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(54) **BIOMASS FUEL VERTICAL RING DIE PELLET MACHINE WITH IMPROVED COMPRESSION MECHANISM.**

(57) The present invention discloses a biomass fuel vertical ring die pellet machine with improved compression mechanism, comprising a base. The upper surface of one end of the base is equipped with a support, inside the top end of which is an annular slide rail. At the center of this end of the base is positioned a second drive shaft, the bottom end of which is fitted with a second bevel gear, and the top end with a circular turntable. Inside the lower surface of the circular turntable is an annular groove, and the center of its upper surface has a fixed rod, the external part of the top end of which is equipped with a limit plate. This invention, by mounting the center of the limit plate at the top end of the fixed rod, enables the circular turntable to drive the press rollers to compress cattle manure material when rotating. This design allows the press rollers to endure a more balanced force during compression, avoiding bending of the rollers. It not only enhances the production efficiency of the ring die pellet machine but also prolongs its lifespan.

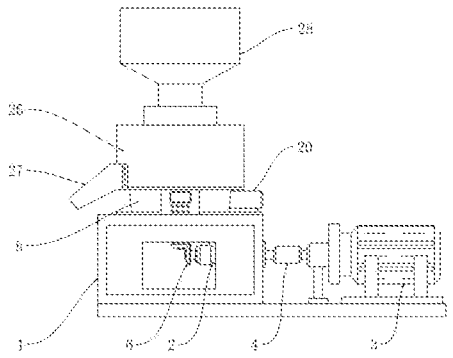

FIG.1

BIOMASS FUEL VERTICAL RING DIE PELLET MACHINE WITH IMPROVED COMPRESSION MECHANISM

Technical Field

The present invention relates to the field of ring die pellet machine technology, specifically a biomass fuel vertical ring die pellet machine with improved compression mechanism.

Background Technology

Biomass fuel refers to the use of biomass materials as fuel, mainly agricultural and forestry waste, such as straw, sawdust, bagasse, rice bran, cattle and sheep manure, etc. These are processed by a ring die pellet machine through crushing, mixing, extruding, drying, and other processes to form a new type of clean fuel in various block or strip shapes for direct combustion.

The current ring die pellet machines are usually composed of a base, ring die, mold, feed port, motor, rotating shaft, support, and press roller. During operation, the crushed cattle manure is fed into the pellet machine through the feed port. Then, the motor drives the rotating shaft, which in turn drives the press roller via the support, thereby pressing the cattle manure through the mold inside the ring die into shape. However, existing ring die pellet machines generally have the press roller's top movably mounted on both ends of the support, driven by a transmission shaft through the support to rotate the press roller. This can cause bending of the rotating shaft under pressure during extrusion, thus affecting the production efficiency of the ring die pellet machine. Therefore, the inventor proposes a biomass fuel vertical ring die pellet machine with improved compression mechanism to address the above issues.

Summary of the Invention

The objective of this invention is to provide a biomass fuel vertical ring die pellet machine with improved compression mechanism, aiming to resolve the problem found

in existing ring die pellet machines where the press rollers are generally movably mounted at the top on both ends of the support. These rollers are driven to rotate by a transmission shaft through the support. This design can lead to bending of the rotating shaft under pressure during compression, thereby affecting the production efficiency of the ring die pellet machine.

To achieve this purpose, the invention provides the following technical solution: a biomass fuel vertical ring die pellet machine with improved compression mechanism, including a base. At one end of the base, the upper surface is equipped with a support, inside the top of which is an annular slide rail. At the center of this end of the base is a second drive shaft, the bottom end of which is fitted with a second bevel gear, and the top end with a circular turntable. The lower surface of the circular turntable has an annular groove inside, and the center of its upper surface has a fixed rod, the outer part of which at the top end is equipped with a limit plate. Close to the fixed rod on both sides of the upper surface of the circular turntable are clearance slots. At the center of these clearance slots are press rollers, with two sets of press rollers movably mounted inside the ends of the limit plate, to facilitate the circular turntable rotating and pressing the cattle manure material.

As a technical solution of the present invention, a protective sleeve is mounted on the side of one end of the base. Inside the protective sleeve, a first drive shaft is rotatably installed, which at one end has a first bevel gear, enabling the first drive shaft to drive the first bevel gear to rotate.

As a technical solution of the present invention, a first rotary drive component is installed on the upper surface of the other side of the base through a fixed frame. The output end of the first rotary drive component is equipped with a coupling, enabling it to drive the first drive shaft to rotate.

As a technical solution of the present invention, an installation slot is set inside

one side of the support. Inside the installation slot, a third drive shaft is rotatably installed, the top end of which has an active gear, and the bottom end a third bevel gear, enabling the third drive shaft to drive the active gear to rotate.

As a technical solution of the present invention, a second rotary drive component is mounted on one side of the support. The external part of the output end of the second rotary drive component is equipped with a fourth bevel gear, enabling the second rotary drive component to drive the third bevel gear to rotate.

As a technical solution of the present invention, a feed turntable is movably set on the outer part of the top of the support. The inside center of the feed turntable has a tooth slot, enabling the active gear to drive the feed turntable to rotate around the outside of the top of the support.

As a technical solution of the present invention, a ring die is set at the top of the support. The inside near the bottom of the ring die has a mold, enabling the press roller to press the raw material through the mold into shape.

As a technical solution of the present invention, a shell is mounted on the outside of the support. The outside of the lower material port on one side of the shell has a guide plate, enabling the extruded biomass fuel to be discharged through the guide plate.

As a technical solution of the present invention, at the center of the top of the installation slot is a feed hopper. On both sides inside the top of the feed hopper, baffles are movably installed via hinges. Near the center of the upper surface of the baffle is a second mounting component, enabling the baffle to block the overflow of raw material powder.

As a technical solution of the present invention, near the upper surface of the

baffle inside the center of the feed hopper is a first mounting component. The inside of the first mounting component is movably installed with a resetter through a mounting shaft, enabling the resetter to drive the baffle to reset via the second mounting component.

Compared to existing technology, the beneficial effects of this invention are: the biomass fuel vertical ring die pellet machine with improved compression mechanism is not only rationally structured and convenient for use with simple maintenance, but also has the following advantages:

(1) The present invention, by setting a circular turntable at the top end of the second drive shaft and an annular groove at the lower surface of the circular turntable, enables the second drive shaft to move the circular turntable along the external part of the annular groove. By installing the press rollers inside the clearance slots on the upper surface of the circular turntable through bearings, and rotatingly mounting the top ends of the two sets of press rollers inside the ends of the limit plate through bearings, with the center of the limit plate mounted at the top end of the fixed rod, it ensures that the rotation of the circular turntable drives the press rollers to compress the cattle manure material. This design allows the press rollers to endure a more balanced force during compression, avoiding bending of the rollers. This not only enhances the production efficiency of the ring die pellet machine but also prolongs its lifespan.

(2) The present invention, by symmetrically setting two sets of baffles on both sides inside the top of the feed hopper using hinges, and placing the second mounting component at the center of the upper surface of the baffles, as well as setting the first mounting component near the center of the upper surface of the baffles inside both sides of the feed hopper, and by movably mounting the resetter outside the mounting shaft inside the first mounting component, with one end of the resetter movably mounted in the sleeve inside the second mounting component, allows the baffles to

flip down when adding raw materials. This leads the raw materials to enter the feed hopper and the resetter to reset the baffles via the second mounting component, thereby closing the feed hopper. This solves the issue of a large amount of dust floating into the air when adding raw materials to the ring die pellet machine, making the machine more environmentally friendly.

Description of the Drawings

FIG.1: front view of the external structure of the invention;

FIG.2: front sectional view of the structure of the invention;

FIG.3: enlarged view of Section A in FIG.2;

FIG.4: enlarged view of Section B in FIG.2;

FIG.5: enlarged view of Section C in FIG.2;

FIG.6: enlarged view of Section D in FIG.2.

In the Drawings: 1. Base; 2. Protective Sleeve; 3. First Rotary Drive Component; 4. Coupling; 5. First Drive Shaft; 6. First Bevel Gear; 7. Second Drive Shaft; 701. Second Bevel Gear; 8. Support; 9. Annular Slide Rail; 10. Circular Turntable; 11. Annular Groove; 12. Clearance Slot; 13. Press Roller; 14. Fixed Rod; 15. Limit Plate; 16. Installation Slot; 17. Third Drive Shaft; 18. Third Bevel Gear; 19. Active Gear; 20. Second Rotary Drive Component; 21. Fourth Bevel Gear; 22. Feed Turntable; 23. Tooth Slot; 24. Ring Die; 25. Module; 26. Shell; 27. Guide Plate; 28. Feed Hopper; 29. Baffle; 30. First Mounting Component; 31. Resetter; 32. Second Mounting Component.

Specific Embodiments

The following is a clear and complete description of the technical solutions in the embodiments of this invention, in conjunction with the drawings provided. All other embodiments obtained by those skilled in the art from this disclosure, without creative efforts, are within the scope of this invention's protection.

Please refer to FIGs. 1-6 for an embodiment provided by this invention: a biomass

fuel vertical ring die pellet machine with improved compression mechanism, which includes a base 1. The upper surface of one end of the base 1 is equipped with a support 8, inside the top end of which is an annular slide rail 9. At the center of this end of the base 1 is positioned a second drive shaft 7, the bottom end of which is fitted with a second bevel gear 701, and the top end with a circular turntable 10. The lower surface inside the circular turntable 10 has an annular groove 11, and the center of its upper surface has a fixed rod 14. The external part of the top end of the fixed rod 14 is equipped with a limit plate 15. Close to the fixed rod 14 on both sides of the upper surface of the circular turntable 10 are clearance slots 12. At the center of these slots are press rollers 13, with two sets of press rollers 13 movably mounted inside the ends of the limit plate 15.

In use, the circular turntable 10 is set at the top end of the second drive shaft 7, with an annular groove 11 at the lower surface of the circular turntable 10. This allows the second drive shaft 7 to move the circular turntable 10 along the external part of the annular groove 11. Press rollers 13 are rotationally mounted inside the clearance slots 12 on the upper surface of the circular turntable 10 through bearings, and the top ends of the two sets of press rollers 13 are rotationally mounted inside the ends of the limit plate 15 through bearings. The center of the limit plate 15 is mounted at the top end of the fixed rod 14, allowing the circular turntable 10 to drive the press rollers 13 to compress the cattle manure material when rotating.

A protective sleeve 2 is mounted on the side of one end of the base 1, inside of which a first drive shaft 5 is rotationally set, with a first bevel gear 6 at one end.

In use, the protective sleeve 2 is fixed to the side of one end of the base 1 through a fastener, and a first drive shaft 5 is movably set inside the protective sleeve 2. A first bevel gear 6 is set at one end of the first drive shaft 5, enabling it to rotate the first bevel gear 6.

On the upper surface of the other side of the base 1, a first rotary drive component 3 is mounted through a fixed frame. The output end of the first rotary drive component 3 is equipped with a coupling 4.

In use, a coupling 4 is set on the external part of the output end of the first rotary drive component 3. The coupling 4 fixes the mounting end of the first drive shaft 5 to the output end of the first rotary drive component 3, enabling the first rotary drive component 3 to drive the first drive shaft 5 to rotate through the coupling 4.

An installation slot 16 is set inside one side of the support 8, inside of which a third drive shaft 17 is rotationally mounted, with an active gear 19 at the top end, and a third bevel gear 18 at the bottom end.

In use, the third drive shaft 17 is rotationally mounted inside the installation slot 16, with a third bevel gear 18 at the bottom end and an active gear 19 at the top end, enabling the third drive shaft 17 to rotate the active gear 19.

One side of the support 8 is equipped with a second rotary drive component 20, the external part of whose output end has a fourth bevel gear 21.

In use, a fourth bevel gear 21 is set at the output end of the second rotary drive component 20, meshing with the third bevel gear 18, enabling the second rotary drive component 20 to drive the third bevel gear 18 to rotate.

A feed turntable 22 is movably set on the outer part of the top end of the support 8, with a tooth slot 23 at the center of its inner side.

In use, a tooth slot 23 is set at the center of the inner side of the feed turntable 22, meshing with the active gear 19, thereby driving the feed turntable 22 to rotate around the outer part of the top end of the support 8 through the tooth slot 23.

The top end of the support 8 is equipped with a ring die 24, inside near the bottom of which a module 25 is set.

In use, the module 25 is fixed in place, setting the ring die 24 on the upper surface of the circular turntable 10, and multiple sets of modules 25 are set inside near the bottom of the ring die 24. This allows the press rollers 13 to press the raw material through the modules 25 into shape.

The exterior of the support 8 is equipped with a shell 26, and on one side of the shell 26, near the lower material port, is a guide plate 27.

In use, a guide plate 27 is installed on the exterior of one side of the shell 26 near the lower material port, enabling the extruded biomass fuel to be discharged through the guide plate 27.

At the center of the top of the installation slot 16 is a feed hopper 28, and on both sides inside the top of the feed hopper 28 are baffles 29, movably installed via hinges. Near the center of the upper surface of the baffle 29 is a second mounting component 32.

In use, two sets of baffles 29 are symmetrically installed via hinges on both sides inside the top of the feed hopper 28, preventing the overflow of raw material powder.

Near the upper surface of the baffle 29 inside the center of the feed hopper 28 is a first mounting component 30, on the inside of which a resetter 31 is movably installed via a mounting shaft.

In use, a resetter 31 is movably installed on the exterior of the mounting shaft inside the first mounting component 30, and one end of the resetter 31 is movably

installed in the sleeve on the exterior of the mounting shaft inside the second mounting component 32, enabling the resetter 31 to drive the baffle 29 to reset via the second mounting component 32.

In this embodiment, when in use: firstly, raw materials are added to the interior of the shell 26 through the feed hopper 28. Then, the resetter 31 drives the baffle 29 to reset via the second mounting component 32, closing the feed hopper 28. Next, the first rotary drive component 3 drives the first drive shaft 5 to rotate via the coupling 4. The first drive shaft 5 then drives the second bevel gear 701 via the first bevel gear 6, which in turn drives the second drive shaft 7 to rotate. This causes the second drive shaft 7 to rotate the press roller 13 via the circular turntable 10, thus compressing the raw materials. The materials are then pressed into shape through the module 25 inside the ring die 24 and conveyed outside the ring die 24. Finally, the second rotary drive component 20 drives the third bevel gear 18 via the fourth bevel gear 21, which then drives the active gear 19. The active gear 19 then drives the feed turntable 22 to rotate along the exterior of the top end of the support 8, enabling the feed turntable 22 to discharge the formed fuel through the guide plate 27, thus completing the operation of the biomass fuel vertical ring die pellet machine with improved compression mechanism.

The embodiments of this invention are provided for illustrative and descriptive purposes; it is understood that these embodiments are exemplary and not intended to limit the invention. Those skilled in the art may make variations, modifications, replacements, and variations within the scope of the invention based on the foregoing embodiments.

CLAIMS

1. A biomass fuel vertical ring die pellet machine with improved compression mechanism, comprising a base (1), characterized in that: the upper surface of one end of the base (1) is equipped with a support (8), inside the top end of which is an annular slide rail (9), and at the center of this end of the base (1) is positioned a second drive shaft (7). The bottom end of the second drive shaft (7) is fitted with a second bevel gear (701), and the top end with a circular turntable (10). Inside the lower surface of the circular turntable (10) is an annular groove (11), and the center of its upper surface has a fixed rod (14). The external part of the top end of the fixed rod (14) is equipped with a limit plate (15), and close to the fixed rod (14) on both sides of the upper surface of the circular turntable (10) are clearance slots (12). At the center of these slots are press rollers (13), with two sets of press rollers (13) movably mounted inside the ends of the limit plate (15).

2. The biomass fuel vertical ring die pellet machine with improved compression mechanism according to claim 1, characterized in that: the side of one end of the base (1) is equipped with a protective sleeve (2), inside of which a first drive shaft (5) is rotationally set, with a first bevel gear (6) at one end.

3. The biomass fuel vertical ring die pellet machine with improved compression mechanism according to claim 1, characterized in that: the upper surface of the other side of the base (1) is equipped with a first rotary drive component (3) through a fixed frame, the output end of which is equipped with a coupling (4).

4. The biomass fuel vertical ring die pellet machine with improved compression mechanism according to claim 1, characterized in that: one side of the support (8) internally has an installation slot (16), inside of which a third drive shaft (17) is rotationally mounted, with an active gear (19) at the top end, and a third bevel gear (18) at the bottom end.

5. The biomass fuel vertical ring die pellet machine with improved compression mechanism according to claim 1, characterized in that: one side of the support (8) is equipped with a second rotary drive component (20), the external part of whose output end has a fourth bevel gear (21).

6. The biomass fuel vertical ring die pellet machine with improved compression mechanism according to claim 1, characterized in that: the outer part of the top end of the support (8) is movably equipped with a feed turntable (22), at the center of whose inner side is a tooth slot (23).

7. The biomass fuel vertical ring die pellet machine with improved compression mechanism according to claim 1, characterized in that: the top end of the support (8) is equipped with a ring die (24), inside near the bottom of which a module (25) is set.

8. The biomass fuel vertical ring die pellet machine with improved compression mechanism according to claim 1, characterized in that: the exterior of the support (8) is equipped with a shell (26), and on one side of the shell (26), near the lower material port, is a guide plate (27).

9. The biomass fuel vertical ring die pellet machine with improved compression mechanism according to claim 1, characterized in that: at the center of the top of the installation slot (16) is a feed hopper (28), on both sides inside the top of which are baffles (29), movably installed via hinges, and near the center of the upper surface of the baffle (29) is a second mounting component (32).

10. The biomass fuel vertical ring die pellet machine with improved compression mechanism according to claim 9, characterized in that: near the upper surface of the baffle (29) inside the center of the feed hopper (28) is a first mounting component (30), on the inside of which a resetter (31) is movably installed via a mounting shaft.

REVENDICATIONS

1. Machine à blocs de biomasse à matrice annulaire verticale avec mécanisme de compression amélioré, comprenant une base (1), caractérisée en ce que : une extrémité supérieure de ladite base (1) est équipée d'un support (8), à l'intérieur du sommet du support (8) est disposé un rail coulissant annulaire (9), et au centre d'une extrémité de la base (1) est disposé un second arbre de transmission (7), le bas du second arbre de transmission (7) est équipé d'un second engrenage conique (701), et le haut du second arbre de transmission (7) est équipé d'un plateau circulaire (10), à l'intérieur de la surface inférieure du plateau circulaire (10) est disposée une rainure annulaire (11), et au centre de la surface supérieure du plateau circulaire (10) est disposé un bâton fixe (14), à l'extérieur du sommet du bâton fixe (14) est disposée une plaque de limite (15), et les deux côtés du plateau circulaire (10) proches du bâton fixe (14) sont équipés de rainures de concession (12), au centre des rainures de concession (12) est disposé un rouleau de pression (13), et deux ensembles de rouleaux de pression (13) sont installés de manière mobile sur les deux extrémités internes de la plaque de limite (15).

2. Machine à blocs de biomasse à matrice annulaire verticale selon la revendication 1, caractérisée en ce que : un côté de la base (1) est équipé d'un manchon de protection (2), à l'intérieur du manchon de protection (2) est disposé rotatif un premier arbre de transmission (5), une extrémité du premier arbre de transmission (5) est équipée d'un premier engrenage conique (6).

3. Machine à blocs de biomasse à matrice annulaire verticale selon la revendication 1, caractérisée en ce que : un autre côté supérieur de la base (1) est équipé d'un premier élément d'entraînement rotatif (3) à travers un cadre fixe, une sortie du premier élément d'entraînement rotatif (3) est équipée d'un accouplement (4).

4. Machine à blocs de biomasse à matrice annulaire verticale selon la revendication 1, caractérisée en ce que : à l'intérieur d'un côté du support (8) est disposée une rainure de montage (16), à l'intérieur de la rainure de montage (16) est installé rotatif un troisième arbre de transmission (17), le haut du troisième arbre de transmission (17) est équipé d'un engrenage actif (19), et le bas du troisième arbre de transmission (17) est équipé d'un troisième engrenage conique (18).

5. Machine à blocs de biomasse à matrice annulaire verticale selon la revendication 1, caractérisée en ce que : un côté du support (8) est équipé d'un second élément d'entraînement rotatif (20), à l'extérieur de la sortie du second élément d'entraînement rotatif (20) est équipé d'un quatrième engrenage conique (21).

6. Machine à blocs de biomasse à matrice annulaire verticale selon la revendication 1, caractérisée en ce que : le sommet extérieur du support (8) est équipé de manière mobile d'un plateau de chargement (22), au centre de l'intérieur du côté du plateau de chargement (22) est disposée une denture (23).

7. Machine à blocs de biomasse à matrice annulaire verticale selon la revendication 1, caractérisée en ce que : le sommet du support (8) est équipé d'une matrice annulaire (24), à l'intérieur de la matrice annulaire (24) près du bas est disposé un module (25).

8. Machine à blocs de biomasse à matrice annulaire verticale selon la revendication 1, caractérisée en ce que : l'extérieur du support (8) est équipé d'une coque (26), et à l'extérieur de la bouche de déchargement d'un côté de la coque (26) est équipée d'une plaque de guidage (27).

9. Machine à blocs de biomasse à matrice annulaire verticale selon la revendication 1, caractérisée en ce que : au centre du haut de la rainure de montage (16) est disposée une trémie d'alimentation (28), aux deux côtés intérieurs du haut de

la trémie d'alimentation (28) sont installés de manière mobile des clapets (29) à travers des charnières, au haut des clapets (29) près du centre sont disposés face à face un second élément de montage (32).

10. Machine à blocs de biomasse à matrice annulaire verticale selon la revendication 9, caractérisée en ce que : au centre intérieur de la trémie d'alimentation (28) près du haut des clapets (29) est disposé un premier élément de montage (30), à l'intérieur du premier élément de montage (30) est installé de manière mobile un réinitialisateur (31) à travers un axe de montage.

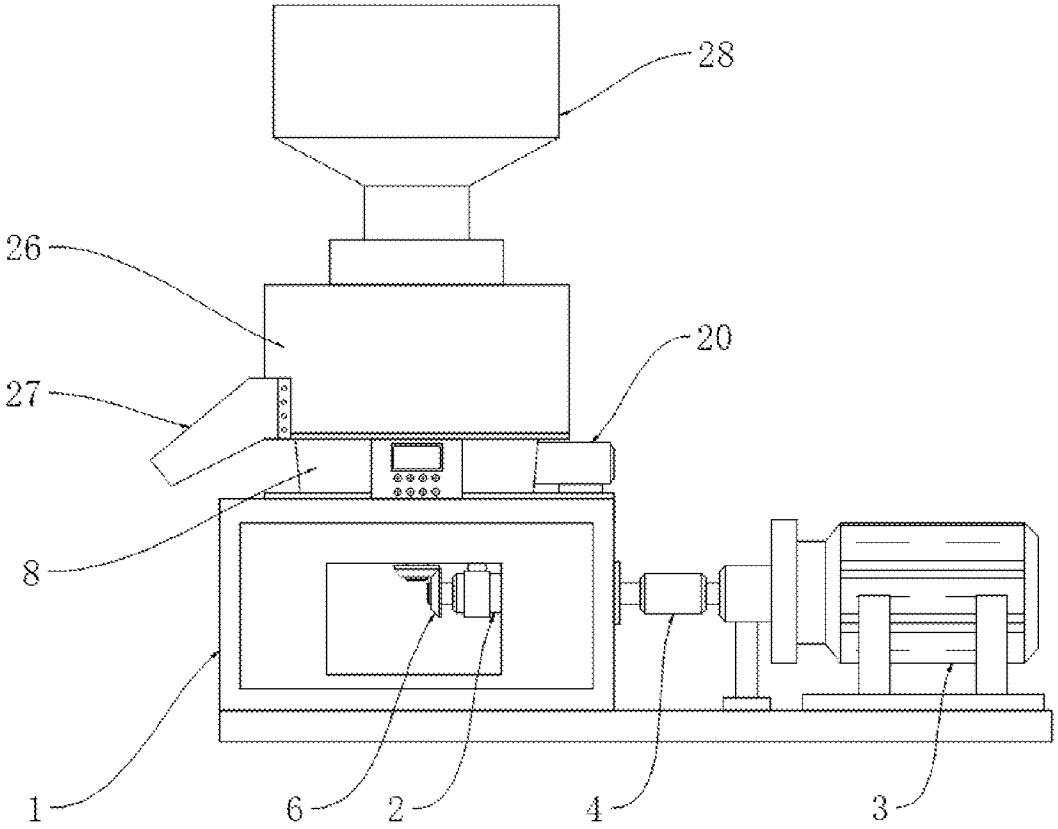

FIG.1

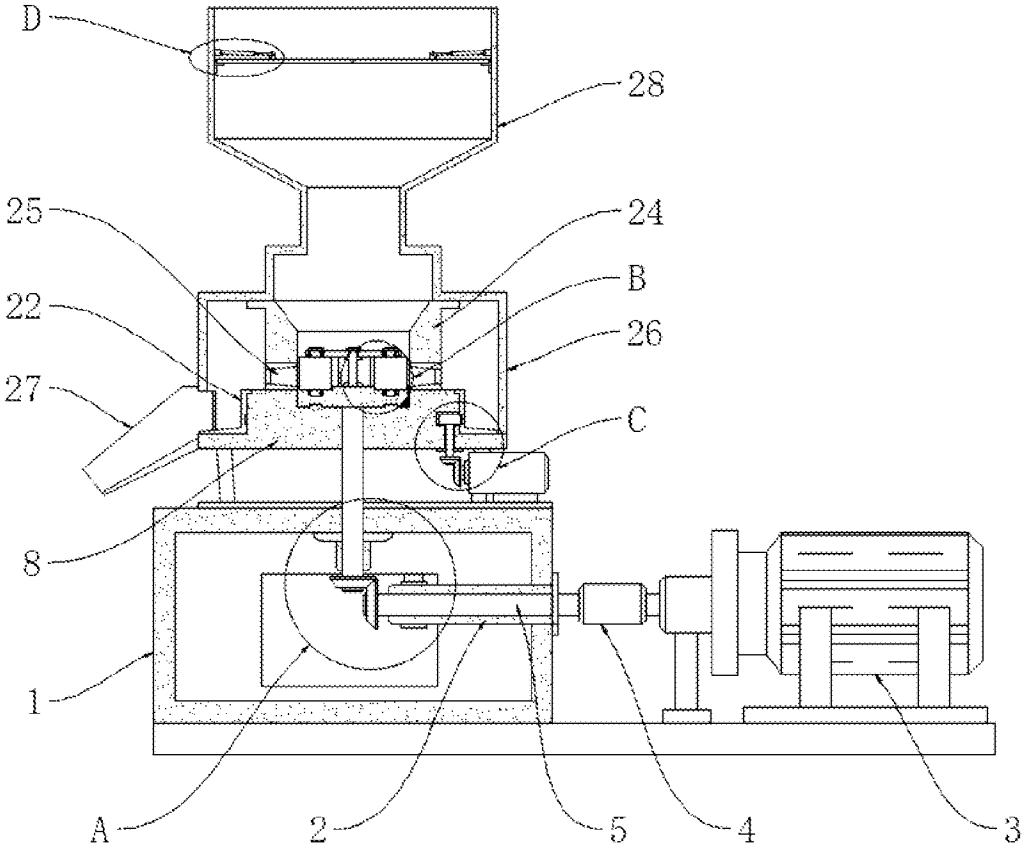

FIG.2

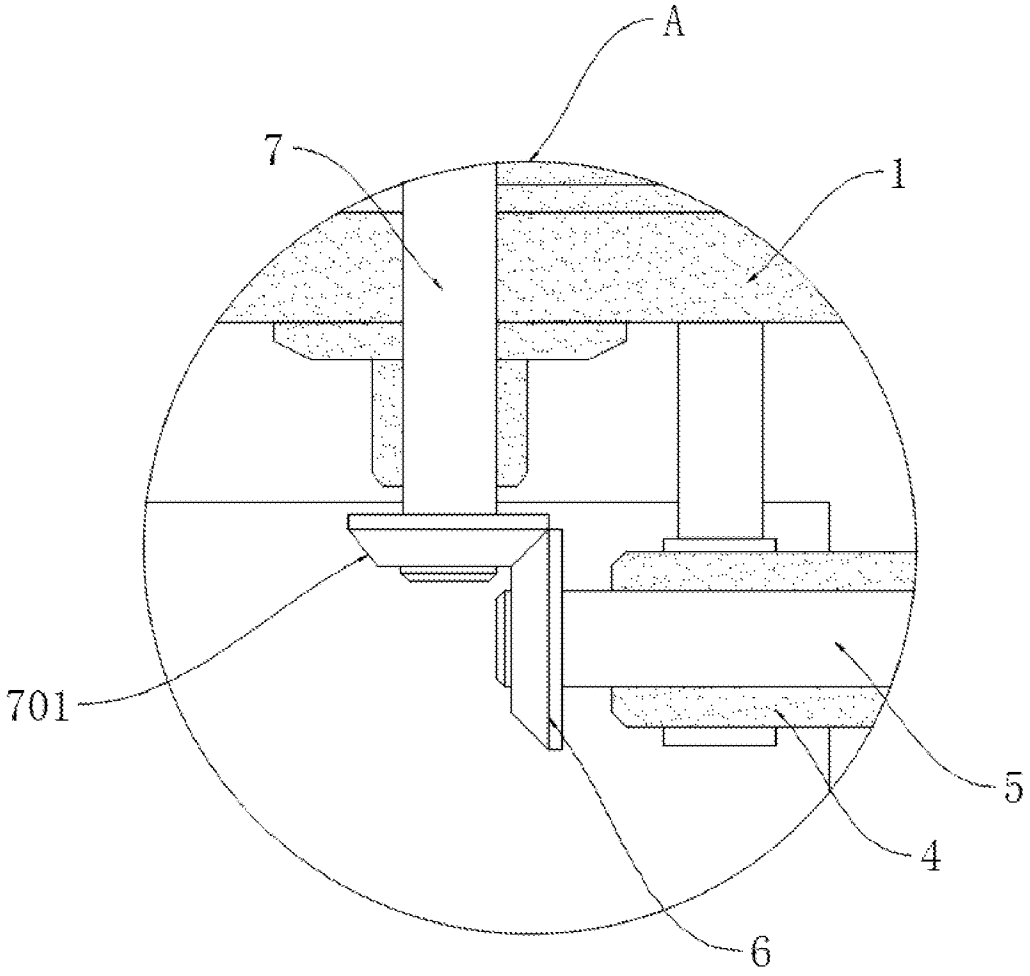

FIG.3

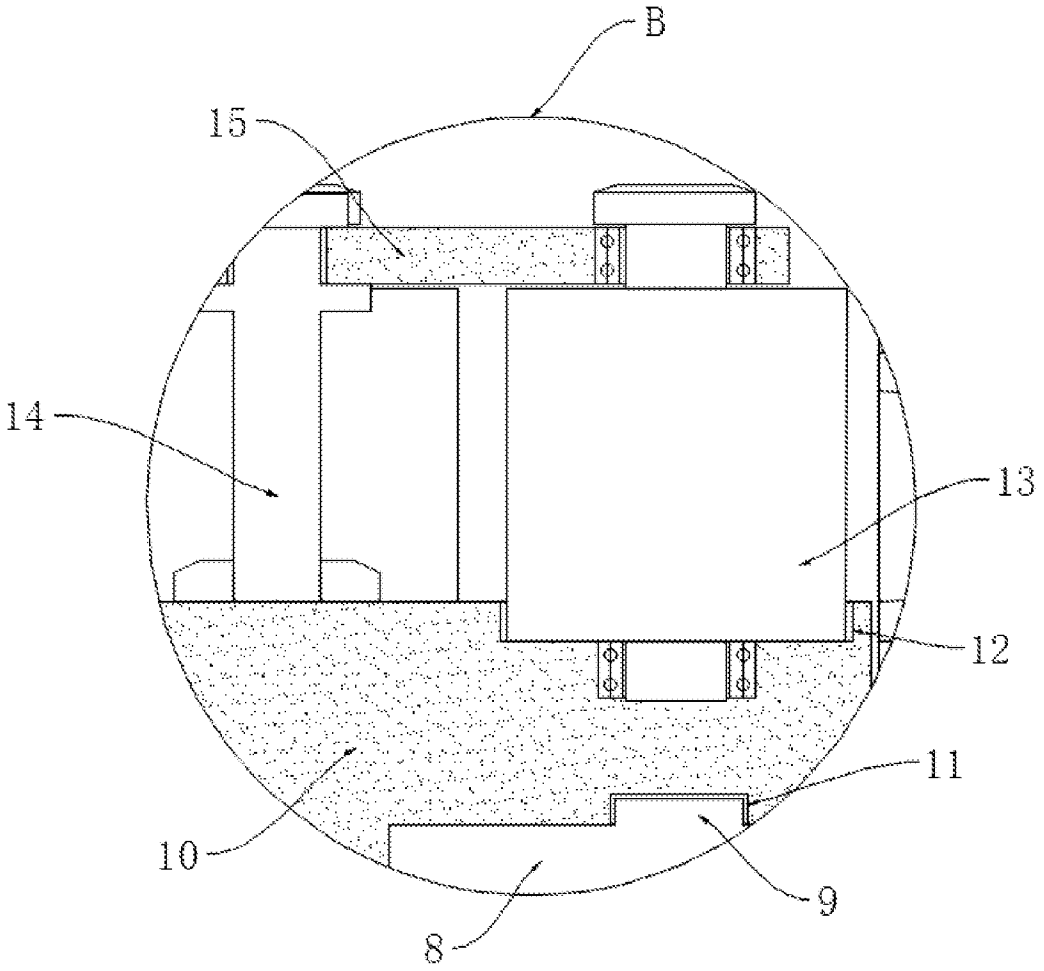

FIG.4

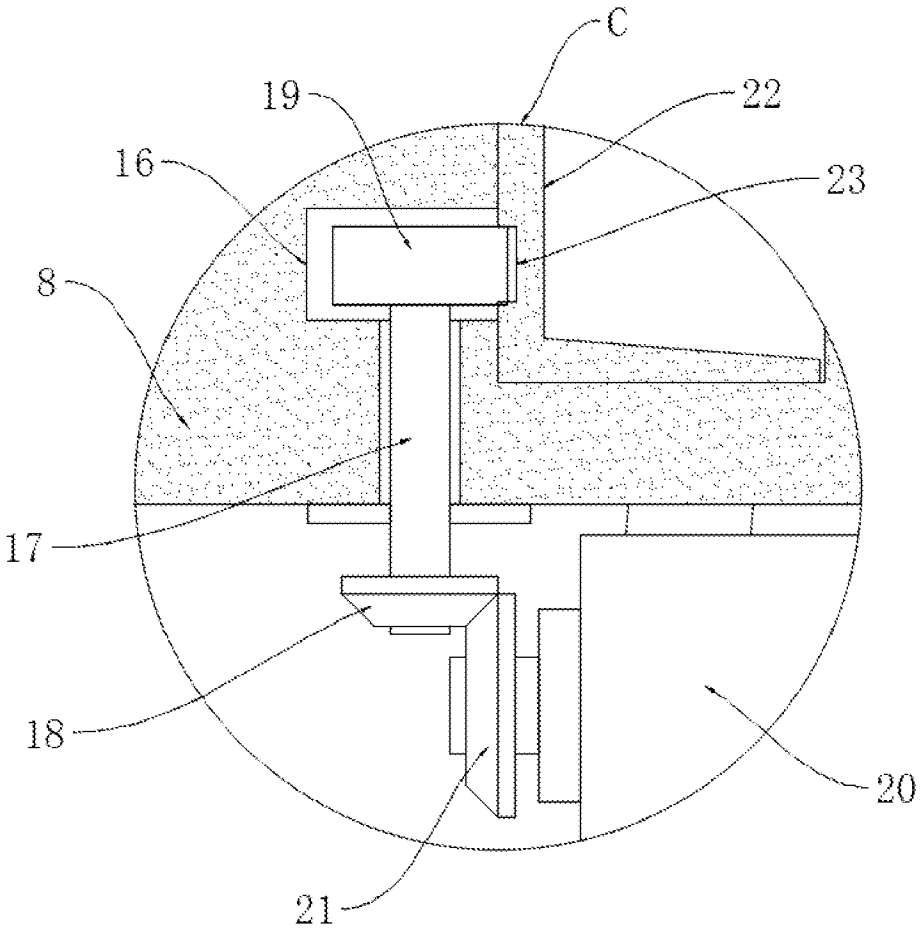

FIG.5

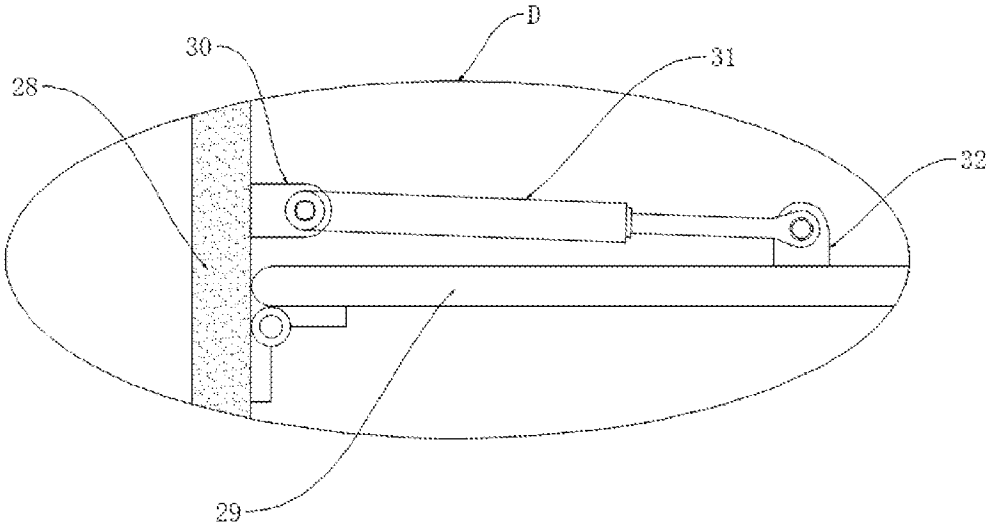

FIG.6