C. E. REED.

REAMING DRILL.

APPLICATION FILED JULY 16, 1917.

1,284,453. Patented Nov. 12, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

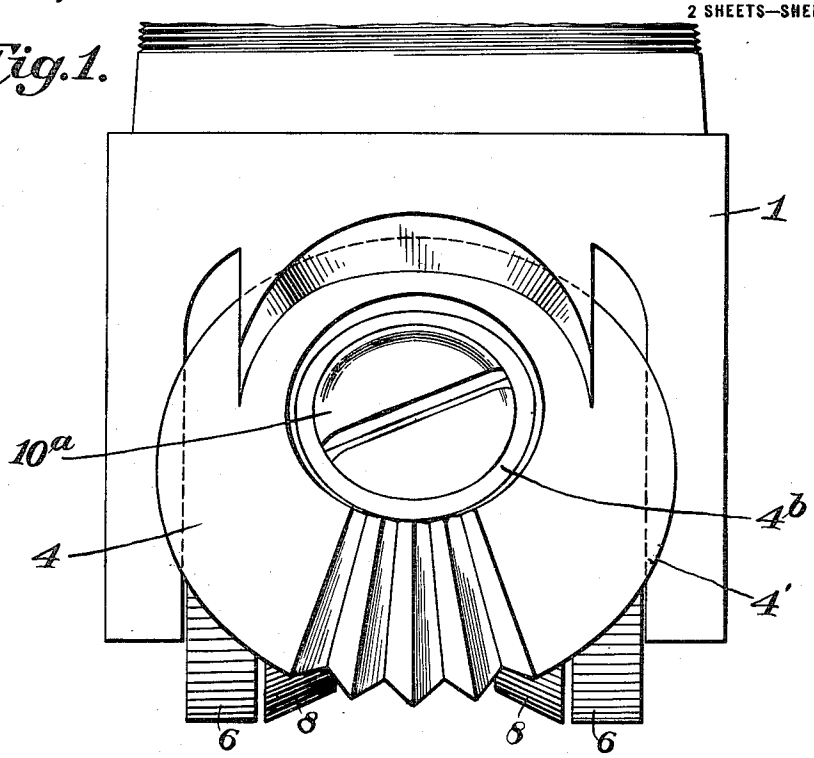
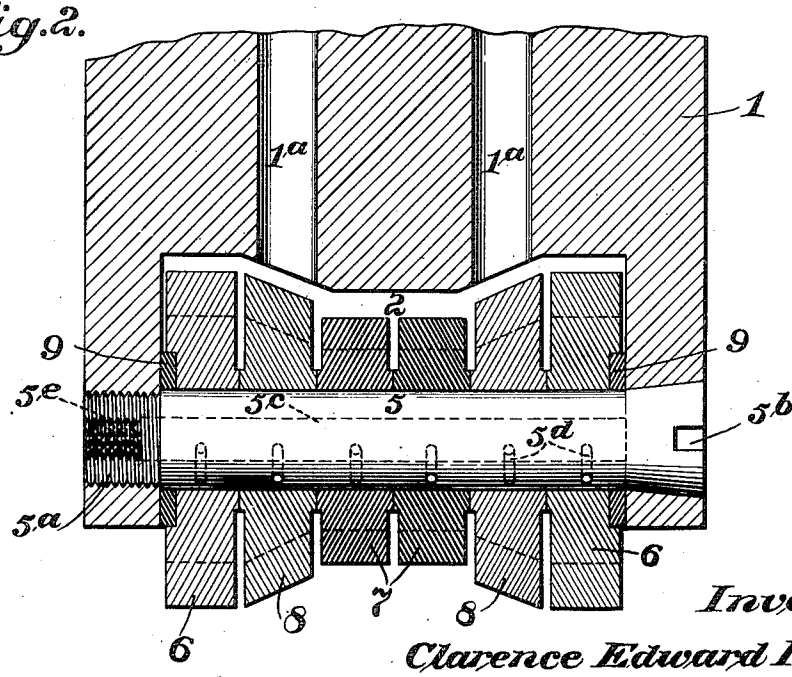


Fig. 2.



Inventor:

Clarence Edward Reed,

by Spear Middleton Donaldson & Spear

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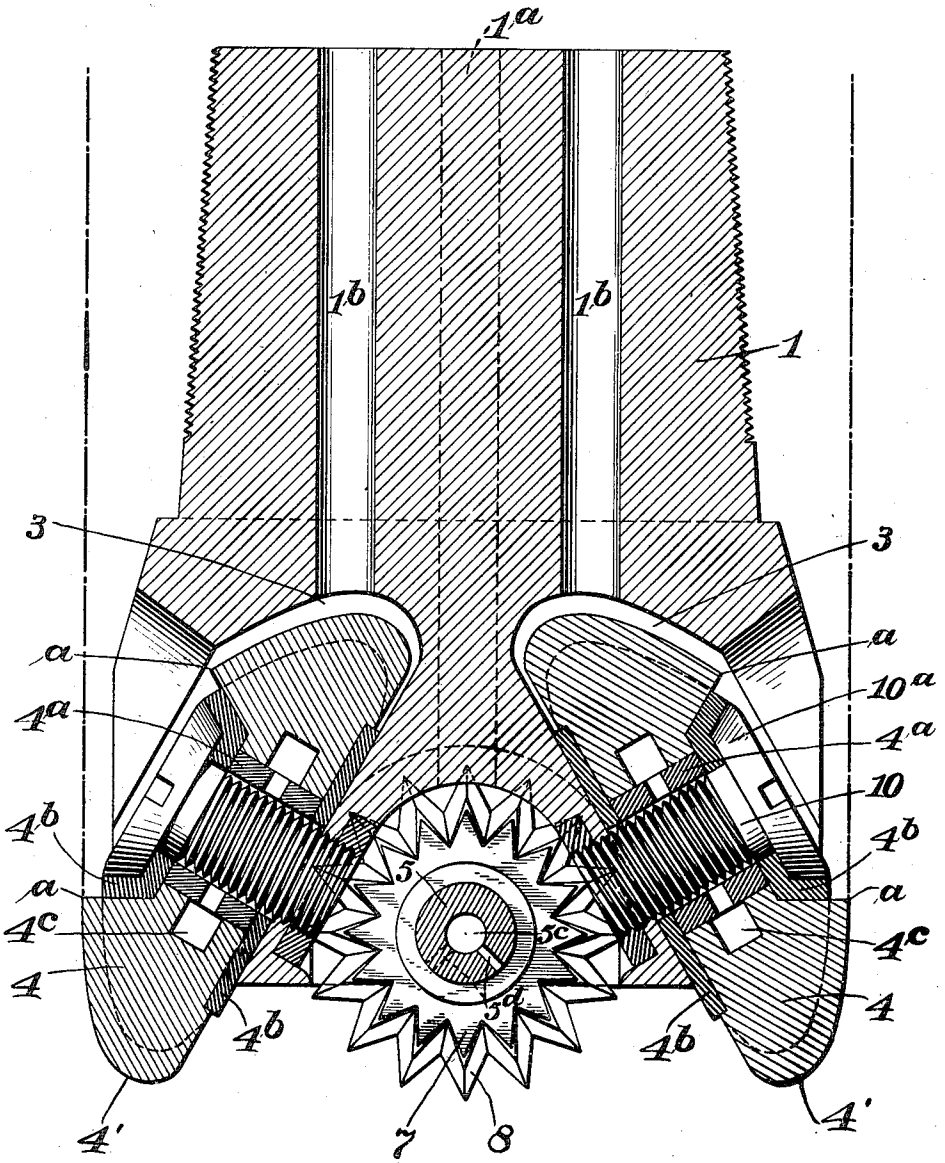
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2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

CLARENCE EDW. REED, OF HOUSTON, TEXAS.

REAMING-DRILL.

1,284,453. Specification of Letters Patent. Patented Nov. 12, 1918.

Application filed July 16, 1917. Serial No. 180,878.

To all whom it may concern:

Be it known that I, CLARENCE E. REED, a citizen of the United States, and resident of Houston, Texas, have invented certain new and useful Improvements in Reaming-Drills, of which the following is a specification.

My present invention relates to improvements in drills designed more especially for efficiency in boring hard rock and aims to provide a construction which shall be durable and efficient and in which the main cutting action will be secured by terminal rotary cutters while the reaming will be secured by independent cutters properly housed and protected by the drill head.

With these and other objects in view the invention includes the novel features of construction and arrangement and combination of parts hereinafter described and particularly defined by the appended claims, an embodiment of the invention being illustrated in the accompanying drawings, in which,

Figure 1 is a side elevation of a drill head.

Fig. 2 is a transverse vertical section.

Fig. 3 is a similar section at right angles to the section shown in Fig. 2.

Referring by reference characters to said drawing the numeral 1 indicates the drill head which is preferably of the shape shown and has its upper portion exteriorly screw-threaded for connection with the lower end of the drill stem, (not shown).

This head is provided with water passages 1^a leading to the recess or cavity 2 containing the main cutters, and with other water passages 1^b leading to the cavities or recesses 3 housing the reaming cutters 4. The main cutters are mounted on a transverse shaft 5, which is preferably inserted through a tapered opening in one wall of the cavity and held in position by having its threaded end 5^a screwed into a correspondingly threaded opening in the other wall, the head of the shaft being provided with a kerf or non-circular recess 5^b for the application of a suitable tool to enable the shaft to be screwed home. The main cutters may conveniently take the form of two outer cylindrical cutters 6, two inner cylindrical cutters 7, and two intermediate beveled or tapered cutters 8, all journaled on the shaft 5 and having teeth or cutting projections of any approved form. Wear plates or washers 9 are preferably interposed between the outer cutters and the side walls of the recess.

The shaft 5 is provided with a hollow interior or bore 5^c forming a lubricant chamber from which lubricant reaches the bearing surfaces of the rollers through ports 5^d, and the lubricant chamber is closed by a screw plug 5^e.

The cavities 3 containing the reaming cutters converge upwardly at such an inclination as to bring the working thrust as nearly as possible perpendicular to the axis of the bearing pins or spindles 10. These bearing pins or shafts are preferably, like shaft 5, provided with tapered heads 10^a at one end and with screw-threaded shanks 10^b at the opposite end engaging correspondingly threaded openings in the inner walls of the cavities 3. The shafts 10 may be secured against working out by locking nuts 11.

The reaming cutters 4 are arranged to trim out the peripheral portion at the bottom of the hole left by the main cutters and also to ream out the sides of the hole to give sufficient clearance, the cutting or trimming and reaming actions merging the one into the other, and to this end these cutters are formed with curved surfaces 4^a, which begin with a gradual curve at the portion *a*, the curve gradually increasing or having a shorter radius as the greatest diameter of the cutter is approached.

The cutters 4 may be provided with teeth of any approved form, and I prefer to mount them on suitable bushings 4^x and between side wear plates or washers 4^b. I also provide them with lubricant chambers 4^c.

What I claim is:

1. A reaming drill comprising a head provided at its lower end with main cutting means and separate and distinct reaming cutters housed in pockets on opposite sides of the main cutting means and having portions projecting therefrom, each of said reaming cutters when viewed in cross section presenting a curved edge merging into a flat face on one side and into a flattened curve on the other side, the tangent of which flattened curve is at an acute angle to said flattened face, said reaming cutters being constructed and adapted to cut and ream the side walls of a hole.

2. A reaming drill comprising a head pro-

vided at its lower end with main cutting means, and having downwardly diverging pockets on each side of said cutting means and open at their lower ends, and reaming cutters journaled in said pockets and projecting therefrom, each of said reaming cutters when viewed in cross section presenting a curved edge merging into a flat face on one side and into a flattened curve on the other side, the tangent of which flattened curve is at an acute angle to said flattened face, said reaming cutters being arranged to bear upon, to roll against, or to ream the hole.

3. A reaming drill comprising a head provided at its lower end with main cutting means, and having downwardly diverging pockets on each side of said cutting means and open at their lower ends, and reaming cutters journaled in said pockets and projecting therefrom, said cutters having teeth on an oval shaped portion with the radii of the curve gradually decreasing toward the center of the drill, the major portion of the teeth reaming the hole formed by the drill.

4. A reaming drill comprising a head provided with a pocket, and a reaming cutter housed in said pocket and projecting therefrom, said reaming cutter, when viewed in cross section, presenting a curved edge merging into a flat face on one side and into a flattened curve on the other side, the tangent of which flattened curve is at an acute angle to said flattened face.

5. A reaming drill comprising a head provided with a downwardly and outwardly inclined pocket, and a transversely toothed reaming cutter housed in said pocket, said reaming cutter, when viewed in cross section, presenting a sharply curved periphery merging into a flattened curve on the outer face.

6. A reaming drill comprising a head provided at its lower end with main cutting means and a separate and distinct reaming cutter housed in a pocket at the side of the main cutting means and having a portion projecting therefrom, said reaming cutter presenting, when viewed in cross section, a sharply curved periphery merging into a flattened curve on the outer face.

7. A reaming drill comprising a head provided at its lower end with main cutting means, and having a downwardly and outwardly inclined pocket at the side of said cutting means open at its lower end, and a reaming cutter journaled in said pocket and projecting therefrom, said cutter having teeth on an oval shaped portion with the radii of the curve gradually decreasing toward the center of the drill, the major portion of the teeth reaming the hole formed by the drill.

In testimony whereof, I affix my signature.

CLARENCE EDW. REED.