Oct. 6, 1931. H. A. PIPPIN 1,826,634

WELL DRILLING APPARATUS

Filed Dec. 16, 1930

Fig. 1.

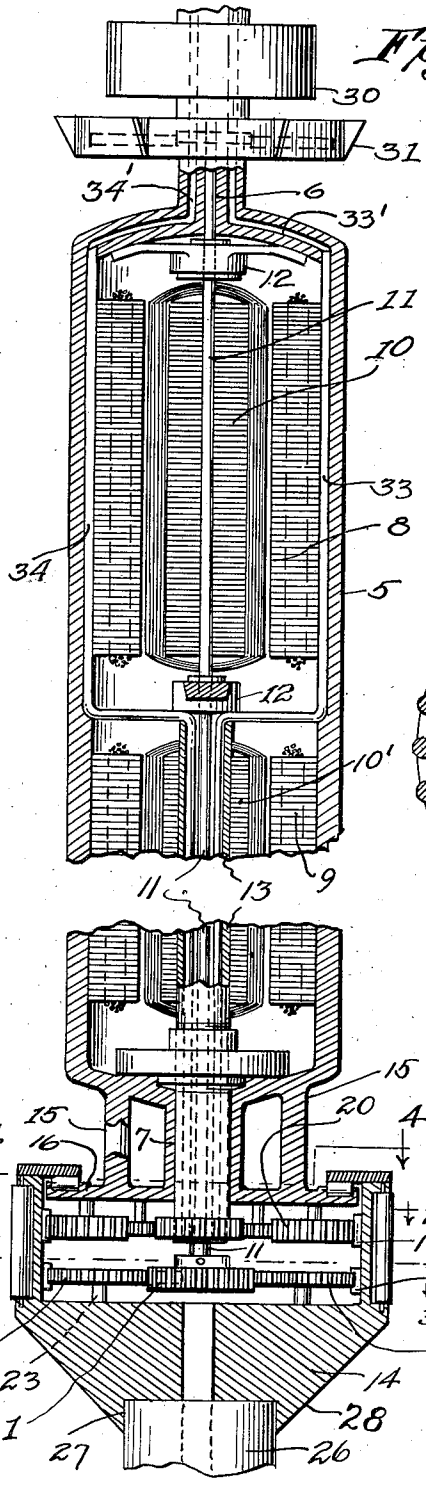



Fig. 2.

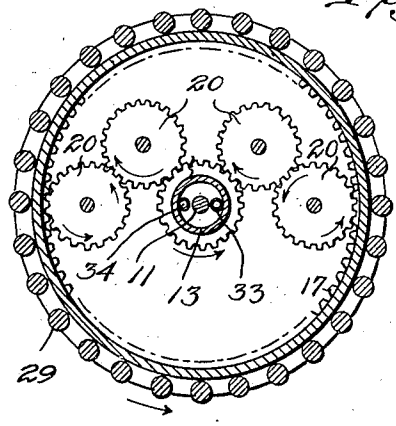



Fig. 3.

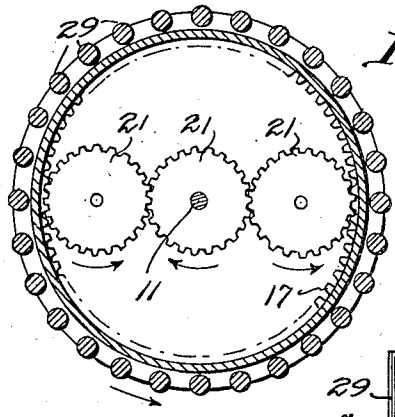
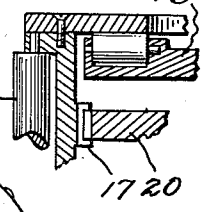



Fig. 5.



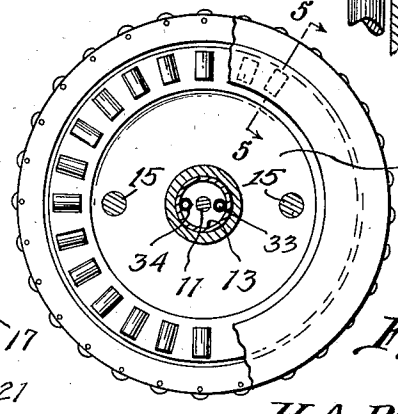




Fig. 4.

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1,826,634

# UNITED STATES PATENT OFFICE

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## WELL DRILLING APPARATUS

Application filed December 16, 1930. Serial No. 502,760.

My invention relates to improvements in apparatus for drilling wells, and is particularly, though not exclusively, adapted for deep well drilling.

An important object of the invention is to provide a device for the above purpose having two armatures rotating in opposite directions to maintain the apparatus carrying the fields of the armatures from rotation, and to make the fields of both armatures oppose each other so that the fields and the structure to which they are connected will be substantially stationary during the operation of drilling.

Another object of the invention is to provide such apparatus with a follower adapted to operate on the walls of the hole to facilitate removal of the apparatus.

Other objects and advantages of the invention will become apparent during the course of the following specification which is to be read in connection with the accompanying drawings, in which

Figure 1 is a side view of a device embodying the invention, the same being partly in section and partly in elevation;

Figure 2, a sectional view on the line 2—2 of Figure 1;

Figure 3, a sectional view on the line 3—3 of Figure 1;

Figure 4, a sectional view on the line 4—4 of Figure 1; and

Figure 5, a sectional view on the line 5—5 of Figure 4.

Referring to the drawings, the numeral 5 designates an elongated casing, having an opening 6 in its top wall and an opening 7 in its bottom wall, and within which are mounted an upper electric motor 8 and lower motor 9, which are constructed to rotate their armatures 10 and 10′ in opposite or clock-wise and counter-clockwise directions, respectively. A shaft 11 extending through the entire casing is journaled in the bearings 12, and is rotated with the armature 10 of the motor 8, while a tubular shaft 13 surrounds the shaft 11 and extends through the motor 9 and through the opening 7, and is driven by the armature 10′ of the motor 9 in an opposite direction to the direction of rotation of shaft 11.

A turntable 14 is mounted below the casing 5 by means of supports 15 which supports are secured in any suitable manner, in the present instance by integral construction, to the casing 5 and the stationary cover 16. The turntable is provided with two sets of internal gear teeth 17. One set of gear teeth 17 is connected to the shaft 13 by a gear train 20, while the other set of gear teeth 17 is connected to the shaft 11 by a gear train 21. These gear trains 20 and 21 are developed so as to tend to rotate the turntable 14 in the same direction, although their respective driving shafts rotate in opposite directions, such development of these gear trains 20 and 21 is clearly shown in Figure 2 and 3.

The cutting is done by the drill bit 26 which is mounted in the socket 27 of the turntable 14 for rotation therewith, and the tapered portion 28 leads up to rollers 29 carried by the turntable 14. These rollers rotate with the turntable 14 and smooth and finish the walls of the hole as the apparatus proceeds in its digging operation. A dead weight 30 is mounted on top of the device to provide sufficient weight to urge the apparatus downward in drilling. It will be understood that the apparatus can be suspended by means of drill pipe and couplings or cable into the well.

Rotary cutting knives 31 are mounted for rotation with shaft 11 above the casing 5, so that as the apparatus proceeds the walls of the well will be trimmed thereby to facilitate withdrawal of the apparatus from the well and to prevent it from becoming wedged or stuck in the hole it has dug.

A constant flow of water through the apparatus into the hole being dug is provided by the piping or hose 33—34 leading from openings 33′—34′ in the casing and downwardly between casing 5 and motor 8 and through the tubular shaft 13 and from which the water is delivered into the turntable 14 and thence discharged into the hole being dug.

The operation and advantages of the device are obvious from the foregoing descrip-

tion; and the apparatus and parts can be constructed in various sizes and proportions for various uses.

I claim:

1. A well drilling apparatus comprising a casing, two motors in the casing having armatures rotatable in opposite directions, shafts connected to said armatures, respectively, and rotatable therewith, one of said shafts extending through the entire length of the casing and through the other shaft, a turntable mounted on the casing, connections between each shaft and the turntable tending to rotate the latter in the same direction, and a drill carried by the turntable.

2. A well drilling apparatus comprising a casing, two motors in the casing having armatures rotatable in opposite directions, shafts connected to said armatures, respectively, and rotatable therewith, one of said shafts extending through the entire length of the casing and through the other shaft, a turntable mounted on the casing, connections between each shaft and the turntable tending to rotate the latter in the same direction, a drill carried by the turntable, and rollers carried by said turntable to engage the wall of the hole dug by said drill.

3. The structure of claim 2 wherein the drill bit is carried by a turntable having tapered walls extending between the drill bit and rollers.

4. The structure of claim 2 wherein a rotary cutting knife is mounted above the casing and operated by one of said shafts as a follower to trim the walls of the well hole.

In testimony whereof I hereunto affix my signature.

HASKEL A. PIPPIN.