

Aug. 30, 1927.

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DRILLING TOOL

Filed Dec. 15, 1922

Fig. 1.

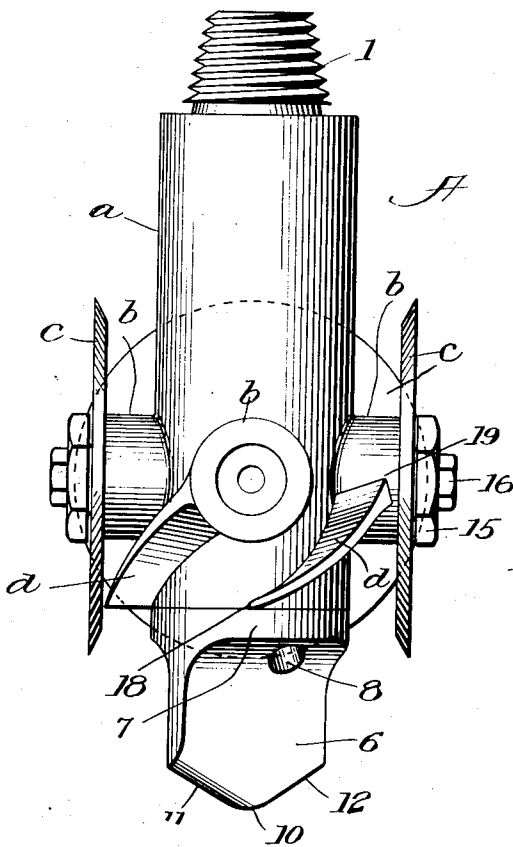
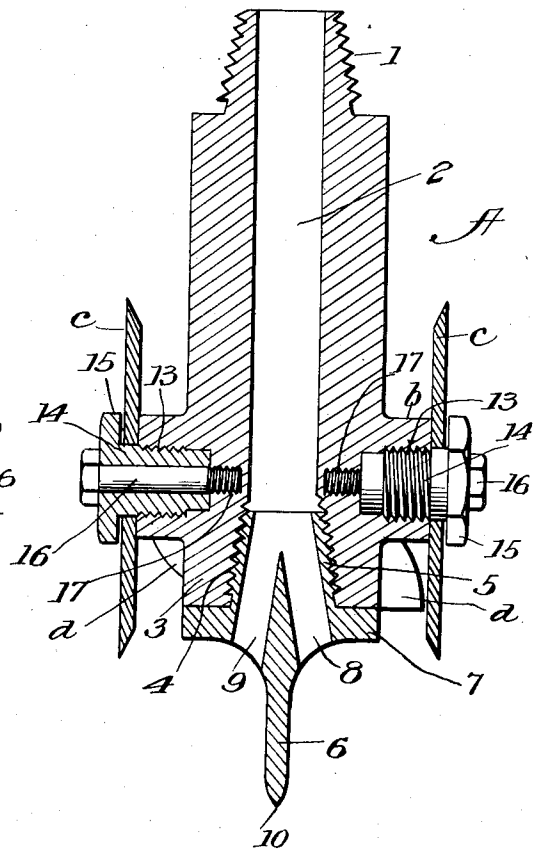


Fig. 2.



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DRILLING TOOL.

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This invention relates to drilling tools, and particularly to a drilling tool adapted to produce well holes. The device is applicable to producing well holes in any direction, whether vertical, horizontal or otherwise, and includes several novel features of construction, combining as it does a drill provided with discs and with a diamond drill bit. The various elements of the bit are so combined as to force dirt or other substance through which the bit is passing toward and away from the bit, and in this connection the bit is adaptable for producing bores in earth formation regardless of the nature of said formation, whether sand, rock or dirt, forcing the dirt above the bit and holding it above the bit. If the bit is used for rotary drilling apparatus in which mud is circulated through the drill pipe and the bit, the formation and interrelation of the parts tends to force the circulation of the mud up the well hole to the sump.

The invention has for an object the novel and useful provision, formation, construction and inter-relation of the various parts, members and features of the improved drilling tool, as shown in certain of its embodiments in the accompanying drawing, described in the following statement, and finally pointed out in claims.

In the drawing:

Figure 1 is a perspective view of the improved drilling tool; and,

Figure 2 is a vertical cross sectional view of the same.

Corresponding parts in both figures are designated by the same reference characters.

Referring with particularity to the drawing, the improved drilling tool is designated as an entirety by A, of which *a* is a body member provided with the usual taper joint 1 having screw threads for engagement with a hollow drill pipe, in the embodiment shown, it being understood that this particular drill does not of necessity have to be connected with rotary drilling apparatus for forcing water through the drill. The body *a* is provided with a longitudinal bore 2, a zone of said bore at the opposite end 3 of said body being tapered and screw-threaded as shown at 4 for reception of a threaded shank 5 of a diamond bit 6, there being a flange 7 between the threaded shank 5 and the cutting portion 6 of the drill, which flange 7 is adapted to contact with the base of the body *a*. The shank 5, as well as the flange 7 is provided with circulation openings 8 and 9, opening on opposite sides of the drilling element 6, as illustrated in the figures. The diamond bit 6 is conventional in form, terminating in a point 10, with shaped edges 11 and 12. As the drill is adapted to turn to the right, the threads on the shank 5 are likewise right-handed, so that rotation will tend to tighten the shank within the body *a*. A series of radial projections *b* are integrally formed or otherwise held to the body *a* and said projections are adapted to carry discs *c*. The discs *c* are arranged above the diamond bit 6, and the radial projections *b* are annular in formation and provided with screw threads on their interior surfaces, as shown at 13. Pins 14 are adapted to pass through a central opening in the discs *c* and have screw-threaded engagement with the screw threads 13 of the projections *b*, said pins being provided with head portions 15 for retaining the discs in position. The pins 14 are annular in formation and screw members 16 are adapted to pass through the opening in said pins and having screw-threaded engagement with screw-threaded bores 17 in the body *a*. The screw threads 13 may be right-handed in which case the screw threads in the bores 17 would be left-handed, the result being that there is a locked relation between the screw threads 16 and the pin 14 and that the disc *c* is prevented from ever being disengaged from the pin 14, as said pin in attempting to rotate to the left would be prevented from so doing by the screw 16, the head of the screw 16 contacting with the head 15 of the pin. Thus when the device is in operation the diamond bit 6 will contact with the formation first, and tend to cut away the formation, whether it be rock, dirt or other substance, whereupon the disc members *c* will contact and further enlarge the size of the well hole, the entire construction and combination of the rotary discs and the diamond bit tending for rapid work through any formation. In addition I provide a series of vanes or curved blades *d* carried by the body *a* and arcuately formed so that rotation of the drill A will cause the vanes to scoop any formation cut by said drill and force it upwardly beyond the drill. In this connection it will be noted that the ends 18 of the vanes *d* terminate in a vertical plane

immediately below the vertical axis of each of the discs *c*, and then are curved upwardly from said point to a point approximately in alignment with the horizontal axis of said discs *c*, as shown at 19. Four arms *b* are provided in the showing of the drill A and they are arranged about the body *a*, approximately 90 degrees apart.

The operation of the device is as follows:
10 Assuming that the device A is used in rotary drilling apparatus, it will be noted that this drill A performs three functions. It provides first, a circulation pump, second, a diamond bit, and third, a disc bit. It is thus
15 possible with a drill of this character to bore a hole in a perfectly straight direction without in any manner tending to twist the hollow drill pipe. This is true for the reason that the point 10 of the diamond bit contacting with the formation through which the
20 bit is passing will tend to center the drill and the cutting edges 11 and 12 of the bit 6 will chip away the formation, and the rotary movement given the drill will bring the
25 vanes or blades to come into play, and scoop the chipped formation and force it upwardly and beyond the cutting disc *c*. If water is being forced downwardly in the hollow drill pipe and through the drill, the water will
30 keep the diamond bit cool and the mud which is formed by the water and the chipped formation will be forced upwardly by the vanes *d*, back past the drill, the hollow drill pipe and hence to the sump. In
35 other words, the diamond bit will contact with the formation first and the discs *c* will contact secondly, enlarging the hole. It is possible by varying the size of the discs *c* or the size of the diamond bit 6, to drill any
40 given diameter of hole. Furthermore, the feature of providing the lock for holding the discs in place upon the arms is novel, in that it makes it possible to hold the discs in position without fear of loss thereof in the
45 well hole.

I do not wish to confine this invention to rotary drilling apparatus, as it may be used for other purposes, such as the drilling of post holes, telephone holes, horizontal bores, and is useful for producing well holes for
50 water wells, as well as for oil well use.

It is obvious that various changes and

modifications and variations may be made in practicing the invention, in departure from the particular disclosure as given, without departing from the true scope of the invention. 55

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. In a rotary drill, an annular body formed at one end with a screw-threaded
60 shank, the other end of said body being adapted to receive a diamond point bit, and said diamond point bit; said diamond point bit being formed with circulation openings permitting communication with the opening
65 in said body and exterior of the diamond point bit, there being a disc bit spaced from the curved periphery of the annular body above the diamond point bit with the axis of the disc bit intersecting at a substantially right
70 angle the axis of the body, and a spiral vane associated with the body and confined in the space included between said disc bit and the periphery of the body.

2. In a rotary drill, an annular body, a
75 diamond point bit joined to the body at an end thereof, said bit being formed with circulation openings permitting communication with the opening in said body and exterior the bit, there being a disc bit spaced from
80 the curved periphery of the annular body above the diamond point bit, and a spiral vane associated with the body and confined in a space included between said disc bit and the periphery of the body. 85

3. In a rotary drill, the combination of a bit member having inclined cutting edges meeting at a common point, thereby centering the drill when the drill is in operation, an annular body joined to the bit, said bit
90 being formed with circulation openings permitting communication with the opening in said body and exterior the bit, there being a disc bit spaced from the curved periphery of the annular body above the first named bit
95 with the axis of the disc bit intersecting at a substantially right angle the axis of the body, and a spiral vane associated with the body and confined in the space included between said disc bit and the periphery of the
100 body.

In testimony whereof, I have signed my name to this specification.

STEVE BULLUM.