Sept. 13, 1927. 1,642,572

W. L. ACKER

CORE BIT AND PLUG FOR DRILLING

Filed July 28, 1927

Fig. 1.

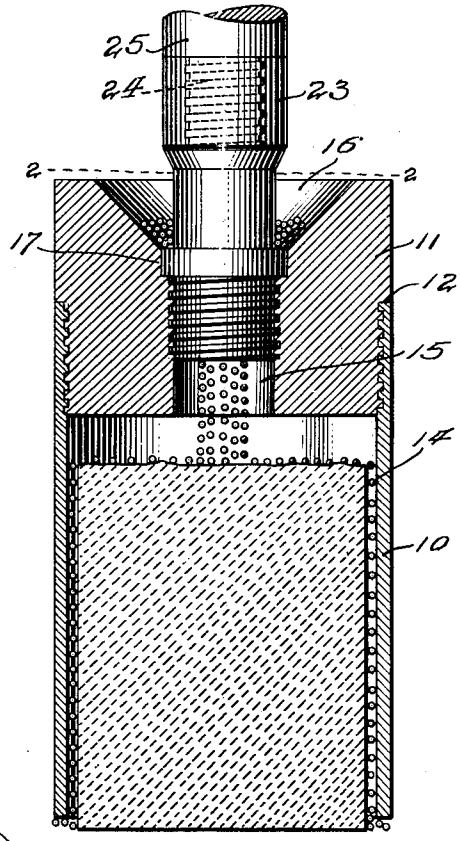


Fig. 2.

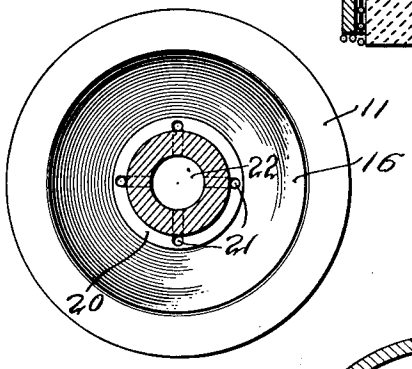


Fig. 3.

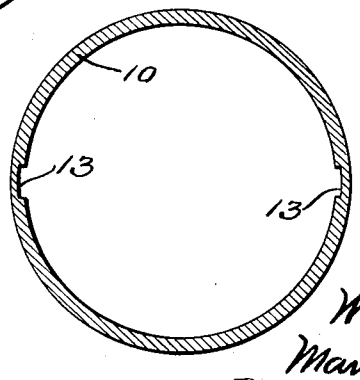
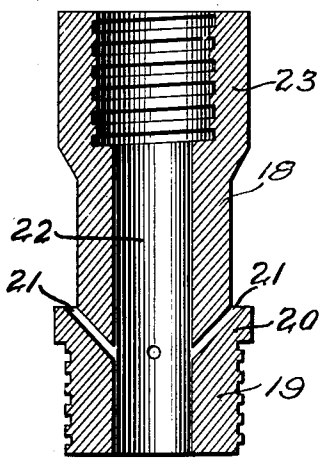


Fig. 4.



Inventor
William L. Acker,
By Mawhinney & Mawhinney
Attys.

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WILLIAM L. ACKER, OF SCRANTON, PENNSYLVANIA.

CORE BIT AND PLUG FOR DRILLING.

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The present invention relates to drills, and more particularly to that type utilized for cutting out cores in rock, concrete and the like by the use of steel shot.

An object of the present invention is to provide a drill of this character, wherein a single shell or wall barrel may be used, and wherein the shot may be fed through a head of novel construction together with the required amount of water for feeding the shot to the inner side of the core barrel and retain the shot in the desired position therein.

Another object of the invention is to provide an improved head or plug, which forms a closure for the top of the barrel and which carries a detachable connection for coupling to a drill rod or other part of a drilling machine used in rotating the head and the barrel at a relatively high rate of speed.

Another object of the invention is to obtain the advantages of insuring the proper feeding of the shot down through the head into the barrel, and which admits of the introduction of the shot and the water from about the exterior to the head and the drill rod connection, and which at the same time maintains the shot from being dislodged incident to the rapid rotation of the head.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a vertical section taken centrally through a core barrel and head, showing approximately the location of shot therein and showing in side elevation a connection for use with the head.

Figure 2 is a transverse section taken on the line 2—2 of Figure 1.

Figure 3 is a transverse section taken through the lower part of the core barrel, showing the longitudinal slots in the inner wall of the barrel, and

Figure 4 is an enlarged longitudinal section taken through the connection or nipple used for mounting the barrel head upon the drill rod or the like.

Referring to the drawing, 10 designates a core barrel which is of single thickness and of suitable length, and which is internally threaded at its upper end for the reception of a detachable head 11, which is threaded externally at its lower end and provided with a stop shoulder 12 against which the upper edge of the barrel 10 is adapted to jam for securely mounting the head 11 in the upper end of the barrel.

As shown particularly in Figure 3, the barrel 10 is provided in its inner wall and preferably at opposite sides, with longitudinally extending grooves or channels 13 of desired width and of substantial depth to receive shot 14 therein, the shot 14 being freely movable downwardly through the channels 13 to the lower edge of the barrel 10. The lower edge of the barrel 10 may be of any suitable configuration best adapted for supporting the shot against the concrete, rock or other substance which is to be cut, the shape or configuration of the lower edge of the barrel depending upon the nature of the material in which the drill is worked.

The head 11 comprises a cylindrical plug of substantially the diameter of the exterior wall of the barrel 10, and which extends a short way down into the barrel and extends a considerable distance above the upper edge of the barrel. The head 11 is provided with an axial opening 15 of relatively large diameter and which opens upwardly into a flaring chamber or hopper 16 into which shot or other suitable cutting material is adapted to be poured.

The hopper 16 opens upwardly and freely through the top of the head 11. The bottom of the hopper 16, which is of substantially inverted cone shape, is provided with a counter-sunk annular groove 17 and the groove 17 opens into the upper part of the axial opening or passage 15, and the latter is internally threaded from the base of the groove 17 downwardly for a substantial distance. For the purpose of supporting the head 11 and barrel 10 upon a drilling rod or other suitable device used for rotating the head and the barrel, a connection is used, such as shown in Figures 1, 2 and 4. This connection comprises a hollow stem 18 slightly enlarged at its lower end and externally threaded to form an attaching shank section 19 adapted to be secured into the upper end of the opening 15.

The shank 19 has an outstanding annular flange or collar 20 at its upper end adapted to seat in the groove 17 for jamming the shank in the head 11 and thus firmly connect-

ing the head to the shank. The collar or flange 20 is provided with a plurality of openings in its upper face which lead into radially disposed channels 21 which are inclined downwardly and opened into the hollow axial opening 22 within the stem 18. The shot from the hopper 16 is adapted to roll down through the passages 21 into the opening 22 and downwardly through the connection into the opening 15 of the head and then to the interior of the barrel 10. Four passages 21 are shown in the present instance and it is understood that the number may be increased or decreased as is found desirable.

The upper end of the stem 18 is again enlarged to provide a socket 23 which is internally threaded and adapted to receive the threaded stem portion 24 of a drilling rod 25 or the like which is connected to the drilling machine and adapted to be rotated and adjusted for turning the bit and for raising and lowering the same.

In operation, the bit is rotated at high speed and shot and water are fed into the hopper 16 from any side of the bit found convenient and the shot by gravity moves downwardly and is permitted to pass in its downward movement through the channels or passages 21 to the interior of the connection. As the shot passes downwardly through the connection and head 11 into the barrel 10, the centrifugal action incident to the high speed of the head and barrel and connection cause the shot to move downwardly against the inner wall of the barrel 10 and to seek the longitudinal channels 13 wherein the shot is entrapped and confined, and permitted to work downwardly. The shot is thus brought into abrasive contact with the rock, concrete, shale or the like and cuts an annular groove or opening downwardly within which the barrel 10 may be fed until the desired depth is obtained. The shot thus cuts out a core from the material which may be removed for the purpose of testing or the like.

The improved connection admits of the use of a head 11 with a relatively large hopper or receptacle 16 in its top and also provides ample space or room at the top of the head for the introduction of the shot, and water and at the same time affords a reliable connection between the parts. The provision of this connection between the head and drilling rod also provides a means for admitting of the quick and easy attachment and removal of the drill with respect to the drilling rod.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:—

1. In a drill bit, the combination of a single wall cylinder provided with opposed longitudinal channels in its inner wall, a head mounted on the upper end of the barrel and having an axial opening terminating in an upwardly flaring hopper opening through the top of the head, and a connection detachably mounted in the upper end of the head and adapted for mounting upon a drilling rod, said connection having an axial opening therein communicating with the axial opening of the head and also provided with downwardly inclined radial passages leading from the bottom of said hopper to the axial opening in the connection.

2. In a drill bit, a hollow barrel having longitudinal channels in its inner wall, a head mounted on the upper end of the barrel having an axial opening leading at its lower end to the interior of the barrel and terminating at its upper end in an upwardly flaring concentric hopper which opens through the top of the head, and a connection carried by the head and secured at its lower end in the axial opening of the head and having inwardly and downwardly inclined passages leading from the bottom of said hopper to the interior of the connection, said connection having means of attachment at its upper end for engagement with a drilling rod.

3. A head for use with core barrels comprising a body portion having an axial opening therethrough, the upper end of said opening flaring outwardly through the upper face of the head to provide a hopper for the reception of shot for passage through the head, and a connection detachably mounted at its lower end in the axial opening of the head and provided with passages therethrough leading to the interior of the connection from said hopper to convey shot from the hopper to the interior of the connection, said connection having means at its upper end for attachment to a drilling rod.

4. In a drill bit, the combination of a single wall core barrel having longitudinal slots in its inner side, a head threaded into the upper end of said barrel and having an axial opening therethrough leading from the interior of the barrel upwardly, said axial opening of the head flaring upwardly through the upper face of the head to provide a hopper for the reception of shot, and a connection having an enlarged shank portion detachably threaded in the axial opening of the head and provided with radial downwardly and inwardly inclined passages leading from the bottom of said hopper for conveying shot therefrom to the interior of the connection and to the head, the intermediate portion of said connection being reduced in diameter to accommodate a rela-

tively large quantity of shot in the hopper, said connection having an enlarged socketed upper end for detachable engagement with the drilling rod.

5. A shot bit comprising a core barrel having a single wall with longitudinal channels in its inner face, a head secured into the upper end of the barrel and having an axial opening leading from the interior of the barrel upwardly, said head having a flaring opening in its upper end leading to said axial opening for receiving steel shot for passage downward through the opening in the head, and a connection threaded at its lower end into the axial opening of the head and having passages leading inwardly from the exterior of the connection to the interior thereof for conveying shot from said enlarged opening through the connection to the interior thereof, said connection having attaching means at its upper end for receiving a drilling rod.

In testimony whereof I affix my signature.

WILLIAM L. ACKER.