

Aug. 6, 1935.

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2,010,070

REPLACEABLE BIT ROCK DRILL

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2 Sheets-Sheet 1

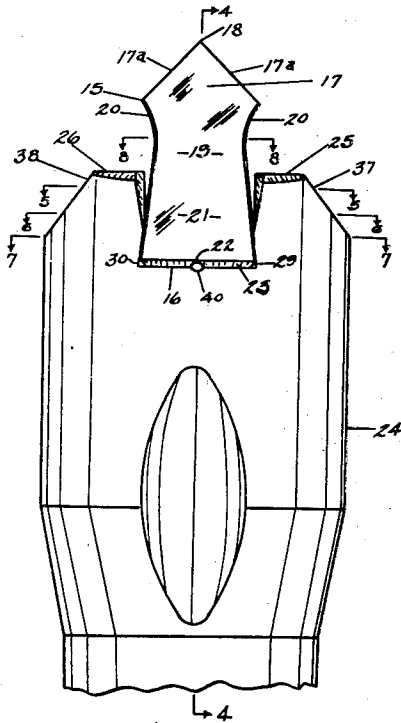


FIG. 1

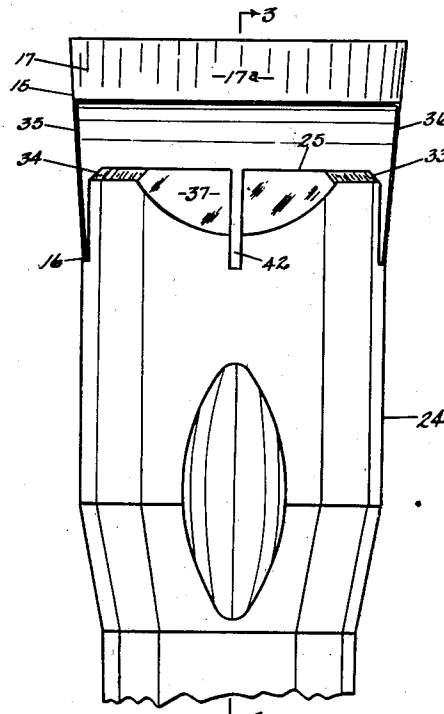


FIG. 2

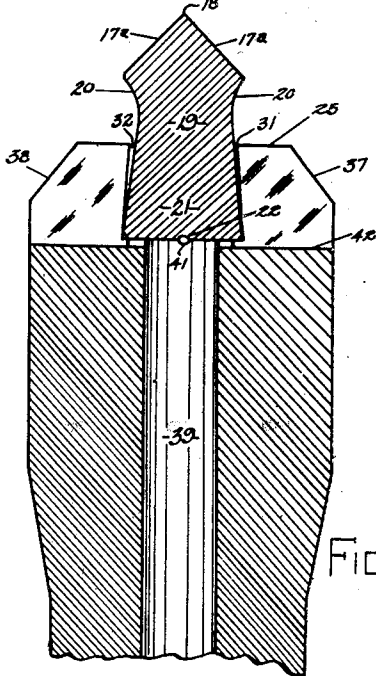


FIG. 3

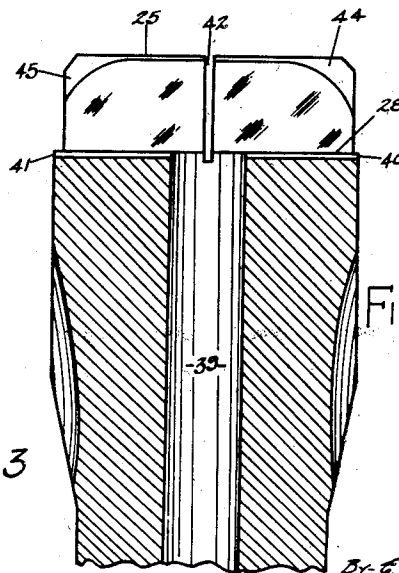


FIG. 4

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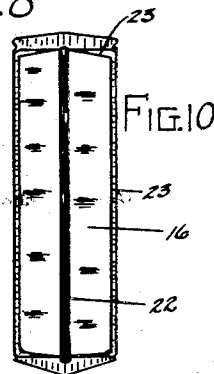
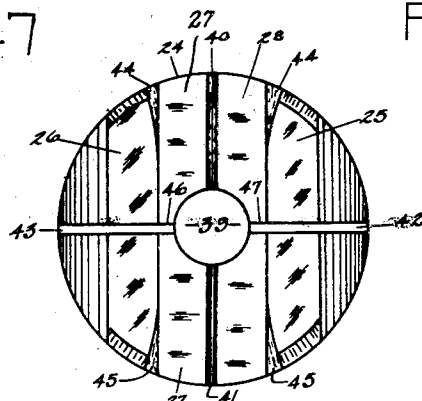
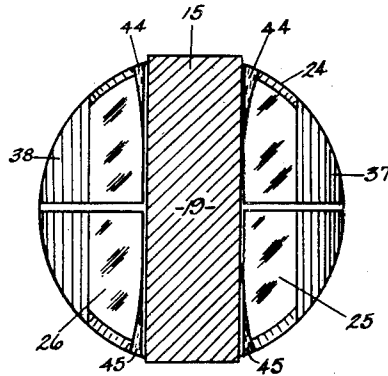
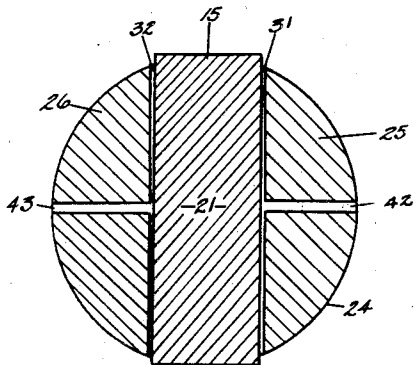
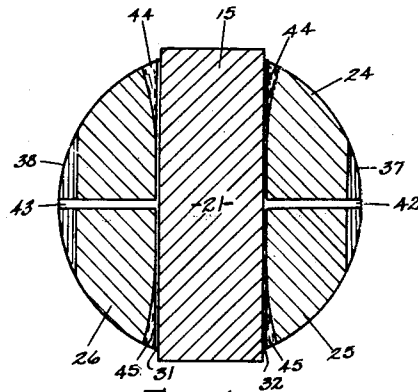
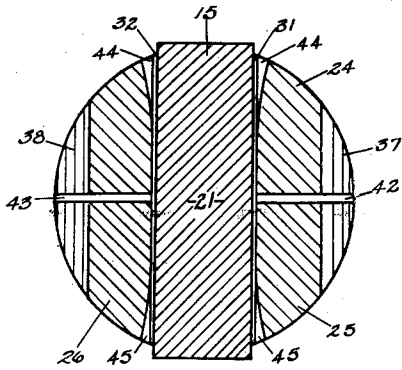
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REPLACEABLE BIT ROCK DRILL

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REPLACEABLE BIT ROCK DRILL

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6 Claims. (Cl. 255—64)

The invention relates to a replaceable bit rock drill, as described in the present specification and illustrated in the accompanying drawings which form part of the same.

The invention consists essentially in the relative shapes of stock and bit whereby a loose fit is assured for the bit beyond the base and facilities for cooling provided within and about the socket and bit as pointed out in the claims following a description in detail of the shape preferred in carrying out this invention.

The objects of the invention are to eliminate the breakages of the jaws of the stock of the drill following the sharp blows incident to the operations of drilling holes and the consequent impacts of the bits with the rock, thereby avoiding trouble and delay in the replacement of the drills and materially increasing the speed and efficiency in carrying on the work in mining and contracting and at the same time economizing in so far as the consumption of steel is concerned through the expenditures of money in labor and power in transporting quantities of metal sometimes to almost inaccessible places; to construct a stock and bit which will contain provisions for a constant flow of water and consequently keep the bit cool throughout the drilling operation; and generally to overcome the difficulties incident to the use of a drill of this classification and hitherto found to be troublesome in the matter of fractured jaws.

In the drawings, Figure 1 is an end elevation view of the bit and drill assembled showing the stock broken away.

Figure 2 is a side elevational view of the assembled bit and drill showing the stock broken away.

Figure 3 is a longitudinal sectional view of the stock broken away and of the bit within the socket and taken on the lines 3—3 in Figure 2.

Figure 4 is a longitudinal sectional view of the stock taken on the lines 4—4 in Figure 1 with the bit removed.

Figure 5 is a cross sectional view through the complete drill taken on the lines 5—5 in Figure 1.

Figure 6 is a cross sectional view through the complete drill taken on the lines 6—6 in Figure 1.

Figure 7 is a cross sectional view through the complete drill taken on the lines 7—7 in Figure 1.

Figure 8 is a cross sectional view of the bit inserted in the socket of the stock and taken on the lines 8—8 in Figure 1.

Figure 9 is a plan view of the upset head of the stock.

Figure 10 is a plan view of the underside of the bit.

Like numerals of reference indicate corresponding parts in the various figures.

Referring to the drawings, the bit is indicated by the numeral 15 and the shape of this bit is all important in relation to its holder for in its impacts with the rock following the blows on the holder, the results from these impacts must not affect the holder in such a way as to cause a fracture, therefore the base 16 on the bit should be flat and its head 17, a form of spear-shape in cross section omitting any barbs, while the thickness through the bit at the extremities of the head, much the same as through the extremities of the bit at the base.

The bevels 17A form the sides of the head 17 and terminate in the cutting edge 18 of the head. The neck 19 is formed by the inwardly curving surfaces 20 on either side, extended into the surfaces on either side of the shank portion 21, so that the bit in cross section is of tapering shape from the base to the neck, or in other words, the bit has a tapered shank for the side walls and extends outwardly on the convergent lines as far as the neck.

Along the base of the bit, the water groove 22 extends from end to end, while the corners between the flat base and the shank surfaces are bevelled at both sides and ends as shown at 23.

The stock indicated by the numeral 24 is preferably a bar of steel upset at one end and slotted at the upset end to form the jaws 25 and 26, comprising a socket 27 for the bit and the inner wall surfaces of these jaws extend outwardly in convergent lines of direction from the flat base 28 which is between the fillets 29 and 30 roughly corresponding to the bevels 23 of the bit.

The convergent lines of the inner wall surfaces of the socket 27 form a longer taper from substantially the same base as the bit or nearly so, consequently, there are formed on either side of the bit, the spaces 31 and 32 widening out from the bases of bit and stock in the direction of the outer end of the stock, naturally the result is that room is permitted in the socket for the slight upsetting of the bit due to its impacts on the rock.

The jaws 25 and 26 are chamfered at the outer ends 33 and 34 to facilitate a passage of chips on either side of the bit from the end surfaces 35 and 36 and on either side of these chamfered sur-

faces the corners are bevelled in each instance, as shown at 37 and 38.

The central water channel 39 within the stock empties into the socket 27 centrally and the central cross grooves 40 and 41 in the flat base 28 of the socket 27 register with the feed water channel 39. The slots 42 and 43 are respectively cut into the jaws 25 and 26 midway of the length of these jaws and the inner corners of the walls forming the said jaws at the ends thereof are chamfered off at 44 and 45 to reduce the contacting surface with the bit.

The slots 42 and 43 register with cross slots 46 and 47 communicating with the main water channel 39, therefor, there is an assurance of a continuous supply of water around the bit and in the hole drilled.

The shank of the bit 15 may be formed of softer texture than the head or blade portion which is rather an important feature for the very good reason that the metal of the shank necessarily becomes upset in its socket to a very slight extent but sufficiently to take the earlier effects of the impact or in other words to sustain the first shock, which is all important in any holding device.

In the use of this tool, the bit is inserted from one side and settles itself in the socket through the impact. The natural result of the original blows is to upset the shank of the bit a trifle so that it becomes thicker from the lower part of the neck inwardly and the result of this is that the spaces 31 and 32 are filled up, but not before the bit has settled in its own place and it will be noticed that the full force of the blow is taken on the flat base, and as each shock occurs, the bit broadens out in so far as thickness is concerned upwardly from the base until it is well established in the socket, that is to say, until the spaces are completely filled up and any further upsetting may occur on the turned corners, consequently there is really no jar of any moment on the jaws at all, and by the time the spaces 31 and 32 are well filled up, the metal of the bit is like a filling of a hole between harder surfaces, and any impact on that filling causes little or no effect on the harder surfaces which are here represented by the jaws.

What I claim is:

1. In a replaceable rock drill stock and bit, a bit formed with a head and base and an intervening shank and a longitudinal water groove

across the base and a stock suitably formed to receive the bit.

2. In a replaceable rock drill stock and bit, a stock having a longitudinal water channel there-within and a socket at one end to receive a bit, said socket having a flat base and water grooves thereacross registering with said feed water channel, and a bit correspondingly formed to instantly fit in said socket.

3. In a replaceable rock drill stock and bit, a stock having a longitudinal water channel there-within and a socket formed of jaws slotted centrally forming water outlets registering with cross slots in turn registering with the central water feed channel.

4. In a replaceable rock drill stock and bit, a stock having a longitudinal water channel there-within, and a socket at one end to receive a bit, said socket having a flat base and a water groove there across registering with the longitudinal water channel, and jaws projecting upwardly and forming a part of said socket slotted centrally and extending below the level of the socket base, and forming grooves therein at right angles to the water grooves and leading into the water channel, and a bit correspondingly formed to instantly fit in said socket.

5. In a replaceable rock drill stock and bit, a stock having a longitudinal water channel there-within and forming a bit socket having upwardly tapering walls slotted centrally forming water outlets registering with the cross slots in turn registering with the central water feed channel, and a bit in cross sectional shape tapering in sharper converging lines than the socket walls and becoming a looser fit outwardly from the socket and terminating in a blade portion.

6. In a replaceable rock drill stock and bit, a slotted cylindrical stock forming a bit socket and having a longitudinal water channel therewithin, side walls converging upwardly and inwardly from the base of said socket to form jaws and slotted centrally and having shoulders at the top bevelled off on the sides to form flaps, the base of said socket having water grooves thereacross registering with the water channel, a bit having a flat base and correspondingly formed to instantly fit in said socket and a longitudinal water groove across the base of the bit and corresponding with the water groove across the base of said socket.

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