H. R. HUGHES.

ROTARY BORING DRILL.

APPLICATION FILED MAY 29, 1917.

1,292,608.

Patented Jan. 28, 1919.

Fig 3

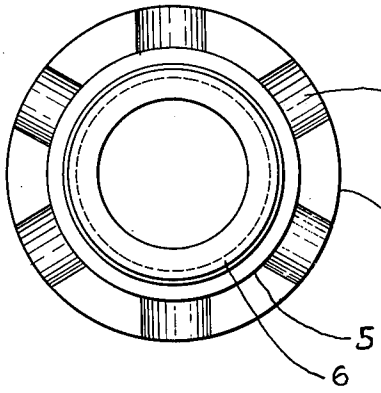


Fig 4

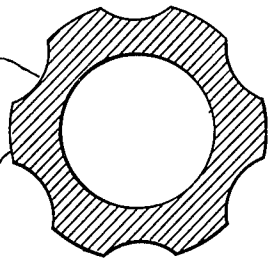


Fig 1

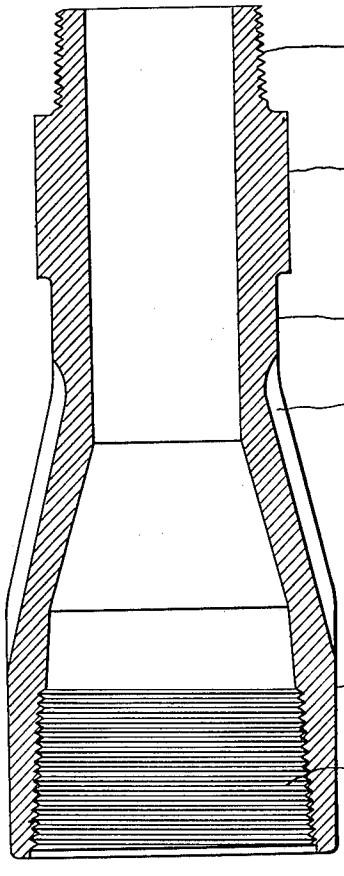
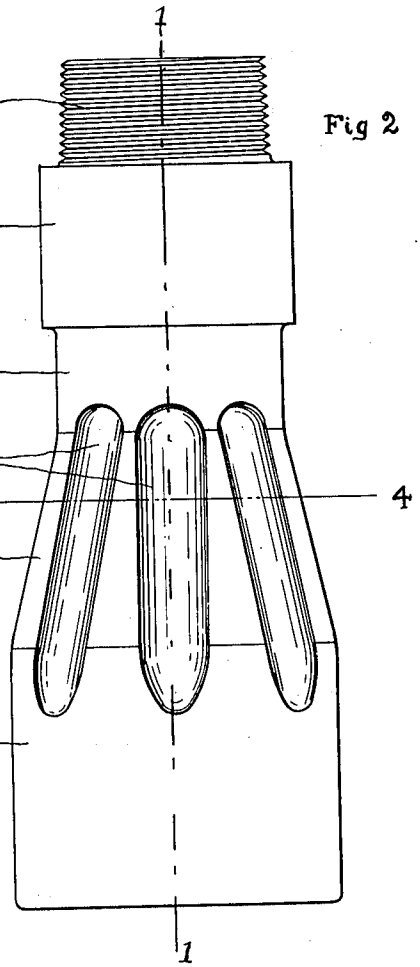


Fig 2



Howard R. Hughes Inventor

By his Attorney Jesse R. Stone

UNITED STATES PATENT OFFICE.

HOWARD R. HUGHES, OF HOUSTON, TEXAS, ASSIGNOR TO HUGHES TOOL COMPANY, OF HOUSTON, TEXAS, A CORPORATION OF TEXAS.

ROTARY BORING-DRILL.

1,292,608. Specification of Letters Patent. Patented Jan. 28, 1919.

Application filed May 29, 1917. Serial No. 171,628.

To all whom it may concern:

Be it known that I, HOWARD R. HUGHES, a citizen of the United States, residing at Houston, Harris county, Texas, have invented a certain new and useful Improvement in Rotary Boring-Drills, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in rotary boring drills, but more particularly to a drill collar forming a connection between the main rotary drill shaft and the drill bit.

The principal object of my invention is to provide a collar for a drill bit having an upper inclined fluted crushing surface which is designed to break up the rock and other material tending to wedge in around the upper part of the head.

Another object is to construct a drilling apparatus having a drill bit and a collar separate therefrom with an upper fluted crushing portion, which collar is simple and rugged in structure and capable of withstanding the great strain to which it is subjected.

Other objects will more clearly appear in the specification which follows:

In boring wells with the rotary forms of drill bits, and especially with those of the roller type, it has been found that pieces of broken rock, boulders and other detritus will get in above the head of the bit and wedge around the same in such manner that it becomes very difficult to withdraw the head from the well, and, in some cases, in attempting to withdraw the drill, the bit is broken off from the drill stem and remains behind in the bottom of the hole. This entails an expensive operation in fishing for the bit, and may cause the well to be abandoned. I have overcome this difficulty by means of my fluted drill collar herein set forth and described.

In the drawing, wherein like characters of reference refer to like parts throughout the different figures, Figure 1 is a longitudinal section taken on the line 1—1 of Fig. 2 and illustrating my fluted drill collar;

Fig. 2 is a side view thereof;

Fig. 3 is a top plan view; and

Fig. 4 is a cross-section on the line 4—4 of Fig. 2.

My improved drill collar consists of an elongated tubular member, having an upper cylindrical portion, 5, the reduced upper end, 6, thereof being threaded and having at its lower end an enlarged cylindrical portion, 7. The lower portion, 7, is threaded interiorly, as at 11, for attachment to the drill bit, not shown. Immediately adjacent the upper cylindrical portion, 5, is a somewhat reduced cylindrical portion, 8. Between the reduced portion, 8, and the base, 7, is an outwardly inclined surface, 9, frusto conical in shape, with the surface thereof deeply fluted, or grooved, as at 10. These grooves are provided to form a grinding or crushing surface whereby material accumulating there-around may be crushed or disintegrated.

In the operation of this device the upper threaded part, 6, is screwed into the main drill stem, not shown, and the lower portion, 7, is attached to the drill bit. The rotation of the drill stem will then rotate the collar, and the bit attached thereto, thereby performing the drilling operation. Material falling in from the side of the well hole and lodging around the upper inclined portion of the drill collar will be caught in the grooves or flutes, 10, and broken up and disintegrated to such a degree that it will be washed away by the upward course of the flushing water commonly used with this type of drill.

This drill collar has been found to effectively avoid the wedging of the head in the hole due to accumulation of material thereabout.

Having thus described my improvement and the novel features thereof, what I claim and desire to protect by Letters Patent is:

1. In a rotary boring drill, a hollow collar to which the drill is attached, said collar having a lower cylindrical portion, an upper cylindrical portion of smaller diameter than the lower portion, an intermediate downwardly inclined portion having grooves in the upper surface thereof, serving to provide a crushing surface in the rotation of the drill.

2. In a rotary boring drill, a collar to which the drill is attached, said collar being smallest at its upper end, and inclined outwardly toward the lower end, the inclined surface thereof being grooved to provide a crushing and grinding face, serving,

during the rotation thereof, to disintegrate the material accumulated there-around.

3. A fluted drill collar for rotary well drills, comprising a threaded upper end for attachment to the drill stem, a threaded lower portion of larger diameter than the upper end for attachment to the drill, an intermediate inclined fluted portion providing a crushing surface to disintegrate the fragments of material accumulated above the drill.

4. A collar for rotary well drills, comprising a hollow tubular member threaded for attachment to the drill stem, having an outer surface inclined outwardly toward the base, said base being cylindrical and of a diameter nearly equal to that of the well, said inclined surface being fluted to provide an upper crushing face.

5. In a rotary boring drill, a collar, smaller at its upper end and having an outer surface inclined outwardly toward the lower end, the inclined surface provided with straight grooves forming a grinding surface, during the rotation of the drill.

In testimony whereof, I hereunto affix my signature this the 16th day of May, 1917.

HOWARD R. HUGHES.