

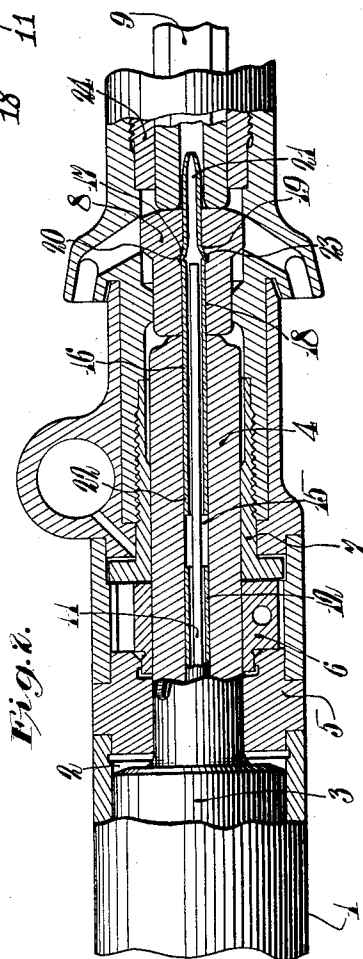
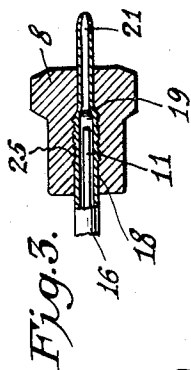
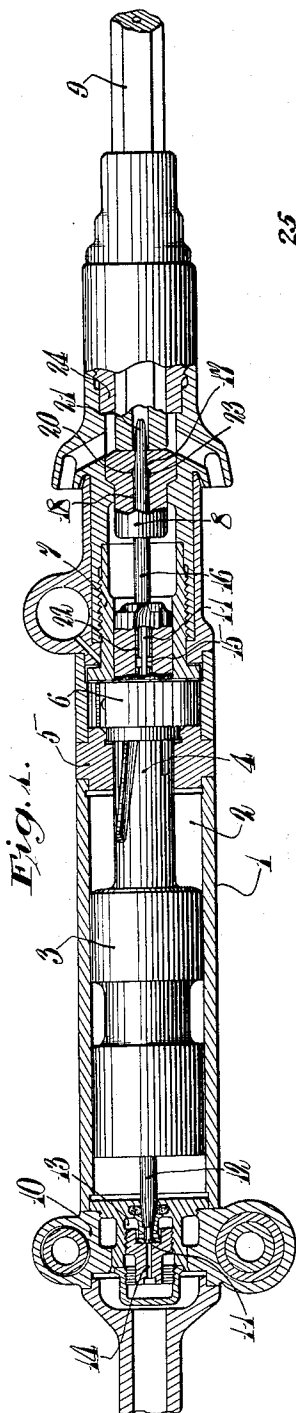
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E. G. GARTIN

ROCK DRILL

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Inventor:
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by
[Signature]
Att'y.

UNITED STATES PATENT OFFICE.

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ROCK DRILL.

Application filed October 22, 1921. Serial No. 509,693.

My invention relates to rock drills, and more particularly to cleansing fluid supply devices for use in supplying cleansing fluid to the drilled hole.

5 An object of my invention is to provide an improved drilling mechanism. Another object of my invention is to provide an improved cleansing fluid supply mechanism for use with drilling devices. A further object of my invention is to provide an improved cleansing fluid mechanism for use in rock drilling apparatus whereby the parts most frequently subject to breakage may be readily replaced and with a minimum of expense.

15 In the accompanying drawings I have shown for purposes of illustration one form which my invention may assume in practice.

In these drawings,—

20 Fig. 1 is a central longitudinal section through a drilling motor provided with the illustrative embodiment of my improved cleansing fluid supply means.

25 Fig. 2 is a similar view on an enlarged scale, certain parts being shown in different relative positions.

Fig. 3 shows a modified form of fastening means for a portion of the cleansing tube.

30 In the accompanying drawings I have shown a drilling apparatus comprising a motor 1 having a cylinder 2 in which a piston 3 is reciprocated, the motor piston 3 having a striking bar 4 formed thereon and the latter projects through a front head 5 and ratchet mechanism 6 into the rear end of a chuck mechanism 7. Within the chuck mechanism is arranged a striking plug 8 which is adapted to transmit the blow struck by the striking bar 4 to the rear end of a hollow drill steel 9. Secured in the rear head 10 of the motor 1 are coaxially arranged tubes 11 and 12, the tube 12 having air supplied thereto in a well known manner from a chamber 13 while liquid cleansing fluid is supplied by way of a passage 14 to the inner tube 11.

40 It has been found in practice that if the cleansing fluid supply tubes are not projected into the rear end of the hollow drill steel, there is material loss in efficiency and increase in discomfort to the drill runner due to leakage and at times the water tends to work back into the cylinder and cause trouble. On the other hand, if steels are

carelessly sharpened so that the hole extending through them is not centrally formed at the rear end or the steel shanks are defective so that sharp edges are formed thereon, there is frequently trouble due to breakage or cutting off of the tubes which are so formed as to project beyond the striking block and into the bore of the steel. I have accordingly terminated the water supply tube 11 within the striking plug and terminated the air supply tube 12 within the limits of the striking bar 4 of the piston and, to provide for the conduction of the air led through tube 12 to the striking plug and so through it and to the steel with a minimum of loss, have provided improved mechanism connected to the striking plug 8 in such manner that it may be readily replaced. This mechanism comprises a tube 16 whose rear end has a snug sliding fit with a bore 15 extending through the piston and striking bar. The tube 16 has a shoulder 17 formed thereon and fits in a differential bore 18 in the striking plug. It will be noted that at the point 19 the bore 18 of the striking plug is provided with a taper and near the larger end of the taper is formed a small annular enlargement of still greater size, this being designated 20. It will be noted that the short tube section 16 is provided with a forward end 21 of such size as to fit freely within the hole of a drill steel 9 and that, as stated above, its rear end 22 has a smooth sliding fit with the interior of the bore 15 extending through the striking bar and that it is mounted in the striking plug 8 and held in position with respect thereto by a bead 23 interlocking with the annular groove 20. When one of these tubes is to be placed in the striking block, it is forced forward until its shoulder 17 fits against the shoulder in the block and a mandrel having an end equal in diameter to the full diameter of the bore of the tube 16 is driven down and, engaging the taper, the mandrel drives out the bead 23 to fill the groove 20. The tube portion 16 is then rigidly, but readily removably, held in the striking block 8 and may be driven or pulled out without undue difficulty. It will of course be understood that the tube 16 has a driving fit in the bore 18 and so is for that reason held more securely therein. It will be understood that other methods of holding

the tube 16 in position may be employed, e. g. by making it of somewhat heavier stock it may be threaded and screwed in place as at 25. The particular mode of securing it in position, however, may be varied without departing from my invention, this being a feature belonging in the mechanic's field.

From the foregoing description the mode of operation of my improved mechanism will be readily apparent. The tube 16 being held in the striking plug and extending into the striking bar constitutes with the passage in the striking bar a continuous connection between the hollow drill steel and the air tube and also serves as a conducting means for the liquid cleansing fluid passing through the tube 11. When the tube 16 has been damaged by an improperly formed drill steel so as to require repair, the chuck bushing shown at 24 may be unscrewed and the striking block readily withdrawn. After the striking plug has been taken out the damaged tube may be cut off and pulled or driven out and a new tube replaced as previously described. This is obviously a much simpler operation than taking down the rear end of the drill motor after disconnecting the feeding mechanism in order to reach a tube held therein, and is also considerably less expensive than replacing the larger length of the tube 12 or even the tube 11.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in 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 drilling apparatus, the combination with a drilling motor having a cylinder and a piston reciprocable therein, said piston having a longitudinally extending bore, of cleansing fluid supply means including means for supplying fluid to said bore, and a fluid conduit portion for conducting fluid from said bore to a hollow drill steel and having its rear end projecting freely into said bore and its forward end projecting freely into the hollow drill steel, said conduit portion being replaceable from the front end of the apparatus.

2. In a drilling apparatus, the combination with a drilling motor having a cylinder and a piston reciprocable therein, said piston having a longitudinally extending bore, of cleansing fluid supply means including means for supplying fluid from the rear end of the apparatus to said bore, and a fluid conduit portion for conducting fluid from said bore to a hollow drill steel and having its main support intermediate its ends and having its rear end projecting freely into

said bore and its forward end projecting freely into the hollow drill steel, said conduit portion being withdrawable from and insertible in said bore at the forward end of the apparatus.

3. In a drilling apparatus, the combination with a drilling motor having a cylinder, a piston reciprocable therein, said piston having a longitudinally extending bore, and an axially bored striking plug, of cleansing fluid supply means including means for supplying fluid from the rear end of the apparatus to said bore, and a fluid conduit portion for conducting fluid from said bore projecting rearwardly freely into the latter and extending forwardly through said striking plug into the rear end of a hollow drill steel, said conduit portion being withdrawable from said bore in a forward direction.

4. In a drilling apparatus, the combination with a drilling motor having a cylinder, a piston having a bore, and a hollow striking plug disposed to receive the impact of said piston, of cleansing fluid supply means including means for supplying fluid to said bore, and a tube rigidly secured in said plug and projecting freely into said bore for conducting fluid therefrom to a hollow drill steel.

5. In a drilling apparatus, the combination with a drilling motor having a cylinder, a piston having a bore, and a hollow striking plug disposed to receive the impact of said piston, of cleansing fluid supply means including means for supplying fluid to said bore, and a tube rigidly secured in said plug and projecting freely at its rear end into said bore for conducting fluid therefrom, said tube projecting at its forward end into the rear end of a hollow drill steel.

6. In a drilling apparatus, the combination with a drilling motor comprising a plurality of parts including a drill steel actuating member, of cleansing fluid supply means including fluid passage forming means extending through said actuating member into a hollow drill steel, said means comprising a plurality of separate cooperating fluid conducting members, and separate supporting means therefor positioned at and removable from opposite ends of said actuating member without dismantling the motor parts, the supporting means for each of said members being individual thereto.

7. In a drilling apparatus, the combination with a drilling motor comprising a plurality of parts including a drill steel actuating member, of cleansing fluid supply means including a fluid passage forming means extending through said actuating member into a hollow drill steel, said means comprising a plurality of separate cooperating fluid conducting members, supporting means for said members individual to each of the same and positioned at opposite ends

of said actuating member, and means whereby one of said supporting means can be withdrawn from the forward end of the apparatus without dismantling the motor parts.

5 8. In a drilling apparatus, the combination with a drilling motor having drill steel actuating means having a bore, of cleansing fluid supply means including means for supplying fluid to said bore, and a detachable
10 tube having its rear end terminating within said bore, and means forming the main support for said tube carried within the forward end of the apparatus.

15 9. In a drilling apparatus, the combination with a drilling motor having drill steel actuating means having a bore, of cleansing fluid supply means comprising means for supplying fluid to said bore, and a detachable
20 tube having its rear end terminating within said bore and constantly overrun thereby, and means forming the main support for said tube carried within the forward end of the apparatus.

25 10. In a drilling apparatus, the combination with a drilling motor comprising a plurality of parts including drill steel actuating means having a bore, of cleansing fluid supply means including means for supplying fluid to said bore, and a detachable tube having
30 its rear end terminating within said bore, means forming the main support for said tube carried within the forward end of the apparatus, and means for withdrawing said tube from the front end of the apparatus
35 without dismantling the motor parts.

11. In a drilling apparatus, the combination with a drilling motor comprising a plurality of parts including drill steel actuating means having a bore, of cleansing fluid
40 supply means including means for supplying fluid to said bore, and a plurality of tubes, the front end of one tube and the rear end of the other tube extending freely into and terminating within said bore, one of said
45 tubes being removable from the forward end of the apparatus without dismantling the motor parts.

12. In a drilling apparatus, a drilling motor adapted to actuate a hollow drill steel
50 and including a striking plug, and means for conducting cleansing fluid to said drill steel including a fluid conducting tube rigidly secured within said apparatus and a tube carried by said striking plug.

13. In a drilling apparatus, a drilling motor adapted to actuate a hollow drill steel
55 and including a striking plug, and means for conducting cleansing fluid to said steel including a fluid conducting tube rigidly carried by said apparatus and removable rearwardly therefrom and a cooperating tube
60 carried by said striking plug and removable longitudinally from the front end of said apparatus.

65 14. In a drilling apparatus, the combina-

tion with a drilling motor adapted to actuate a hollow drill steel and having a rear head member, of cleansing fluid supply means including a tube rigidly secured within said head member and projecting forwardly
70 within the motor, and a cooperating tube portion supported wholly within the forward end of the apparatus and projecting into the hollow drill steel, said tube portion being removable forwardly from said motor. 75

15. In a drilling apparatus, a drilling motor adapted to actuate a hollow drill steel and having a rear head and a striking plug, and fluid cleansing means including a tube rigidly secured within said head and a separate tube portion carried by said striking
80 plug and projecting into said hollow drill steel.

16. In a drilling apparatus, a drilling motor adapted to actuate a hollow drill steel
85 and having a rear head and a striking plug, and fluid cleansing means including a tube rigidly secured within said head and a separate communicating tube portion carried by said striking plug and projecting into said
90 hollow drill steel, said tube portion and said striking plug being simultaneously removable forwardly from said apparatus.

17. In a drilling apparatus, the combination with a drilling motor adapted to actuate
95 a hollow drill steel comprising a plurality of parts including a drill cylinder having a piston therein, said piston having a longitudinally extending bore, and a striking plug actuated by said piston, of cleansing fluid
100 supply means including means for supplying fluid to said bore, and a tube secured within said plug and extending into said hollow drill steel, said tube projecting freely into said bore, said tube also being removable
105 from the front end of the apparatus without dismantling the motor parts.

18. In a drilling apparatus, the combination with a drilling motor adapted to actuate
110 a hollow drill steel, and comprising a plurality of parts, and cleansing fluid supply means for said drill steel including a plurality of separate tubes one removable from the rear end of the apparatus and the other removable from and insertible in the front
115 end of said apparatus without dismantling the motor parts, said latter tube being supported wholly within the front end of the apparatus.

19. In a drilling apparatus, the combination with a drilling motor including a piston
120 adapted to actuate a hollow drill steel, said piston being provided with a longitudinally extending bore, of cleansing fluid supply means including a plurality of separate
125 tubes disposed in said bore, one of which supplies fluid to said bore while the other thereof conducts fluid from said bore to the hollow drill steel, one of said tubes being removable from the rear end of the appa- 130

ratus while the other tube is removable from and insertible in the front end of the apparatus.

20. In a drilling apparatus, a drilling motor including a piston adapted to actuate a hollow drill steel and a striking plug, said piston being provided with a longitudinally extending bore, and cleansing fluid supply means for said hollow drill steel including a plurality of fluid conducting tubes each having an end terminating within said bore while the other ends are secured within the rear end of said drilling apparatus and in said striking plug, respectively, and means for removing one of said tubes from the rear end of said apparatus while the other is removable from the front end of said apparatus.

21. In a drilling apparatus, the combination with a drilling motor including a hammer piston adapted to actuate a hollow drill steel, said piston having a longitudinally extending bore, of cleansing fluid supply means including means for supplying fluid to said bore, and a tube having its rear end terminating within and having sliding telescopic relation with the bore in said piston, said tube being adapted to receive pressure fluid from said bore at said end and its forward end terminating within said hollow drill steel, said tube being removable from and insertible in the front end of the apparatus.

22. In a drilling apparatus, the combination with a drilling motor including a hammer piston adapted to actuate a hollow drill steel, said piston having a longitudinally extending bore, of cleansing fluid supply means communicating with said steel including means for supplying fluid to said bore, and a detachable tube having its rear end terminating within and having sliding telescopic relation with the bore in said piston, said tube being adapted to receive pressure

fluid from said bore at said end and having its forward end terminating within said hollow drill steel, said tube having its main support between the ends thereof at the front end of said apparatus.

23. In a drilling apparatus, the combination with a drilling motor having a cylinder, a hollow piston reciprocable therein, and a hollow striking plug actuated thereby, of cleansing fluid supply means including a fluid conducting tube secured at its rear end within the apparatus and extending forwardly within said piston, and a cooperating detachable fluid conducting tube forming a continuation of said first mentioned tube and held in operative relation to the latter by said striking plug.

24. In a drilling apparatus, the combination with a drilling motor adapted to actuate a hollow drill steel and including a hollow striking plug, of cleansing fluid supply means for conducting cleansing fluid to said steel including a fluid conducting tube rigidly secured within the apparatus, and a cooperating detachable tube forming a continuation of said first mentioned tube and supported by said striking plug.

25. In a drilling apparatus, the combination with a drilling motor including a piston adapted to actuate a hollow drill steel, said piston having a longitudinally extending bore, and a hollow striking plug, of cleansing fluid supply means including a tube portion secured within the rear end of said motor and extending forwardly into the bore in said piston, and a cooperating detachable tube portion forming a continuation of said first mentioned tube and supported within said striking plug, said tube portion projecting through said striking plug into the rear end of said hollow drill steel.

In testimony whereof I affix my signature.
ELMER G. GARTIN.