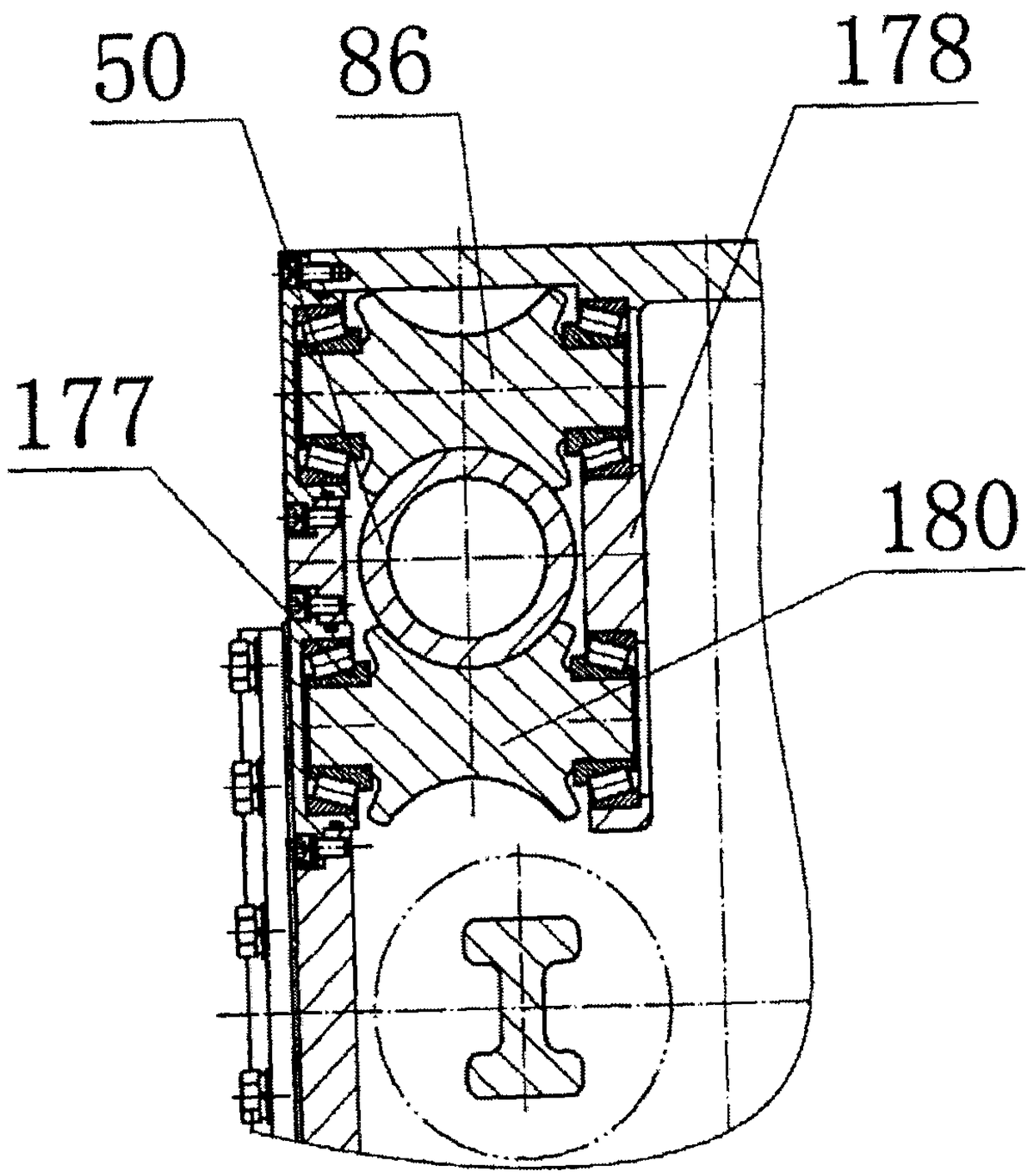


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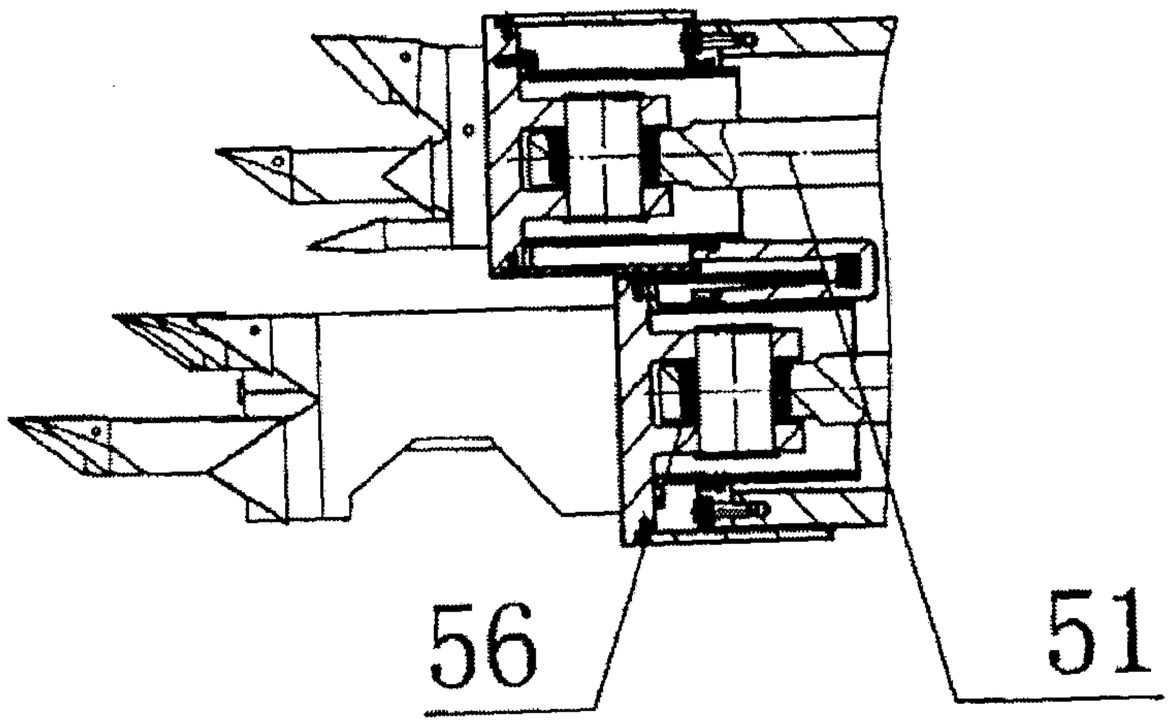


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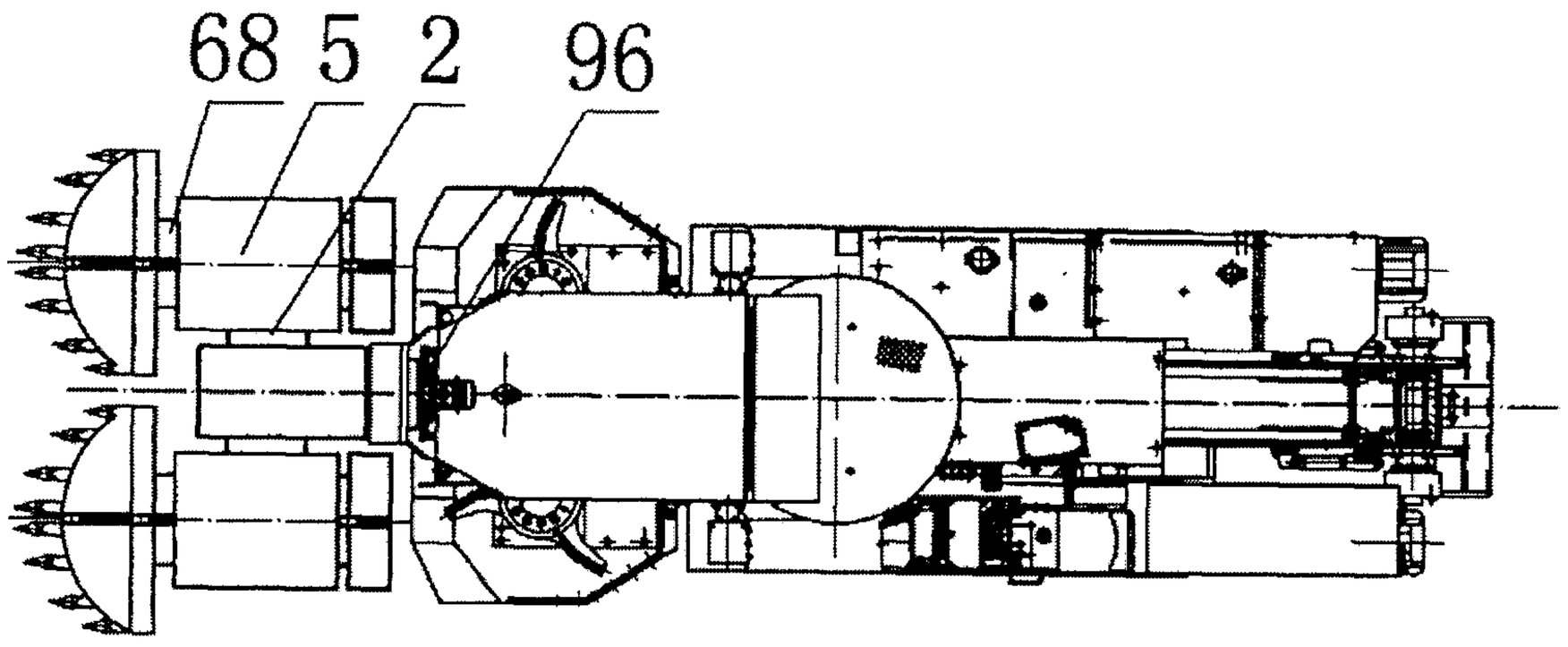


Fig. 158

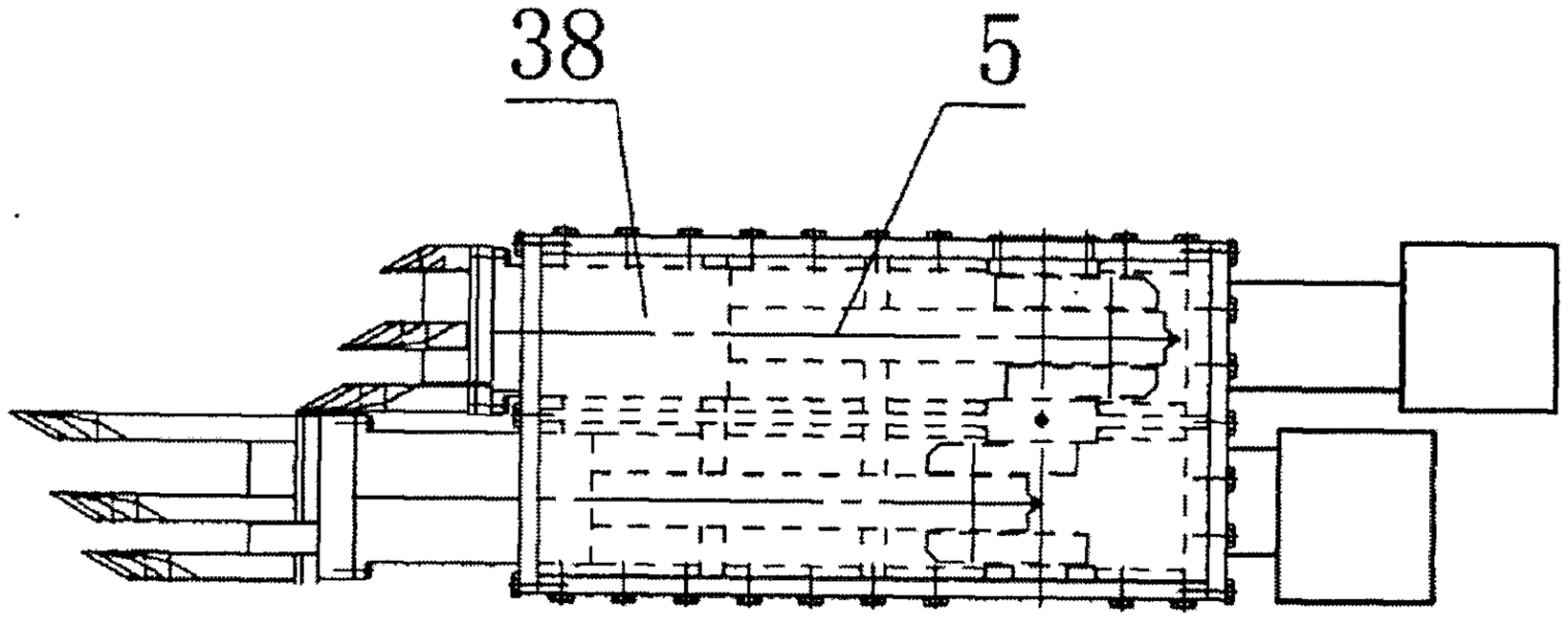


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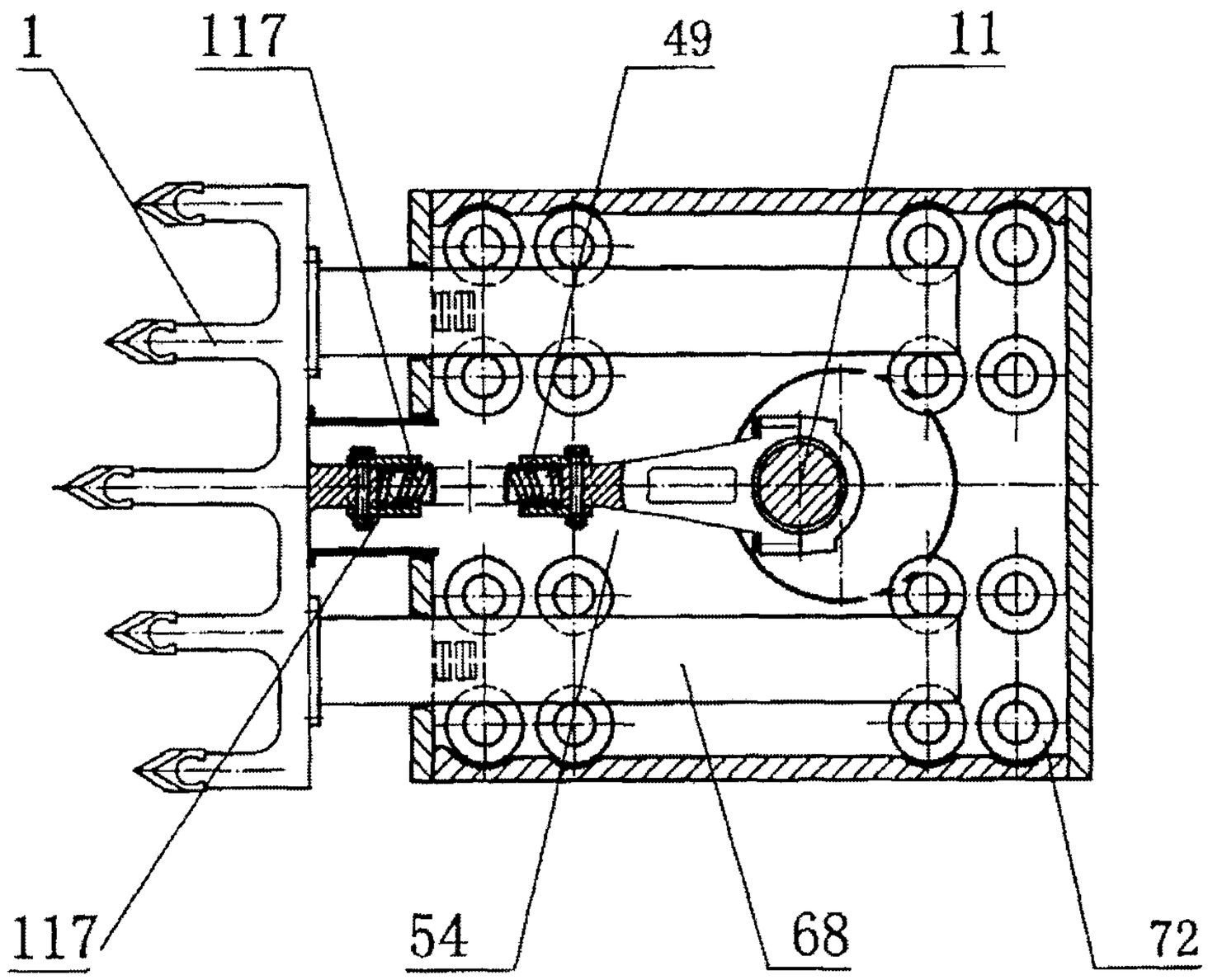


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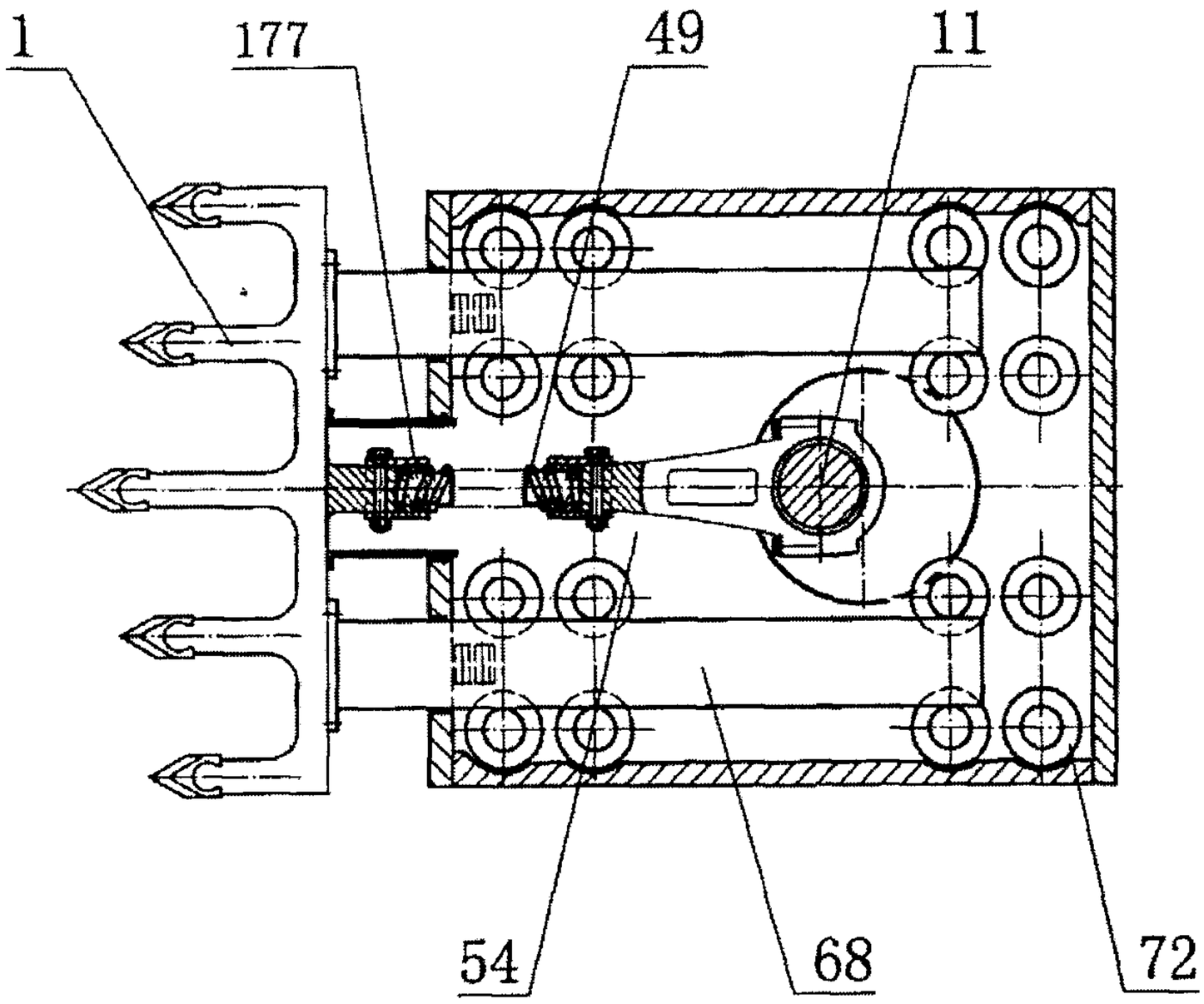


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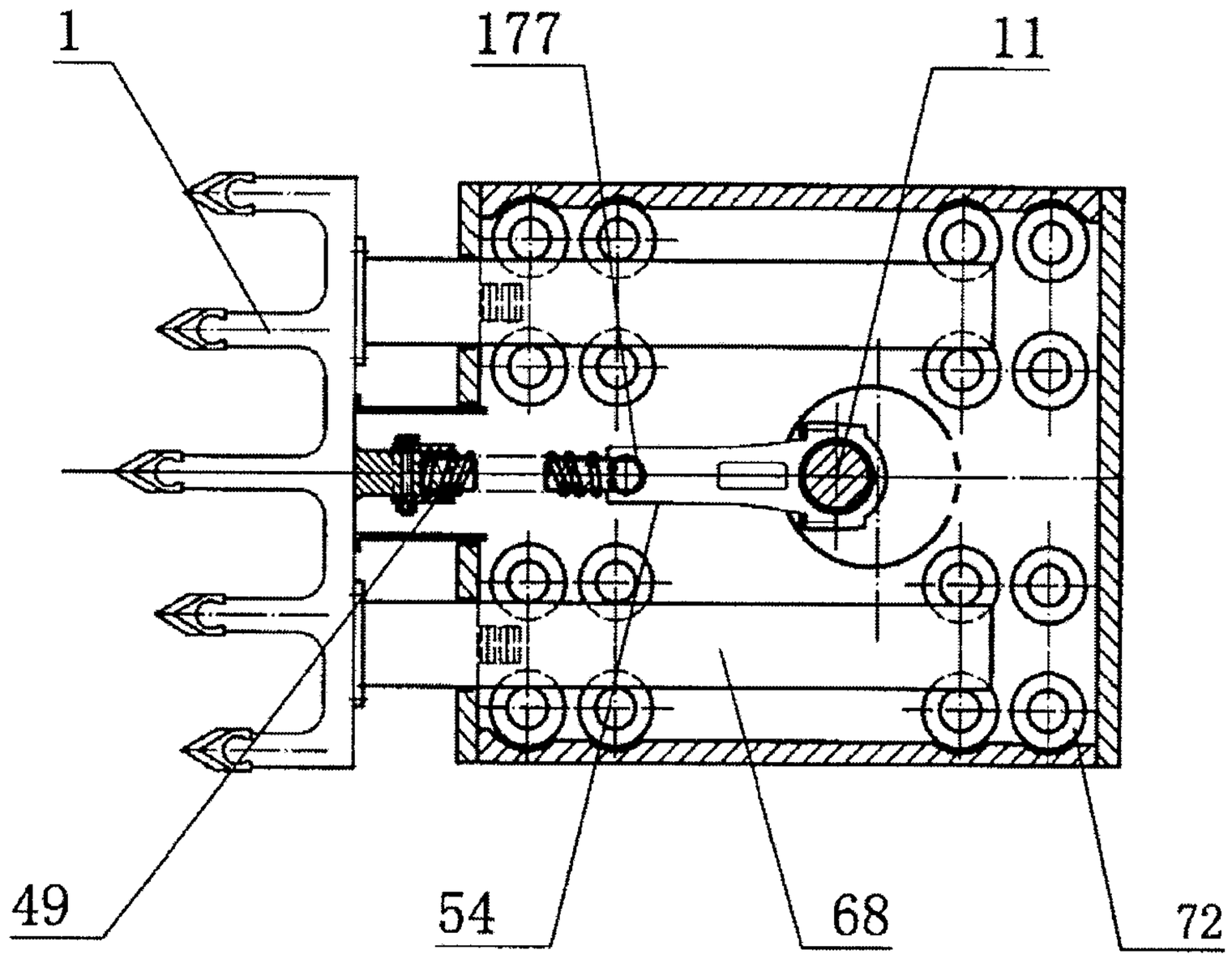


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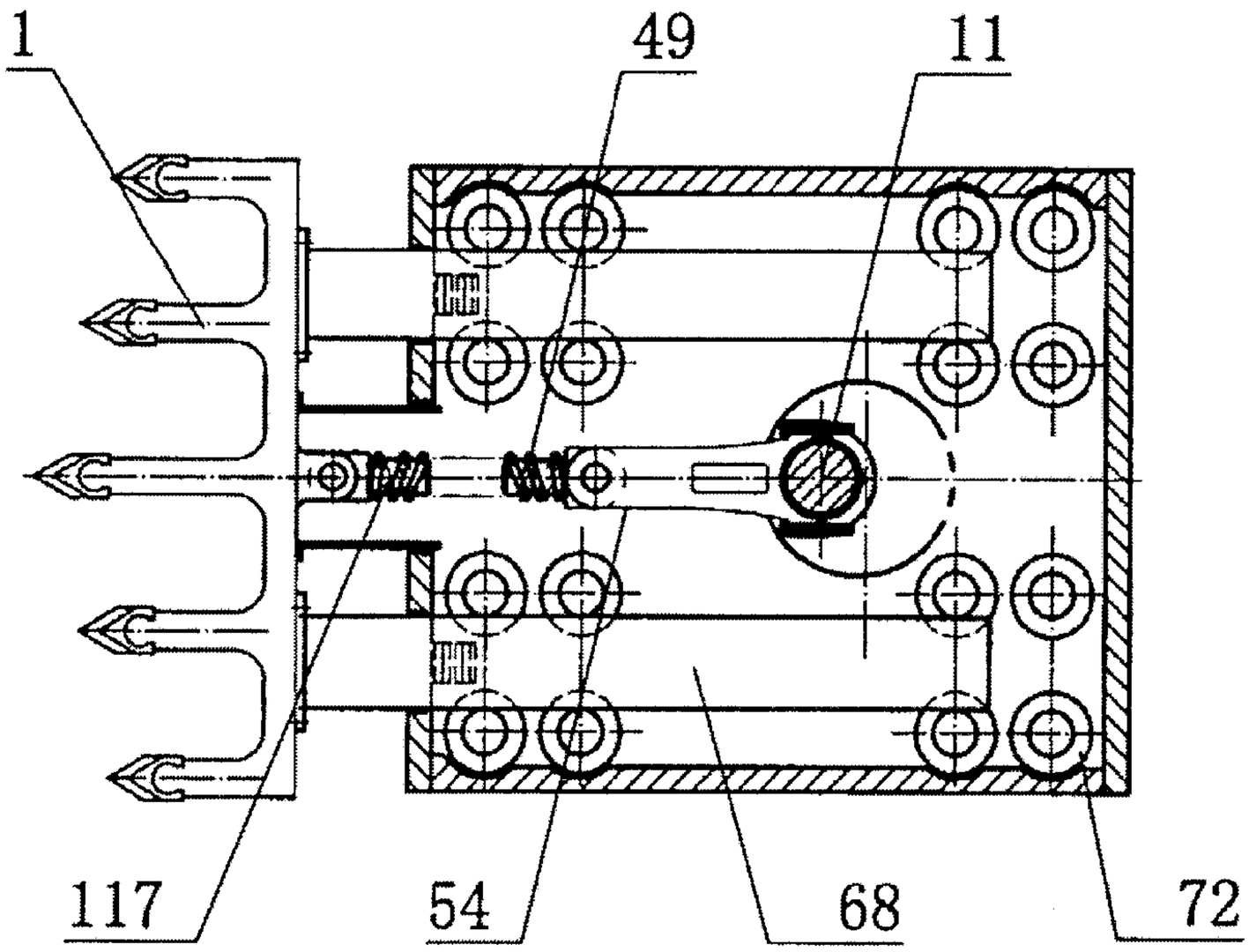


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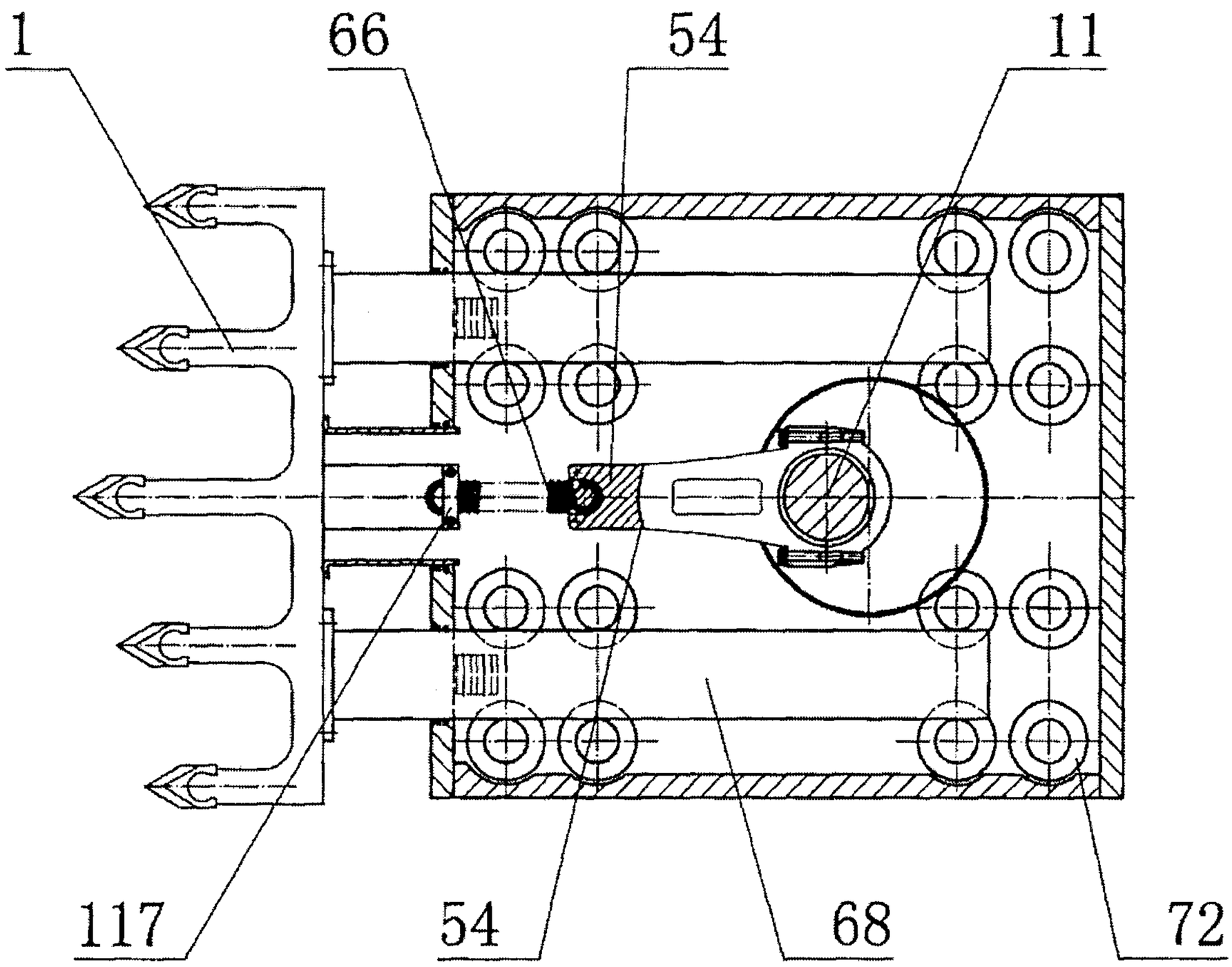


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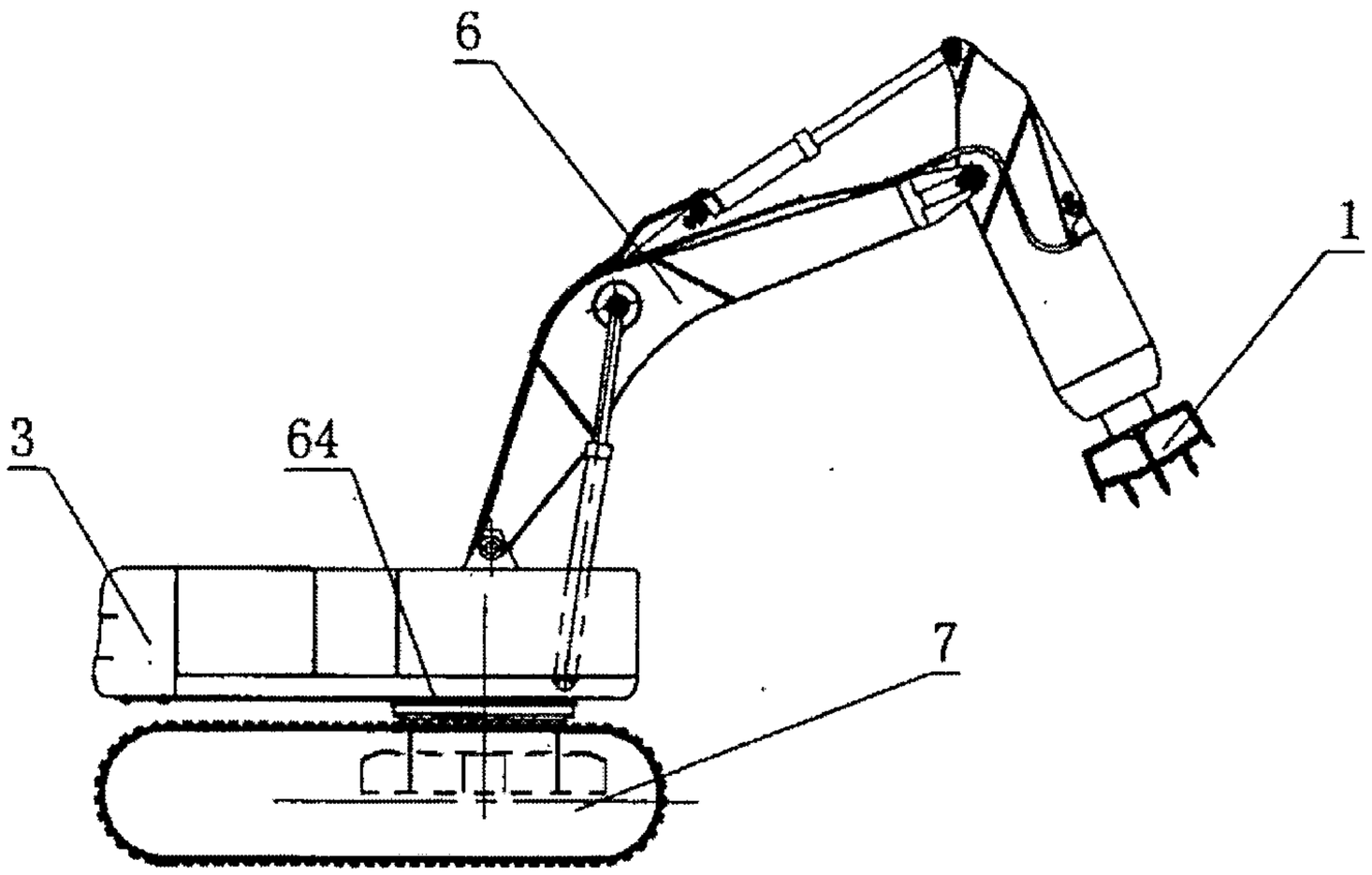


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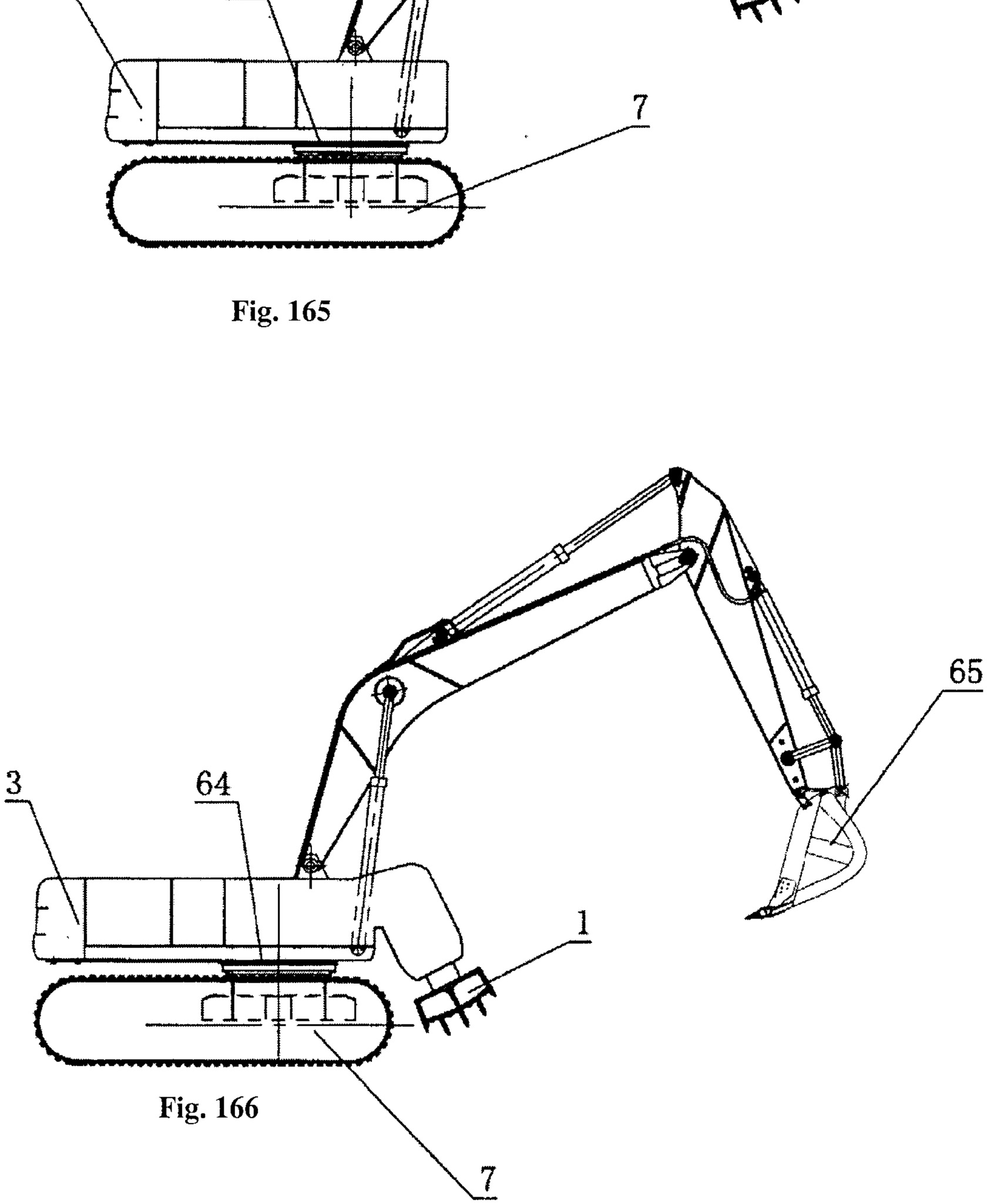


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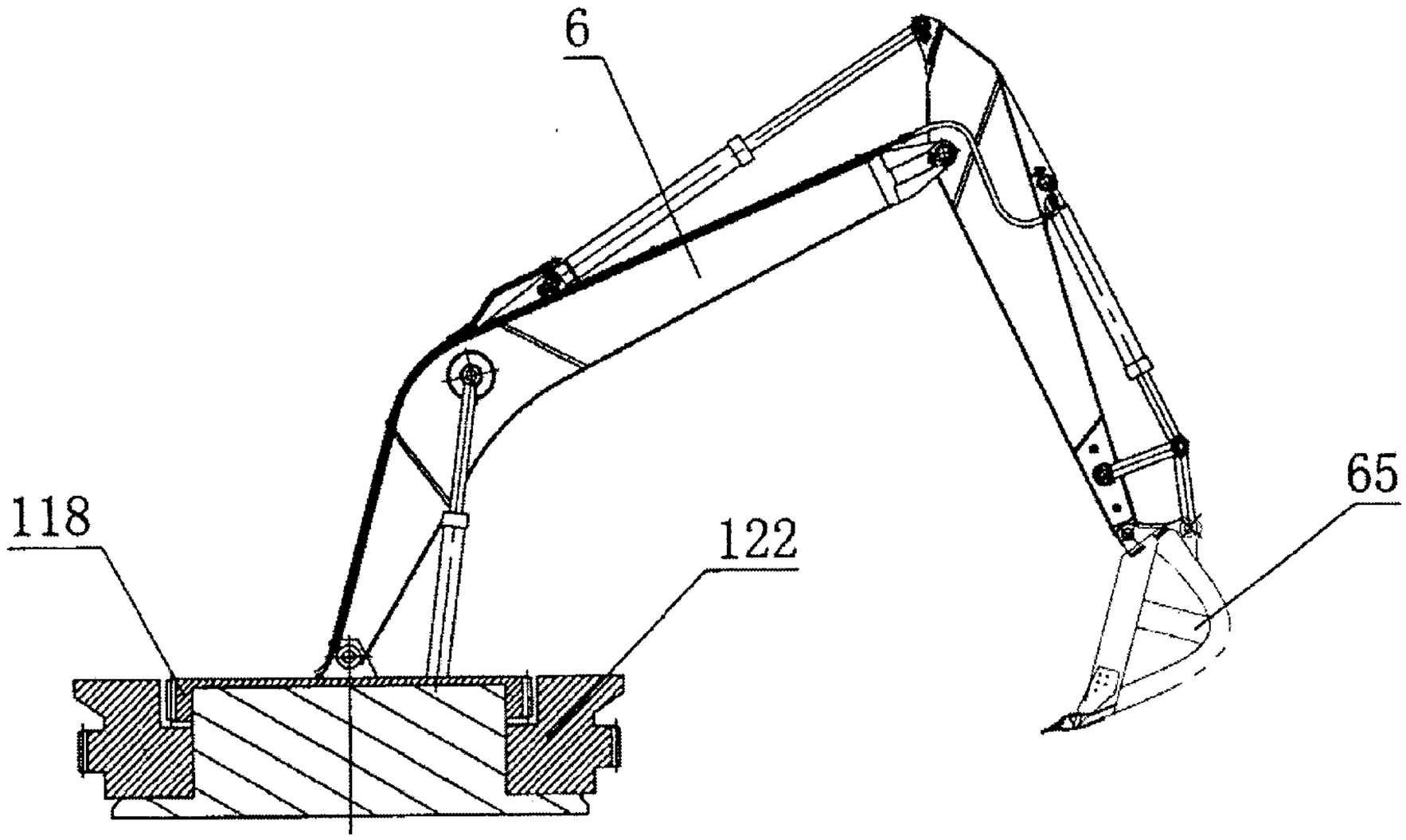


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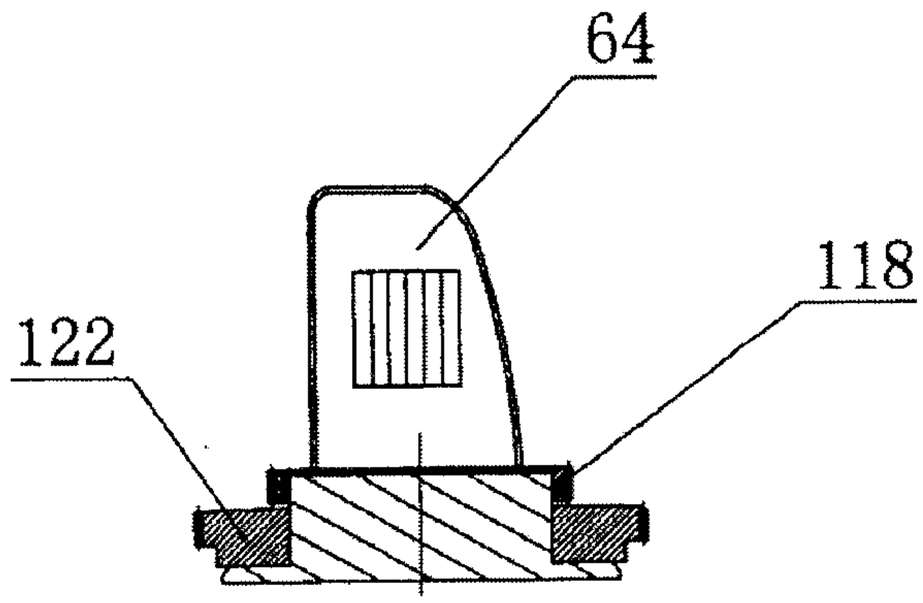


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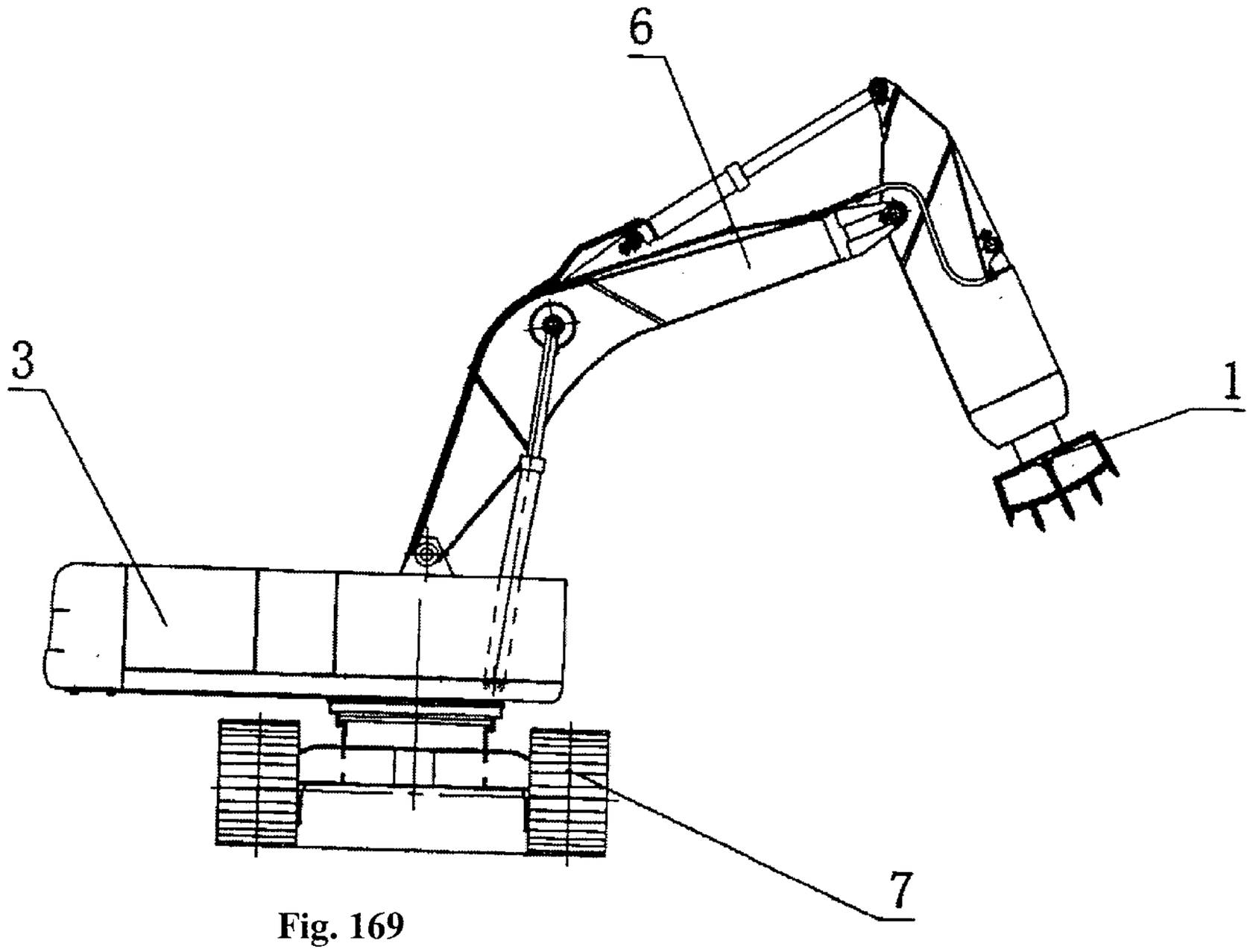


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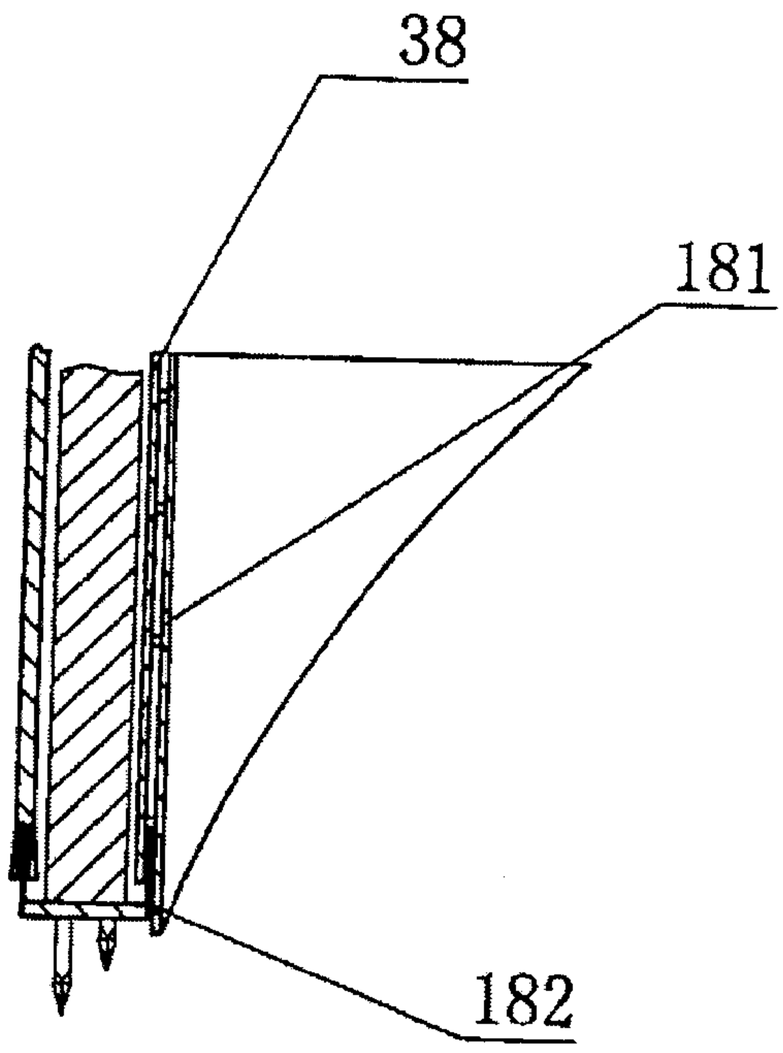


Fig. 170

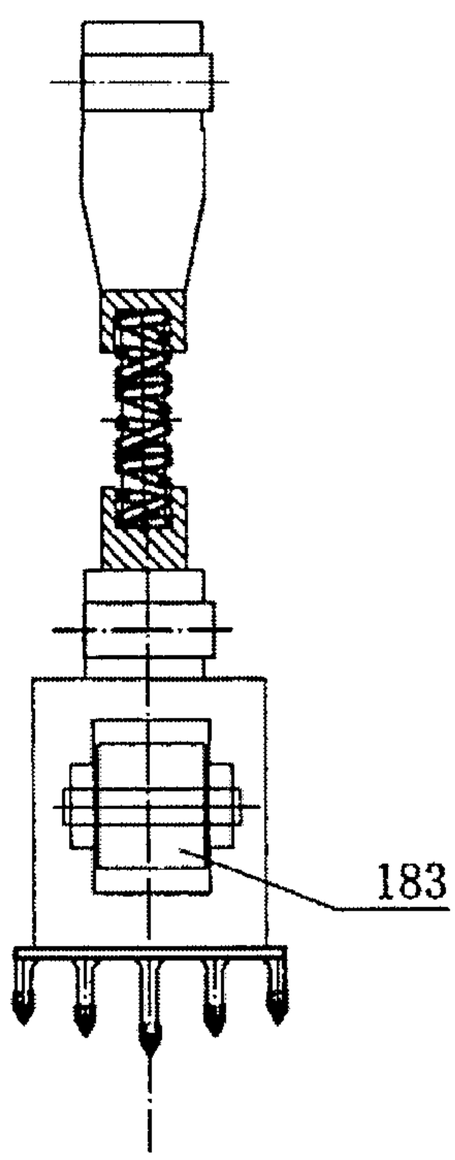


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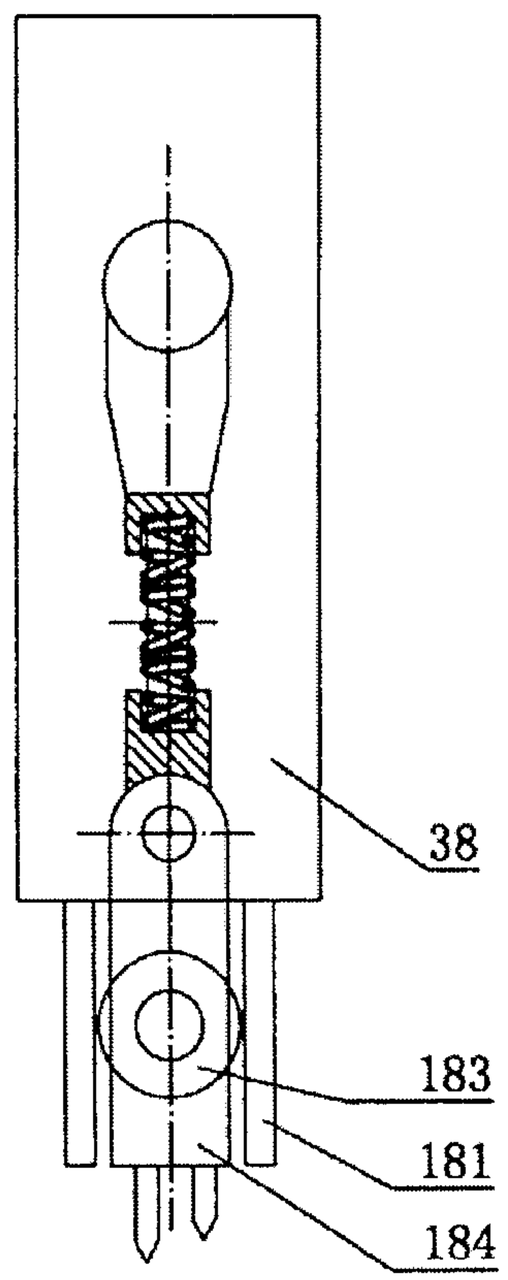


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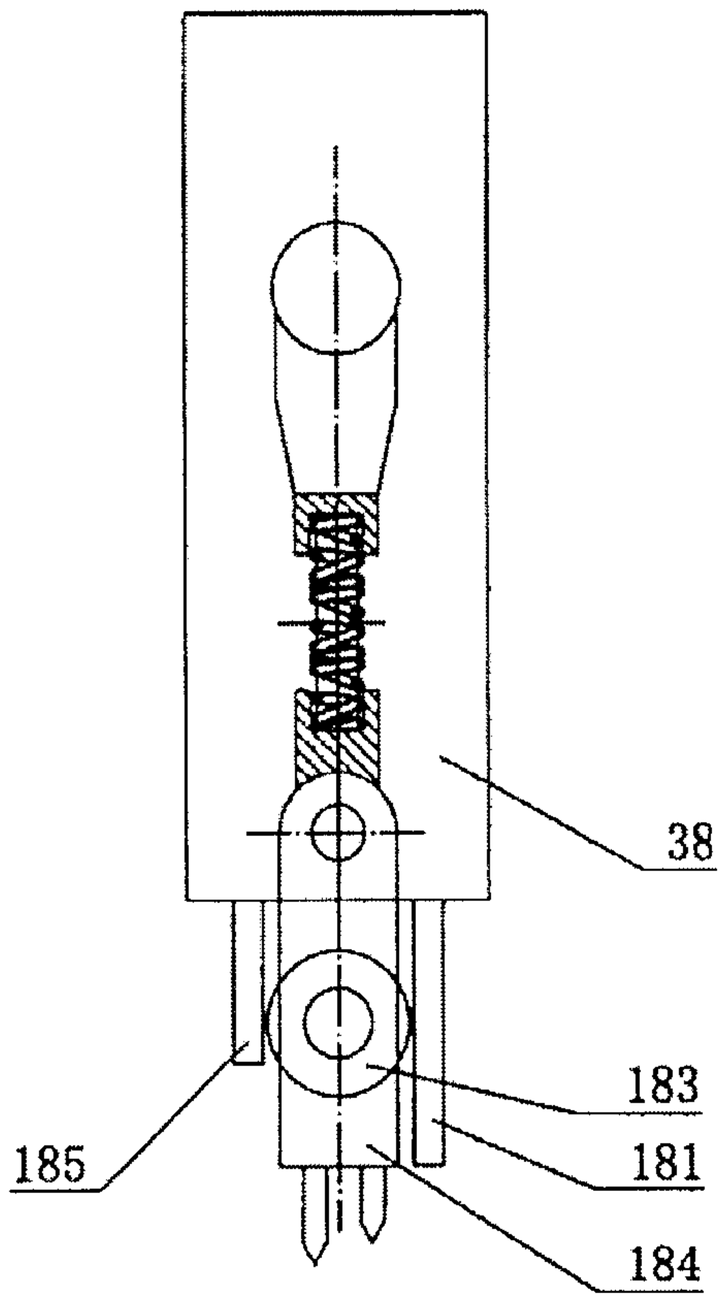


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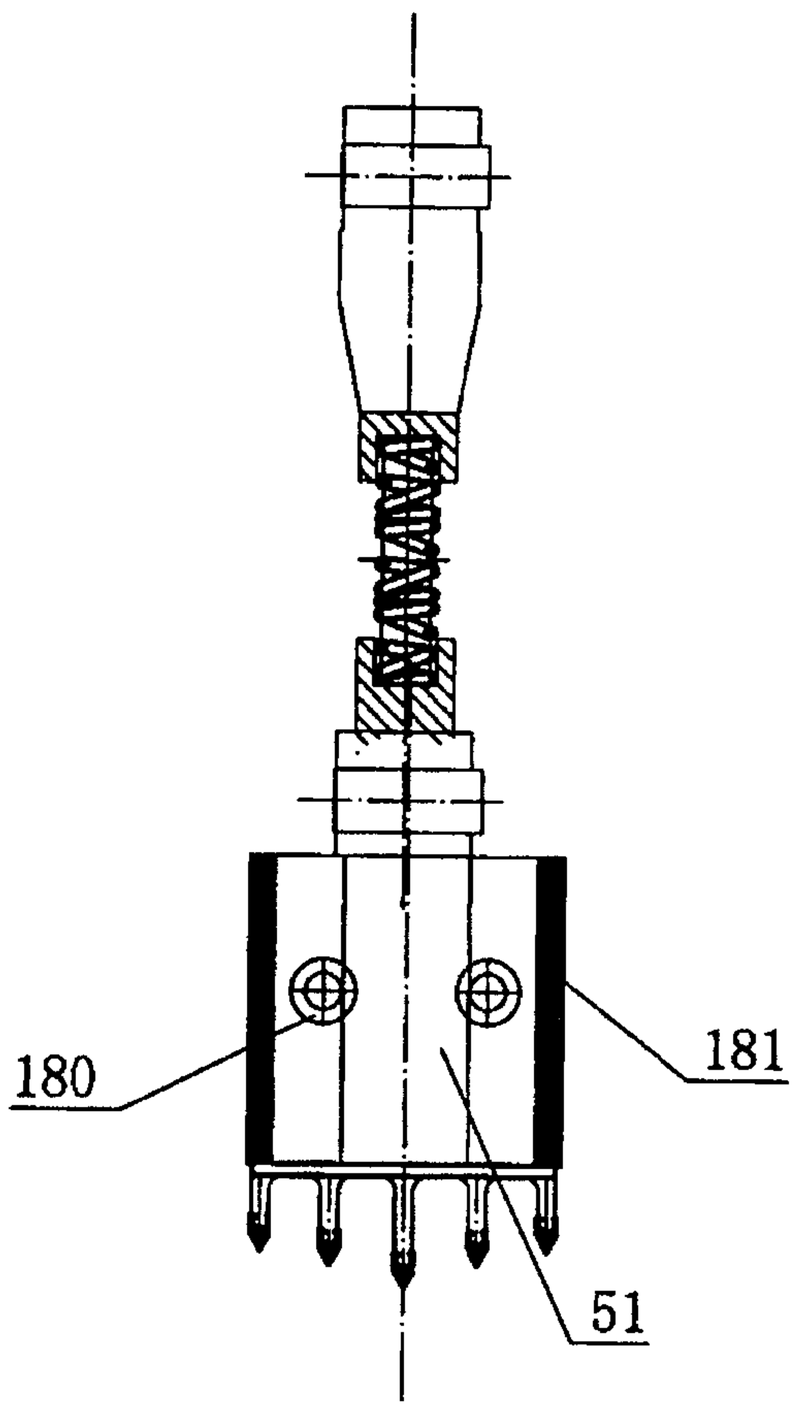


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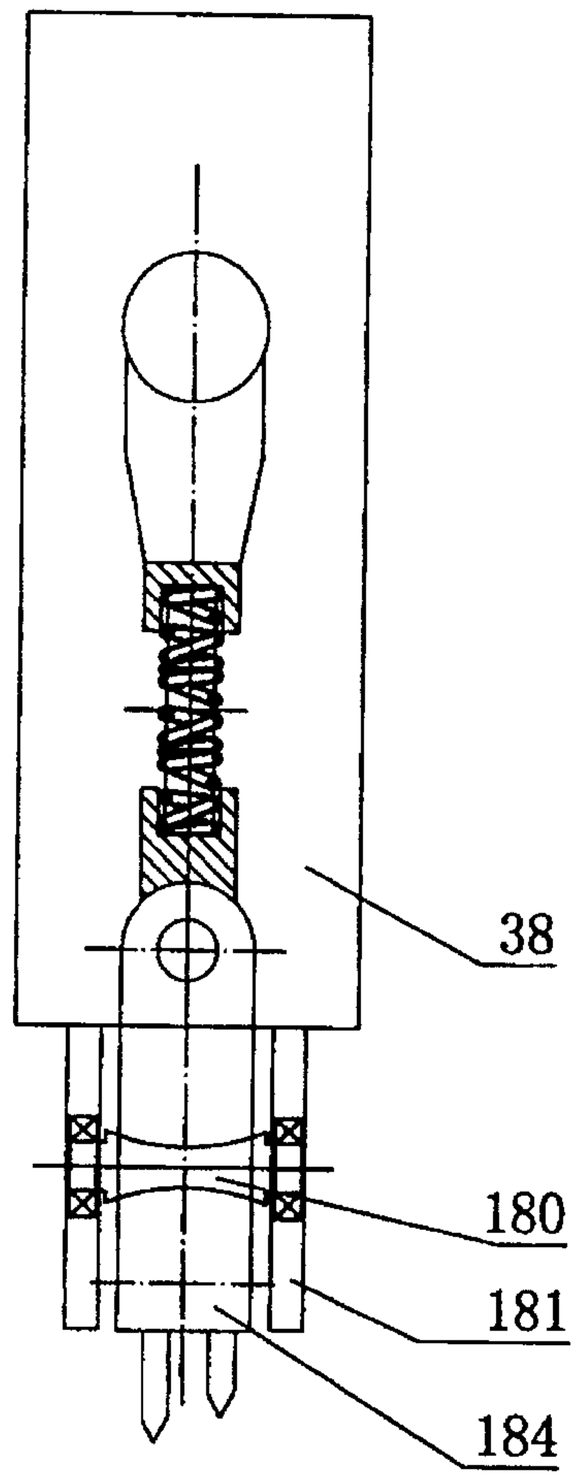


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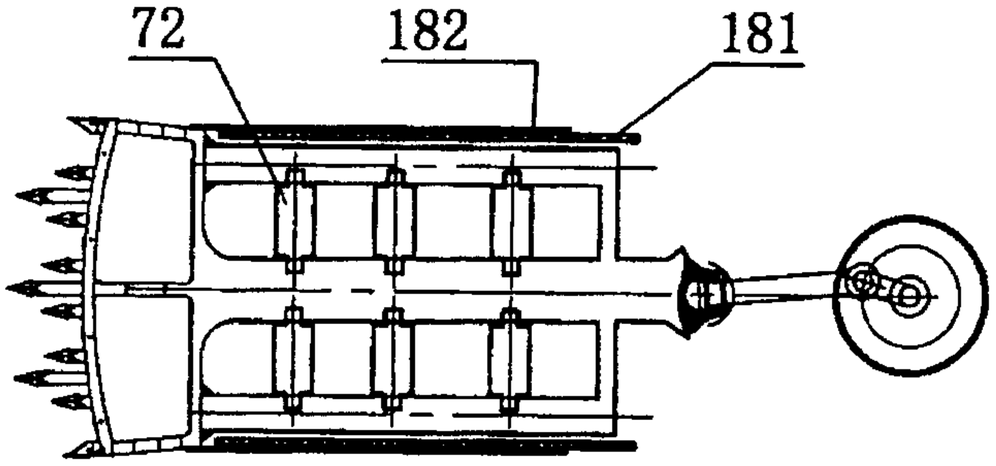


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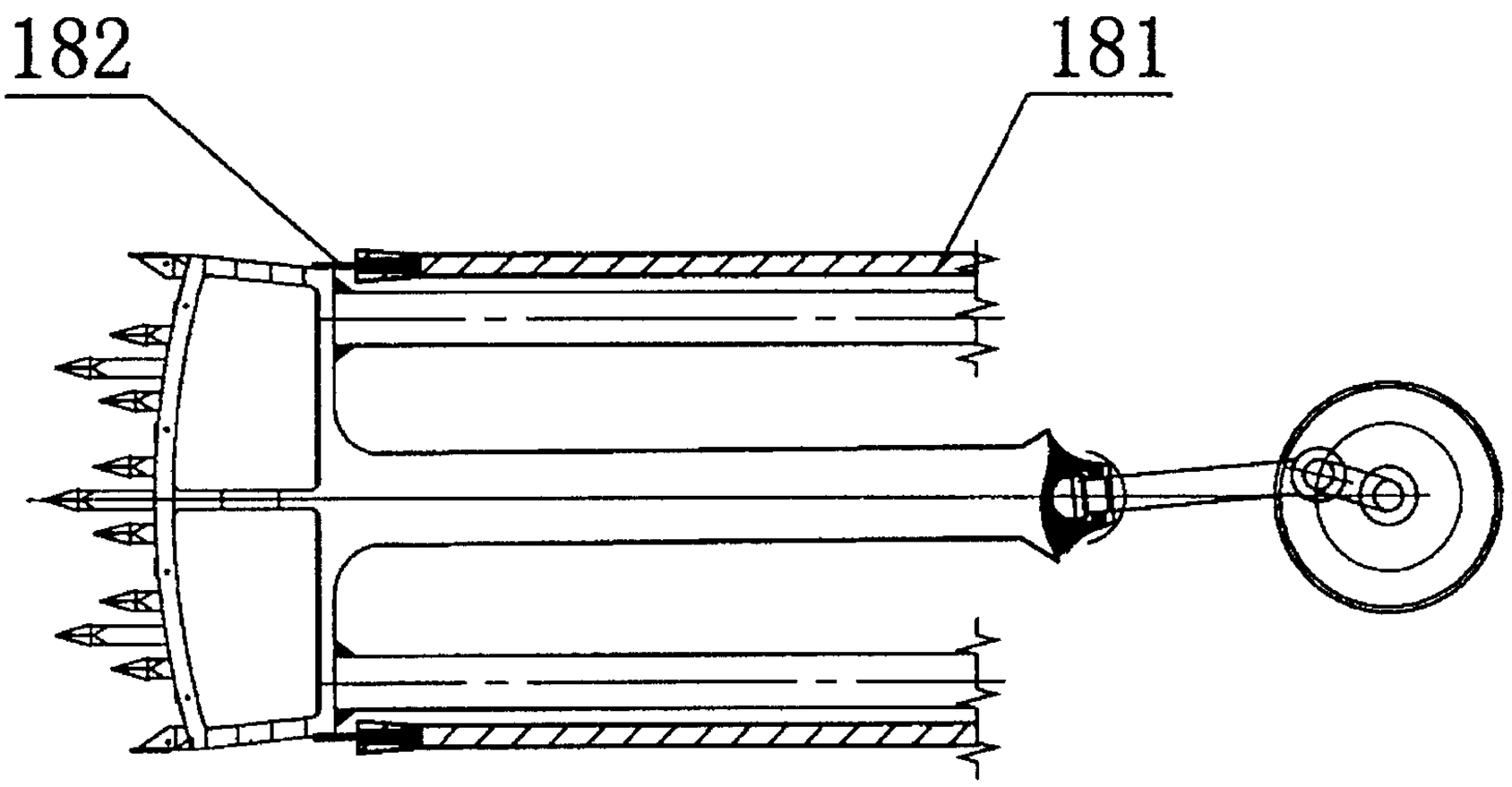


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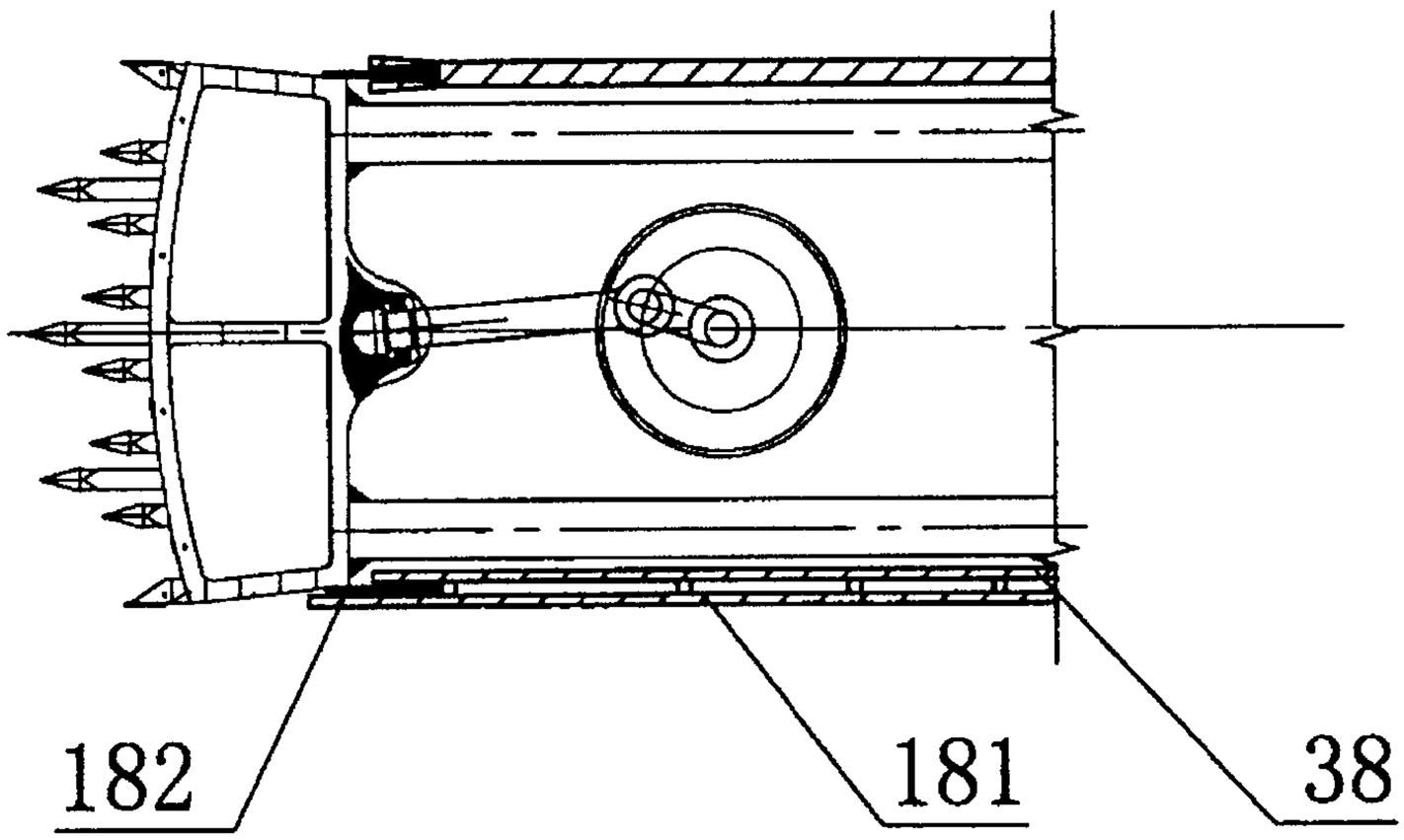


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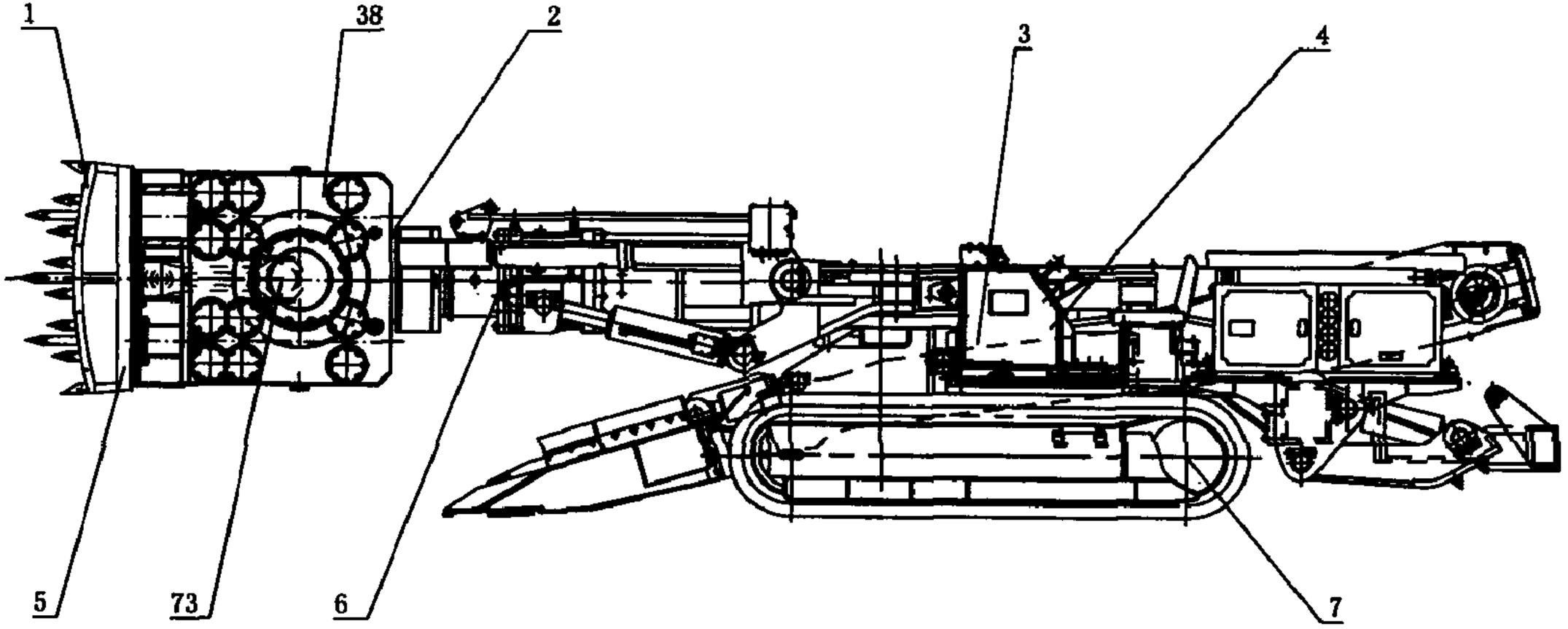


图1 / Fig.1