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2,367,458

DRILL BIT (DETACHABLE)

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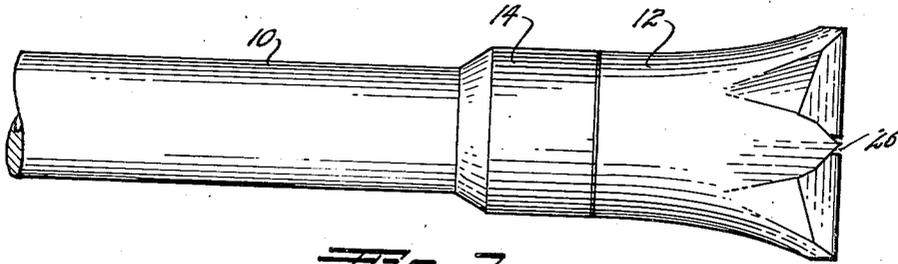


FIG. 1

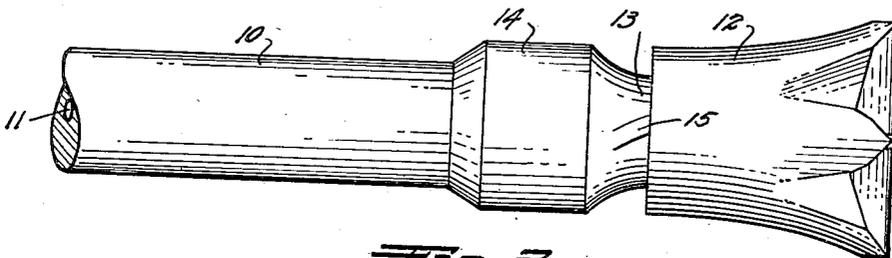


FIG. 2

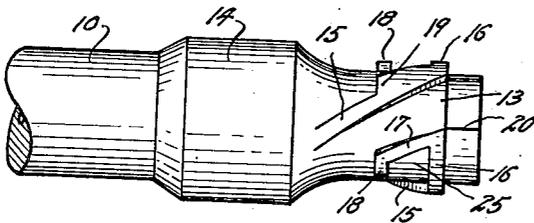


FIG. 3

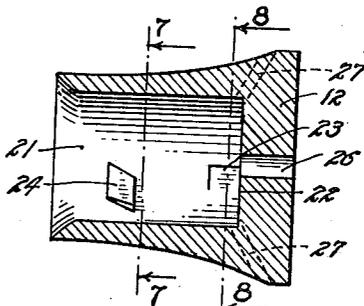


FIG. 4

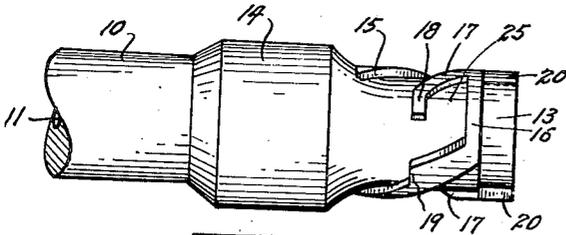


FIG. 5

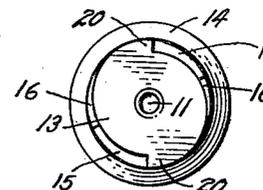


FIG. 6

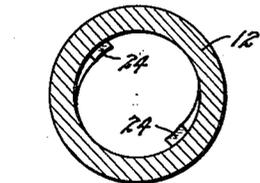


FIG. 7

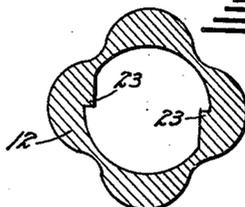


FIG. 8

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DRILL BIT (DETACHABLE)

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4 Claims. (Cl. 287-119)

This invention relates to a detachable rock drill bit. Detachable drill bits are well known in the art, and are on the market with the bit threaded onto the drill shank. The thread acts in the same direction that the drill rotates, and the combination of rotation with vibration seats the threads so tightly that it is impossible to remove the bits without elaborate equipment.

The principal object of this invention is to provide a detachable rock drill bit which can always be easily removed from the shank regardless of the length of time in use, and to provide a detachable bit which cannot become accidentally detached from the shank or lost in the drill hole.

A further object is to provide a bit of this character in which all of the impact of drilling is absorbed between the end of the shank and the bit and not by the attachment means so that the latter will not be damaged by the action of the hammer.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing—

Fig. 1 is a side view of the extremity of a typical drill shank with the improved detachable bit in place thereon, ready for use;

Fig. 2 is a similar view illustrating the position of the bit when the shank is being withdrawn from the drill hole;

Figs. 3 and 4 are side views of the shank extremity, taken at right angles to each other;

Fig. 5 is a longitudinal section through the drill bit;

Fig. 6 is an end view of the shank; and

Figs. 7 and 8 are cross sections through the drill bit taken on the lines 7-7 and 8-8, Fig. 5, respectively.

In the drawing a typical rock bit shank is indicated at 10 with the usual water hole at 11. The improved detachable drill bit is designated in its entirety by the numeral 12, and may have any of the standard outer contours of the typical bit.

In the specification and claims the words "left" and "right" designate directions of the upper portions of the elements when viewed from the driller's position.

The shank 10 is provided with a reduced ex-

5 tremity preferably, but not necessarily, slightly tapered. The rear portion of the reduced extremity 13 is rounded outwardly, terminating in an enlarged shoulder portion 14. The reduced portion 13 is provided with two ridges of unusual design. Each ridge consists of an inclined ridge portion 15 extending from the shoulder 14, forwardly to a point spaced from the forward extremity of the portion 13. A circumferential ridge 16 extends from the forward extremity of the ridge 15, to the left, partially around the portion 13 for approximately 135°. A hook-shaped ridge 17 thence extends from the extremity of the ridge 16 rearwardly parallel to the ridge 15 for approximately 1/2 the length of the latter, thence turns circumferentially to the right, as indicated at 18. The rib 15 is, at a point in alignment with the rib 18, widened to form a shoulder 19. The above described rib structure is repeated on the opposite side of the reduced portion 13.

20 The extremity of the portion 13 beyond the rib 16 is eccentrically formed in opposite directions to form two ratchet faces 20, on opposite sides, in alignment with the juncture of the ribs 16 and 17. The ratchet faces are so faced that they will engage when the shank is rotated to the left.

25 The interior of the bit 12 is conformed to engage the above described structure on the extremity of the shank, that is, it is provided with a socket 21 conforming to the contour of the reduced extremity 13. The bottom of the socket indicated at 22 is at a depth which will allow the extremity of the shank portion 13 to rest thereagainst, and adjacent this bottom two inclined dogs 23 are formed on opposite sides. These dogs project into the socket 21 a distance corresponding to the depth of the faces 20, so that when the portion 13 is fully inserted it can rotate to the right within the socket 21. The socket 21 is also provided with two inclined lugs 24, on opposite sides, which enter between the ribs 15 and 17 of the shank extremity.

30 To insert the shank in the bit, the extremity 13 is placed into the socket 21 and rotated to the left. This causes the two lugs 24 to travel rearwardly between the ribs 15 and 17 until they pass the rearward extremity of the rib 17. This releases the lugs 24 and allows the shank to be rotated to the left until the ratchet faces 20 engage the dogs 23. At this time, the lugs 24 are resting on the shoulders 19, which prevent withdrawal of the shank. During the drilling, the shank 14 rotates to the left so that the ratchet faces 20 and dogs 23 and the lugs 24 and the shoulders 19 are constantly engaged and vibration is prevented.

When it is desired to withdraw the bit, it is pulled upon and rotated to the right. The first movement to the right releases the lugs 24 from the shoulders 19 and allows them to enter the pocket 25 surrounded by the ribs 16, 17, and 18. Further rotation to the right wedges the lugs into the incline between the ribs 16 and 17 and locks the bit in place. The shank at this time, is in the position illustrated in Fig. 2 with the bit firmly locked thereon for withdrawal.

Should it be desired to remove the bit from the shank, the bit is simply rotated to the right. This releases the lugs 24 from the pockets 25 through the opening of the pocket between the shoulder 19 and the rib 18. The bit is then pushed inwardly and rotated to the left. This causes the lugs 24 to slide along the inclined ribs 15 and follow them to their extremities with the lugs exiting in the groove between the ribs 15 and 17.

It will therefore be noted that if the shank is rotated to the left it is solidly locked thereon, and the shank extremity is bottomed against the bottom 22 of the bit. This is the drilling position. If the shank is pulled upon and rotated to the right, the bit will be released from its drilling position, but will be firmly locked on the shank, and if the shank is rotated to the right without being pulled upon and the bit is held, the shank will simply release itself completely from the bit.

Should the operator accidentally rotate the shank to the right without exerting any pull thereon, he will cause the inclined ribs 15 to engage the lugs 24 and release the shank from the bit. Should this occur, the shank can be immediately reinserted by rotating it to the left, thence the shank can be pulled upon and rotated to the right, which will hook the lugs in the pocket 25, for withdrawal.

The bit can be, of course, provided with either a central water hole 26 or with side wall water holes as indicated at 27, as desired.

While a specific form of the improvements has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. Means for attaching a rock drill bit to a drill shank comprising: a reduced extremity on said shank; inclined ribs formed on opposite sides of said reduced extremity; a circumferentially extending shoulder formed on one side of each rib; a socket in said bit conforming in shape to the reduced extremity; lugs on the opposite sides of the socket positioned so that when the shank is rotated in one direction they will follow down the inclined sides of the ribs and when rotated in the other direction, will follow upwardly along the shouldered sides of the ribs to engage the shoulder thereon to prevent withdrawal of the shank; ratchet-like projections on the extremity of said shank; and ratchet teeth in the bottom of said socket for engaging said projec-

tions to prevent rotation of the shank in one direction in the socket.

2. Means for attaching a rock drill bit to a drill shank comprising: a reduced extremity on said shank; inclined ribs formed on opposite sides of said reduced extremity; a circumferentially extending shoulder formed on one side of each rib; a socket in said bit conforming in shape to the reduced extremity; and lugs on the opposite sides of the socket positioned so that when the shank is rotated in one direction they will follow down the inclined sides of the ribs and when rotated in the other direction, will follow upwardly along the shouldered sides of the ribs to engage the shoulder thereon to prevent withdrawal of the shank; ratchet-like projections on the extremity of said shank; and ratchet teeth in the bottom of said socket for engaging said projections to prevent rotation of the shank in one direction in the socket, said teeth being relatively narrow so that rotation is prevented only when the shank is fully inserted in the socket.

3. Means for attaching a rock drill bit to a drill shank comprising: a reduced extremity on said shank; inclined ribs formed on opposite sides of said reduced extremity; a circumferentially extending shoulder formed on one side of each rib; a socket in said bit conforming in shape to the reduced extremity; and lugs on the opposite sides of the socket positioned so that when the shank is rotated in one direction they will follow down the inclined sides of the ribs and when rotated in the other direction, will follow upwardly along the shouldered sides of the ribs to engage the shoulder thereon to prevent withdrawal of the shank, said inclined ribs terminating in spaced relation to the extremity of the reduced portion; and a circumferential rib extending to the left from the extremity of each inclined rib to act as a hook to engage said lugs to prevent withdrawal of the shank.

4. Means for attaching a rock drill bit to a drill shank comprising: a reduced extremity on said shank; inclined ribs formed on opposite sides of said reduced extremity; a circumferentially extending shoulder formed on one side of each rib; a socket in said bit conforming in shape to the reduced extremity; lugs on the opposite sides of the socket positioned so that when the shank is rotated in one direction they will follow down the inclined sides of the ribs and when rotated in the other direction, will follow upwardly along the shouldered sides of the ribs to engage the shoulder thereon to prevent withdrawal of the shank, said inclined ribs terminating in spaced relation to the extremity of the reduced portion; a circumferential rib extending to the left from the extremity of each inclined rib; and a hook-shaped rib extending rearwardly from the extremity of the circumferential rib to form a hook to engage said lugs to prevent withdrawal of the shank.

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