March 22, 1949. J. B. BAKER 2,464,781

ROTARY PERCUSSION DRILL

Filed Nov. 19, 1945

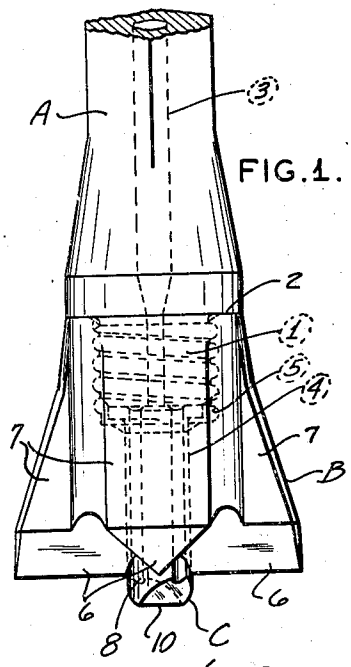


FIG. 1.

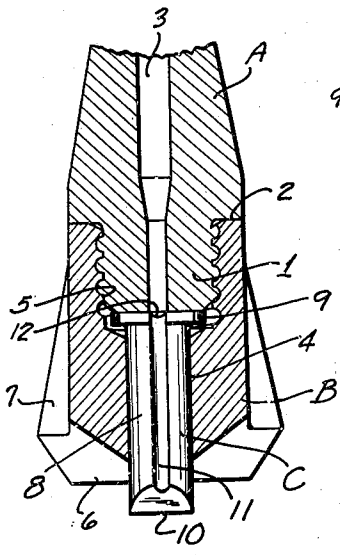


FIG. 3.

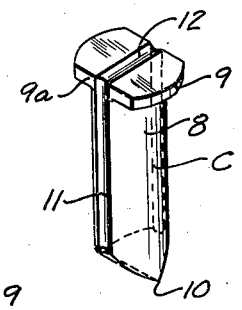


FIG. 4.

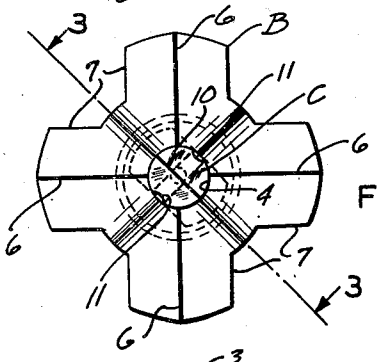


FIG. 2.

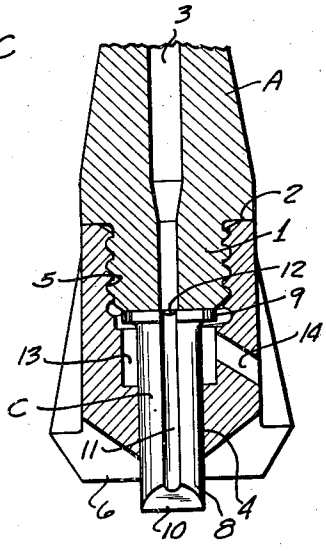


FIG. 5.

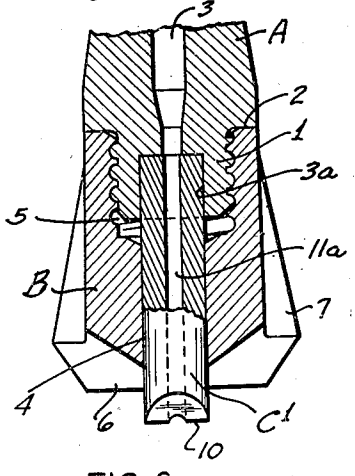


FIG. 6.

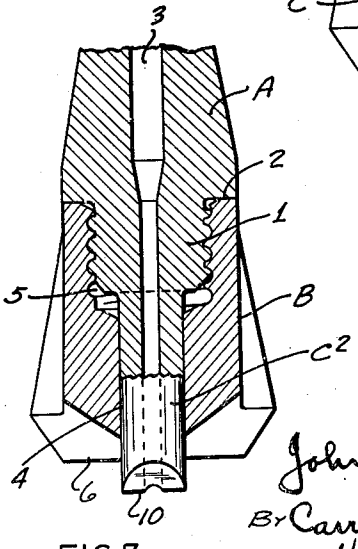


FIG. 7.

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ROTARY PERCUSSION DRILL

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5 Claims. (Cl. 255—64)

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This invention relates principally to rotary percussion drills of the kind comprising a drill rod and a separable drill bit threaded thereon and communicating axial passageways in said rod and bit for conveying a cleansing fluid or liquid to the cutting face of said bit to clean away chips therefrom.

The present invention has for its principal object to provide a drill of the above type that will drill a lead hole in advance of the main hole so that the material surrounding said lead hole is quickly and easily broken down by the main cutting edges of the bit. Another object is to provide for accommodating the pilot or lead hole forming bit in the axial cleansing fluid passageway of the separable main bit without stopping the flow of the cleansing fluid therethrough. Another object is to provide a separable pilot bit that is held in place by the separable main drill bit. Other objects are cheapness and simplicity of construction, strength and durability and compactness of design. The invention consists in the rotary percussion drill and in the parts and combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawing, which forms part of this specification and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a side elevational view of a rotary percussion drill embodying my invention,

Fig. 2 is an end elevational view of the cutting end of said drill,

Fig. 3 is a central longitudinal sectional view on the line 3—3 in Fig. 2,

Fig. 4 is a perspective view of the separable pilot bit; and

Figs. 5, 6 and 7 are views similar to Fig. 3 illustrating three modified forms of drill construction.

In the accompanying drawing my invention is shown embodied in a well known type of rotary percussion drill comprising a drill rod A and a separable drill bit B. The drill rod A has a reduced threaded stem 1 at its lower end, an annular abutment shoulder 2 formed by said stem and an axial passageway 3 for the cleansing fluid or liquid used during the drilling operation.

The separable drill bit B is of the hollow body or cup type and has a bore 4 extending axially therethrough which terminates at the upper end

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of the bit in an enlargement or counterbore 5 that is threaded to receive the threaded stem 1 of the drill rod A. The bit B is threaded on the stem 1 of the drill rod A with its upper end abutting against the annular shoulder 2 thereon. As shown in the drawing, the stem 1 of the drill rod A stops well short of the bottom of the counterbored upper end of the axial bore in the drill bit B.

The drill bit B has the usual cutting teeth 6 disposed radially of the axial bore 4 at the lower end of said bit and the usual reinforcing wings or ribs 7 which taper toward and merge into the body of said bit near the upper end thereof.

According to the present invention, the above rotary percussion drill is provided with a central pilot bit C that extends beyond the radial cutting edges 6 of said main bit B. The pilot bit C has a cylindrical body 8 with a head 9 at its upper end and a chisel shaped cutting edge 10 at its lower end. The cylindrical body 8 of the pilot C fits in the lower portion of the axial bore 4 of the main bit B with the head 9 of said pilot bit disposed in the counterbored upper end portion of said bore in abutting relation to the lower end of the stem 1 of the drill rod A.

The cylindrical body 8 of the pilot bit C has longitudinal peripheral grooves 11 in two diametrically opposite sides thereof, which grooves are connected at the upper end of said pilot bit by means of a diametral groove 12 in the top of the head 9 thereof. This diametral groove communicates with the lower end of the axial pasageway 3 of the drill rod A, whereby the cleansing fluid or liquid flows from said passageway into said diametral groove, thence into the space or chamber 12 between the lower end of the stem 1 of said drill rod and the bottom of the counterbore 5 at the upper end of the axial bore 4 of the main drill bit B and thence downwardly through the longitudinal peripheral grooves 11 in the pilot bit C to the cutting face of the drill. As shown in the drawing, the head 9 of the pilot bit C is flattened, as at 9a, on the grooved sides thereof so as to provide ready access of the cleansing fluid to the upper end portions of the longitudinal peripheral grooves 11 of said bit.

The modified construction illustrated in Fig. 5 is similar to that shown in Figs. 1 to 4, inclu-

sive, except that the counterbored portion of the axial bore of the main bit is deepened to provide an annular chamber 13 between said portion and the cylindrical body 8 of the pilot bit C and a downwardly inclined passageway 14 leads from this annular chamber and opens through the side of the main bit B into the space between two of the backing wings 7 of said main bit slightly above the rear edges of the cutting teeth 6 thereof. By this arrangement, the cleansing fluid or liquid is discharged from the side of the main bit C as well as from the lower end thereof.

In the construction shown in Fig. 6 the pilot bit C^1 has its upper end press-fitted in a counterbore 3^a provided therefor in the lower end of the axial passageway 3 in the drill rod; and said pilot bit has an axial bore 11^a that extends from end to end thereof and communicates at its inner end with the axial passageway in said drill rod. The construction illustrated in Fig. 7 is similar to that shown in Fig. 6 except that the tubular drill bit C^2 is formed integral with the lower end of the threaded stem portion of the drill rod. In both of these constructions, the pilot bit is rigid with the drill rod and the main drill bit B is slipped over the pilot bit and threaded on to the stem 1 portion of the drill rod A.

Each of the rotary percussion drill constructions hereinbefore described is provided with a pilot bit that projects axially beyond the cutting edges of the main drill bit so as to drill a small lead hole in the dead spot or area opposite the axial bore of the main bit, thus permitting the trailing cutting edges of the main bit to quickly and easily break down the material surrounding the lead hole, which material caves or falls in said hole; and in all of said constructions the pilot bit is accommodated in the axial bore of a standard separable drill bit. In the construction shown in Figs. 1 to 4, inclusive, and Fig. 5, the grooved portions of the pilot bit permit a flow of cleansing fluid or liquid to clear away chips from the cutting face of the drill; and the pilot bit may be quickly and easily attached to and removed from the drill rod with the main bit and readily mounted in and dismounted from the detached main bit.

In the construction shown in Fig. 6, the pilot bit is of tubular form and is removably mounted in a counterbore provided therefor in the lower end of the cleansing fluid passageway of the drill rod and constitutes a portion thereof and remains attached to the drill rod when the main drill bit is attached to and removed therefrom. The construction shown in Fig. 7 is similar to that shown in Fig. 6 except that the tubular pilot bit is formed integral with the drill rod.

Obviously, the piloted rotary percussion drill constructions hereinbefore described are capable of considerable modification without departing from my invention. Therefore, I do not wish to be limited to the precise details of construction shown and described.

What I claim is:

1. In a rotary percussion drill comprising a drill rod having a threaded lower end and an axial passageway opening therethrough, and a separable drill bit having a lower cutting end and an axial bore extending therethrough with a counterbored upper end portion threaded to receive said threaded end of said rod, the combination of a pilot bit comprising a cylindrical body mounted in said bore and terminating at its upper end in a head portion located in said counterbore in abutting relation to the lower end of said stem and at its lower end in a cutting edge located below the cutting end of said drill bit, said cylindrical body having a longitudinal exterior groove therein and said head having a groove in its upper surface disposed opposite the lower end of the passageway in said drill rod and in communication with said longitudinal groove.

2. In a rotary percussion drill comprising a drill rod having a threaded stem at its lower end and an axial passageway opening therethrough, and a separable drill bit having a bore extending axially therethrough with a counterbored upper end portion threaded to receive said stem, the combination of a pilot bit comprising a cylindrical body mounted in said bore and terminating at its upper end in a head portion located in said counterbore in abutting relation to the lower end of said stem and at its lower end in a cutting edge located below the cutting end of said drill bit, said cylindrical body having longitudinal external peripheral grooves in two diametrically opposite sides thereof and said head having a diametral groove in the top thereof that communicates with the lower end of the axial passageway in said drill rod and with the upper ends of said longitudinal grooves.

3. In a rotary percussion drill comprising a drill rod having a reduced threaded stem at its lower end and an axial passageway opening through the lower end of said stem and a separable drill bit having a lower cutting end, a bore extending axially therethrough with a counterbored upper end portion threaded to receive said stem, and a hole leading from said counterbore to the outer side face thereof, the combination of a pilot bit comprising a cylindrical body mounted in said bore and terminating at its upper end in a head portion located in said counterbore in abutting relation to the lower end of said stem and at its lower end in a cutting edge located below the cutting end of said drill bit, said head having a cross groove in the top thereof in communication with the axial passageway of said drill rod and with the counterbored upper end of said bore.

4. In a rotary percussion drill comprising a drill rod having a reduced threaded stem at its lower end and an axial passageway opening through the lower end of said stem, and a separable drill bit having a lower cutting end, a bore extending axially therethrough with a counterbored upper end portion threaded to receive said stem, and a hole leading from said counterbore below the stem threaded therein to the outer side face of said bit, the combination of a pilot bit comprising a cylindrical body axially slidable in said bore and terminating in its upper end in a head portion confined in said counterbore between the bottom thereof and the lower end of said stem and at its lower end in a cutting edge located below the cutting end of said drill bit, said counterbore communicating with the lower end of the axial bore in said drill rod.

5. In a rotary percussion drill comprising a drill rod having a reduced threaded stem at its lower end and an axial passageway opening through the lower end of said stem and a separable drill bit having a lower cutting end, a bore extending axially therethrough with a counterbored upper end portion threaded to receive said stem, and a hole leading from said counterbore and opening through the outside face of said bit, the combination of a pilot bit comprising a

cylindrical axially slidable body in said bore and terminating at its upper end in a head portion confined in said counterbore between the bottom thereof and the lower end of said stem and at its lower end in a cutting edge located below the cutting end of said drill bit, said cylindrical body portion of said pilot bit having a passageway therein extending substantially from end to end thereof, said last mentioned passageway and said counterbore communicating with the lower end of the axial passageway in said drill rod.

JOHN B. BAKER.

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