April 19, 1927. 1,625,030

E. U. KELLER

DRILL BIT

Filed May 1, 1926

Fig. 1.

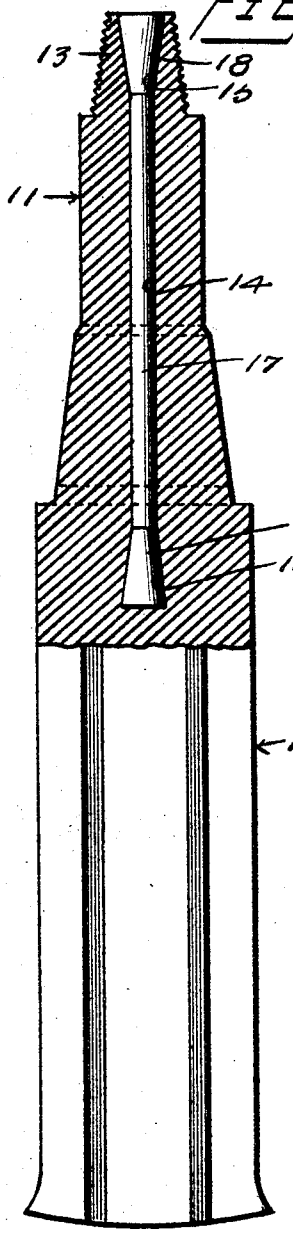


Fig. 2.

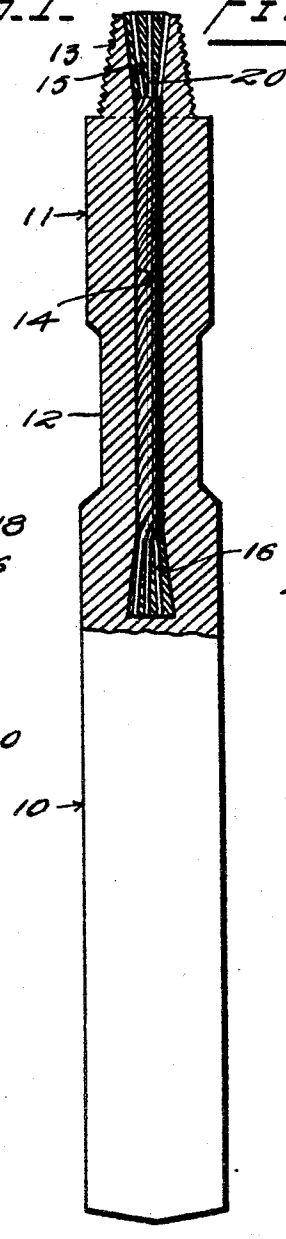
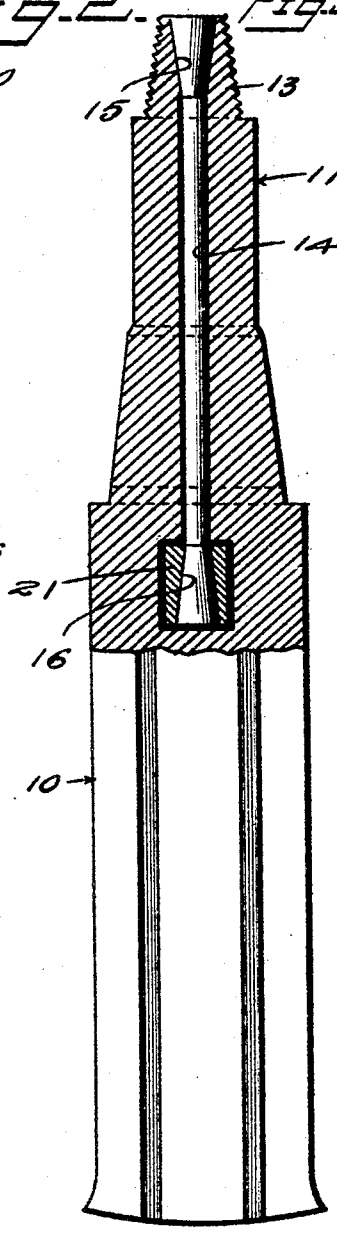


Fig. 3.



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DRILL BIT.

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This invention relates to improvements in drill bits and more particularly to a device of this character having means for preventing separation of sections of the bit in event the bit breaks at the shank thereof.

A further and more specific object of the invention is to provide a device of this character which will permit the broken sections of the bit to swivel to rotate with relation to one another without twisting or otherwise applying heavy strains to the connecting member, thereby preventing shearing of the connecting member by a continued rotation of the bit shank after the breakage actually occurs.

A still further object of the invention is to provide a device of this character which may be readily applied to bits of the usual construction and which will be durable and efficient in service.

These and other objects I attain by the construction shown in the accompanying drawing, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

Figure 1 is a vertical sectional view through a drilling tool constructed in accordance with my invention and employing a relatively soft metal rod as a means for anchoring the sections of the bit in case of breakage;

Figure 2 is a view similar to that shown in Figure 1 but showing cable employed as an anchorage;

Figure 3 is a modified construction wherein one end of the anchor is engaged in a rotatably mounted block.

Referring now more particularly to the drawing, the numeral 10 generally designates a drill bit having a shank 11 provided with the usual wrench receiving portion 12 arranged intermediate its ends and pin 13 at its upper end. In the type of bit illustrated, breakage during the drilling operation is a fairly frequent occurrence, this breakage usually occurring at or between the ends of the wrench receiving socket or at the junction of the pin with the shank of the bit. In accordance with my invention, I form in the shank of the bit a longitudinally extending axial bore 14, the ends of which have tapering enlargements 15 and 16. This bore has a tendency to increase the resistance of the bit to breaking strains as it renders the shank more flexible but it will not entirely prevent the breakage.

In order to insure against separation of the sections if breakage does occur, I dispose within the bore a body of metal softer than the metal of the shank having enlargements at its ends fitting the tapered portions 15 and 16. The body may either consist of a rod 17 which is preheated and forced into the bore and has its ends upset, as at 18, into the enlargements 15 and 16, as illustrated in Figure 1, or of a cable 19, the ends of which are enlarged by the application of babbitt thereto to fit the enlargements of the bore, as indicated at 20. The fitting of these elements in the tapered enlargements will provide at once a retaining element preventing separation of the sections of the bit and a bearing upon which the separated sections of the bit may rotate. The construction shown in Figure 3 may conveniently be employed. In this figure, the bit is shown as provided with a transverse opening within which is rotatably arranged a block 21 in which the tapered enlargement 16 at the lower end of the bore is formed. Since this block may rotate of itself, any tendency of the metal connection lying within the bore to bind in the sockets will be relieved by rotation of the block 21. This block may, of course, be arranged at either end of the bore but is most conveniently disposed at the lower end of the bore, as illustrated. It will be noted that the lower end of the bore projects below the shoulder of the bit so that the shank is fully protected and strengthened.

It is pointed out that drills of this character are subjected to very severe strains. In tightening the drill joints the wrench is applied to the shank at the squares 12 against which a jack is usually applied to insure proper "setting up" of the joint. The strain thus placed against the joint is so severe that occasionally a drill joint snaps thereunder and it will of course, be understood that upon other occasions, the strain applied, while insufficient to cause actual breakage, will so severely damage the shank that it is very likely to break. Furthermore, the jolts and jars to which such bits are subjected from constant pounding of the bit upon the hard rock has a tendency to cause cystallization which, attacking the weakest point of the drill, the shank, weakens the same so that it is unable to stand the strain. This latter cause of breakage is practically impossible to detect and the con-

dition of the drill is unknown until the breakage occurs which is usually while the bit is within the well. The core which I employ, being of tougher metal than that employed in the construction of the drill, and not being subjected to the strains to which the bit is subjected does not break and accordingly insures against separation of the sections and leaving of portions of the drill within the hole.

Since the construction hereinbefore set forth is capable of a certain range of change and modification without materially departing from the spirit of the invention, I do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. In combination with a bit comprising a body having at its upper end a shank, the upper end of the shank being provided with the usual pin, of a bore extending from the top of the pin into the upper end of the body, said bore being axial to the shank and being enlarged at its opposite ends and a metallic filling for the bore consisting of a metal softer than the metal of the drill bit and having its ends enlarged to fit the enlarged portions of the bore, the enlarged portion at one end of the bore being formed in a block rotatably mounted in the drill structure.

2. In combination with a bit comprising a body having at its upper end a shank, the upper end of the shank being provided with the usual pin, of a bore extending from the top of the pin into the upper end of the body, said bore being axial to the shank and being enlarged at its opposite ends and a metallic filling for the bore consisting of a metal softer than the metal of the drill bit and having its ends enlarged to fit the enlarged portions of the bore formed by upsetting the ends of the body, the enlarged portion at one end of the bore being formed in a block rotatably mounted in the drill structure.

In testimony whereof I hereunto affix my signature.

ERNEST U. KELLER.