Oct. 29, 1929. J. S. McNEILL 1,733,311

DRILL BIT

Filed Oct. 24, 1928

Fig. 1.

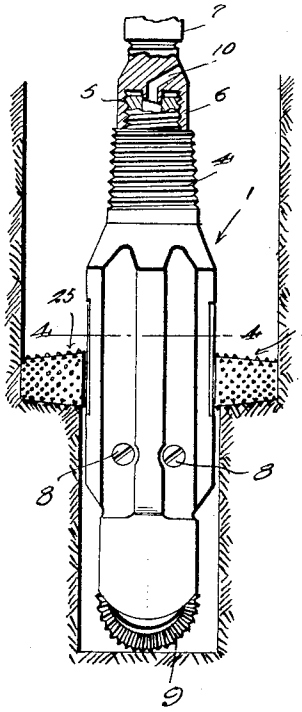


Fig. 2.

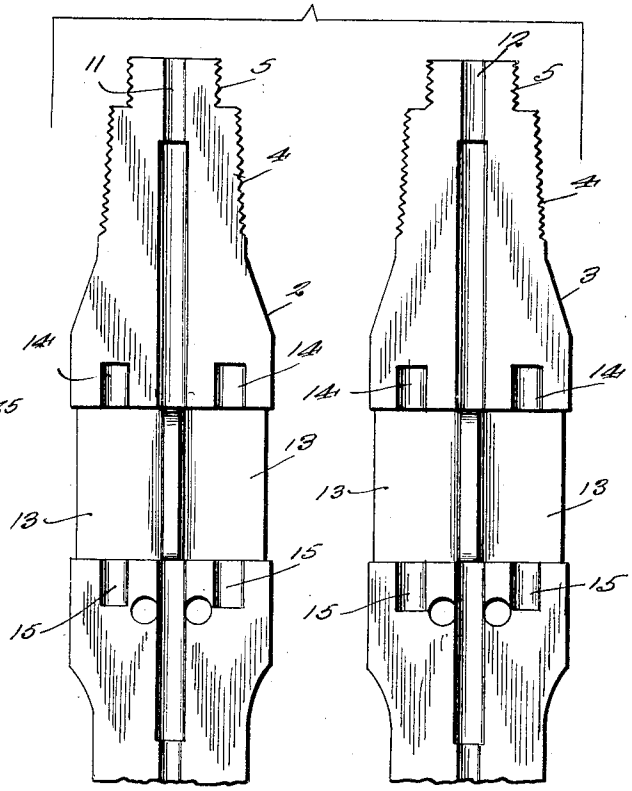


Fig. 3.

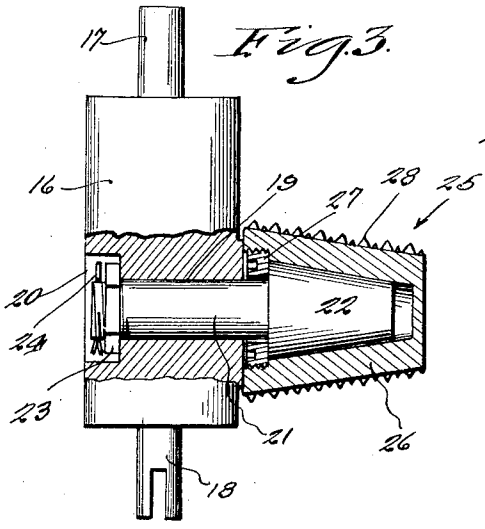
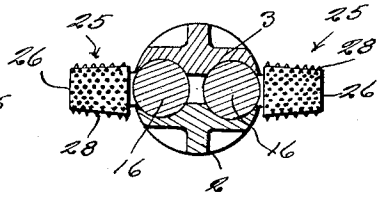


Fig. 4.



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Patented Oct. 29, 1929 1,733,311

UNITED STATES PATENT OFFICE

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DRILL BIT

Application filed October 24, 1928. Serial No. 314,694.

The present invention relates to improvements in earth boring implements and has reference more particularly to a drill bit wherein horizontally disposed rotatable cutters extend from the body of the bit at a point above the vertical cutting element for the purpose of enlarging the hole that is being drilled.

One of the important objects of the present invention is to provide a drill bit of the above mentioned construction that will at all times be positive and efficient in its operation, the parts being further so arranged as to permit the same to be readily and easily assembled or disassembled whenever necessary.

Still a further object is to provide a bit of the above mentioned character, which is simple in construction, inexpensive, strong and durable, and further well adapted to the purpose for which it is designed.

Other objects of the invention will become apparent as the nature of the invention proceeds and when taken in connection with the accompanying drawings, forming a part of this application.

In the accompanying drawing, wherein like reference characters designate like parts throughout the several views:

Figure 1 is an elevational view of the drill bit embodying my invention, showing the same in the act of drilling a well.

Figure 2 is a view showing the complementary sections of the body of the bit disassembled and looking at the inner faces thereof.

Figure 3 is an enlarged detail of one of the units forming a salient part of the present invention that is employed for the purpose of enlarging the well that is being drilled, and

Figure 4 is a transverse section, taken approximately on the line 4—4 of Figure 1.

In the drawing, wherein for the purpose of illustration is shown the preferred embodiment of my invention, the numeral 1 designates generally my improved drill bit, the same comprising a sectional body that includes the complementary identical sections 2 and 3, respectively. Each of the semi-cylindrical sections is formed at its upper end with the threaded portion 4 and a reduced threaded neck 5 extends upwardly from the upper end of each section. The complementary neck portions of the sections, when the latter are fitted together are secured within a suitable socket 6 to provide a means for connecting the upper end of the complementary sections together, and the socket member is formed on the lower end of a suspension member 7. The lower end portions of the complementary sections are detachably secured together through the medium of screws 8 that extend through openings formed in one of the sections with the threaded ends of the screws being threaded in the threaded openings formed in the other sections.

A cutting element 9 of any conventional construction is disposed vertically in the lower end portion of the sectional body with the lower portion of the cover projecting beyond the lower end of the body of the bit for forming a hole of a predetermined size, as is well known in the art. The sectional body is formed with a fluid conducting passage that has communication with a similar passage 10 formed in the socket member 6 for a purpose also well known in the art, the complementary fluid passage is formed in the sections of the body being shown at 11 and 12 respectively, with reference more particularly to Figure 2.

The opposed faces of the complementary sections of the body are channeled as at 13, and the upper and lower ends of the channeled out portions are formed with sockets 14 and 15 respectively as also illustrated in Figure 2, for a purpose to be presently described. The outer sides of the channeled out portions 13 terminate at the outer side edges of the complementary sections.

A cylindrical block 16 is removably fitted within each pair of opposed cut-out portions 13 and trunnions 17 and 18 project from the upper and lower ends of each of the cylindrical blocks as indicated very clearly in Figure 3. The trunnions 17 are received in the respective sockets 14, whereas the lower trunnions are receivable in the lower socket 15, and when the sections of the body of the bit are clamped together, the cylindrical blocks and the trunnions associated therewith

will be positively held in position between the sections of the body against casual displacement therefrom.

The manner in which the cylindrical blocks are positioned in the sectional body of the bit is clearly disclosed in Figure 4. Each cylindrical block is formed adjacent its lower end with a transverse bore 19, the inner end portion of which is enlarged as at 20, and a spindle 21 extends through the bore 19. A conical shaped head 22 is formed on the outer end of the spindle while the inner extremity thereof is threaded for receiving the nut 23 that will be confined within the enlarged portion 12 of the bore 19, and a cotter pin 24 extends through a transverse opening formed in the inner threaded end of the spindle to retain the nut 23 on the spindle against displacement therefrom.

A cutter unit is rotatably and detachably secured on the conical shaped head 22 and this unit includes a substantially conical shaped socket member 26, the larger inner end thereof being opened and this socket member is of a length greater than the length of the conical head 22, so that when the socket member is positioned on the conical head, the internally threaded inner end portion of the socket member 26 will project beyond the shoulder formed at the juncture of the head 22 with the spindle 21 and an externally threaded locking ring 27 encircles the spindle 21 and cooperates with the internally threaded portion of the socket member 26, to secure the same against displacement from the conical head 22.

Formed on the outer face of the rotatable socket members 26 are the cutting teeth 28, and these teeth may be arranged in any predetermined manner.

It is of course to be understood that the cutter unit 25 is positioned on the conical head 22 and the spindle 21, prior to the positioning of the spindle within the bore 19 of the cylindrical block 16, and the locking ring 27 will engage with the shoulder formed at the juncture of the conical head 22 with the spindle to prevent outward sliding movement of the socket member 26 with respect to the tapered head 22, in a manner readily obvious from the construction shown in Figure 3.

The cutter units 25 are disposed on opposite sides of the sectional body and are adapted for rotation on a horizontal axis at right angles to the axis of rotation of the drill bit, the threaded portion 4 of the body affording a means for connecting the bit to the lower end of a driven shank (not shown).

In operation, during the forming of a hole in the ground by the bit cutter 9, the horizontally disposed cutter units 25 will gradually increase the diameter of the hole. The simplicity of my improved bit construction enables the parts to be readily and easily assembled or disassembled, and furthermore, the bit will at all times be efficient and reliable in its operation.

While I have shown the preferred embodiment of my invention, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to, without departing from the spirit of the invention or the scope of the appended claims.

Having thus described my invention, what is claimed as new is:

1. In a drill bit, a sectional body, a cutter carried by the lower end thereof, a block secured between the sections of the body and formed with a bore, a spindle extending through the bore, the outer end of the spindle projecting beyond the side of the body for disposition at right angles thereto, and a cutter unit rotatably mounted on the outer end of the spindle.

2. In a drill bit, a sectional body, a cutter carried by the lower end thereof, a block secured between the sections of the body and formed with a bore, a spindle extending through the bore, the outer end of the spindle projecting beyond the side of the body for disposition at right angles thereto, and a tapered head formed on the outer projecting end of the spindle, a similar tapered socket mounted on said head for rotation, the inner end of the socket being open, means for securing the socket member against displacement from the tapered head, and cutting teeth formed on the outer face of the socket member.

3. In a drill bit of the class described, a sectional body, the inner opposed faces of said sections being formed with cooperating cut out portions, a block mounted within said cut-out portions, a cutter carried by the lower end thereof, said block being formed with a horizontally disposed bore, a spindle extending through said bore, the outer end of the spindle projecting beyond the side of the sectional body, and a cutter unit rotatably mounted on the outer end of the spindle.

In testimony whereof I affix my signature.

JAMES S. McNEILL.