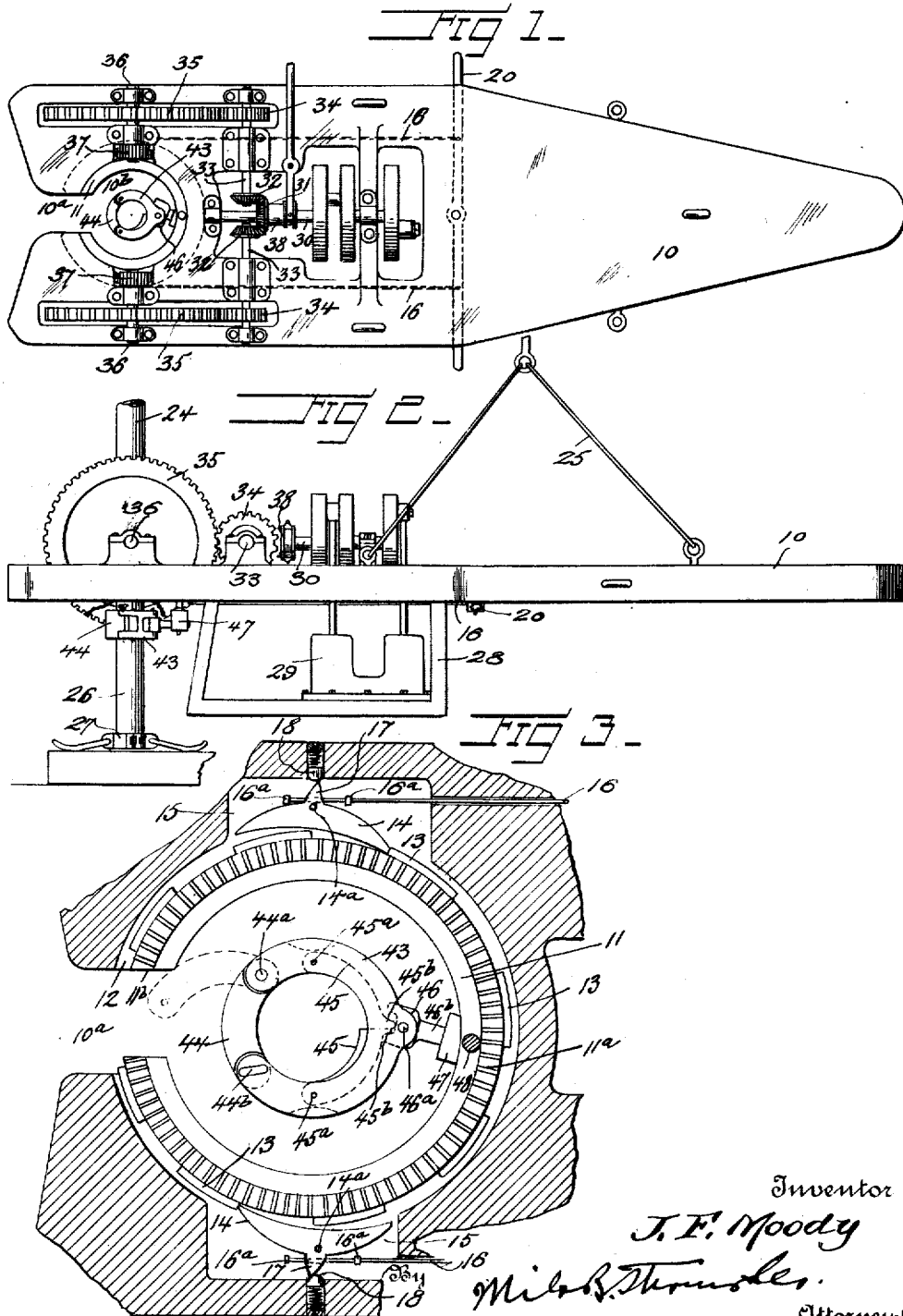


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WELL DRILLING APPLIANCE.
APPLICATION FILED AUG. 10, 1918.

1,300,995.

Patented Apr. 15, 1919.

2 SHEETS—SHEET 1.



Inventor
J. F. Moody

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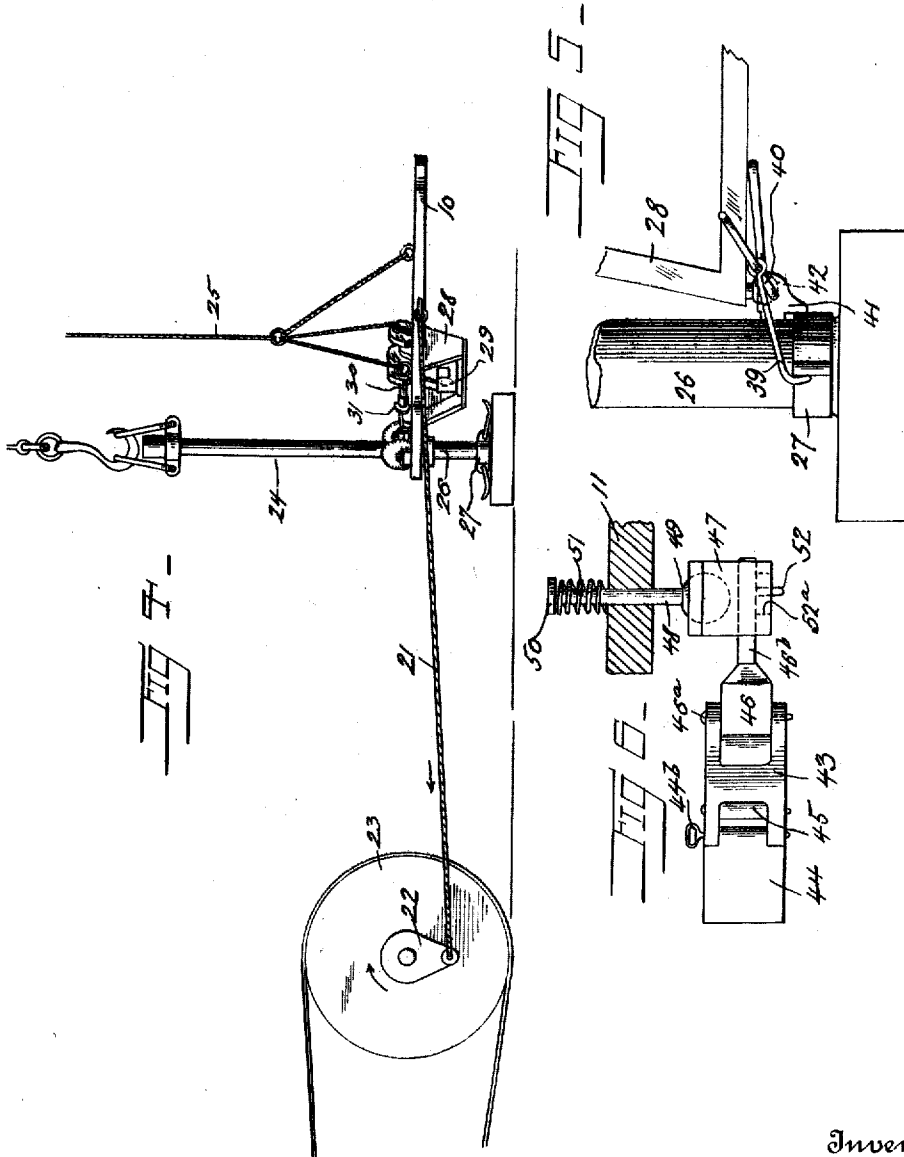
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UNITED STATES PATENT OFFICE.

JOSEPH F. MOODY, OF ST. FRANCISVILLE, ILLINOIS.

WELL-DRILLING APPLIANCE.

1,300,995.

Specification of Letters Patent.

Patented Apr. 15, 1919.

Application filed August 10, 1918. Serial No. 249,284.

To all whom it may concern:

Be it known that I, JOSEPH F. MOODY, a citizen of the United States, residing at St. Francisville, in the county of Lawrence and State of Illinois, have invented new and useful Improvements in Well-Drilling Appliances, of which the following is a specification.

This invention relates to improvements in well-drilling appliances, and more particularly an appliance for screwing and unscrewing casing or pipe sections.

The invention has for its object to provide an appliance for the purpose stated which is powerful and rapid in action, and which can be easily controlled.

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 drawings, forming a part of this specification.

In the drawings,

Figure 1 is a plan view of the appliance;

Fig. 2 is a side elevation thereof;

Fig. 3 is a sectional detail;

Fig. 4 is an elevation showing the appliance attached to the well casing and ready for operation;

Fig. 5 is an elevation showing an anchoring means for the appliance, and

Fig. 6 is an elevation of a gripping device.

Referring specifically to the drawing, 10 denotes the base of the appliance, the same being a plate of suitable length having an opening 10^a at one end for entrance of the casing section to be operated on, the inner or rear portion of this opening having a circular enlargement 10^b.

In the circular opening 10^b is mounted a ring 11 set horizontally and having its top face formed with a circular rack 11^a. This ring is not continuous, it being formed with an opening 11^b adapted to come opposite the opening 10^a for entrance of the casing section. The forward end of the base plate 10 carrying the ring has a recess 12 extending inward from the rim of the opening 10^b, in which recess the ring rotatably seats.

The periphery of the ring 11 has ratchet teeth 13 engageable by diametrically oppositely located pawls 14 carried by the base plate 10, said pawls being pivoted, as shown at 14^a, in enlargements 15 of the recess 12.

The pawls 14 are of the reversible type, and they are shifted or reversed by rods 16 having abutments 16^a on opposite sides of lugs 17 extending from the back of the pawls. These lugs are engageable by spring pressed plungers 18, and reversal is effected by swinging the pawls to bring the lugs on one or the other side of the plungers. This is a well known type of reversible pawl and a further description thereof is therefore not deemed necessary. The pawl shifting rods 16 are connected to a hand lever 20 carried by the base plate 10.

In operation, the casing section to be screwed or unscrewed, is coupled to the ring 11 by a gripping device to be presently described, and the base plate 10 is then swung back and forth in a horizontal plane, whereupon the pawls 14, through the ratchet teeth 13 rotate the ring and thus turn the casing section, it being understood, that the pawls are first set to take the proper hold. The appliance may be operated by a jerk line 21 connected at one end to the base plate 10 and at the other end to a crank 22 on some rotatable power-driven member 23 of the drilling machinery. For turning the casing in an opposite direction, as for unscrewing the same, it is necessary only to reverse the pawls and to place the appliance on the side of the casing 24 opposite the side to which it is shown attached in Fig. 4. It will be understood that the jerk line 21 gives the appliance its power stroke, the return stroke being obtained by swinging the appliance back by hand, which can be readily done as the pawls now slip. The operation of the appliance is similar to that of a ratchet lever.

As shown in Fig. 4 the appliance will be held in position for operation by a suspension line 25 suitably supported by the derrick or some other overhead portion of the rig, and connected to the base plate 10.

When screwing or unscrewing the casing section 24, the next section 26 below the same is held stationary by the usual clamp 27 provided for this purpose.

The casing section 24 can also be screwed or unscrewed by holding the base plate 10 stationary and rotating the ring 11, a power drive being provided for the purpose, composed of the following parts:

A bracket 28 depending from the base plate 10 carries a fluid-pressure motor 29 which may be a steam or other engine, or a compressed air motor. On the drive shaft

30 of this motor is a bevel gear 31 which is in mesh with bevel gears 32 on aligned shafts 33 having pinions 34 meshing with spur gears 35 on short shafts 36 provided with pinions 37 which are in mesh with the rack 11^a and located on diametrically opposite sides of the center of the ring 11. The shaft 30 is provided with a clutch 38 for throwing the drive into and out of gear. The several shafts are all carried by the base plate 10.

It will be evident from the foregoing that when the casing section 24 is coupled to the ring 11 and the latter is rotated through the drive gearing just described, the section will be screwed or unscrewed according to the direction the ring is turning. The motor 29 is reversible so that the ring 11 may be rotated in either direction. It will also be understood that the pawls 14 must be placed in inoperative position when the power drive is employed.

When the ring 11 is power driven as just described, the base plate 10 is held stationary by being anchored to the clamp 27. For this purpose a pair of hooks 39 is provided which are slipped over outstanding ears on the clamp as shown in Fig. 5. The hooks are carried by a crank arm 40 supported by a block 41 carried by the bracket 28. Upon swinging the crank arm rearward the hooks are drawn back to grip the ears on the clamp, and when the crank arm is swung forward, the hooks are released in an obvious manner. The block 41 is swiveled to the bracket 28 by a ball-and-socket joint 42 so that the base plate 10 may have sufficient play to accommodate itself to the casing section.

The gripping device hereinbefore mentioned, whereby the casing section to be screwed or unscrewed is grasped, comprises the following parts:

A segmental head 43 of a dimension to embrace the casing section is suspended from the ring 11. This head is closed up by a link 44 pivoted at one end to the head as shown at 44^a and having its other end fastened to the head by a removable pin 44^b. Upon removing this pin and swinging the link outward as shown dotted in Fig. 3, the head 43 may be slipped over the casing section, after which the link 44 is swung back and fastened so that the casing section is now completely encircled by the head and the link. Inside the head are two pivoted dogs 45 having sharp ends which are adapted to impinge against the casing section and thus grip and hold the same in the head. These dogs are pivoted at diametrically opposite points as shown at 45^a, and their free ends, back of sharp casing section engaging edges, have outstanding lugs 45^b which are straddled by the branches 46 of a fork pivoted at 46^a to the head 43. Thus, when the fork is swung in one direction, one of the dogs 45 is advanced into operative position, and when the

fork is swung in the opposite direction, this dog is retracted, and the other dog is advanced into operative position. The fork has a stem 46^b seating slidably in an aperture in a block 47 carried by a depending stem 48 on the ring 11, the connection between the stem and the block being made by means of a ball-and-socket joint 49. The stem 48 passes slidably through an aperture in the ring 11, and above the latter the stem has an abutment 50 for one end of a spring 51 tending to hold the stem elevated. The stem is however, free to slide so that the head 43 may follow the casing section down or up as it is being screwed or unscrewed. The stem 46^b has a depending side pin 52 seating in a slot 52^a in the block 47, whereby it is prevented from slipping out of the block. The slidable stem 46^b, with the universal joint at 49 enables the gripping device to readily accommodate itself to the casing section being operated on.

The action of the dogs 45 is entirely automatic as the fork 46 swings to advance the proper dog when the ring 11 commences to turn.

I claim:

1. A well drilling appliance comprising a base, a rotatable ring carried by the base and having a side opening, a gripping device carried by the ring, means for rotating the ring, a suspension means for the base, and means for anchoring the base stationary relative to the ring.

2. A well drilling appliance comprising a base, a rotatable ring carried by the base and having a side opening, a gripping device carried by the ring, power-driven means for rotating the ring, a suspension means for the base, and means for anchoring the base stationary relative to the ring.

3. A well drilling appliance comprising a base, a rotatable ring carried by the base and having a side opening, a gripping device carried by the ring, a circular rack on the ring, a pinion meshing with the rack, power-driven means carried by the base for operating the pinion, a suspension means for the base, and means for anchoring the base stationary relative to the ring.

4. A well drilling appliance comprising a base, a rotatable ring carried by the base and having a side opening, a gripping device carried by the ring, means for rotating the ring, a suspension means for the base, and swiveled means for anchoring the base relative to the ring.

5. A well drilling appliance comprising a base, a rotatable ring carried by the base and having a side opening, a gripping device carried by the ring, ratchet teeth on the ring, reversible pawls carried by the base and engageable with the ratchet teeth, and means for swinging the base.

6. A well drilling appliance comprising a

base, a rotatable ring carried by the base and having a side opening, a gripping device carried by the ring, ratchet teeth on the ring, reversible pawls carried by the
 5 base and engageable with the ratchet teeth, means for swinging the base, and suspension means for the base.

7. A well drilling appliance comprising a rotatable ring, a support for the ring, means
 10 for operating the ring, and a gripping device carried by the ring and yieldable in the direction of the axis of the ring.

8. A well drilling appliance comprising a rotatable ring, a support for the ring, means
 15 for operating the ring, and a swiveled gripping device supported by the ring and yieldable in the direction of the axis of the ring.

9. A well drilling appliance comprising a rotatable ring, a support for the ring, means
 20 for operating the ring, a gripping head, diametrically oppositely pivoted holding dogs inside the head and having outstanding lugs at their free ends, a pivoted fork carried by the head and straddling the lugs, and a con-
 25 nection between the fork and the ring.

10. A well drilling appliance comprising a rotatable ring, a support for the ring, means for operating the ring, a gripping head, diametrically oppositely pivoted hold-
 30 ing dogs inside the head and having outstanding lugs at their free ends, a pivoted

fork carried by the head and straddling the lugs, a stem extending from the fork, a block carried by the ring, and a sliding connection between the block and the fork
 35 stem.

11. A well drilling appliance comprising a rotatable ring, a support for the ring, means for operating the ring, a gripping head, diametrically oppositely pivoted hold-
 40 ing dogs inside the head and having outstanding lugs at their free ends, a pivoted fork carried by the head and straddling the lugs, a stem extending from the fork, a block carried by the ring, a connection be-
 45 tween the block and the fork stem, and a yieldable connection between the block and the ring.

12. A well drilling appliance comprising a rotatable ring, a support for the ring, 50 means for operating the ring, a gripping head, diametrically oppositely pivoted holding dogs inside the head and having outstanding lugs at their free ends, a pivoted fork carried by the head and straddling
 55 the lugs, a stem extending from the fork, a block carried by the ring, a connection between the block and the fork stem, and a yieldable and swiveled connection between the block and the ring.

In testimony whereof I affix my signature.

JOSEPH F. MOODY.