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2,816,737

DRILLS

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FIG. 1.

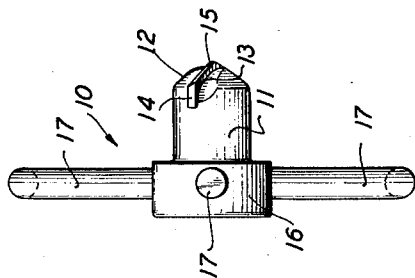


FIG. 2.

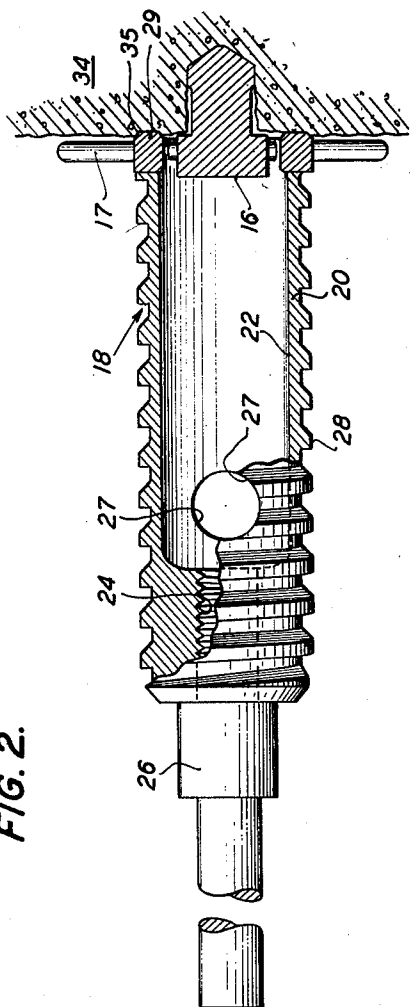
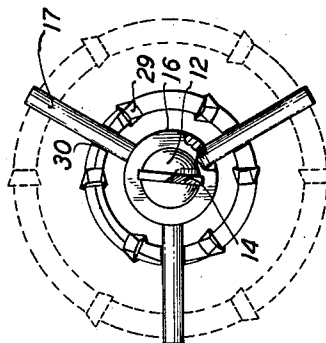


FIG. 3.



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DRILLS

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4 Claims. (Cl. 255—69)

This invention relates to drills, and more particularly 15
core bits and pilot bits for starting core bits into a material which is to be drilled.

A conventional core bit includes a rotatable cylindrical barrel provided with cutting teeth at one end so that an annular hole may be drilled with the bit, the material 20
within the core bit being either preserved as a core sample or else comminuted during the drilling operation.

One difficulty with core bits is their tendency to "walk" or shift laterally as the bit makes its initial cut into the material being drilled. This common fault makes it difficult for an operator to center the bit precisely over a location which is to be drilled. To overcome this difficulty pilot bits have been devised to fit into the cutting end of core bits, and drill a pilot hole ahead of the core bit. The pilot bit provides a sharp drilling point which has much less tendency to "walk" than the annular core bits, and as the pilot bit penetrates the material being drilled, it provides an anchor which prevents the core bit from "walking" when it first engages the material. Pilot bits used heretofore have been designed to fit snugly within the internal diameter of the core bit barrel, and have proved satisfactory but they have the disadvantage of being useful in only one particular size core bit. Thus, a separate pilot bit of the conventional type heretofore available must be provided for each size of core bit.

This invention provides core bits and a pilot bit which can readily be used with the core bits over a wide range of sizes. Thus, an operator needs only a single pilot bit to accommodate many sizes of core bits.

The invention contemplates a pilot bit having a shank 45
with a cutting element set in one end of the shank, and at least three outwardly extending supporting members attached to the shank and adapted to fit in receptacles in a core bit. The supporting members hold the shank coaxially within the core bit so that the end of the shank with the cutting element projects out of the cutting end of the core bit.

In a preferred form, the core bit is provided with slots in its cutting end and the supporting members are elongated rods, adapted to fit snugly in the core bit slots so that regardless of the diameter of the core bit, the elongated supporting members span the core bit diameter to locate and hold the pilot bit shank coaxially in the core bit.

The invention also includes a core bit for use with the pilot bit, the core bit comprising a core barrel having cutting teeth set in the cutting end of the barrel, and slots formed in cutting end of the barrel to receive the supporting members of the pilot bit.

The invention will be completely understood from the following detailed description, taken in conjunction with the accompanying drawing in which:

Fig. 1 is a side elevation of the presently preferred embodiment of the pilot bit of the invention;

Fig. 2 is a side elevation partly broken away, of the pilot bit mounted in a core bit in operating position; and

Fig. 3 is the end view of the core bit and pilot bit

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mounted therein, and shows in phantom line how the pilot bit is easily adapted to fit core bits of various sizes.

Referring to Fig. 1 a pilot bit 10 comprises a cylindrical pilot bit shank 11 provided with a taper portion 5
12 and a transverse slot 13 at one end in which a cutting element 14 is embedded so that a cutting point 15 protrudes from the tapered end of the shank. The other end of the pilot bit shank has a hub or boss 16 formed integrally thereon. Three equally angular spaced supporting rods 17 are threadably engaged at their inner ends into the hub and extend radially therefrom in a plane perpendicular to the shank axis.

As shown in Fig. 2, a core bit 10 comprises a cylindrical core barrel 20 having an axial bore 22 which is stepped down to a reduced diameter section 24 at one end. The section 24 is internally threaded to receive one end of a core bit shank 26 which is adapted to be connected to any suitable power tool. A pair of diametrically opposed transverse bores 27 are in the intermediate portion of the core barrel to permit cuttings to leave the core barrel during drilling operations, and a helical thread 28 is formed on the outer surface of the core barrel to serve as an auger and carry cuttings out of the hole as the core bit is operated. A plurality of cutting teeth 29 are set in the opposite end of the core barrel. The cutting teeth may be of any desired number, for example six equally angular spaced teeth as shown in Fig. 3. Three equally angular spaced radial slots 30 are formed in the cutting end of the core barrel between the cutting teeth. Each of the supporting rods on the pilot bit makes a snug fit in a respective slot so that the pilot bit is rigidly located by the supporting rods in the center of the core bit. In this position the pilot bit shank is coaxially positioned within the core barrel and the end of the shank with the cutting element projects out of the cutting end of the core bit.

The operation of the pilot bit is understood most readily from reference to Fig. 2, which shows the pilot bit drilling a pilot hole 32 in a piece of work 34, concrete for example. The point of the pilot bit engages the concrete in the center of the area to be drilled, and drills the pilot hole to a sufficient depth to restrain the pilot bit from lateral shifting before the core bit contacts the work. As drilling proceeds, the core bit teeth engage the work and cut an annular groove 35 therein, the pilot bit preventing the core bit from "walking" as the core bit makes its initial cut. The core bit and pilot bit are then withdrawn from the work and the pilot bit is removed. The annular groove formed by the core bit is of sufficient depth to maintain the core bit in the desired position, and drilling proceeds in a normal fashion with the pilot bit removed.

As can be seen from Fig. 3, the pilot bit may be used in core bits ranging in internal diameter from a size just slightly larger than the dimension of the pilot bit (the hub as shown in Figs. 1 through 3), up to a bit diameter established by the pilot bit supporting rods (shown in phantom lines in Fig. 3).

We claim:

1. Drilling apparatus comprising a cylindrical barrel having a cutting portion at one end, a drill bit shank on the opposite end of the barrel and adapted to be rotated and thereby rotate the barrel, the cutting end of the barrel having at least three slots formed in its cutting portion, one of the slots extending at an angle to at least one of the other slots, a pilot shank having a cutting portion at one end, and at least three outwardly extending supporting members attached to the pilot shank, each member being shaped to fit in a respective slot in the barrel and lie below the cutting portion of the barrel and hold the cutting portion of the pilot shank out beyond the cutting portion of the barrel.

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2. Drilling apparatus comprising a cylindrical barrel having a cutting portion at one end, a drill bit shank on the opposite end of the barrel and adapted to be rotated and thereby rotate the barrel, the cutting end of the barrel having at least three equally angular spaced slots formed in its cutting portion, one of the slots extending at an angle to at least one of the other slots, a pilot shank having a cutting portion at one end, and at least three outwardly extending supporting members attached to the pilot shank, each member being shaped to fit in a respective slot in the barrel and lie below the cutting portion of the barrel and hold the cutting portion of the pilot shank out beyond the cutting portion of the barrel.

3. Drilling apparatus comprising a cylindrical barrel having a cutting portion at one end, a drill bit shank on the opposite end of the barrel and adapted to be rotated and thereby rotate the barrel, the cutting end of the barrel having at least three slots formed in its cutting portion, one of the slots extending at an angle to at least one of the other slots, a pilot shank having a cutting portion at one end, and at least three outwardly extending supporting members releasably attached to the pilot shank, each member being shaped to fit in a respec-

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tive slot in the barrel and lie below the cutting portion of the barrel and hold the cutting portion of the pilot shank out beyond the cutting portion of the barrel.

4. Drilling apparatus comprising a cylindrical barrel having a cutting portion at one end, a drill bit shank on the opposite end of the barrel and adapted to be rotated and thereby rotate the barrel, the cutting end of the barrel having at least three radially extending slots formed in its cutting portion, a pilot shank having a cutting portion at one end, and at least three outwardly and radially extending supporting members attached to the pilot shank, each member being shaped to fit in a respective slot in the barrel and lie below the cutting portion of the barrel and hold the cutting portion of the pilot shank out beyond the cutting portion of the barrel.

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