

July 28, 1925.

G. A. STAFFORD ET AL

1,547,459

DRILL

Filed Dec. 22, 1923

2 Sheets-Sheet 1

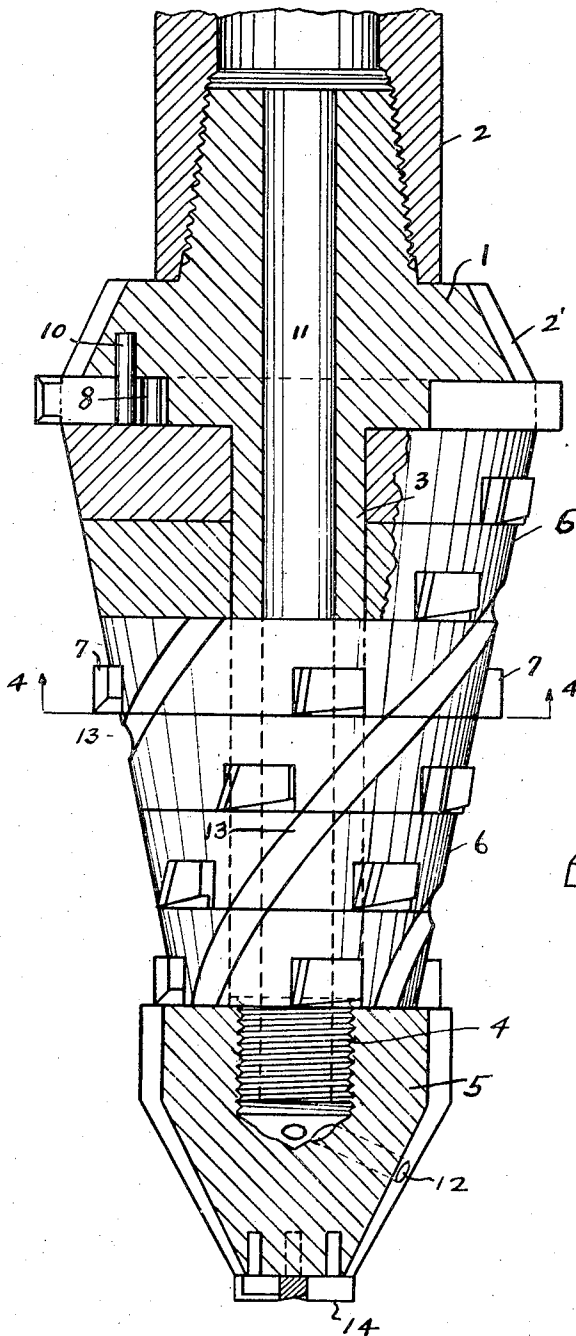


Fig. 1.

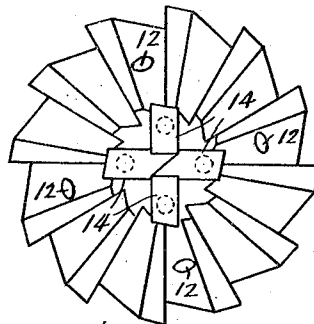


Fig. 2.

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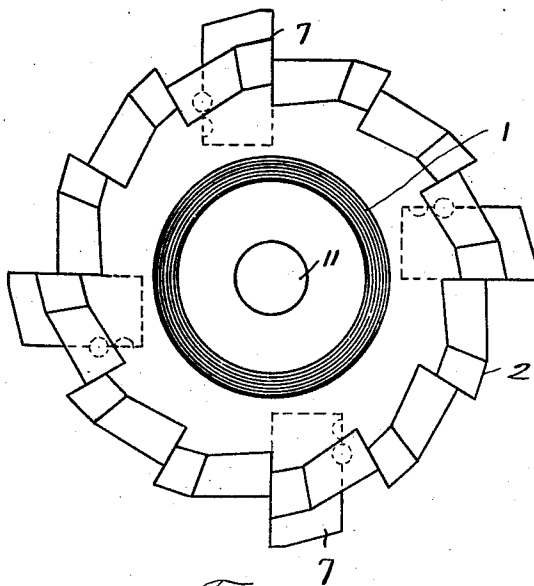


Fig. 3.

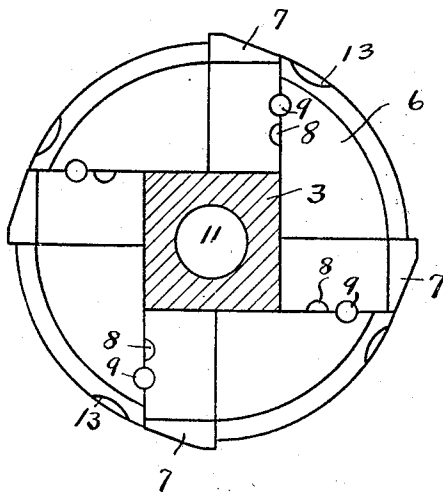


Fig. 4.

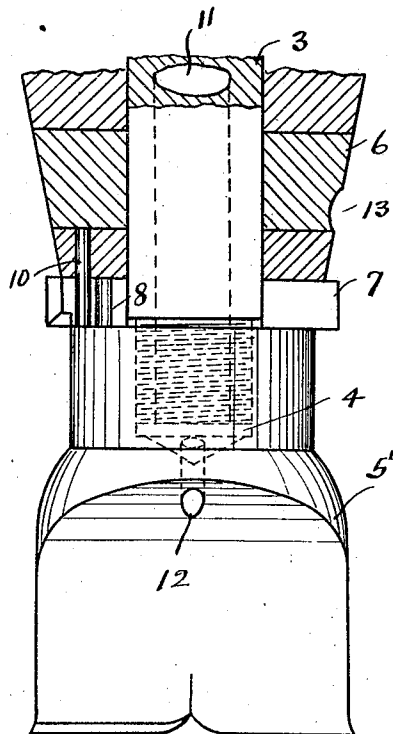


Fig. 5

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UNITED STATES PATENT OFFICE.

GEORGE A. STAFFORD AND ALEXANDER S. HUDSON, OF SOUR LAKE, TEXAS.

DRILL.

Application filed December 22, 1923. Serial No. 682,159.

To all whom it may concern:

Be it known that we, GEORGE A. STAFFORD and ALEXANDER S. HUDSON, citizens of the United States, residing at Sour Lake, in the county of Hardin and State of Texas, have invented certain new and useful Improvements in a Drill, of which the following is a specification.

This invention relates to new and useful improvements in a drill.

One object of the invention is to provide a drill specially designed for use in drilling through rock and shale in the process of drilling wells, but which is also capable of use for general drilling purposes.

Another object of the invention is to provide a drill of the character described which, by the variation in size, of certain parts, may be used for drilling holes of various diameters.

A further feature of the invention is to provide a drill of the character described whose worn parts may be readily replaced and the bit, as a whole thereby renewed.

A still further feature of the invention is to provide a drill of the character described which is of very sturdy construction, which may be produced cheaply and which, when dull, or worn, may be cheaply and easily renewed.

With the above and other objects in view, this invention has particular relation to certain novel features of construction, operation, and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:—

Figure 1 shows a side view of the bit, partly in section.

Figure 2 shows a point view thereof.

Figure 3 shows a plan view.

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

Figure 5 shows a fragmentary side view, partly in section, showing a point of the fish tail type.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 designates the bit shank whose upper end is reduced and outwardly threaded to receive the drill collar 2. Beneath the reduced portion, the shank flares downwardly, as at 2', and is toothed so that if the drill becomes stuck in the bore

by bowlders or the like, falling in upon it, it can cut itself out and thus be withdrawn.

Beneath the flared portion there is an integral central downward extension, or mandrel 3, square in cross section, and whose lower end is round and externally threaded, as at 4, to receive a point, or pilot bit as 5 or 5'. Fitted onto the mandrel and interposed between the pilot bit and the enlarged part of the shank, there is a plurality of relatively thick discs 6 forming the body of the drill. This body, as a whole, converges, or tapers downwardly, as shown. Clamped between the discs, and also between the pilot bit and the enlarged shank, and the respective adjacent discs are the radiating cutters 7, which are fitted into suitable seats provided for them, and into which their inner ends fit.

Each cutter has two or more vertical key ways, as 8, and the wall of the corresponding seat has a similar key way 9, and keys are seated in the keyways 9 and one of the keyways 8 to lock the cutters against detachment, all of which is shown in the drawings. Each key is elongated and one end thereof is fitted into a seat, as 10, provided for it in the adjacent part of the drill, as shown in Figures 1 and 5. The two keyways in the cutters 7, provide means for the adjustment of the cutters out or in, so that as they become worn off they may be adjusted outwardly. The outer ends of these cutters, as well as their lower sides are beveled, so as to present sharp cutting edges to the material to be cut away. There is a water course 11 extending down through the shank and mandrel which separates into a plurality of diverging water courses 12 through the pilot bit and through these water courses water is supplied to the point of the drill. The water, and cuttings carried thereby, return along the spiralled grooves 13, around the drill from its lower to its upper end. The pilot bit 5 is of a general inverted conical contour and its surface is toothed as shown in Figures 1 and 2. To its lower end there are secured the radiating cutters 14. In the form shown in Figure 5, the pilot bit is of the form of the usual fish tail bit.

It is obvious that certain mechanical changes may be made in the construction of this drill without departing from the principle of the invention and we hereby re-

serve the right to make such mechanical changes, as will not depart from the scope of the appended claims.

What we claim is:

5 1. A drill bit comprising a reduced outwardly threaded shank, an annular downwardly flared shoulder adjacent to said shank having peripheral teeth, a mandrel polygonal in cross section below said shoulder, discs secured on said mandrel, adjustable cutters clamped between said discs, means for securing said cutters against detachment, said cutters being arranged spirally around said discs, and a pilot bit secured on the end of said mandrel.

2. A drill bit comprising a shank outwardly threaded, adapted to receive a drill stem collar, a flared portion outwardly toothed, an integral central downwardly extending mandrel whose lower end is externally threaded, a plurality of discs adapted to be inserted over said mandrel whose outer contour converges toward the end of the mandrel in a frusto-conical shape, adjustable cutters carried by said discs, means for securing said cutters in said discs, and a bit secured upon the end of said mandrel.

3. A drill bit including an outwardly threaded shank adapted to receive a drill stem collar, a flared portion beneath said shank provided with peripheral teeth, an in-

tegral downwardly extending mandrel having a threaded lower end, a plurality of discs fitted over said mandrel, said discs having a downwardly converging contour, cutters clamped between said discs, said cutters being radially adjustable, means for securing said cutters in position between the discs, and a pilot bit having threaded connection with the threaded end of said mandrel.

4. A drill bit including a shank an outwardly flared portion beneath said shank provided with peripheral teeth, a central mandrel beneath said flared portion, a plurality of discs adapted to be inserted over said mandrel, said discs forming a downwardly converging frusto-conical shaped body, said body having a spiralled peripheral groove, radially adjustable cutters arranged between the discs, means for securing said cutters in position and the pilot bit secured on the lower end of the mandrel.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGE A. STAFFORD.
ALEXANDER S. HUDSON.

Witnesses:

S. WILLIAMS,
E. E. STRANGE.