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DIAMOND DRILL BIT

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Fig. 1.

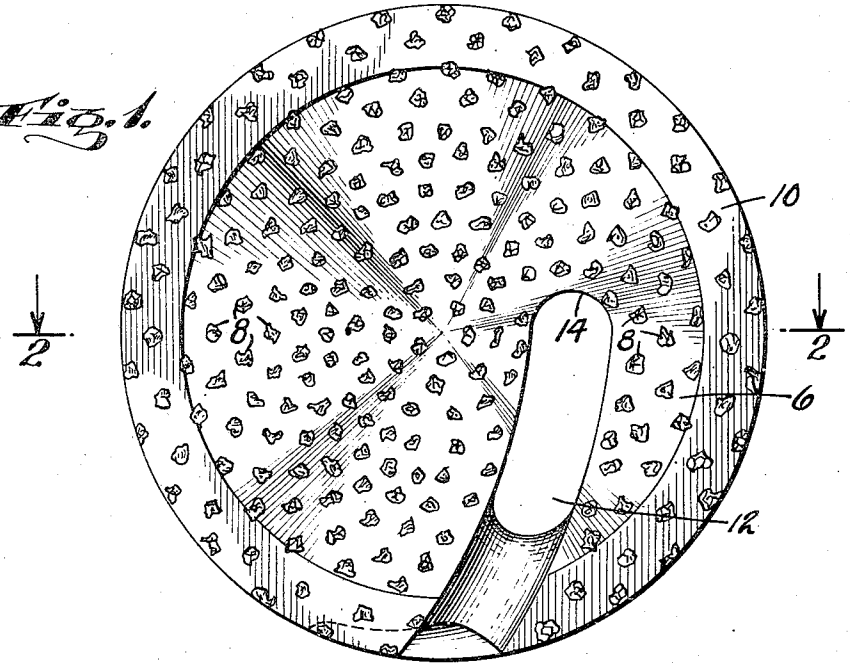
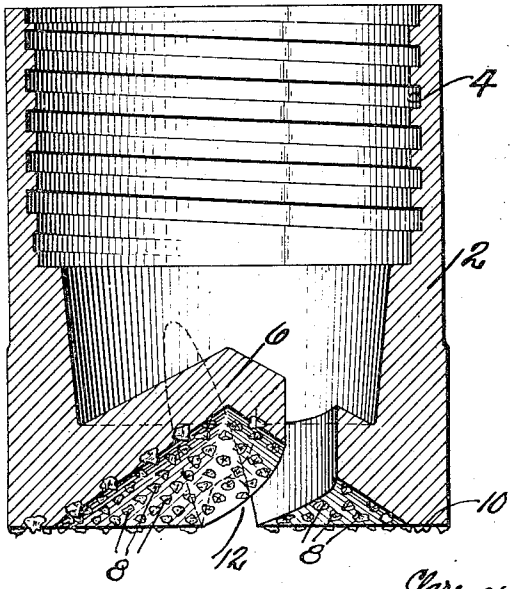


Fig. 2.



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DIAMOND DRILL BIT

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1 Claim. (Cl. 255—1)

This invention relates to improvements in diamond tools and is specifically directed to the provision of a diamond drill bit particularly adapted for drilling holes which do not require the taking of core.

It is one of the objects of the present invention to provide a diamond drill bit which is so constructed that it will completely bore or drill a hole in hard rock and not merely form an annular cut with a central core which must be cut away.

More specifically the present invention provides a diamond drill bit in which the working face of the bit is concaved, the diamonds set in this concave face pointing toward the axis of rotation of the bit. All of the diamonds are offset from the center line of the bit so as to "sweep" or have movement about the axis of rotation of the bit as the bit is rotated, to provide the desired cutting operation. By providing this concaved face it will be apparent that the edges of the bit are in advance and while there are no diamonds at the exact bit center, nevertheless they are in such close proximity to the axis of rotation that we are assured that all of the rock formation from the edge of the bit to the axis of rotation will be cut and broken away, thereby avoiding the necessity of taking a core.

Still further objects of the invention will be manifest from the following description and the accompanying drawing, in which drawing:

Fig. 1 is a plan view of the cutting face of our improved drill bit; and

Fig. 2 is a vertical sectional view of the bit.

Referring to the drawing in detail: The bit comprises a hollow body portion 2 of any suitable metal screw threaded either internally or externally at its inner end as shown at 4 for attachment of the drill tubes or shanks and to permit of the admission of wash water for sludge removal as will be referred to presently.

As will be seen from Fig. 2, the end wall 6 of the bit is concave and solid at the center, and diamonds 8 are mounted therein.

As will be seen from the drawing, the diamonds point toward the axis of rotation of the bit and inasmuch as there are no diamonds at the axis of rotation, every stone has a "sweep" or movement about this axis. As a consequence of this construction every stone will perform the desired cutting and drilling operation, and while there is no diamond at the axis of rotation, some of the diamonds are in such close proximity thereto that any relatively small unsupported portion of the rock which may be left readily breaks away and is ground up by the diamonds in the drilling operation so that the necessity of taking a core is avoided. It will be appreciated, also, that this construction provides that the edges of the bit are in advance of the center.

The perimeter or annular rim 10 of the bit is flat with diamonds mounted therein. This construction promotes the drilling of a straight hole in that there is no tendency for the drill to veer to one side.

It will be appreciated that by the foregoing construction all of the material ahead of the bit will be cut up or ground up and that the necessity of taking a core is completely avoided.

The rock formation as it is ground and cut up in the operation of our bit is removed by a flow of wash water. For this purpose we provide the bit with a cutout or waterway 12. This waterway is located close enough to the center of rotation of the bit to insure a flow of water to that point and still is far enough removed from the center of rotation to permit of diamonds being located between the waterway and this point so as to provide the cutting area above alluded to immediately adjacent the axis of rotation of the bit.

The waterway, as will be seen from the drawing, extends in a curvilinear path from a point 14 to the outside or perimeter of the bit and then a short distance in a curve longitudinally along the outside of the wall thereof.

This contour or formation of the waterway 12 insures a flow of water, which may be under pressure, to the center of the concave portion of the bit. The relative size of the waterway serves to protect the diamonds from water cut. The portion of the waterway on the outside of the bit is of sufficient size to accommodate the large amount of sludge thrown out by the bit. This waterway, on the other hand, however, is not so large as to cause a heavy drop in water pressure. We find also that the waterway being lower at the apex of the concaved face of the bit and higher as it extends to the bit periphery as well as curved, we get the benefit of centrifugal force which is created when the bit is in operation, particularly when the bit is running at the high speeds such as 600 R. P. M. for which these bits are designed.

The bit of the present invention may be made and the diamonds set therein by any of the well known methods.

The construction, operation and the manifold advantages of the drill bit of the present invention readily will be understood from the foregoing.

It is to be understood, however, that various changes and modifications may be made in the structure herein illustrated and described without departing from the spirit and scope of our invention.

What we claim is:

A diamond drill bit, the working face of which is concaved and imperforate at the center or axis of rotation of the bit, a waterway in the concaved working face of the bit extending in a curvilinear path toward the bit periphery from a point offset from but adjacent to the axis of rotation of the bit, said waterway extending to the outside of the bit and along the outside face of the bit, and diamonds set in said concaved working face and extending toward the axis of rotation of the bit, all of said diamonds being offset radially from the axis of rotation of the bit, some of said diamonds being disposed intermediate the inner end of the waterway and the axis of rotation of the bit.

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