May 27, 1930. E. E. MILLER 1,760,310

ROCK DRILL

Filed June 22, 1927

Fig. 1.

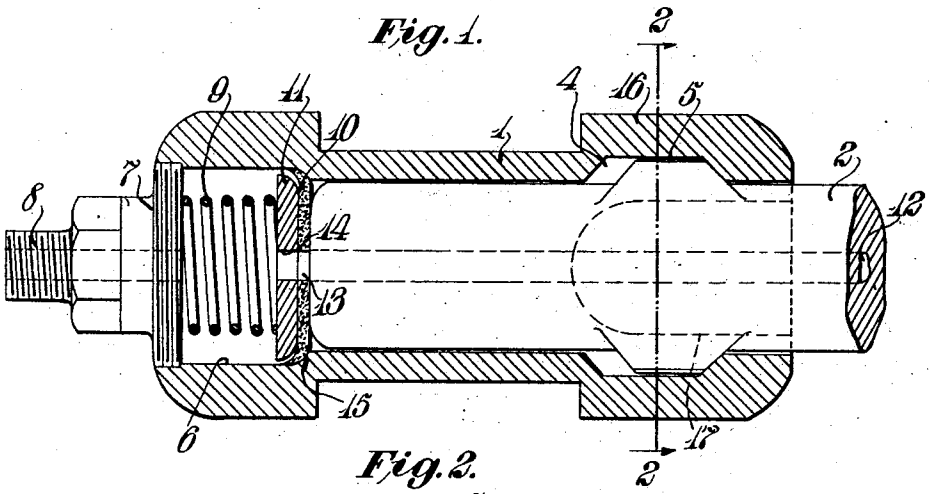


Fig. 2.

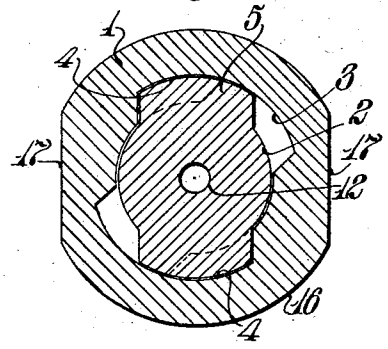
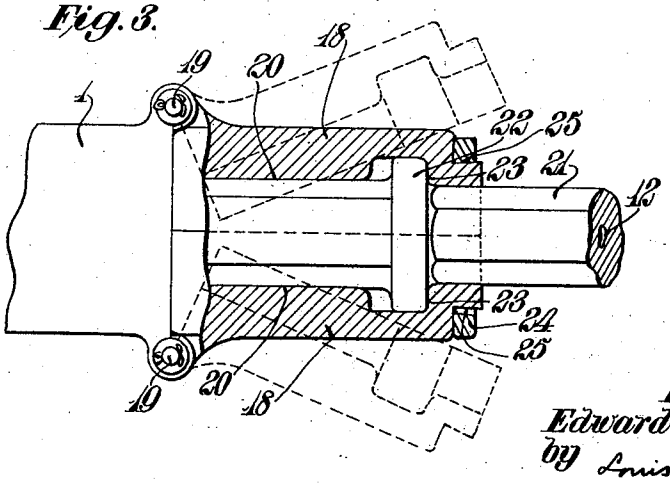


Fig. 3.



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UNITED STATES PATENT OFFICE

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ROCK DRILL

Application filed June 22, 1927. Serial No. 200,704.

My invention relates to rock drills.

It has for an object to provide an improved device of very simple and rugged character adapted to be used for loosening stuck drill steels. A more specific object is to provide a device for loosening stuck drill steels having improved means for supplying pressure fluid to the bore of the drill steel and improved means for preventing leakage around the drill steel. Other objects and advantages will hereinafter more fully appear.

In the accompanying drawings there are shown for purposes of illustration two forms which my invention may assume in practice.

In these drawings,—

Fig. 1 is a central sectional view through one form of my improved device, showing the same applied to the shank of a drill steel.

Fig. 2 is a transverse sectional view on line 2—2 of Fig. 1.

Fig. 3 shows a modification of the front end construction of my device.

In the form of my invention shown in Figs. 1 and 2 there is shown a cap member or socket member 1 mounted on the shank of a round drill steel 2. This socket member 1 has a longitudinally extending recess 3 and a laterally extending recess 4 adapted to receive lugs 5 on the drill steel. This front end construction of the member 1 is similar to that of the chuck in a drilling machine for receiving a lugged drill steel of this type. The rear end of the cap member is provided with an enlarged bore 6 into which is fitted a plug 7 having means 8 for connection to a fluid pressure supply. Disposed within the enlarged bore 6 is a spring 9 bearing against the forward face of the plug 7, a packing member 10 of resilient material at the forward end of the bore, and a metal washer 11 disposed between the spring 9 and packing 10. It will be observed that the drill steel is provided with the usual longitudinal bore 12 for conducting cleansing fluid to the forward end of the drill steel, and packing 10 and metal washer 11 are provided with apertures 13 and 14 respectively, disposed in line with the passage 12 so that fluid may pass from the bore 6 into the bore of the drill steel as will be apparent from the drawings. It will be observed that the packing 10 is held directly against the end of the drill steel by the action of the spring 9 and washer 11 and when the steel is removed from the device the packing member bears against the shoulder 15 formed in the socket member at one end of the enlarged bore 6. At the forward end of the member 1 and formed on the enlarged portion 16 are provided flat surfaces 17 for the purpose of receiving a wrench to assist in the loosening operation.

The operation of this form of my device will be apparent from the drawings and above description. When it is observed that the drill steel is stuck in its hole, the drilling machine is removed from the shank of the steel and the cap member 1 is inserted over the same, the lugs 5 of the drill steel passing longitudinally through the recesses 3 and then rotated into the lateral recesses 4 whereby the cap member is locked rigidly to the shank of the steel against longitudinal movement. Compressed air or water under pressure is then admitted through the connection 8 into the bore 6, forcing the packing member 10 into sealing engagement with the end of the drill steel and also clamping the cap member to the shank of the drill steel by the longitudinal pressure upon the lugs 5. As will be apparent, pressure fluid flows through the bore 12 to thoroughly cleanse the hole and assist in the loosening operation. At the same time a wrench may be applied to the flat surfaces 16 and the steel positively rotated in a clockwise direction as viewed in Fig. 2, whereupon the steel is loosened, the fluid pressure is cut off, the member 1 removed from the steel, and the drilling operation again resumed.

In the modified construction shown in Fig. 3 the forward end of the member 1 takes the form of a plurality of hinged members 18 pivotally connected to the casing as at 19. The members 18 have recesses 20 formed to fit a hexagonal drill steel 21 having a retaining collar 22 thereon. Recesses 23 are also formed in the members 18 for cooperation with the retaining collar 22. A holding ring 24 is mounted on the reduced extensions 25 for retaining these members in operative po-

sition. The members 18 are shown in dotted line position to which they are moved when it is desired to remove or insert a drill steel. Otherwise the construction of the modification shown in Fig. 3 and the operation thereof is identical with that shown in Figs. 1 and 2.

While I have in this application specifically described two forms which my invention may assume in practice, it will be understood that these forms are shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a device for freeing stuck drill steels, a hollow cap member adapted to receive the shank of the drill steel, means for passing pressure fluid through said cap member directly to the longitudinal bore at the end of the steel, and fluid pressure held means carried by said cap member for providing a seal between said cap member and said steel.

2. In combination, a drill steel having a bore therethrough for conducting cleansing fluid, a socket member adapted to be attached to one end of said steel and having means for connection to a source of cleansing fluid supply and means for conducting fluid to a longitudinal passage through the end of said steel, and a sealing member carried by said cap member adapted to be held in tight engagement with said cap member and steel by pressure of said cleansing fluid against the same.

3. In a device for freeing stuck drill steels, a socket member adapted to receive the shank of a drill steel, means for preventing relative rotative movement between said socket member and said steel, means for preventing outward movement of said steel from said member, means connected to one end of said member for supplying cleansing fluid to the bore of a drill steel, and a resilient packing member longitudinally adjustably carried by said socket member adapted to be held in engagement with said socket member and the end of said steel by the pressure of said cleansing fluid against the same, said socket member having means thereon whereby said steel may be rotated.

4. In combination, a drill steel of circular cross-section having lugs thereon, a cylindrical shank projecting beyond said lugs, and a bore therethrough for supplying cleansing fluid to the cutting end of the steel, a socket member having a bore to receive the cylindrical shank of said steel and having means thereon for engagement with said lugs to prevent relative rotative and longitudinal movement, means connected to said socket member for supplying cleansing fluid therethrough to said bore, means forming a seal between said socket member and steel, and means carried by said socket member for retaining said sealing means in position therein when the socket member is disconnected from said shank.

5. In combination, a drill steel of circular cross-section having lugs thereon and a bore therethrough for supplying cleansing fluid to the cutting end of the steel, a socket member having a bore to receive the shank of said steel and having means at the front end thereof for engagement with said lugs to prevent relative rotative and longitudinal movement, means connected to said socket member for supplying cleansing fluid therethrough to said bore, means forming a seal between said socket member and steel, said latter means comprising a resilient packing washer mounted in said socket member for bodily longitudinal adjustment relative thereto and adapted to be held against the end of said steel by fluid pressure in said socket member, and means for retaining said washer in position in said socket.

6. In combination, a drill steel having a bore therethrough for conducting cleansing fluid to the cutting end of the steel, a device for freeing the steel in the event of its becoming stuck in the hole, comprising a member adapted to be clamped against relative rotative movement on the shank of the steel, said member having means at its outer end for supplying pressure fluid therethrough to said bore, a packing washer mounted in said member for bodily longitudinal adjustment relative thereto and adapted to be held against the end of said steel by fluid pressure and having an aperture therein in alinement with said bore, a spring in said member also tending to hold said washer in engagement with the steel, and means for retaining said washer and spring in said socket while being connected with said shank.

7. In a device for freeing stuck drill steels, a socket member adapted to receive the shank of the drill steel, means for supplying pressure fluid through said cap member to a bore in said steel, fluid pressure held means carried by said socket and bodily adjustable longitudinally therein for providing a seal between said cap member and said steel, means in said socket adapted to engage the drill steel to prevent relative rotation between the socket and steel, and flat exterior surfaces on said socket to form a wrench engaging portion whereby said steel may be rotated.

8. In combination, a drill steel having a bore therethrough for conducting cleansing fluid, a socket member adapted to be attached to one end of said steel and having means for connection to a source of cleansing fluid supply, and a sealing member mounted in said socket and bodily movable longitudinally relative thereto adapted to be held in engagement with said cap member and steel and a shoulder in said socket member for limiting

movement of said member and retaining said sealing member in said socket.

9. In combination, a drill steel having a bore therethrough for conducting cleansing fluid, a socket member adapted to receive the shank of said drill steel, means for preventing outward movement of said steel from said member, said socket member having bores of different diameters providing a shoulder therebetween, a connection fitting in the larger of said bores for supplying cleansing fluid to a bore in the drill steel, a packing member slidable longitudinally in said larger bore adapted to engage said shoulder and the end of said drill steel, a metal washer in said larger bore of larger size than the smaller of said bores and a spring acting between said connection and said washer to press the washer against said packing member to hold the latter against said shoulder and drill steel.

In testimony whereof I affix my signature.

EDWARD E. MILLER.