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C. E. REED

ROTARY DEEP WELL DRILLING APPARATUS

Filed May 24, 1923

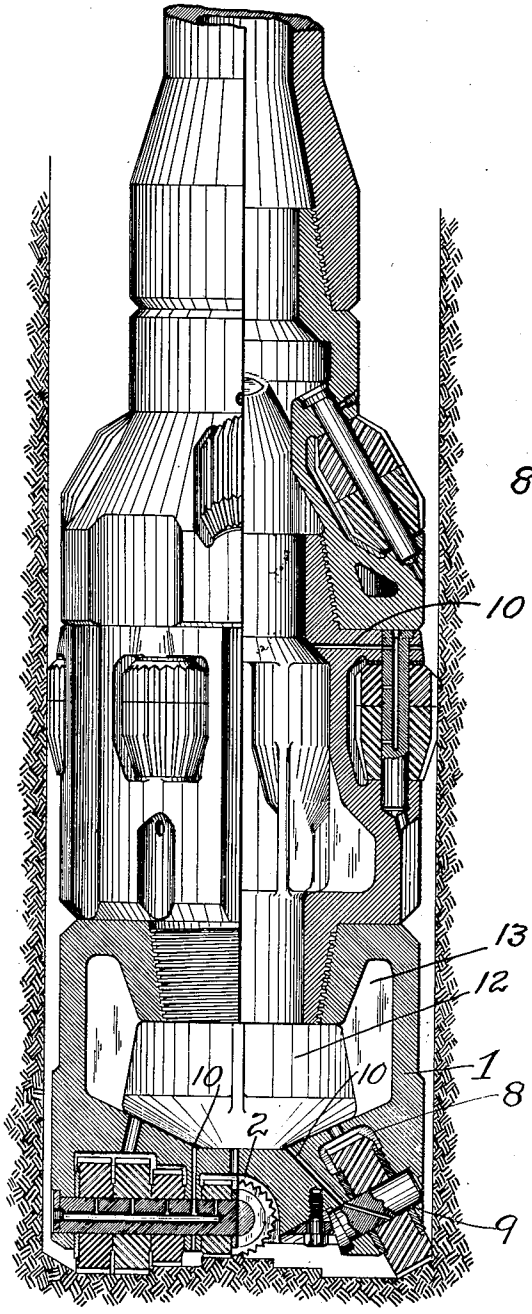


Fig. 2.

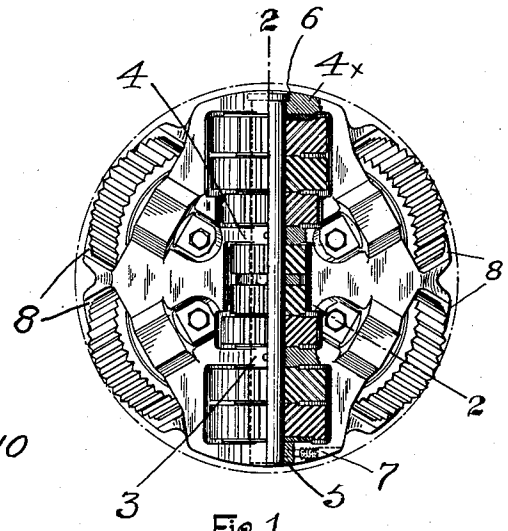


Fig. 1.

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UNITED STATES PATENT OFFICE.

CLARENCE E. REED, OF HOUSTON, TEXAS, ASSIGNOR TO REED ROLLER BIT COMPANY, OF HOUSTON, TEXAS, A CORPORATION OF TEXAS.

ROTARY DEEP-WELL-DRILLING APPARATUS.

Application filed May 24, 1923. Serial No. 641,144.

To all whom it may concern:

Be it known that I, CLARENCE E. REED, a citizen of the United States, and resident of Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Rotary Deep-Well-Drilling Apparatus, of which the following is a specification.

The invention relates to the type of rotary drill bits for making deep wells in which cross roller cutters are employed in a recess at the lower face of the drill head, and the invention is designed to provide a structure which will enable the bit to be made in large sizes, say for instance twenty-four inches in diameter, and maintain a high degree of efficiency in reaching with its cutters all parts of the large expanse of surface covered by a head or bit of the large size mentioned. The invention consists in the features and combination and arrangement of parts hereinafter described and particularly pointed out in the claim.

In the accompanying drawings

Figure 1 is a bottom plan view of a bit or head embodying the invention.

Fig. 2 is a vertical section on the line 2—2 of Fig. 1.

In the drawings the head 1 is provided in its lower face with a recess 2 divided up into compartments by transverse bridge portions 3, 4. The cross roller cutter is made up of sections of different diameters, the sections of smallest diameter being at the axial center of the bit or head, and the sections of largest diameter being at the ends of the cross recess, and the cross roller may also include sections of intermediate diameter, these being located in the compartments of the cross recess adjacent the central compartment of said recess. These cross roller sections are journalled upon a pin which is seated in the end walls 4^x, 5 of the head or bit, said end wall defining the ends of the cross recess. The journal pin may be provided with an eccentric head to fit into a socket portion 6 in the end wall 4^x, so that the pin will be held against rotary displacement. The other end of the pin which is seated in the end wall 5 may receive a set screw introduced at 7 by which the pin will be held against longitudinal displacement. This journal pin at its intermediate portions is supported in openings in the bridge pieces 3, 4. These bridge pieces are at different distances from the axial center of the bit or head, the bridge piece 3 being at the greater distance and by reason of this construction it will be noticed that the cross roller sections are so disposed that the sections adjacent the bridge piece 3 will do the cutting under the cross piece or bridge 4 and conversely the cross roller section which is adjacent the cross piece or bridge 4 will do the cutting under the bridge piece 3. In other words, the relation of these bridge pieces is such as to bring sections of the cross roller cutter beneath the paths described by the bridge pieces in the revolution of the bit, so that all parts of the bottom of the hole will be subjected to a cutting action by the cross roller cutter organization.

The head or bit also carries side cutters, these being located in inclined recesses or pockets 8 and mounted on journal pins which are inserted in the bearing openings 9. These journal pins may have eccentric heads to be received in sockets adjacent one of the bearing openings 9 so as to prevent the pin from being displaced rotatively.

Suitable ports are provided for directing flushing water to the recesses in which the cross roller cutters and the inclined side cutters are located, and water passages may be provided as at 10 for directing water to the journal pins, and thence to the bearing surfaces between these pins and the roller cutters for lubricating these surfaces.

The side cutters are arranged in pairs, there being a pair on each side of the cross roller cutters, and the members of each pair of side roller cutters are arranged in divergent planes which are radial to the axial center of the drill head.

From an inspection of the plan view, Fig. 1, it will be seen that the cutters are so disposed as to act on all parts of the surface of the bottom of the hole, and it will be further seen that the structure is of rugged character throughout, and that the various cutter sections are securely held in position to do the work required of them.

In order to lighten the structure, the head is cored out at 12, and for strength ribs may be incorporated as at 13.

It will be understood, of course, that the structure may be embodied in drill heads of

various sizes, the twenty-four inch diameter being mentioned as an example of one size to which the invention may be applied.

I claim:

A rotary bit for deep well drilling, comprising a head having a recess in its lower face with bridge pieces extending across said recess, cross roller cutters in said recess, and journal means for said cross roller cutters mounted in the end walls of the recess and in the bridge pieces, said bridge pieces being at different distances from the axial center of the drill head and with the portion of the cross roller cutter on one side of said center, extending across and below the path described by the bridge on the other side of said axial center so that the surface of the bottom of the hole below said bridge pieces will be cut, substantially as described.

In testimony whereof, I affix my signature.

CLARENCE E. REED.