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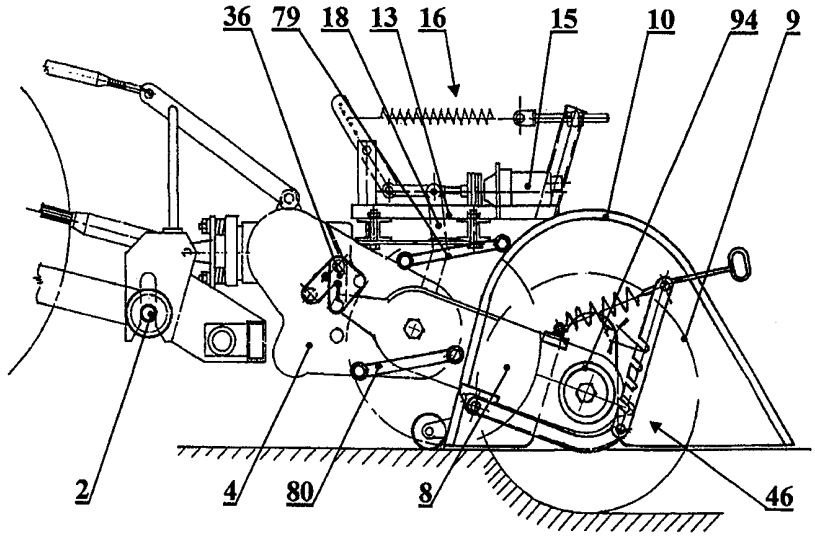


(57) Abstract

Universal machine for land strip tilling and sowing permits by its functional assemblies not only to vary the depth and width of the tilled land strips and the width of left–out strips between them, but also the pressure of cultivator wheels on the tilled land surface. On an auxiliary frame (13) of the machine a lifter (15) and a balancer (16) are assembled. The lifter (15) is connected with an actuating lever (18), fastened on a swing arm (8). The locking fixture (36) locks the swing arm (8) in idle position to secure a safe handling of cultivator wheels (9) as well as the transport of the machine. The cultivator wheels (9) consist of at least one cutter head (58, 59, 60) with at least one cutter disk (71), to which tilling cutters (76, 77, 78) are fastened. The guard (10) of cultivator wheels (9) enables copying of the land surface profile during the motion of the machine and helps to shovel the thrown–out earth back into the cut–out groove.

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# Universal Machine for Land Strip Tillage and Its Sowing

## Technical Field of the Invention

The invention concerns a machine for strip tilling of land and for its sowing.

## Description of the Prior Art

For recultivating the meadow and pasture land machines are used, cultivating the land in defined strips, whereas the plants on non-tilled land strips remain in original condition. Clover or clover-grass mixtures are then sown into tilled land strips. Such method of land cultivation and the machines suitable for the purpose are known. Tilling is performed by means of rotary cultivator wheels, on which cutter disks having a certain width are fastened. Such cultivator wheels are fastened on swinging arms of the cultivating machine. This state-of-the-art is documented e.g. in Czech specifications AO 269.856 and AO 269.861 "A Device for Pasture Sowing", which describe forming of a cultivated strip, having a width of 40 mm and depth 20 - 25 mm, in which then seeds are sown and covered with dispersed earth particles. The Czechoslovak specification AO 270.287 "Equipment for land preparing and sowing in grass cultures" describes a machine, carrying on its arms cultivator wheels with cutter disks, by means of which the machine cuts narrow and shallow grooves in the land surface. A sowing device, being a part of the machine, sows clover or clover-grass mixture seeds in a known manner into the pre-formed grooves. A shovel blade, forming a guard of the equipment on its whole width, covers the groove with earth.
The diameter of rotary cultivator wheels with cutter blades on such machines was relatively small, the swing arms were rather short, the whole structure was lightweight. Such machines formed, however, grooves with only 25 mm depth and not more than 60 mm wide.

The machine enabled to cultivate land only with a fix strip width setting, fix depth and pitch between the cultivated land strips. Purchasing several different machines for various widths and pitches is not only prohibitive, but it would also bring a risk that a particular purchased machine can become unsuitable for the optimum additional sowing for a given lane.

A general limitation of such machines is their single-purpose character as to the groove size and pitch, a tedious, physically tiresome and dangerous handling of swing arms, in particular when treating and repairing the cultivator disks, a fix pressure of cultivator wheels onto the land surface in their working position, an imperfect control of returning the thrown-out earth back into the formed grooves, resulting in an uneven land surface, because the cultivated strips without a correct restoring of earth layer will have a deeper surface than the left-out land strips with overrests of thrown-out earth.

Experiments have proven that narrow and shallow grooves do not constitute favourable conditions for the growth of added types of clover-grass mixtures. The original old grass or clover-grass culture between the newly added species adversely affects their growth as a consequence of a strong aleopathy of grass cultures against added cultures, the result of which is largely influenced not only by the parameters of the cultivated land, i.e. land quality grade, situation, type of original and of the added grass culture as well as other factors. Pratotechnically more favourable conditions are constituted, when forming wider and deeper strips for added culture. Preferable therefore appear the efforts to enhance the quality of the resulting culture by modifying all harmfully acting parameters, above all in changing the depth and width of cut grooves in the land and of their pitch. With the aim of fulfilling this objective a machine has been invented, enabling to change the width and depth of cut land strips and to vary their pitch, thus adapting these parameters to the agro-environmental conditions of the site.

## Background of the Invention

The limitations mentioned above are largely remedied and the objective is solved by the machine according to the invention, having several functional assemblies, providing for the necessary land tilling parameters, allowing a controlled pressure of cultivation wheels on the cultivated land surface, permitting a safe handling of swing arms, a satisfactory back-shoveling of earth particles with the organic substrate into the formed grooves and preventing carryover of earth particles sideways onto the existing plant strip, reducing the risk of machine handling, maintenance and repair. Said functional assemblies are: a lifter, a balancer, a positioner, a resetter, cultivator wheels and their guard.

The essence of the invention consists in that on the machine frame, carrying a gear box with a power take-off cross-shaft, on which are fitted swing arms with cultivator wheels with freedom of sliding, two pairs of parallel, horizontally situated cross bars are mounted, carrying a pair of vertical brackets, on which fastening hubs of swing arms are fitted, through which a driving cross-shaft is inserted. The inner vertical brackets, i.e. those that are near to each other, are interconnected by means of two double-acting hydraulic jacks, which are superposed in vertical plane symmetrically to the level plane, running through the axis of the driving cross-shaft. Said vertical brackets are fastened dismountably in the interstice between the pairs of horizontal parallel cross-bars, thus allowing for their freedom of horizontal travel.

A cultivator wheel, shifted onto and fastened on a non-round output shaft, has a cutter head with at least one cutter disk

with at least one cutter blade fixed dismountably on the cultivator wheel. The position of the fastening hub on the output shaft is secured by a locking screw, running tangentially in radial direction and engaging with the circumferential groove formed in a required position on the output shaft.

On a pair of horizontal, parallel cross-bars an auxiliary frame is situated, carrying a lifter and a balancer. This assembly consists of a pneumatically actuated control jack, whose hollow piston rod carries a strut which is dismountably connected to a tie-rod and actuating lever, fastened to the swing arm. The other tie-rod extremity is rotatably connected with one extremity of a rocking lever, fitted amidst on a vertical bracket, fastened to the auxiliary frame. The free arm of the rocking lever has several jointing elements to which a spring is connected by its one end, the other end being anchored to a setting screw, running through a spring holder also fastened on the auxiliary frame.

The swing arm is adapted so that at that extremity, which carries the cultivator wheel, a cast-on block is made, in which positioning pegs are fastened. The other swing arm extremity has an arm lip. This swing arm comes by the said arm lip in its end positions in contact with the upper stop and with the bottom stop, fastened on the machine frame. A locking fixture, consisting of parallel cheeks, between which a tilting latch with a locking peg and safety lock are inserted, and which is fastened to the machine frame, locks the swing arm in its maximum top position.

On the bottom side of the swing arm, rotatably in relation to the suspensions, a positioner is fastened, consisting of slats with an arched termination of the straight arm. On these slats are fastened rotatably fitted strut arms, connected on their opposite ends with an axle, to which an actuating rod with a handle is fitted. In the opposite direction a spring suspension holder is made towards the strut arm axle, the other spring end being connected to the upper suspension, fastened on the upper side of the swing arm. The strut arms have several oblique grooves with which are meshing the positioning pegs, fastened in the cast block of the swing arm.

On each cultivator wheel independently adapted is a cultivator wheel guard. It consists of side walls, bridged over by an arched upper wall with straight faces both at the front and the rear side. On the front side of the guard arched wall, adjacent to the gear box, a twin suspension forming a parallelogram is fitted by an upper and a bottom suspension arm to the upper and to the bottom holder respectively. At the same side, near the guard bottom edge, a track roller is situated in the holder. In the rear straight part of the guard arched wall a swinging tilting lid is fastened, whose trailing edge deflects the flow of the thrown-out earth. In the side wall of the guard a down-facing recess is made, in whose arched part a support surface is formed, whose shape corresponds to the shape of the swing arm bearing hub, located in the swing arm bottom part above the output shaft of the cultivator wheel.

The tilting lid is exchangeable.

In the working position the swing arms of the land strip tillage machine are extended by the tractor hydraulic system into the working position. When in motion, the cultivator wheels are driven from the gear box via driving shaft by the driving mechanism inside the swing arm. The cutter blades of the cutter head mill out an earth strip. The gravity effect of the swing arm is controlled by the balancer.

The swing arm lifting is made pneumatically by the lifter. Pressure air is fed to the actuating jack of this system from the tractor air pressure system. The hollow piston rod is shifted and raises the swing arm with its cultivator wheel into idle position, the top position of which is given by the bottom stop, which comes in contact with the swing arm lip. The swing arm is locked in its position by a tilting latch, meshing with the lip upper face, and a lock peg, running through the throughgoing bores in the arms of the swing latch and the side cheeks of the locking fixture. The position of the locking peg is locked by a safety lock, engaging with the locking peg collar after its turning. The hollow

piston rod and the strut rod layout enable the action of the actuating jack after lifting of the swing arm in any position of its working stroke.

The rocking lever. the tie-rod, the setting screw and the spring together constitute a balancer, helping to regulate the gravity force of the cultivating wheels with cutter blades depending on agro-environmental conditions, and to constitute thus the most favourable land tilling conditions. A rough setting is made by changing the attachment of the spring to some of the suspension elements on the rocking lever free end. A fine setting, i.e. accurate regulation of the pressure of cultivating wheels, is then performed by means of the setting screw.

The tilling depth of the cultivation wheels is set by means of the positioner. To perform it, the swing arm is lifted by the lifter over the land level, then by pulling the actuating lever handle the pre-stressing of the spring, suspended between the positioner actuating lever and the swing arm upper surface is overwhelmed, and the positioning pegs from the strut arm oblique grooves are released. The arm is tilted off free. The slat is then reset into the new required position by means of the strut arms. The positioning pegs, touching in tilted-off position of the strut arms their outer edges, will come flush to the opening level of oblique grooves. By releasing the pulling force on the control lever handle the spring pre-stressing is interrupted and the positioning pegs enter their respective oblique grooves. This presets the extension of the cultivator wheel over the slat, thus determining the tilling depth of the cultivator wheel. To get a deeper tilling, the slats should be reset in relation to the swing arm towards the outpout shaft,carrying the cultivator disk, i.e. to lift them with tilted strut arms.

The horizontal resetting of the swing arms on the driving cross-shaft, i.e. changing their distance from ech other and thus determining the width of the left-out land strip (not to be tilled) between the tilled grooves, is made by the

pitch resetter. With the swing arms lifted, the operator of the machine releases the fastening bolts of the vertical brackets with double-acting hydraulic jacks, connecting the inner vertical brackets, changes the required distance and secures the new position is by tightening the vertical brackets fastening bolts. This shifting can be performed easily and quickly though the mechanism weight is about 250 kg.

The tilled groove width can be changed by changing the cutter blade head. Release and pull-out the locking screw, remove the cutter blade head from the output shaft, insert a new cutter blade head and fasten same with locking screw again.

The cultivator wheel guard, fastened on the machine frame by means of the suspension arms forming a parallelogram, picks up the land surface profile by means of a tracking roller independently on the vertical stroke of the cultivator wheel. In case of an extremely high cultivator wheel lifting a cam on the cultivator wheel hub strikes against the contact surface of the wheel guard recess and lifts the guard to prevent any contact of the cultivator wheels with the inner surface of the arched guard wall, because a constant distance between the guard and the cultivator wheel is safeguarded. In this way any damage of cutter blades in the guard is prevented. The tilting lid in the guard rear part helps to level-out continuously and gently the tilled land strip, into which the seeds have been introduced. The bottom edge of the tilting lid can be straight or profiled, so that it shapes a channel, shoveling the tilled earth onto a strip of a desired form and size. A preferable exchangeability of the tilting lid is an advantage. The guards need not be changed when changing the groove width, only one universal guard can be used.

## Overview of figures in the drawings

An exemplary layout of the machine according to the invention is shown in the drawing, whose individual figures represent:

Fig. 1 Front view of the machine with lifter and balancer

Fig. 2 Front view of the machine with positioner and wheel guard

Fig. 3 Section of the actuating jack of the lifter

Fig. 4 Modification of the swing arm and locking fixture

Fig. 5 Axonometric view of the positioner

Fig. 6 Axonometric view of the cultivator wheel guard

Fig. 7 Front view of the resetting mechanism and cultivator wheel

Fig. 8 Cultivator wheel set in side view

Fig. 9 Section of cutter head in radial plane of the locking screw

Fig. 10 Axonometric view of locking hub and its fitting on the driving cross-shaft

## Examples of embodiment of the invention

The universal machine for land strips tillage and sowing consists of a frame 1, which is fitted in its front part with a three-point suspension 2, a trailing device 3, a gear box 4 driven by a power take-off shaft 5 from the tractor vehicle, e.g. tractor, and power output shaft 6. Through the gear box 4 a driving non-round cross-shaft 7 is running, on which swing arms 8 with sliding freedom are fitted, carrying on their ends cultivator wheels 9. The cultivator wheels 9 are driven by an unspecified mechanical driving system situated inside the swing arms 8. Over each cultivator wheel 9 on the frame 1 beside the swing arm 8 an independently swinging tilting guard 10 is fastened. In the upper part of frame 1 two pairs of

cross-bars are situated, consisting of an outer cross-bar 11 and an inner cross-bar 12, on both of which an auxiliary frame 13 is dismountably fitted by means of bolts 14. On the said auxiliary frame 13 are fitted a lifter 15 and a balancer 16, connected by a pin 17 with an actuating lever 18, which is fastened on the swing arm 8. The lifter 15 consists (see Fig. 3) of an actuating jack 19, connected by a (not shown) pipeline with a source of pressure working fluid, and in which a piston with a hollow piston rod 20 exert reciprocating stright line motions. In said hollow piston rod 20 a supporting bar 21 is inserted, having a bifurcated endpiece, connected by a pin 23 with the bottom arm of a rocking lever 24 of the balancer 16. Said rocking lever 24 is rotatably fitted on a pin 25 in a bracket 26, anchored on the auxiliary frame 13. The upper arm of the rocking lever 24 has several suspension elements 27, on which a spring 28 is suspended by one its end. By its other end the spring 28 is connected with a setting screw 29 inserted in a screw holder 30, which is also fastened on the auxiliary frame 13. The setting screw 29 can be reset in the pin 31 of the screw holder 30 and is locked in a given position by locking nuts 32. The suspension elements 27 can be holes, eyes, protrusions, pins, indentations or other forms serving the same purpose.

The swing arm 8 (see Fig. 4) is extended at its end, through which the non-round driving cross-shaft 7 is running, into the form of a lip 33, delimiting the contact with stops 34,35, fixed on the frame 1 of the machine for the extreme position of that swing arm, i.e. its swinging range. The swing arm 8 is leaning in its upper end position by its lip 33 on the bottom stop 35 and is locked in that position by the locking fixture 36, particularly by its tilting latch 39, locking peg 40 and safety lock 41. The locking fixture 36, fastened on the frame 1 of the machine, consists of side cheeks 37, a tilting latch 39 consisting of flat arms 42, connected by an axle 43 and rotatably fitted between the side cheeks 37 on a pin 38, further of a locking peg 40 and a safety lock 41. The bottom end position of the swing arm 8 is determined by the upper stop 34. The tilting latch 39 is held in its deflected position by the locking peg 40, leaning on it by the edge of its flat

arms 42. The locking peg 40 runs through the holes in the side cheeks 37 of the locking fixture 36.

On the bottom side of the swing arm 8 a bottom suspension 44 is fitted, to which by means of a suspension pin 45 a positioner 46 (see Fig. 5) is fitted, consisting of slats 47 with arched termination of the cross arm, to which are, by means of pins 48, rotatably connected strut arms 49, which are interconnected on their opposite ends by an axle 59, to which also connected is an actuating rod 51 with a handle in direction from the gear box 4, and on its other extremity a suspension 52 for connecting the spring 53. The other end of the spring 53 is coupled to the upper suspension 54, fastened on the upper side of the swing arm 8. The strut arms 49 have several oblique grooves 55, opening towards the gear box 4 and rising from level upwards at an angle of 3° to 15°. The positioning pegs 56 fastened in the cast-on block 57 of the swing arm 8 enter in said oblique grooves 55.

The cultivator wheel 9 consists of two cutter heads fitted on the output shaft 61 on both sides of the swing arm 8 (see Fig. 7). The cutter head proper 58, 59, 60 consists at least of one plate-type cutter disk 71, fastened on a fastening hub 62, 63, 64. On said cutter disk are dismountably assembled, e.g. by means of a bolt 74 and a nut 75, inclined tilling cutters 76, 77, 78.

Exchangeable cutter heads 58, 59, 60 are intended for various widths of the tilled land strips. Their layout in relation to the output shaft 61 is fixed by inserting into one of the positioning grooves 65 with a locking bolt 68, runing through a cross hole 70 in the fastening hub 62, 63, 64, and a locking nut 69.

The guard 10 of cultivator wheels 9 (see Fig. 6), fastened to the frame 1 by the upper suspension arm 79 and by the bottom suspension arm 82, consists of side walls of the guard 83, connected with each other by an arched wall 84, to which a tilting lid 85 is connected. Below the bottom suspension arm 80 near the bottom edge of the guard 1O a track roller 86 is fitted in roller holders 87. The

side walls 83 of the guard 10 are fitted with a recess 88 opened downwards, through which is running the output shaft 61 with the fastening hub 62, 63, 64 of the cultivator wheel 9. In the uppermost position of this recess 88 a supporting surface 89 is formed, coming in contact with the upper surface of a collar 94 of the swing arm 8. In the case of a larger pitch of tilling wheels 9 and shifting of the guard 10 from the swing arm 8, on the output shaft 61 is fitted a replacement hub 90, with which the supporting surface 89 of the guard 10 comes in contact. In the rear part of the arched wall 84 of the guard 10 a tilting lid 85 is fitted on axle 91, fastened in holders 92. The trailing edge of said tilting lid 85 is formed so that it constitutes an outlet channel 93, as may be seen in Fig. 6. This edge can, however, be also straight. The guard 10 has normally only one width, convenient for all widths of cultivating wheels 9. The tilting lid 85 is exchangeable.

The form of the trailing edge can be selected so as to make it suitable for a given width of the tilled land strip. As the tilting lid 85 with one form of its trailing edge can easily be exchanged for a lid with another configuration of the trailing edge, the guard 10 becomes universal, because it is not necessary to exchange it when changing the width of tilled land strips. In movement and during tilling a land strip narrower than the width of the guard 10 the trailing profile of a suitably chosen lid will shovel the strip of thrown-out earth back again into the tilled land strip.

If it is necessary to change the pitch between the tilled land strips, i.e. to change the distance between the swing arms 8 carrying the cultivator wheels 9, the fastening bolts 14 of the vertical brackets 72, 73 are released and by means of hydraulic double-acting jacks 66, fastened on the inner brackets 73 and actuated by an unspecified hydraulic motor, the required distance is corrected and the new position is locked by tightening the bolts 14.

**What we claim is:**

1. Universal machine for land strip tillage and sowing, consisting of a frame with three-point suspension, a trailing device, a gear-box with a driving cross-shaft, on which swing arms with cultivator wheels and their drives are mounted, characterized in that the swing arms (8) are fitted with freedom of sliding in vertical outer and inner brackets (72,73) by their fastening hubs (67), whereas on an auxiliary frame (13), fastened on a pair of cross-beams (11,12) a lifter (15) and a balancer (16) are fitted. The swing arms (8) are terminated with a cast-on block (57), in which are fastened positioning pegs (56) and their other extremity is extended by a lip (33), the positioner (46) is suspended with freedom of swinging to the swing arm (8) by suspensions (44,54), the cultivator wheels (9) are fitted at least with one cutter disk (71), carrying tilling cutters (77, 78, 79). a locking fixture (36) is fastened on the frame (1) and the cutter wheel guard (10) is fastened to the frame with suspension arms (79, 80).

2. Universal machine according to claim 1, characterized in that the inner vertical brackets (73), dismountably connected with pairs of cross-beams (11, 12), are interconnected by a pair of hydraulic jacks (66), arranged symmetrically to the horizontal level running through the axis of the driving shaft (7).

3. Universal machine according to claims 1 and 2, characterized in that the lifter (15) consists of an actuating jack (19), a hollow piston rod 20, in which a supporting bar (21) is inserted, whose one end is connected by means of a pin (17) with an actuating lever (18) and a tie-rod (22) connected by means of a pin (23) with the bottom arm of a rocking lever (24) of balancer (16).

4. Universal machine according to claims 1 to 3, characterized in that the balancer (16) consists of a rocking lever (24), in whose upper arm are arranged suspension elements (27), springs (28) fastened between said suspension elements (27), and a setting screw 29, inserted in a holder pin (31).

5. Universal machine according to claims 1 to 4 characterized in that the cultivator wheel (9) has at least one cutter head (58, 59, 60) with at least one cutter disk (71), to which tilling cutters (77, 78, 79) are fastened from the face and/or back surface, said cutter disk (71) is connected with a fastening hub (62, 63, 64), having a non-round central hole with a profile corresponding to the profile of the non-round output shaft (61) and having a cross bore (70) nearer to the edge of the fastening hub (62, 63, 64), parallel to its vertical axis and through which a locking bolt (68) is running, meshing with the circumferential positioning groove (65), formed on the output shaft (61).

6. Universal machine according to claims 1 to 5, characterized in that the locking fixture (36) consists of side cheeks (37), between which on a pin (38) a tilting latch (39) is fitted, consisting in flat arms (42) connected by means of an axle (43), a locking peg (40), a safety lock (41), an upper stop (34) and a bottom stop (35).

7. Universal machine according to claims 1 to 6 characterized in that the positioner (46) consists of slats (47) fastened on the bottom side of the swing arm (8) in the bottom suspension (44) connected with strut arms (49Ę), featuring at least one oblique groove (55) inclined at an angle from 3° to 15° from vertical plane and connected by axle (50), to which, in the direction from the gear box (4) an actuating rod (51) with a handle is arranged, whereas in the opposite direction is a suspension (52) of spring (53) connecting the axle (50) with the upper side of the swing arm (8) by means of the upper suspension (54).

8. Universal machine according to claims 1 to 7, characterized in that the guard (10) of the cultivator wheel (9) consists of side walls (83), featuring a recess (88) and connected with each other by means of an arched wall (84), to the rear part of which an exchangeable tilting lid (85) is rotatably fitted, of suspension arms (79, 80) and a track roller (86).

9. Universal machine according to claims 1 to 8, characterized in that the tilting lid (85) is constituted either as a straight line plate or a profile plate, forming an outlet channel (93).

10. Universal machine according to claims 1 to 9, characterized in that an exchangeable hub (90) is put on the output shaft (61).

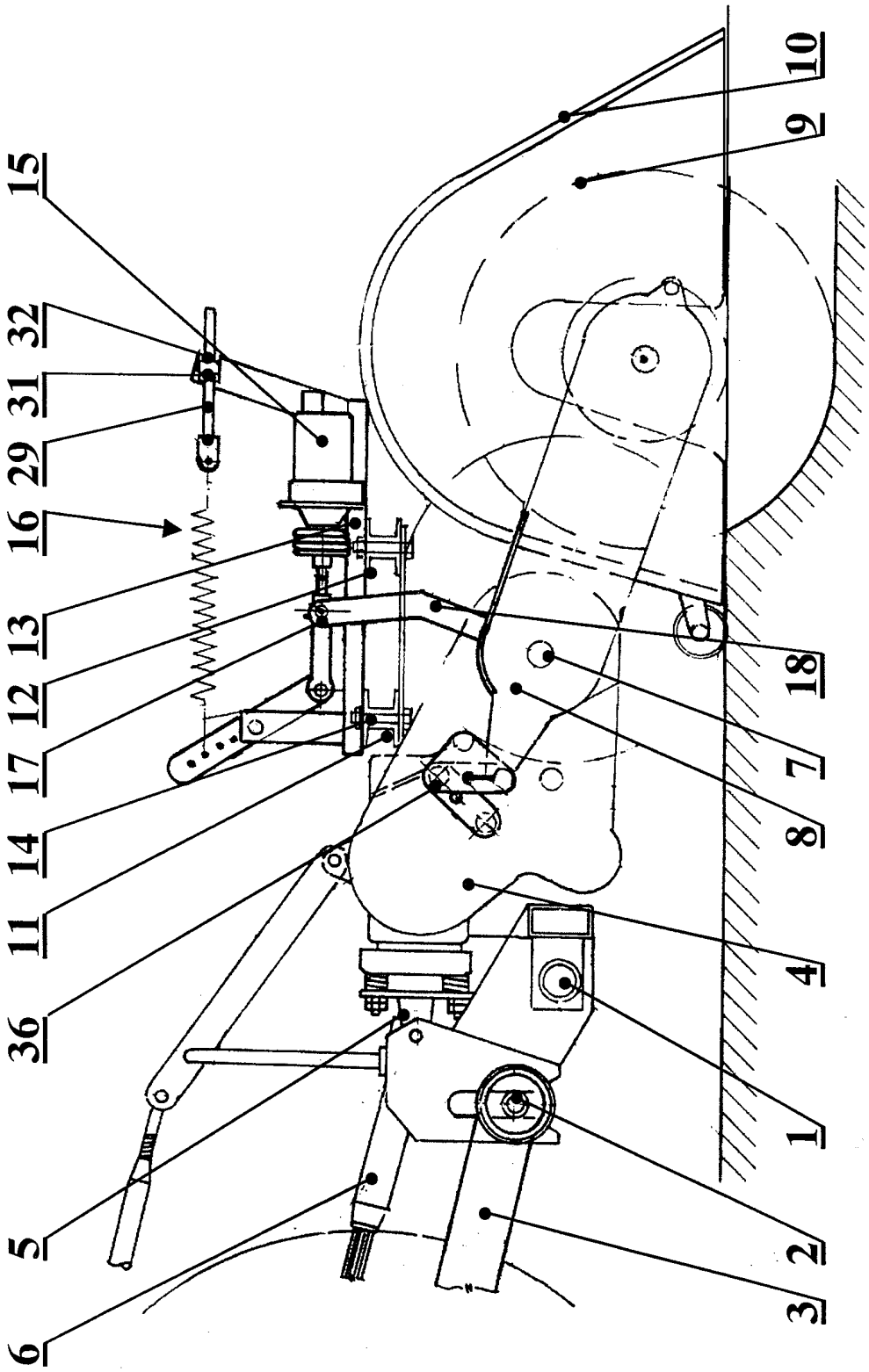



Fig. 1

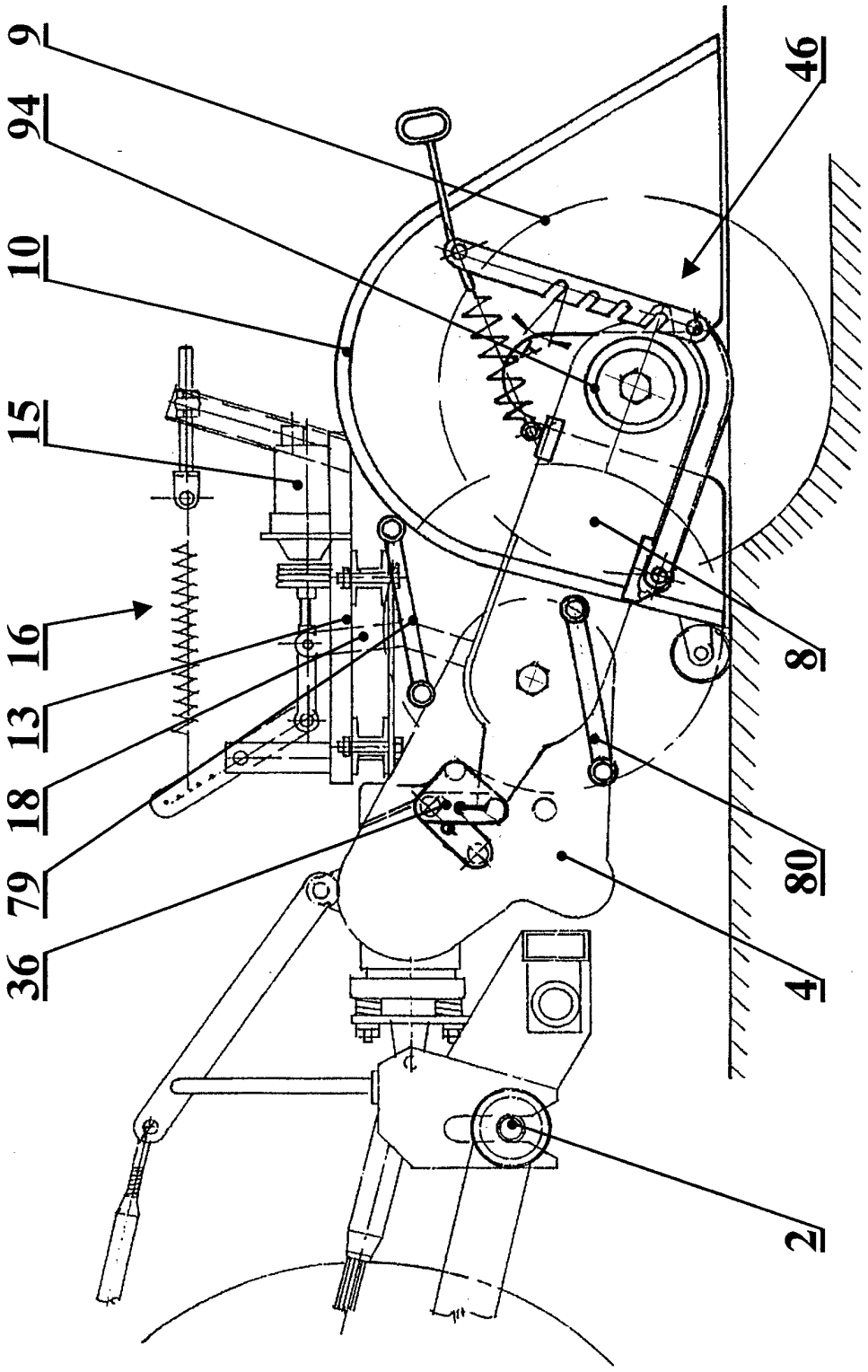



Fig. 2

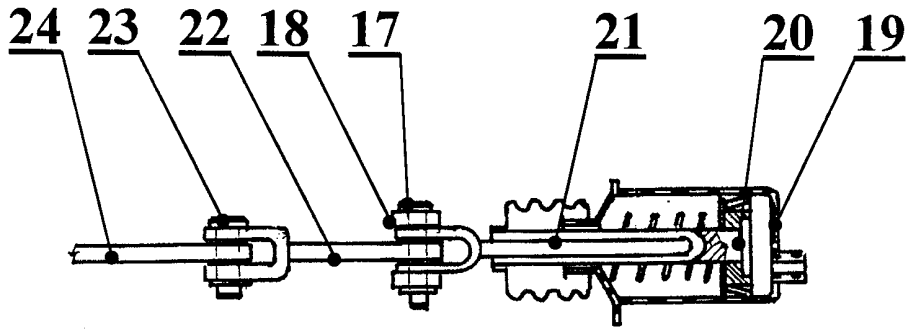



Fig. 3

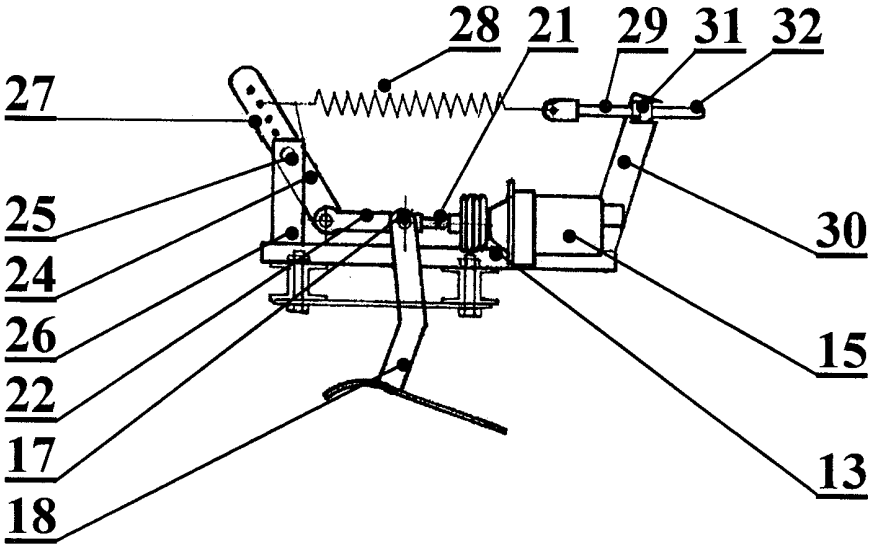



Fig. 3a

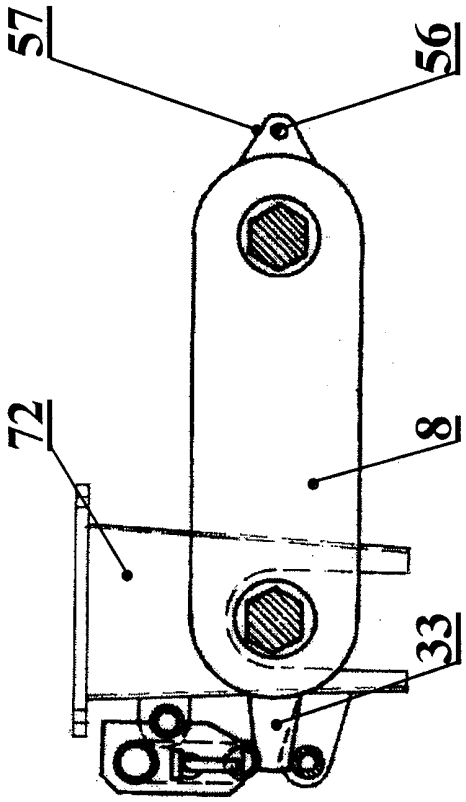



Fig. 4b

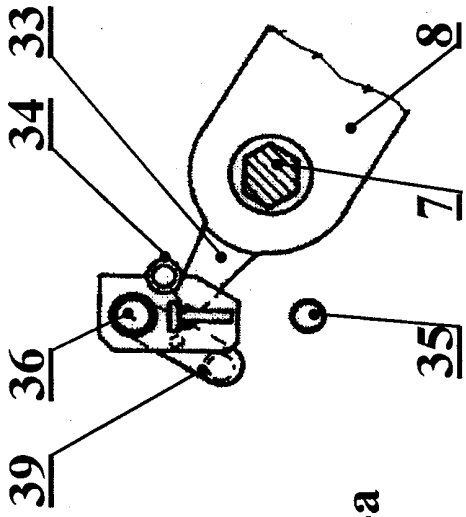



Fig. 4a

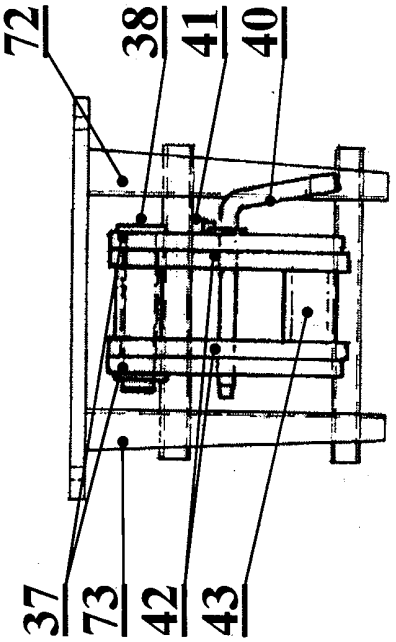



Fig. 4

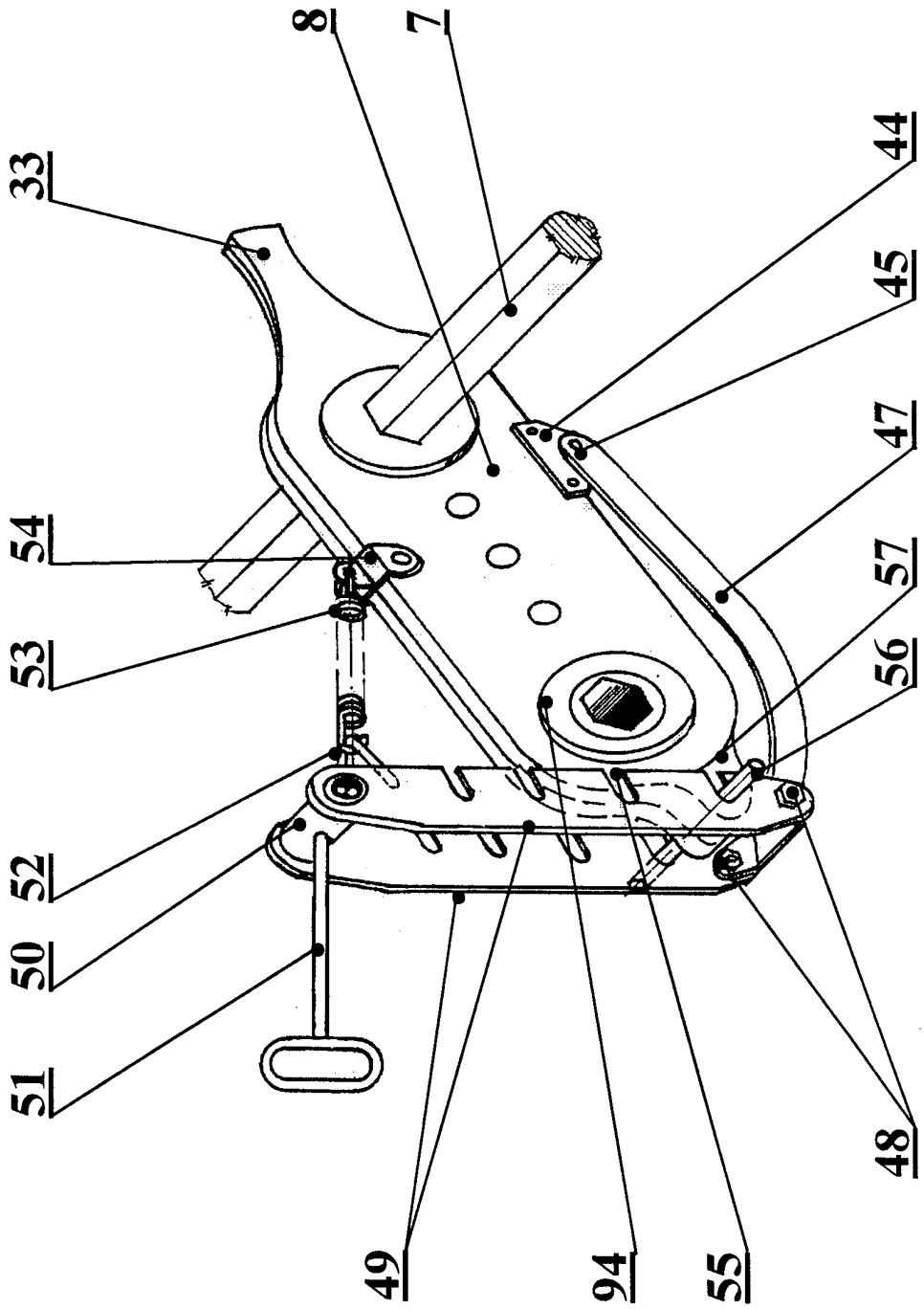



Fig. 5

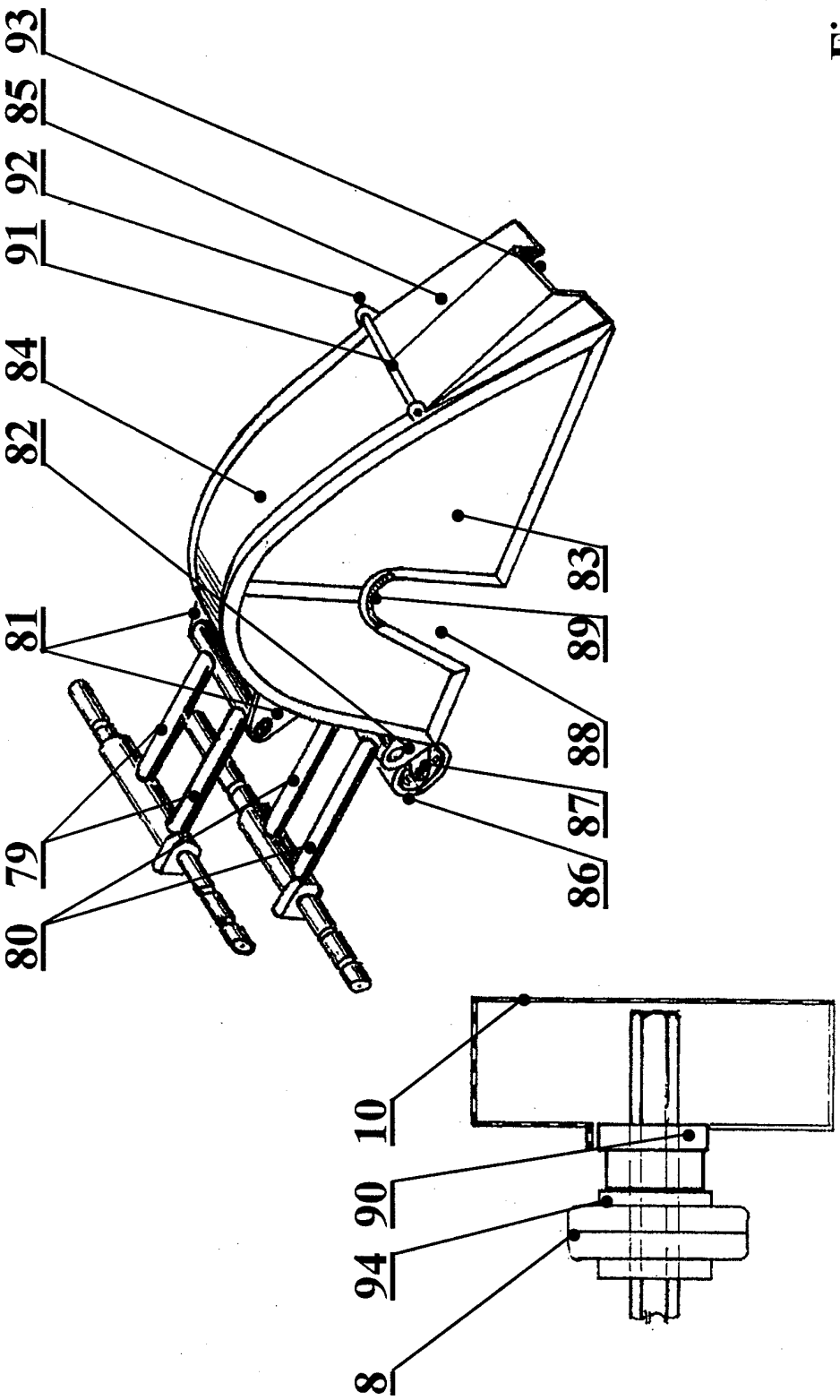
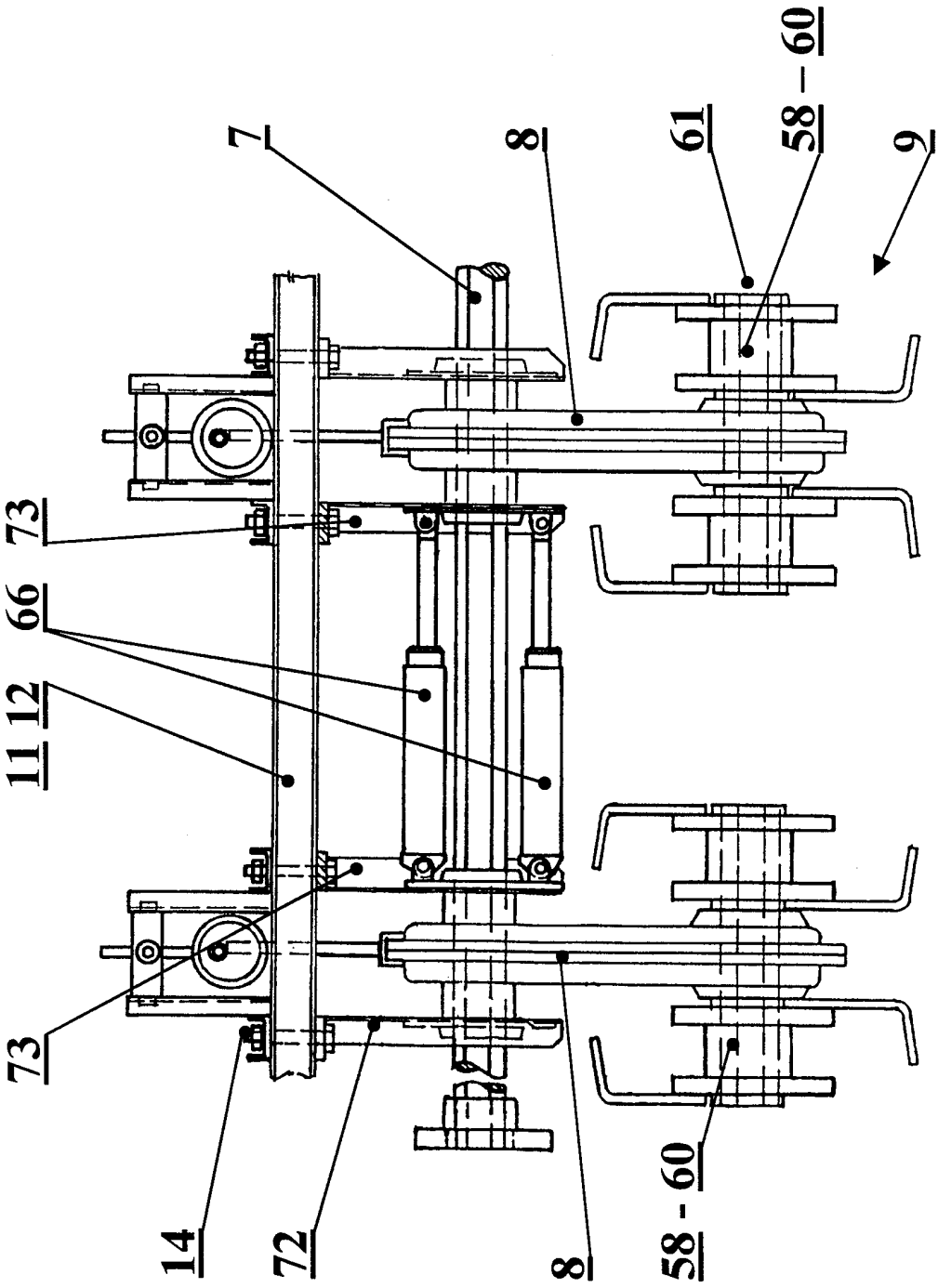



Fig. 6

Fig. 7



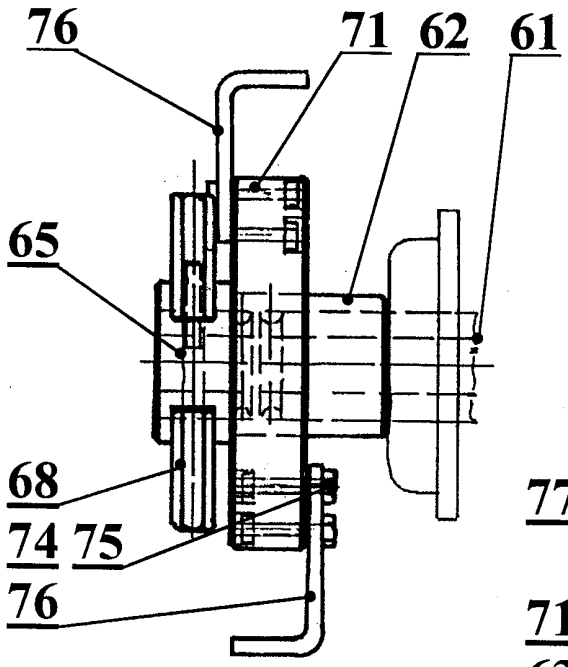



Fig. 8a

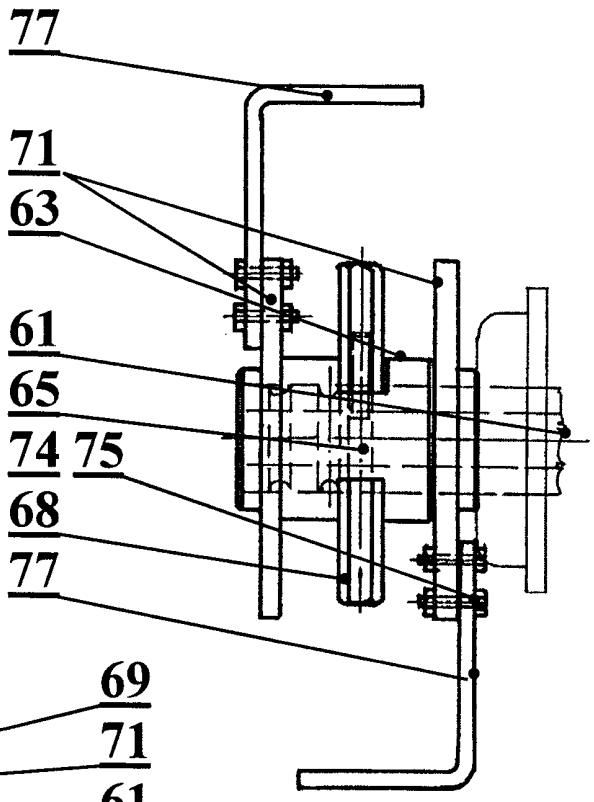



Fig. 8b

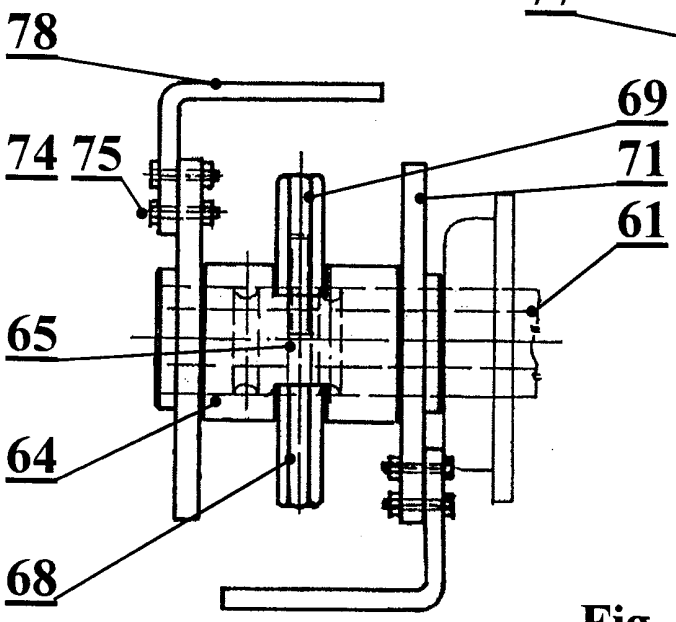



Fig. 8c

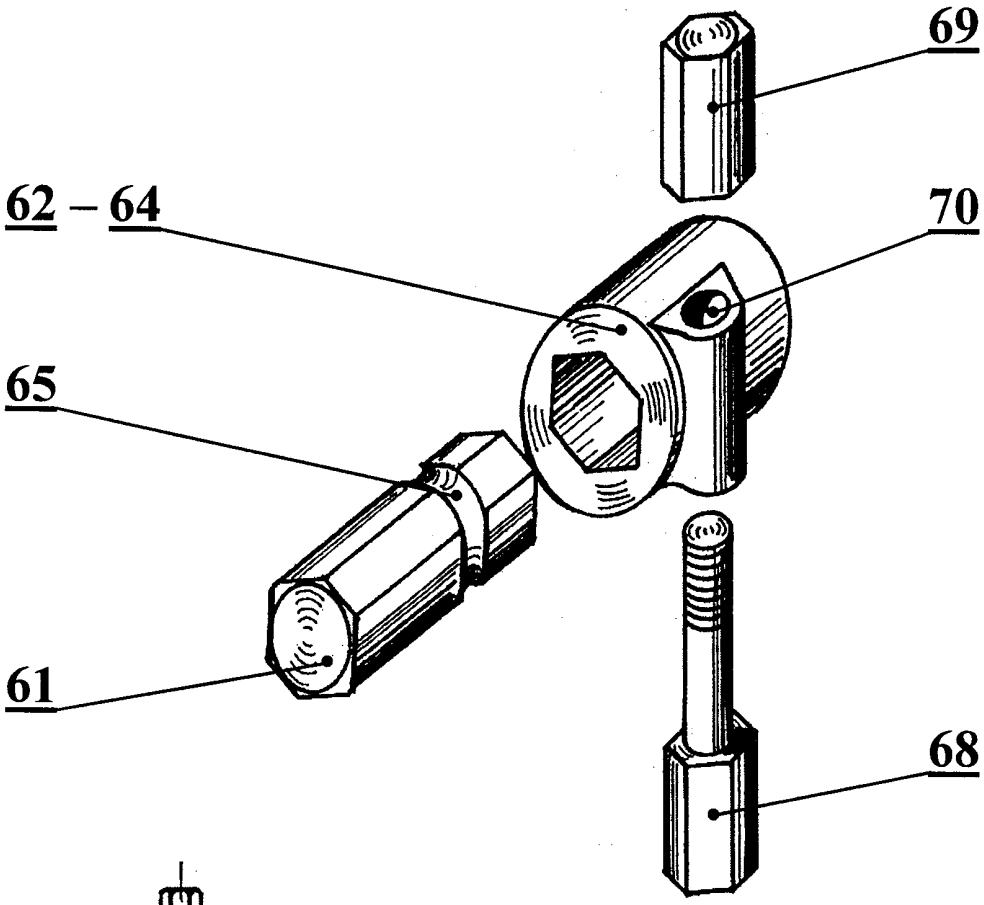



Fig. 10

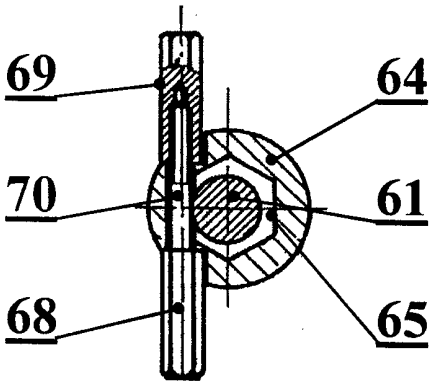



Fig. 9

# INTERNATIONAL SEARCH REPORT

Int onal Application No
PCT/CZ 98/00008

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A01B33/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | FR 1 323 311 A (BADALINI) 28 June 1963<br>see figures | 1 |
| A | FR 2 329 175 A (OMATI) 27 May 1977<br>see figures | 1 |
| A | DE 963 561 C (EBERHARDT) 9 May 1957<br>see figures | 1 |
| A | DE 90 01 064 U (BRAUN) 26 April 1990<br>see figures | 1 |
| A | FR 2 156 491 A (MAMETORA) 1 June 1973<br>see figures | 1 |
| A | FR 1 346 913 A (FIRTH CLEVELAND) 20 March 1964<br>see figures | 1 |

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 8 July 1998 | 15/07/1998 |

| Name and mailing address of the ISA | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Walvoort, B |

1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Ir ıtional Application No
PCT/CZ 98/00008

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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| FR 1323311 A | 28-06-1963 | NONE | |
| FR 2329175 A | 27-05-1977 | NONE | |
| DE 963561 C | | NONE | |
| DE 9001064 U | 26-04-1990 | NONE | |
| FR 2156491 A | 01-06-1973 | NONE | |
| FR 1346913 A | 20-03-1964 | NONE | |