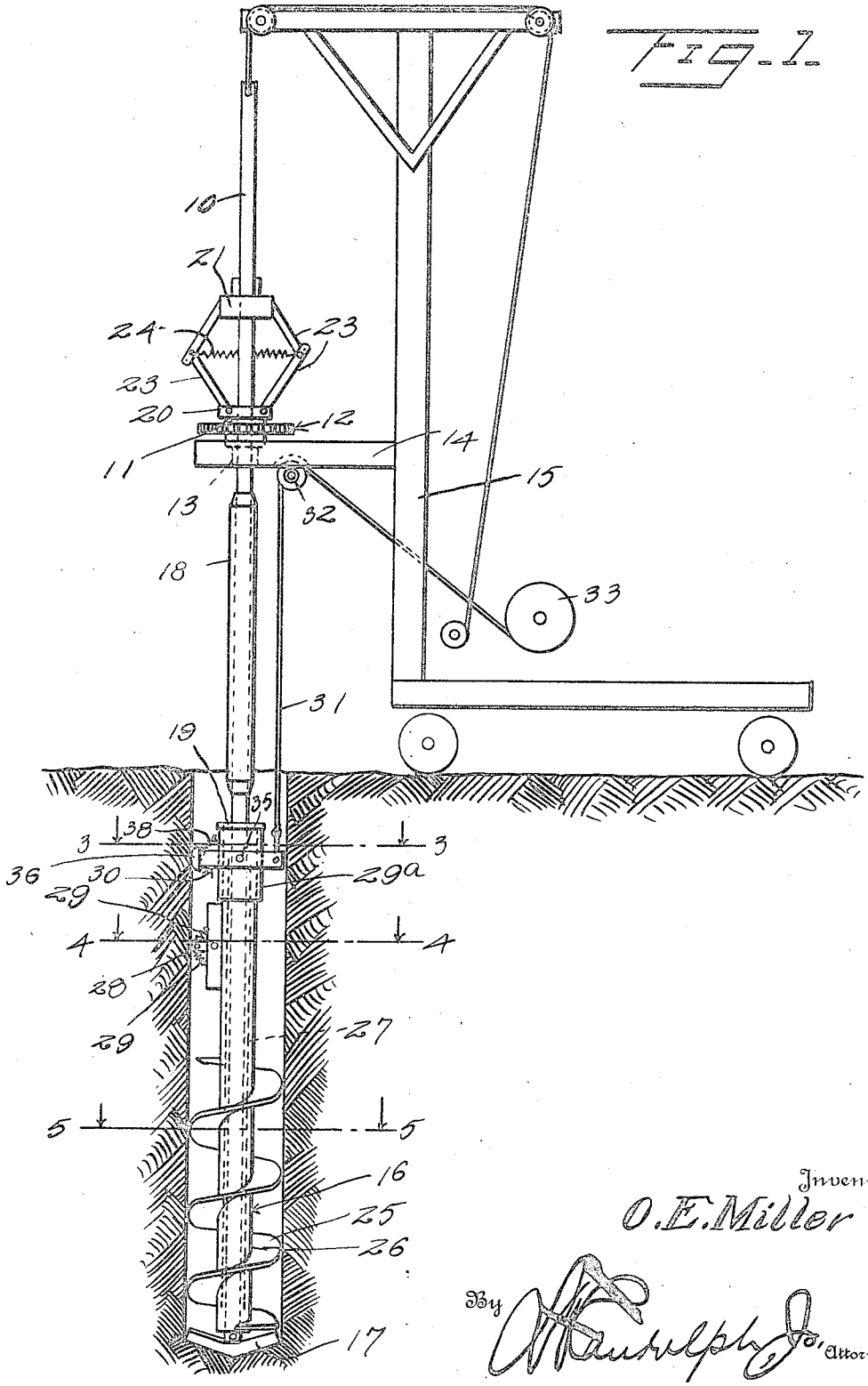
Jan. 15, 1924. 1,481,219

O. E. MILLER

WELL DRILLING MACHINE

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Fig. 1.



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WELL DRILLING MACHINE

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Fig. 2.

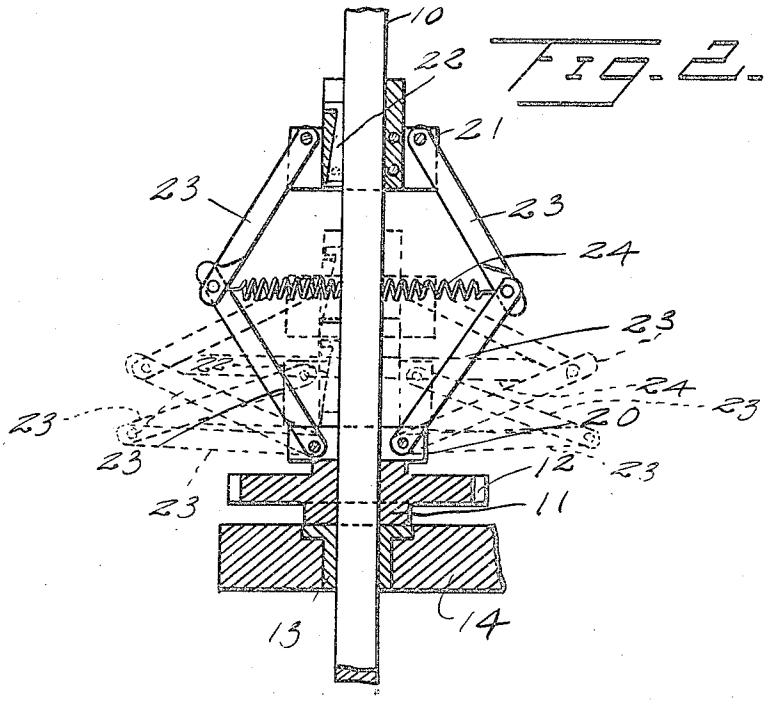


Fig. 6.

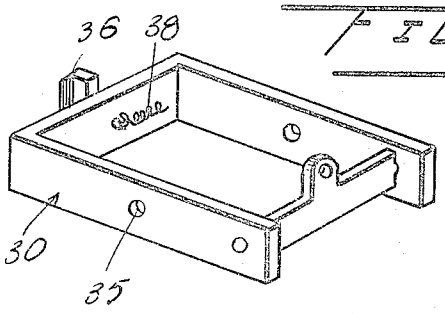
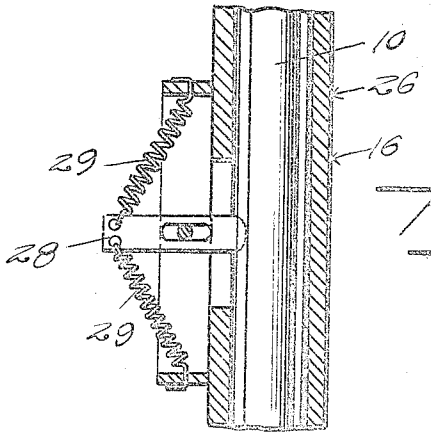


Fig. 8.



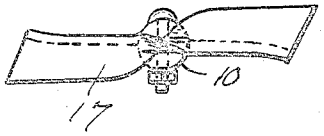


Fig. 7.

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Fig. 3.

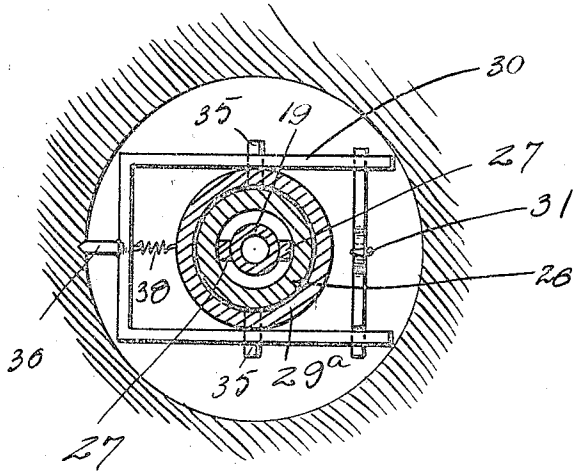


Fig. 4.

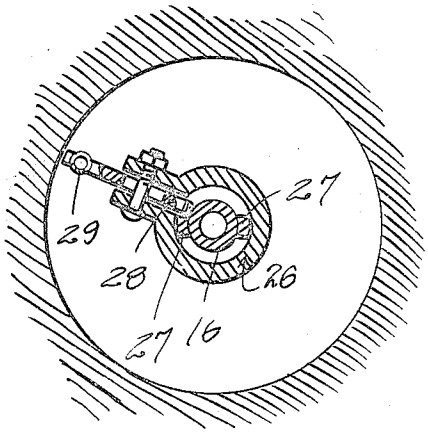
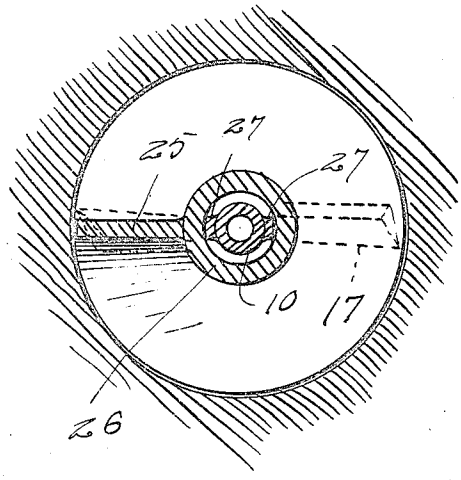


Fig. 5.



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Patented Jan. 15, 1924. 1,481,219

UNITED STATES PATENT OFFICE.

OSCAR E. MILLER, OF STRATTON, NEBRASKA.

WELL-DRILLING MACHINE.

Application filed April 18, 1922. Serial No. 554,642.

To all whom it may concern:

Be it known that I, OSCAR E. MILLER, a citizen of the United States, residing at Stratton, in the county of Hitchcock and State of Nebraska, have invented certain new and useful Improvements in a Well-Drilling Machine; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the invention is to provide a comparatively simple and efficient well drilling apparatus of the type employing a rotary bit or drill tool, wherein the feeding or advancement of the bit as the drilling proceeds is accomplished automatically and therefore continuously and uniformly without constant or special attention on the part of the operator; and furthermore to provide improved means whereby the sand or cutting of the bit may readily be removed from the well from time to time as the occasion may require without withdrawing the bit or the drill rod, and under conditions adapting the operation to be performed during the continuance of the drilling action; and with these objects in view the invention consists in a construction, combination and relation of parts of which a preferred embodiment is illustrated in the accompanying drawing, wherein:—

Figure 1 is a side view of a drilling apparatus constructed in accordance with the invention showing one length of extension rod in place,

Figure 2 is a detail side view partly in section of the feeding mechanism and drill rod driving means, showing the former in full and dotted lines respectively at the extreme limits of its movement,

Figures 3, 4 and 5 are cross sectional views respectively on the planes indicated by the lines 3—3, 4—4 and 5—5 of Figure 1,

Figure 6 is a detail view in perspective of the swivel anchoring device,

Figure 7 is a detail vertical sectional view taken in the plane of the key latch by which the auger barrel is locked to the drill rod, and

Figure 8 is a bottom plan view of the cutting or drilling bit.

The drill rod consists essentially of an operating member 10 which is cross sectionally square or of irregular form to effect a keyed relation with the hub or sleeve 11 of a driving member 12 consisting in the construction illustrated of a gear wheel which is rotatably mounted in a suitable bearing 13 in an arm or bracket 14 which is carried by the mast 15 of a suitable derrick, and a bit member 16 to the lower end of which is detachably secured a suitable cutting or drilling bit 17 which may vary in specific construction to suit the formation through which the drill is operated. A coupling 18 is provided for connecting the adjacent ends of the operating and drill carrying members of the drill rod and the elements of this coupling, which may be of any preferred construction permitting of the communication of rotary motion from the operating member to the bit member, are adapted to be separated to permit of the interposition of supplemental or extension drill rod members or sections 19 which are adapted to be added from time to time as the depth of the well increases, it being obvious that the operating member remains always in operative relation with the drive member 12 which is adapted to receive motion from any suitable source of power. The driving member 12 while rotatable maintains a fixed position on the mast and the operating member of the drill rod is adapted to slide therethrough as the bit cuts its way through the rock or other formation, and as above indicated extension rod sections 19 are introduced from time to time to adapt the drill bit to be progressively advanced to the required depth.

The drill bit feeding mechanism consists of a collar 20 carried by the driving member 12, a collar 21 which is slidingly fitted upon the operating member of the drill rod and carries a clutch consisting in the construction illustrated of the wedge members 22 adapted to engage and bind the drill rod as downward movement is communicated to the collar 21 and to release said rod when upward movement is applied to the said collar so as to slide freely over the drill rod, together with centrifugal toggle arms 23 connecting said collars 20 and 21 and serving by reason of the rotary motion of the drill rod imparted thereto through the drive gear 12 to spread, as indicated in Figure 2, to apply a downward progressive movement to the upper or clutch collar 21 and thus exert a downward impulse upon the drill rod which serves to downwardly

feed the drill bit and hold it in operative or cutting contact with the bottom of the hole. The joints of the toggle arms 23 are connected transversely by a releasing spring 24 which, upon the cessation of rotary movement of the drill rod, serves to draw said joints toward each other and thereby move the clutch collar 21 upward upon the drill rod to obtain a new grip. Therefore in the progress of the operation of the mechanism it is only necessary in order to renew the feeding action from time to time to temporarily interrupt the rotary movement of the drill by stopping the drive gear wheel 12. Immediately upon the checking of the rotary movement of this member the feeding mechanism resumes its normal position with the collar 21 elevated, and when the rotary motion of the drill rod is resumed the feeding mechanism exerts a downward or feeding impulse upon the drill rod which as above noted maintains the drill bit in cutting relation with the bottom of the hole.

Mounted for sliding movement upon the bit member of the drill rod is a sand or cuttings pump or bucket, consisting in the construction illustrated of an auger 25 designed to operate close to and just above the drill bit and having a barrel 26 which more or less snugly fits the drill rod and is keyed thereto so as to receive rotary motion therefrom. In the construction illustrated the drill rod is provided with keys 27 consisting of metallic straps or the equivalent thereof secured to opposite sides of the surface of the rod, and the barrel of the auger carries a double acting latch 28 which is yieldingly held in an intermediate position by the opposed springs 29 and is adapted to swing in either direction from said intermediate position to permit of moving the auger barrel either upward or downward on the drill rod. When in its normal position, the latch engages one of the keys 27 to lock the auger barrel against independent rotation and permit the communication of rotary motion from the drill rod to the auger. When it is desired to raise the auger for the purpose of removing from the well the sand or cuttings which have been accumulated by the auger, the latch swings to accommodate such movement and permits the unobstructed elevation of the auger.

In order to provide for the raising of the auger there is swiveled to the upper end of the barrel thereof a sleeve 29a having a swinging yoke or anchor 30 to which is attached a cable 31 extended to the top of the well over a suitable direction pulley 32 and adapted to be operated by means of a drum 33 or its equivalent. The purpose of the swiveled sleeve obviously is to permit of the rotation of the auger with the bit without causing the winding or entangling of the operating cable 31, and in order that the said sleeve may be positively prevented from turning with the barrel of the auger it carries said anchor 30 and the latter is pivotally mounted as at 35 on the sleeve, having a radial blade 36 which is adapted to engage in the soil at the side of the drill hole when the anchor is in the normal position in which it is held by the spring 38. The yoke to which the cable is connected is mounted in the anchor so that when the cable is strained or placed under tension to elevate the auger it serves to tilt the anchor and thereby withdraw it from engagement with the side of the drill hole in order to release the parts for upward movement. When the load carried by the auger has been discharged at the top of the well and the auger is again lowered, the anchor resumes its sleeve holding position as soon as the tension on the elevating cable has been relaxed.

Having thus described the invention, what I claim is:—

1. A rotary drill having a drill rod, a driving member for said rod and relatively to which the rod is slidable, clutch means engageable with the rod to cause the rod to feed with respect to said member, said clutch means being normally disposed and movable of itself out of clutch engagement with the rod, and the clutch means including a device centrifugally operable by the driving member to cause the said clutch engagement of the clutch means and rod.

2. A rotary drill having a drill rod, a driving member for the drill rod and relatively to which the latter is slidable, a clutch means connected to the driving member and normally urged out of clutch engagement therewith, and a connection between the driving member and clutch means centrifugally operable to cause the clutch means to engage the rod and impart feeding movement thereto.

3. A rotary drill having a drill rod, rotatable collars in which the rod is slidably disposed, clutch means normally out of coacting relation with the rod, and centrifugally operable means connecting the collars to move the clutch into engagement with the rod to impart feeding movement to the latter.

4. A rotary drill having a drill rod, collars through which said rod is slidable, a clutch carried by one of the collars adapted to normally seek a position out of clutch relation with the rod, said clutch being engageable with the rod to rotate the same with the collars, and toggle means connecting the collars and being subject to centrifugal action to control the clutch.

5. A rotary drill having a drill rod, a collar, a driving wheel for the collar, a

collar provided with a clutch to engage said rod, the rod being slidable through said collars, toggle arms connecting said collars and adapted for operation by centrifugal force to control the clutch, means to urge the toggle arms into parallelism with the rod, whereby the clutch will disengage the latter, and said driving wheel being adapted for connection to a source of power.

6. A rotary drill having a drill rod, an auger on the drill rod, the drill rod having a rib, the auger having a slot and a frame about said slot, a latch disposed in said slot and adapted to engage said rib to connect the auger to the rod for unitary movement, a pin and elongated slot connection between said latch and said frame and springs connected to said frame and said latch to urge inward movement thereof.

7. A rotary drill having a drill rod, an auger on the drill rod, the drill rod having a rib, the auger having a slot, a latch mounted for sliding movement and disposed in said slot and adapted to engage said rib to connect the auger to the rod for unitary movement, means connecting the latch to the auger for engagement and disengagement with respect to said rib, and springs connected to the latch at their outer ends and to the auger at their inner ends to maintain the latch in fastening position.

8. A rotary drill having a clearing auger, a hoisting sleeve swiveled on the auger, a frame surrounding and pivoted to the sleeve, an anchor engageable with the ground and extending from the frame, and an operating means extending from the frame on the side of its pivot opposite to the anchor.

In testimony whereof I affix my signature in presence of two witnesses.

OSCAR E. MILLER.

Witnesses:
NORVEL E. DIEHL,
BERT G. SHILLINGTON.