Sept. 29, 1925. 1,555,379

J. F. MOODY

AUTOMATIC ELEVATOR

Filed July 12, 1921 2 Sheets-Sheet 1

Fig. 1.

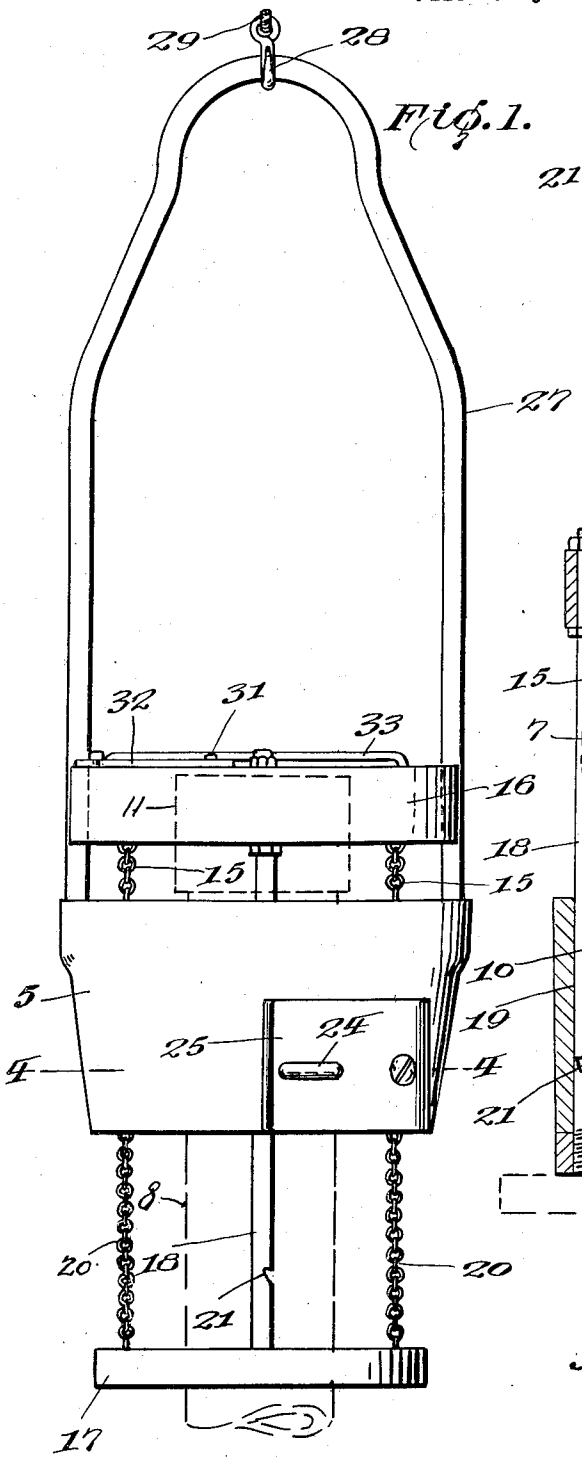


Fig. 6.

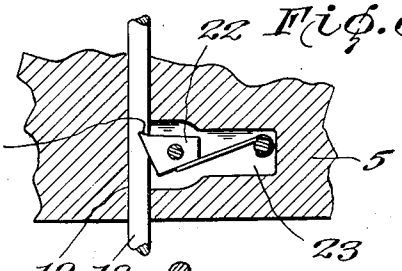
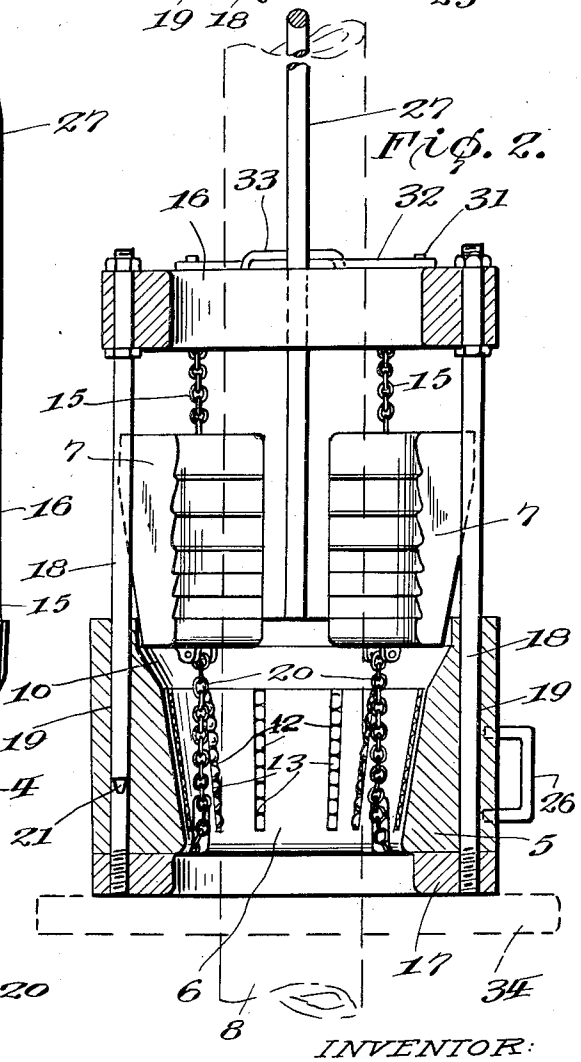


Fig. 2.



INVENTOR:
Joseph F. Moody.

By Wilson & Stevens

ATTORNEYS.

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Fig. 3.

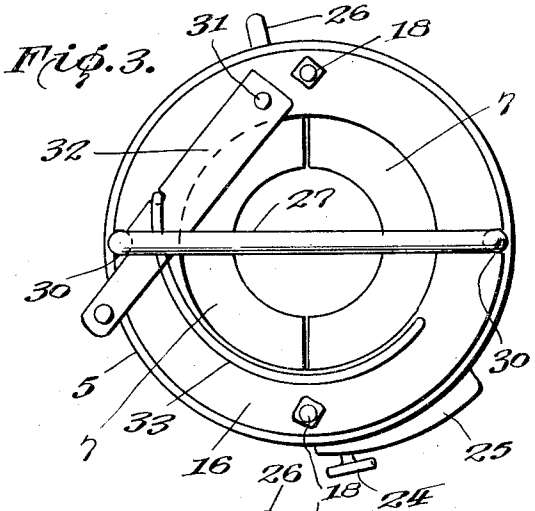


Fig. 7.

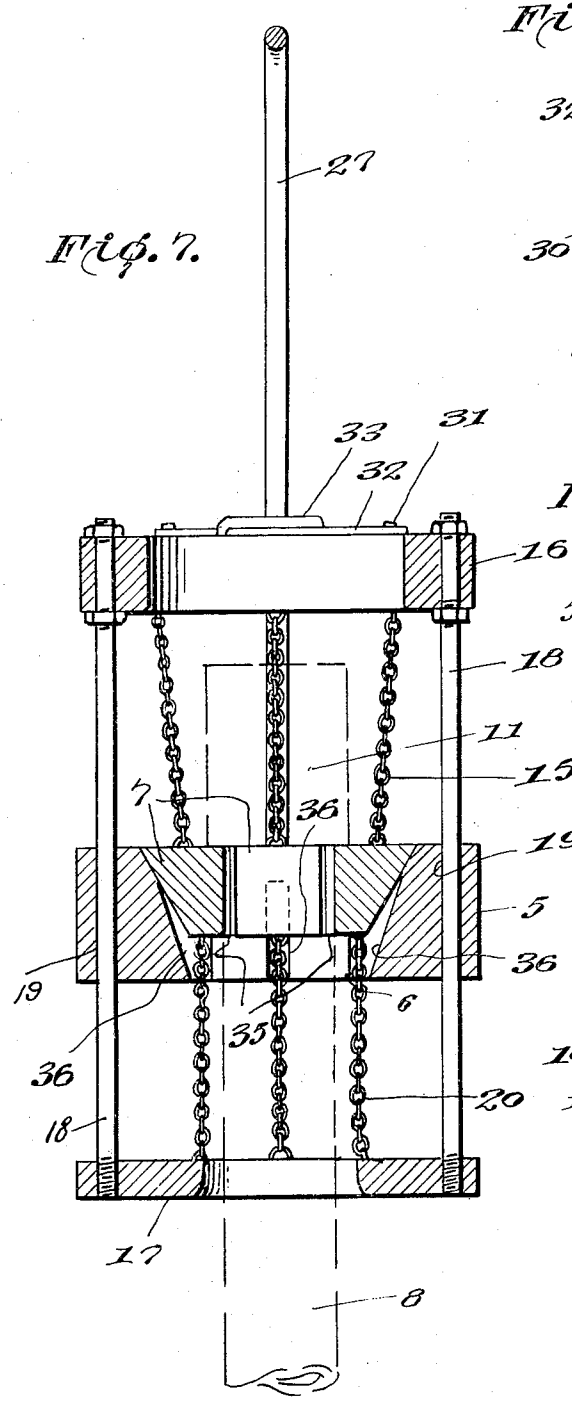


Fig. 4.

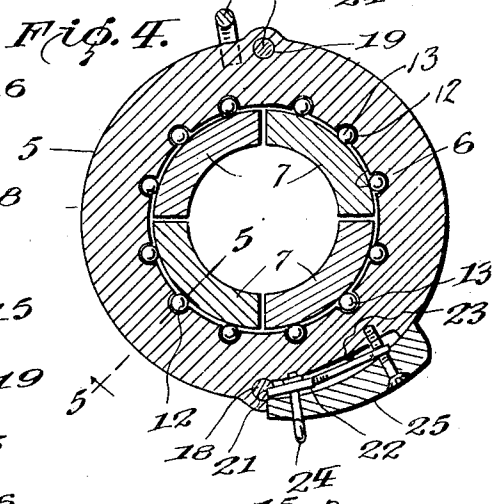
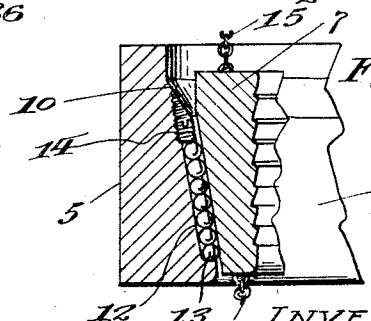


Fig. 5.



INVENTOR:
Joseph F. Moody.

By Wilson Thomas & Co.

ATTORNEYS.

Patented Sept. 29, 1925.

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UNITED STATES PATENT OFFICE.

JOSEPH F. MOODY, OF RANGER, TEXAS, ASSIGNOR TO AUTOMATIC APPLIANCES COMPANY, OF RANGER, TEXAS, A JOINT-STOCK ASSOCIATION.

AUTOMATIC ELEVATOR.

Application filed July 12, 1921. Serial No. 484,127.

To all whom it may concern:

Be it known that I, JOSEPH F. MOODY, a citizen of the United States, residing at Ranger, in the county of Eastland and State of Texas, have invented new and useful Improvements in Automatic Elevators, of which the following is a specification.

This invention relates to gripping devices generally known as "elevators" in the well-drilling art, the same being used in connection with a hoisting line for gripping a pipe or well casing section when the same is to be run into or taken out of the well hole.

The object of the invention is to provide a device of the kind which will securely grip the work, and by which certain operations are automatically effected as will be presently described.

The object stated is attained by means of a novel combination and arrangement of parts to be hereinafter described and claimed, and in order that the same may be better understood, reference is had to the accompanying drawing forming a part of this specification.

In the drawing Fig. 1 is an elevation of the device; Fig. 2 is a vertical section thereof, in another position; Fig. 3 is a plan view; Fig. 4 is a horizontal section on the line 4—4 of Fig. 1; Fig. 5 is a sectional detail on the line 5—5 of Fig. 4; Fig. 6 is a sectional detail showing a latch device, and Fig. 7 is a central vertical section showing a modified structure.

Referring specifically to the drawings 5 denotes the main body portion of the device, the same being cylindrical and having a vertical opening 6 in which slidably seat wedge-shaped gripping jaws 7 commonly termed "slips" in the art, the same being arranged in a circular series to encompass a well pipe, casing or similar element 8 to be elevated or lowered. The opening 6 has a downward taper and the back of the slips 7 are correspondingly tapered, and hence when they move downwardly in the opening they are crowded inwardly to grip the work 8, whereas, when they move upwardly, they recede and release the work. Near the top of the body 5, the opening 6 is enlarged as shown at 10 so that the slips may recede far enough to clear the collar 11, on the pipe or casing section 8.

The inclined portion of the wall of the opening 6 on which the slips 7 slide, back of each slip, has a vertical channel 12 containing a set of anti-friction balls 13 which protrude sufficiently to make contact with the back of the slip. This ball bearing effectually prevents the slips from sticking. The upper ends of the channels 12 are closed by screw plugs 14.

The slips 7 are suspended by chains or other suitable connections 15 from a supporting member in the form of a ring 16 positioned a short distance above the body 5. Beneath the body 5 is an annular support 17 for a pair of upright rods 18 which support at their upper ends, the ring 16. The body 5 has vertical guide apertures 19 through which the rods 18 slidably pass. The slips are also connected at the bottom by chains or other suitable means 20 to the ring 17. It will be understood, of course, that the inside diameters of the rings 16 and 17 is sufficient to let the work 8 through the same.

In order to lock the body 5 and the rods 18 against a relative sliding movement, one of said rods has a keeper notch 21 for a spring-pressed latch or dog 22 mounted in a recess 23 in the body 5 and provided with an operating handle 24 passing through a cover plate 25 for said recess.

The body 5 is also provided with a side hand-grip 26 to facilitate handling and from the top of the body rises a bail 27 by means of which connection is made with the hook 28 of the hoisting line 29. The ring 16 is positioned between the two branches of the bail 27 and it has diametrically opposite guide recesses 30 in which said bail branches seat.

To the top of the ring 16 is pivoted, as shown at 31, a latch lever 32 which swings transversely of the ring so as to extend across the same horizontally, for a purpose to be presently described. The free end of the latch lever 32 works under a curved guide bar 33 carried by the ring 16.

Figure 1 shows the device gripping the work 8 so that the latter may be raised or lowered, the slips 7 being down in the body 5 and gripping the work. The weight of the work automatically keeps the slips in gripping position, and to increase the hold, the faces of the slips may be serrated as shown. It will be noted that the ring 17 is now spaced from the bottom of the body 5. When the work has been lowered as far as desired, the device can be automatically re-

leased from the work by letting the ring 17 come in contact with an abutment such as the slip-supporting ring disclosed in my application filed December 17, 1920, Serial No. 431443, it being understood that the present device has been designed to be used in connection with this apparatus. When the ring 17 is stopped by the abutment (shown dotted at 34 in Fig 2), and the line 29 is allowed to continue to pay out, the body 5 slides down on the rods 18, and as the slips 7 are also now held stationary relative to the body 5, the downward movement of the latter allows the slips to come to release position. The latch 22 also now snaps into the notch 21 and locks the body 5 on the rod 18 in lowered or slip-releasing position, so that the device may now be elevated clear of the work for application to another pipe or casing section, the parts being permitted to again come to gripping position upon disengaging the latch 22. The serrations of the slips 7 cause the latter to firmly grip any portions of the work, and it is not necessary to place the device beneath the collar of a well pipe section or casing as is the customary practice when an ordinary elevator is used, and hence there is no strain on the threads, and no danger of the work dropping on account of a broken collar. The present device also eliminates the danger of the work dropping if it should get stuck in the well hole and become released before the slack in the hoisting line can be taken up. With an ordinary elevator, if the work gets stuck, the elevator slides down thereon as the line continues to be paid out, and if the work gets loose before the slack can be taken out of the line, the sudden drop is very apt to break something, especially if there is considerable weight to the work. With the present device, if the work starts to drop, the slips 7 will slide down and grip instantly as the slack is run off. The device can be used on pipes and casings of different diameters by using different sized slips.

The slips may also be made plain or without serrated faces as shown in Fig. 7, where the device is to be used on large sized casing or pipe sections to seat beneath the collar thereof. In this construction the interior of the body 5 has an annular shoulder 35 to limit the downward movement of the slips, and the wall of the opening on which the slips slide has grooves 36 to seat the chains 20.

The purpose of the lever 32 is to act as a gage when the device is engaged with the work, to prevent it from gripping the same too far downwardly from the top. Upon applying the device to the casing section 8 or other work, the lever 32 is swung to extend across the ring 16 to close up the same, and hence when the device is let down over the work, it is stopped when the lever reaches the top of the work. The hoisting line 29 is now operated, and as it starts to lift the device, the slips 7 go to work-gripping position, after which the lever 32 may be swung clear of the interior of the ring 16 so as not to interfere with the operations hereinbefore described.

The lever 32, when swung across the ring 16, may also be used to obtain the same action as that of the abutment 34. When elevating the work 8, the latter can be automatically released by placing the lever across the ring so that it will rest on top of the work, and then upon allowing the line 29 to pay out, the slips 7 are held up while the body 5 slides down to release the slips, and when the latch 22 comes opposite the notch 21 it snaps thereinto to lock the body 5 on the rods 18 in slip-releasing position as before, after which the device may be elevated clear of the work, it being understood, of course, that the latter is being held below by another gripping device during this operation.

It will be noted from an inspection of Figs. 2 and 7 that the slip supporting chains 15 carried by the ring 16 permit the slips of their own weight to locate themselves in the enlargement 10 when they are disposed in non-gripping position. The enlargement 10 tapers gradually downward toward the tapered vertical opening 6 so that the slips 7 will readily slide thereinto in moving to gripping position. Attention is invited to Figure 4 which illustrates that the several rows of anti-friction elements 13 not only reduce the friction between the slips 7 and the body of the elevator, but also provide a rocking connection between each slip and the elevator so that the several slips may adjust themselves to the periphery of the tubular member 8. The guide chains 15 and 20 insure the engagement of the rows of anti-friction elements 13 with the slips 7 between the side edges of the same and as the slips may partake of a limited rocking movement about the rows of anti-friction elements the slips may be securely and flatly engaged with the tubular member 8 immediately beneath the coupling regardless of any imperfection or any inequalities in the surface of the tubular member.

I claim:

1. A gripping device comprising a body having a downwardly tapered vertical opening, a series of slips positioned to enter the opening, an annular supporting member for the slips positioned above the body, an annular member beneath the body and having means for supporting the slip-supporting member, said annular member being movable vertically relative to the body, and means for locking the annular member and the body against relative movement.

2. A gripping device comprising a body

having a downwardly tapered vertical opening, a series of slips positioned to enter the opening, an annular supporting member for the slips positioned above the body, an annular member beneath the body, rods rising from said annular member, said rods being slidably supported by the body and carrying the slip-supporting member, and means for locking the rods and the body against relative movement.

3. A gripping device comprising a body provided with suspension means for raising and lowering the same, and having a downwardly tapered vertical opening, a series of slips positioned to enter the opening, a supporting member for the slips movable vertically relative to the body, and means for locking said member and the body against relative movement.

4. A gripping device comprising a body having a downwardly tapered vertical opening, a series of slips positioned to enter the opening, an annular supporting member for the slips positioned above the body, an annular member beneath the body, rods rising from said annular member, said rods being slidably supported by the body and carrying the slip-supporting member, and a latch carried by the body and engageable with one of the rods.

5. A gripping device comprising a body having a downwardly tapered vertical opening, a series of slips positioned to enter the opening, an annular supporting member for the slips positioned above the body, an annular member beneath the body and having means for supporting the slip-supporting member, said annular member being movable vertically relative to the body, means for locking the annular member and the body against relative movement, and a latch lever carried by the slip-supporting member, and adjustable to extend across the same.

6. A gripping device comprising a body having a downwardly tapered vertical opening which is enlarged laterally at the top, a series of slips positioned to enter the opening, a supporting member for the slips movable vertically relative to the body, a distance to permit outward radial movement of the slips into the top enlargement of the aforesaid opening and means for locking said member and the body against relative movement.

7. A gripping device comprising a body having a downwardly tapered vertical opening which is enlarged laterally at the top, an annular series of slips positioned to enter the opening, and supporting means for the slips for permitting radial outward movement thereof into the top enlargement of the aforesaid opening, the edges of adjacent slips approaching each other as the slips move into said opening.

8. A gripping device comprising a movable body having a downwardly tapered vertical opening, a series of slips positioned to descend into the opening, a supporting member for the slips positioned above the body, a member beneath the body and having means for supporting the slip-supporting member, said second mentioned member and body being movable vertically relative to each other, and means for locking said second mentioned member and the body against relative movement.

9. A gripping device comprising a body portion having a downwardly tapered vertical opening which is enlarged laterally at the top, said enlarged portion tapering gradually in the direction of the unenlarged portion of said vertical opening, a series of slips positioned to enter the opening, a supporting member for said slips movable vertically relative to the body a distance to permit outward radial movement of the slips into the top enlargement of the aforesaid opening, and connections between said slips and said supporting member for yieldably maintaining said slips in said enlargement when the same are in inoperative position.

10. A gripping device comprising a body portion having a downwardly tapered vertical opening which is enlarged laterally at the top, said enlarged portion tapering gradually in the direction of the unenlarged portion of said vertical opening, a series of slips positioned to enter the opening, and a supporting member for said slips movable vertically relative to the body a distance to permit outward radial movement of the slips into the top enlargement of the aforesaid opening.

11. The combination with a pipe elevator including a body portion having a downwardly tapered vertical opening, a series of slips positioned to enter the opening, a supporting member for the slips movable vertically relative to the body, said supporting member having an annular work receiving opening, and means carried by said supporting member movable toward the annular opening thereof for engagement with the work whereby said supporting member will be moved therewith substantially as and for the purpose described.

In testimony whereof I affix my signature.

JOSEPH F. MOODY.