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E. C. HOLMES ET AL.

2,773,672

DRILLING BIT

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FIG. 1

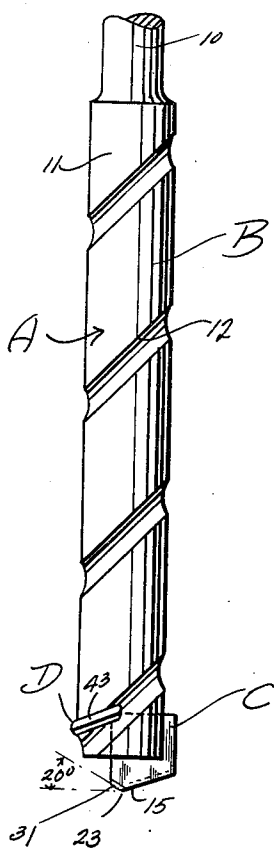


FIG. 2

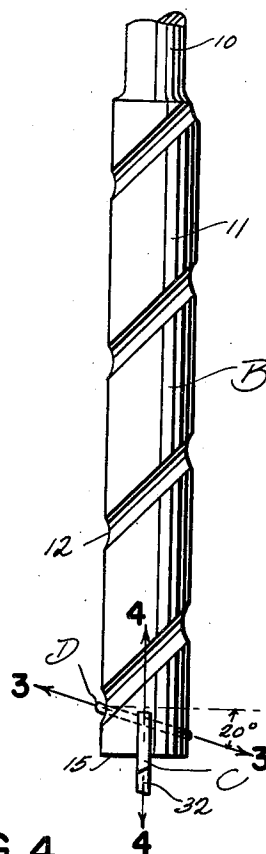


FIG. 3

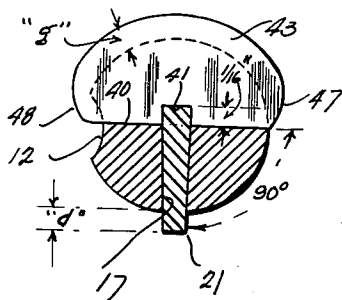
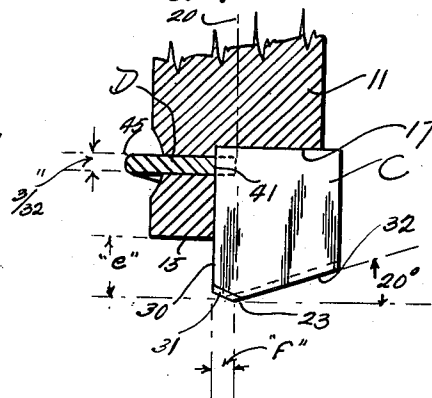


FIG. 4



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DRILLING BIT

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4 Claims. (Cl. 255—61)

This invention relates to improvements in drill bit constructions.

The primary object of this invention is the provision of an improved drill bit construction particularly well adapted for use in connection with the drilling of holes in concrete and brick structures, and having improved cutting and guiding means which will facilitate the drilling action without the degree of pressure usually necessary for drilling holes in such construction.

A further object of this invention is the provision of an improved drill bit construction which is relatively economical to maintain in sharpened drilling condition.

A further object of this invention is the provision of a drill bit having an improved cutter blade and an improved stabilizing and guide construction therefor.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawing, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views:

Fig. 1 is a side elevation of the improved drill bit construction, showing the cutting tip or blade portion in partial side elevation.

Fig. 2 is a view of the drill bit shown in Fig. 1, taken at a 90° angle with respect thereto.

Figs. 3 and 4 are enlarged cross sectional views taken substantially on the respective lines 3—3 and 4—4 shown in Fig. 2.

In the accompanying drawing, wherein for the purpose of illustration is shown a preferred embodiment of the invention, the letter A may generally designate the improved drill bit. It includes a supporting body or shaft B, a cutting blade C connected therewith, and a position centering, stabilizing and guide member D cooperatively associated on the shaft B with respect to the blade C.

The shaft B may be of usual construction, including the shank end 10 to which the rotation imparting tool is connected. The body portion 11 is spirally grooved at 12 for clearance passage of chips and drilled material. The lower end surface 15 of the body portion 11 may be flat, if so desired; the groove 12 extending down to and intersecting the surface 15, as shown in Fig. 1 of the drawing.

The cutter blade C and the guide member D are preferably of hardened steel or carbide tipped. To that extent they are wear resistant and well able to withstand the cutting and frictional pressures imposed thereon incidental to drilling.

The cutting blade C is preferably flat; the body portion 11 of the shaft B being slotted at 17 to receive it. This slot 17 opens upon the bottom surface 15 and also laterally at one side of the bit shaft, as shown in Fig. 4. The blade C may be uniform in thickness, or tapered to fit into the slot 17. The center line of the shaft body 11 is shown at 20 in Fig. 4 of the drawing, and it will be noted that the cutting blade C fits into the slot 17 so that a portion thereof extends to the opposite side of the center line 20

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from the main portion of the cutter blade; the blade laterally projecting for a distance (d) from the outer circumference of the shaft body 11, as shown in Fig. 3 of the drawing. The leading edge 21 is the cutting edge.

The blade below the lower surface 15 of the shaft body 11 projects for a maximum distance (e), as shown in Fig. 4, at least twice the dimension of the distance (d). This bottom projection of the blade C terminates in a lower cutting point 23 which lies about in the center line 20 of the shaft body 11, as shown in Fig. 4; the distance (f) of the point 23 to the rear of the cutting blade C being approximately equivalent to the distance (d). From the point 23 to the rear edge 30 of the blade C the blade bottom edge has an upward slope 31 approximately equivalent to 20°, as shown in Fig. 1, and from the point 23 the bottom cutting edge 32 of the blade has a 20° slope upwardly, as shown in Fig. 4. The cutting bevels for the edges 31 and 32 are shown in Figs. 1, 2 and 4.

The centering and guide member D preferably comprises a disc of the shape shown in Fig. 3; the shaft body 11 being slotted at 40 to receive the major portion thereof. This slot 40 extends approximately half way through the body 11. Centrally the disc D is provided with a slot 41 to receive an inner portion of the cutter C, as shown in Figs. 3 and 4, in an interlocking stabilizing connection of the blade C and guide disc D. The latter preferably projects at 43 from the outer surface of the body 11, defining a rib, which is convexly shaped in cross section at 45. The corners of the guide member D are convexly arcuated at 47 and 48, into merging relation with the external contour of the body 11, as shown in Fig. 3. There are no sharp corners to impose a restriction upon free rotation of the drill bit. It is noted that the distance (g), since the rib 43 projects from the outer surface of the body 11, is substantially equivalent to the cutter projection portion (d) of the blade C.

During rotation the guide rib 45 centers and stabilizes the lower end of the drill bit during the drilling action and the carbide steel tipped cutter blade does all of the cutting.

We have found that using a cutter blade which projects laterally and below the shaft of the bit, to one side only of the bit decreases the pressure needed for drilling without increasing the time period necessary to effect drilling of the hole to a desired depth. We have also found that this arrangement of cutter blade and guide bar requires approximately 50% less sharpening maintenance, mainly due to the fact that decrease of pressure is necessary to effect drilling. Thus, not only is wear upon the parts reduced, but also the drill bit is more durable, has a longer life, and in general is more efficient than conventional drill bits for drilling in concrete and brick structures. We have found by actual tests that superior advantages and prolonged life of the drill bit are obtained by using a drill bit of the kind shown and described, where the distances (d) and (g) are approximately equivalent to $\frac{1}{16}$ of an inch; the thickness of the guide bar and the cutter blade being each $\frac{3}{32}$ of an inch, and the distance (e) being not less than $\frac{1}{8}$ of an inch.

If found necessary, one or more guide bars of carbide steel may be added along the shaft body 11 for the purpose of reducing wear on the drill shaft. We have found that the rear projection of the cutter blade past the center line of the shaft assists in strengthening the bit and improves its drilling action, but such may be eliminated. The 20° angling may also be eliminated if found desirable. The starting of holes is usually accomplished by means of a star drill or chisel, and in this connection the point 23 assists at the start of the drilling action.

All parts of the drill bit are preferably made of steel, and as before mentioned the cutter blade C and the guide member D are of hardened steel, preferably carbide tipped.

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Various changes may be made to the form of the invention herein shown and described without departing from the spirit of the invention or scope of the claims.

We claim:

1. A drill bit comprising a rotary supporting shaft provided with a vertical slot opening on its lower surface and also at one side surface, a cutter blade secured in said slot and laterally projecting from the slot and also projecting below the extreme lower end of said shaft and there having a cutting edge, said shaft having a shallow slot extending transversely therethrough from the opposite side of the shaft with respect to that upon which the vertical slot opens, said slots at the central portion of said shaft being in intersecting communication, and a shallow guide disc mounted in the second mentioned slot having an interconnection with said blade at the location where said slots intersect, said disc having a portion thereof projecting beyond the outer surface of said shaft which is elongated circumferentially of said shaft.

2. A drill bit for drilling hard masonry such as concrete comprising an elongated metal shaft having a cutting blade extension projecting below the shaft at the lower end thereof for a portion of the distance across the lower end of the shaft, said cutting blade also projecting for a short distance to one side only thereof, both the lower projection and the lateral projection providing masonry cutting surfaces, and a centering guide rib fixedly connected upon the shaft for an appreciable distance around the shaft directly opposite to the lateral projecting portion of said cutting blade, said rib projecting to each side of the plane of the cutting blade and its projecting portion being relatively narrow lengthwise of the shaft and projecting lateral-

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ly from the outermost surface of the shaft the same distance as the lateral projecting portion of the cutting blade.

3. A masonry drill bit as described in claim 2 in which said centering rib is fixedly countersunk into the shaft and has its upper end terminating lengthwise of the shaft at about the same location as the uppermost end of the laterally projecting portion of the blade.

4. A masonry type drill bit comprising a rotary supporting shaft provided with a vertical slot the lower end thereof opening on a portion of the lower surface thereof and laterally opening on said shaft at one side only of the shaft, a cutter blade secured in said slot and having a laterally projecting cutting portion and a depending cutting portion at the lower surface of said shaft, said shaft having a transverse lateral slot therein of relatively shallow width axially of the shaft at the opposite side from the lateral projecting portion of the cutter blade, the lateral slot opening into the slot of the cutter blade and a thin centering guide disc secured in the lateral slot providing a guide rib portion which is relatively narrow and projects from the outer surface of the shaft at the opposite side from the lateral projecting portion of the cutter, the guide disc and the blade where the two slots open upon each other being interconnected.

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