

April 24, 1934.

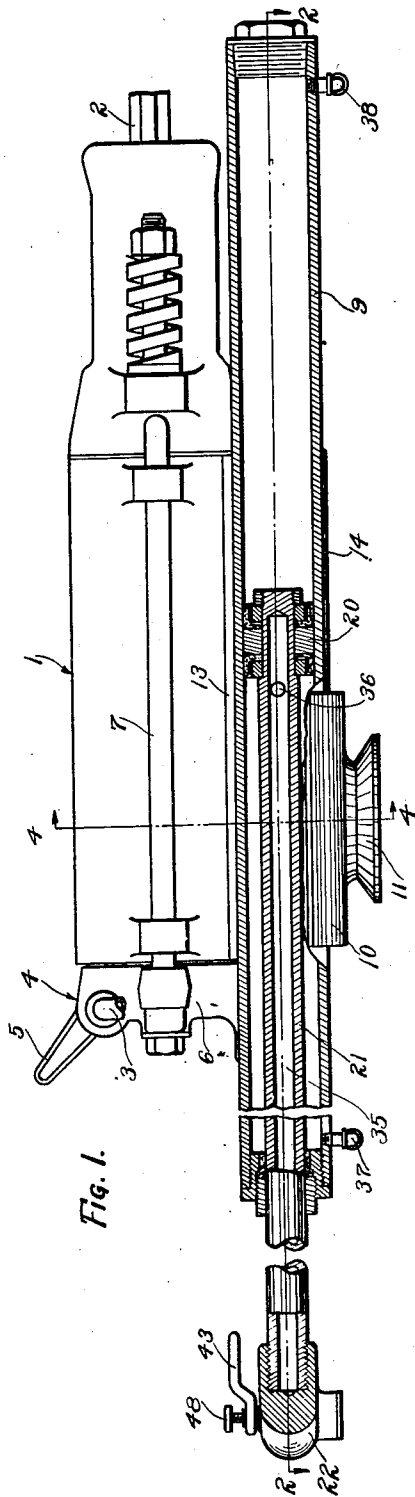
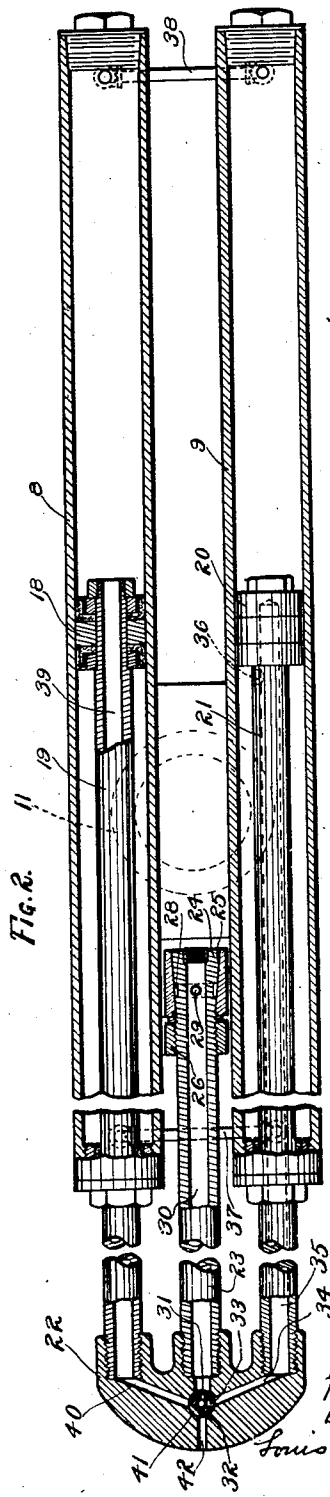
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DRILLING MECHANISM

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2 Sheets-Sheet 1



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Fig. 3.

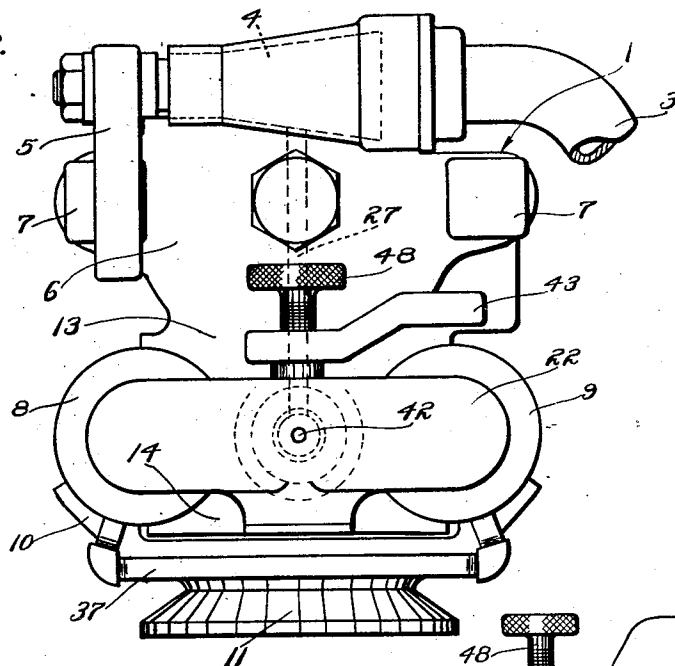


Fig. 5.

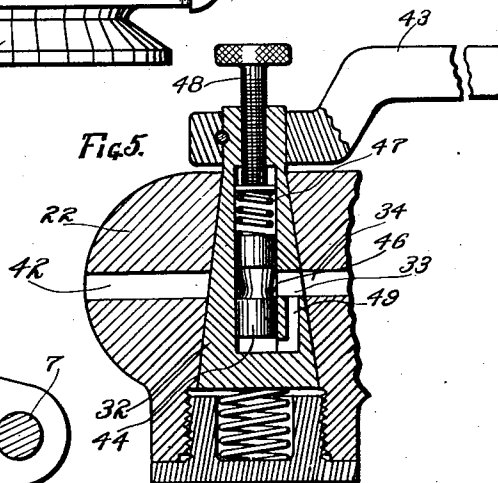
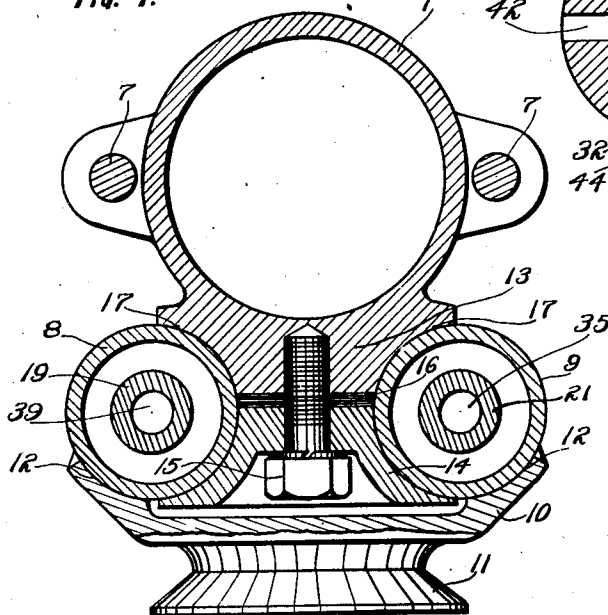


Fig. 4.



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DRILLING MECHANISM

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Application December 21, 1929, Serial No. 415,695
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47 Claims. (Cl. 121-9)

This invention relates to drilling mechanism and more particularly to an improved arrangement for supporting and feeding a drilling mechanism having preferably a percussive motor of the hammer type.

Drilling mechanisms particularly of the pneumatic feed drifter type, to which my invention especially relates, have heretofore been relatively heavy due to using a shell for supporting and guiding the hammer motor and for also carrying the feeding mechanism for the motor. This is particularly true where fluid operated feeding means is employed, as the cylinder and piston generally add considerable weight to the equipment. It is an object of my invention to provide an improved arrangement whereby a fluid operated feed may be employed while the weight of the machine is maintained at the lowest possible minimum thereby directly facilitating handling of the machine by the operator and also reducing the cost of manufacture and maintenance.

It is a further object of my invention to provide an improved arrangement whereby during the drilling operation tendency for turning about the trunnion will be reduced to a minimum without, however, adversely affecting ease of manipulation of the drill about its trunnion. A further object is to provide an improved pneumatic feed for the hammer motor and also to provide an improved supporting and guiding relation between the hammer motor and the pneumatic feed. A further and more specific object of my invention is to provide a multiple piston and cylinder feed with the cylinders transversely spaced apart and suitably supported upon a trunnion bracket and to use these cylinders to serve the guiding function of the usual shell. In my improved arrangement the hammer is provided with a suitable depending member which directly engages the opposed inner surfaces of the parallel feed cylinders and is guided thereby. A further object is to provide improved means whereby a constant feeding pressure may be applied to the drill steel irrespective of whether holes are being drilled downwardly, upwardly, or on the horizontal. Other objects and advantages of my improved arrangement will be seen from the following description of the accompanying drawings in which, for purposes of illustration, I have shown one form which my invention may assume in practice.

In these drawings,

Fig. 1 is a side elevation of a drifter with one

of the feed cylinders shown in section and parts thereof being shown in elevation.

Fig. 2 is a horizontal transverse section taken substantially on the line 2-2 of Fig. 1.

Fig. 3 is an enlarged end elevation looking at the left end of the machine in Fig. 1.

Fig. 4 is an enlarged transverse section taken substantially on the line 4-4 of Fig. 1.

Fig. 5 is an enlarged vertical section of the feed valve and feed throttle valve for maintaining substantially constant feeding force.

While I have shown the illustrative embodiment of my invention in the form of a drifter, it will of course be understood that the principles and structure embodied herein are applicable to other forms of drilling equipment although they are particularly adapted to meet the problems presented in drifter type drills of the pneumatic hammer type. As shown herein, a percussive motor 1 of any usual form, preferably of the hammer type, has a usual hammer adapted to impart in a well known manner, a series of blows to a drill steel 2. The actuating fluid for the hammer supplied through a usual inlet 3 is controlled by a plug valve generally indicated 4 and has a manually operable handle 5 all of which are carried on the rear head 6 of the percussive motor. This head is in turn held in its fixed relation to the drill motor by usual side rods 7. To support the motor and at the same time provide an improved fluid pressure feed while maintaining the weight of the equipment at a minimum, I have provided a pair of feed cylinders 8 and 9 spaced transversely and supported upon a suitable bracket 10 carried by a trunnion 11. The cylinders may be rigidly secured to the bracket 10 in any suitable manner such for instance as by welding at the joints 12. It will be seen from Figs. 1 and 2 that the bracket 10 extends a substantial distance along the cylinders 8 and 9 so as to provide ample support and also sufficient area for the welded joints 12. The trunnion 11 is supported in the usual manner in a saddle, not shown, to permit swiveling of the drifter. The hammer motor is supported directly on and between the cylinders 8 and 9 by the provision of a depending portion 13 which may be of any suitable longitudinal length so as to provide sufficient bearing surface while a clamping element 14 is removably secured to and spaced from the portion 13 as by a screw bolt 15 and shims 16. The elements 13 and 14 present semi-circular bearing surfaces 17 slidably engaging the inner portion of the periphery of the cylinders 8 and 9. As the bearing surfaces wear, the shims 16 may be varied in

thickness and the wear taken up. It is thus seen that the hammer motor is entirely supported by the feed cylinders without the use of any other elements, thereby causing the feed cylinders to perform all of the functions of the usual shell. The functions of the shell are thus accomplished without the use of the same.

A fluid operated feed is obtained by the provision of a piston 18 and hollow piston rod 19 for the cylinder 8 and a piston 20 and piston rod 21 for the cylinder 9, it being noted that the piston rod 19 is hollow throughout its length while the piston rod 21 is closed at its inner end. These rods extend rearwardly and are suitably secured in a transverse connecting head 22 as by being threaded therein. The hammer motor is likewise connected to this head by the provision of a hollow rod 23 preferably threaded into head 22 while the front end of the rod has an enlarged tapered portion 24 disposed in a correspondingly tapered bore of a portion 25 depending from the rear hammer motor head 6. A nut 26 tightens the rod 24 in the tapered bore of portion 25.

To feed the hammer motor forward, air pressure is admitted through the plug valve 4 whereupon the hammer motor may be operated as desired and from the plug valve fluid pressure flows through a passage 27 formed in the rear head 6 downwardly around an annular passage 28 through an opening 29 into passage 30, thence rearwardly through a port 31 in the feed control plug valve 32, through port 33 and a passage 34 communicating with a passage 35 in piston rod 21 from which fluid discharges through a port 36 into the rear end of cylinder 9, fluid pressure continuing from cylinder 9 through a transverse pipe 37 to the rear end of the other cylinder 8 thereby exerting fluid pressure force on the pistons 18 and 20 to feed the hammer motor forwardly. During this forward feed, air is discharged or vented from the other end of the feed cylinders in that fluid pressure in the right end of the cylinder 9 flows through a transverse pipe 38 into cylinder 8 and out through passage 39 in piston rod 19, passage 40 in connecting head 22, vent passage 41 of the feed control plug valve and atmospheric passage 42. To reverse the feed, feed control valve 32 is rotated clockwise 90 degrees, whereupon fluid pressure is admitted from passage 30 through groove or slot 41 to the passage 40 from which fluid flows through passage 39 and pipe 38 to effect a fluid pressure force on the right side of the pistons 18 and 20 and thus move the same rearwardly. At the same time air is vented from the other end of the feed cylinders as by passages 34, 31, 33 and 42.

The feed control valve 32 (Fig. 5) is provided with a suitable handle 43 to control either forward or reverse feed. In order to maintain substantially the same feeding force on the drill steel 2 when drilling "down hill", as when drilling horizontally or upwardly, there is provided within the feed valve 32 an automatic throttle valve 44 which is provided with an annular groove 46 and urged in one direction by a spring 47 which may be suitably adjusted by a screw 48. When the throttle valve is in the position shown in Fig. 5, fluid pressure may flow freely from passage 30 through ports 31 and 33 to the forward feed passage 34. If a hole is being drilled downwardly the normal pressure plus the weight of the various parts may create excessive feeding force so as to prevent proper rotation of the drill steel, and in order to reduce the fluid pressure feeding force the throttle valve 44 is

adjusted automatically by the provision of a passage 49 which communicates with the forward feed passage 34 and the lower end of the throttle valve 44. It will thus be seen that if excessive forward feeding pressure is present it may be diminished by making the valve 44 more responsive to the pressure upon the lower end thereof; as through passage 49 and thus restrict fluid flow through the ports 31 and 33 thereby reducing the feed pressure so as to maintain the proper degree of total feeding force. During reverse feed passage 49 communicates with the passage 42 but this will not be of any consequence as it is not necessary to control the reverse feed to prevent excessive feeding pressure.

It is thus seen that I have provided an extremely simple arrangement for a drifter type of drill using a pneumatic feed and which has a minimum amount of weight, thereby increasing the ease with which the drifter may be handled and also producing a drifter which is relatively cheap to manufacture considering the functions it is capable of performing. It will also be noted that in providing spaced cylinders and with the hammer motor disposed therebetween, the center line of the hammer motor is relatively close to the trunnion 11, thereby providing a short moment arm for the reactive force of the hammer motor. This reduces the tendency to vibrate the drill as a whole around the trunnion as the greater the moment arm, the greater the vibration.

While there is in this application specifically described one form which the 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 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. A drilling mechanism comprising a drilling motor, feeding mechanism including a piston and cylinder for feeding said motor, means for slidably supporting said motor on the cylindrical surface of said cylinder whereby said cylinder supports and guides said motor during feeding, thrust transmitting means including a connection between the rear end of the motor and said feeding mechanism, and means for supplying fluid pressure to said drilling motor and through said connection to said feed cylinder.

2. A drilling mechanism of the drifter type comprising a fluid operated percussive motor, feeding mechanism therefor including a plurality of substantially parallel feed cylinders transversely spaced apart relative to each other; and means for slidably supporting said drilling motor substantially centrally of said feed cylinders including a guide portion integral with said motor and extending downwardly between said feed cylinders, and feed pistons and piston rods in said cylinders operatively connected to said drilling motor.

3. A drilling mechanism of the drifter type comprising a fluid operated percussive motor, a pair of feed cylinders therefor, means for supporting said cylinders in transversely spaced relation, means for slidably supporting and guiding said drilling motor by said feed cylinders including a guide portion integral with said motor and extending downwardly between said feed cyl-

inders, and pistons and piston rods disposed in said cylinders and operatively connected to said drilling motor for feeding the same.

4. A drilling mechanism of the drifter type comprising a fluid operated percussive motor, a pair of feed cylinders therefor, means for supporting said cylinders in transversely spaced relation, means for slidably supporting and guiding said drilling motor by said feed cylinders including a guide portion integral with said motor and extending downwardly between said feed cylinders, and pistons and piston rods disposed in said cylinders and operatively connected to said drilling motor for feeding the same, the operative connections between said piston rods and drilling motor including a common transverse member rigidly fixed to each of the rods and a connecting element between said member and said drilling motor.

5. The combination set forth in claim 4 further characterized in that the connecting element extends rearwardly from said drilling motor for a substantial distance whereby the feed pistons and drilling motor may be disposed in substantially their rearmost position when the feed is substantially fully retracted.

6. A drilling mechanism of the drifter type comprising a fluid operated percussive drilling motor, a pair of feed cylinders secured together in transversely spaced relation, means for slidably supporting said drilling motor between and on said cylinders, pistons and piston rods in said cylinders, means for operatively connecting said piston rods to said drilling motor, and means for controlling supply of actuating fluid to said feed cylinders including passages within said piston rods.

7. The combination set forth in claim 6 further characterized in that the fluid passages for the feed operating pressure include a fluid connection between the rear ends of said cylinders.

8. The combination set forth in claim 6 further characterized in that the fluid passages for the feed operating pressure includes a fluid connection between the front ends of said cylinders.

9. The combination set forth in claim 6 further characterized in that fluid pressure connections for said feed cylinders include passages connecting both of the rear ends of the feed cylinders together and both of the front ends thereof together.

10. The combination set forth in claim 6 further characterized in that the fluid pressure for one of said cylinders first passes through the other of said cylinders.

11. The combination set forth in claim 6 further characterized in that fluid pressure from one of said cylinders is exhausted by passing through the other of said cylinders.

12. A rock drilling mechanism of the drifter type comprising a rock drill, and means for feeding and guiding said rock drill including a pair of feed cylinders secured together in transversely spaced relation, pistons reciprocably mounted in said cylinders and having rearwardly extending piston rods, a transverse member connecting the rear ends of said rods, a member arranged between and parallel with said piston rods and secured to said transverse member and extending forwardly into engagement with the rear end of the rock drill for connecting the rock drill to the feeding means, and means for supplying pressure fluid to said feed cylinders to effect reciprocation of said pistons including a passage extending through said connecting member, communicat-

ing passages formed in said transverse member and passages in said piston rods.

13. A rock drilling mechanism of the drifter type comprising a rock drill, and means for feeding and guiding said rock drill including a pair of feed cylinders secured together in transversely spaced relation, pistons reciprocably mounted in said cylinders and having rearwardly extending piston rods, a transverse member connecting the rear ends of said rods, a member arranged between and parallel with said piston rods and secured to said transverse member and extending forwardly into engagement with the rear end of the rock drill for connecting the rock drill to the feeding means, and means for supplying pressure fluid to said feed cylinders to effect reciprocation of said pistons including a passage extending through said connecting member, communicating passages formed in said transverse member and passages in said piston rods, and a valve carried by said transverse member for alternatively connecting the passage in said connecting member with the passages in said piston rods.

14. A rock drilling mechanism of the drifter type comprising a rock drill, and means for feeding and guiding said rock drill including a pair of feed cylinders secured together in transversely spaced relation, pistons reciprocably mounted in said cylinders and having rearwardly extending piston rods, a transverse member connecting the rear ends of said rods, a member arranged between and parallel with said piston rods and secured to said transverse member and extending forwardly into engagement with the rear end of the rock drill for connecting the rock drill to the feeding means, and means for supplying pressure fluid to said feed cylinders to effect reciprocation of said pistons including a passage extending through said connecting member, communicating passages formed in said transverse member and passages in said piston rods, and a valve carried by said transverse member for alternatively connecting the passage in said connecting member with the passages in said piston rods, the passage in one piston rod supplying fluid to one end of each feed cylinder to effect feed in one direction and the passage in said other piston rod supplying fluid to the other ends of the cylinders to effect piston reciprocation in the opposite direction.

15. In a rock drilling mechanism of the drifter type, a rock drill, and feeding and guiding means therefore including parallel feed cylinders, pistons reciprocably mounted in said cylinders and having piston rods, a connection between said piston rods and the rock drill, and means for supplying pressure fluid to said cylinders including a passage formed in one piston rod for supplying fluid to one end of each cylinder to effect piston reciprocation in one direction, and a passage in said other piston rod for supplying fluid to the other ends of said cylinders to effect piston reciprocation in the opposite direction.

16. In a rock drilling mechanism of the drifter type, a rock drill, and feeding and guiding means therefore including parallel feed cylinders, pistons reciprocably mounted in said cylinders and having piston rods, a connection between said piston rods and the rock drill, and means for supplying pressure fluid to said cylinders including a passage formed in one piston rod for supplying fluid to one end of each cylinder to effect piston reciprocation in one direction, and a passage in said other piston rod for supplying fluid to the other ends of said cylinders to effect piston recip-

location in the opposite direction, said fluid supply means including conduits one at each end of the cylinders for connecting the cylinder bores, one with the other.

5 17. A rock drilling mechanism of the drifter type comprising a rock drill, a pair of feed cylinders secured together in spaced relation and pistons reciprocable in said cylinders, and means for slidably supporting the rock drill between and
10 on said cylinders and maintaining the same in position thereon comprising laterally spaced arcuate guideways formed on the bottom portion of the rock drill and directly slidably engaging the upper cylindrical surfaces of the adjacent inner
15 sides of the feed cylinders, and a member secured to the rock drill and having arcuate guiding surfaces engaging the bottom cylindrical surfaces of the adjacent inner sides of the feed cylinders.

18. A rock drilling mechanism of the drifter type comprising a rock drill, a pair of feed cylinders secured together in spaced relation, means for slidably supporting the rock drill between and on said cylinders and maintaining the same in
20 position thereon comprising laterally spaced arcuate guideways formed on the bottom portion of the rock drill and engaging the upper cylindrical surfaces of the inner sides of the feed cylinders,
25 and a member secured to the rock drill and having arcuate guiding surfaces engaging the bottom cylindrical surfaces of the inner sides of the feed cylinders, and means for adjusting said member
30 thereon with respect to the first mentioned guiding surfaces.

19. In a rock drilling mechanism of the drifter type, a rock drill having a cylinder having formed on a bottom projection thereof laterally spaced arcuate guiding surfaces, and means for feeding
35 and guiding the rock drill including parallel feed cylinders and pistons reciprocably mounted in said cylinders, said rock drill projection extending downwardly between said cylinders with the arcuate guiding surfaces directly engaging the upper
40 cylindrical surfaces of the feed cylinders, and a member secured to the bottom of the drill cylinder and having laterally spaced arcuate guiding surfaces engaging the lower cylindrical surfaces of the feed cylinders.

20. In a rock drilling mechanism of the drifter type, a rock drill having a cylinder having formed on a bottom projection thereof laterally spaced arcuate surfaces, and means for feeding and guiding the rock drill including parallel feed cylinders and pistons reciprocably mounted in said cylinders,
55 said rock drill projection extending downwardly between said cylinders with the arcuate guiding surfaces directly engaging the upper cylindrical surfaces of the feed cylinders, and a member secured to the bottom of the drill cylinder and having laterally spaced arcuate guiding
60 surfaces engaging the lower surfaces of the feed cylinders, and means for adjusting said member relative to said drill cylinder.

21. In a rock drilling mechanism, a percussive drilling motor, and feeding means therefor including a pair of parallel feed cylinders, feed pistons in said feed cylinders having operative connections with said drilling motor and fluid supply and controlling means for said feed cylinders for conducting fluid first to one of said cylinders and thence to the other to effect forward feed,
70 and first to the latter cylinder and thence to the first to effect retraction.

22. In a drilling mechanism, a drilling motor, and pressure fluid feeding means therefor in-

cluding a plurality of feed cylinder and piston mechanisms arranged parallel to each other and of whose relatively reciprocable elements certain corresponding elements are stationary during feeding and other corresponding elements are
80 operatively connected to the drilling motor to transmit feeding movement thereto, and pressure fluid supply and controlling means for controlling said feeding means including means for supplying fluid first to one of said cylinders and
85 thence to another to effect forward feed, and first to the latter cylinder and thence to the former to effect retraction.

23. A rock drilling mechanism of the drifter type comprising a rock drill, a pair of feed cylinders secured together in spaced relation and pistons reciprocable in said cylinders, and means for slidably supporting the rock drill between and on said cylinders and maintaining the same in
90 position thereon comprising laterally spaced arcuate guideways attached to the bottom portion of the rock drill and directly slidably engaging the upper cylindrical surfaces of the adjacent inner sides of the feed cylinders, and a member
95 secured to the rock drill and having arcuate guiding surfaces engaging the bottom cylindrical surfaces of the adjacent inner sides of the feed cylinders.

24. In a rock drilling mechanism of the drifter type, a rock drill having a cylinder having attached thereto a bottom projection having laterally spaced arcuate surfaces, and means for feeding and guiding the rock drill including parallel feed cylinders and pistons reciprocably mounted in said cylinders, said rock drill projection
100 extending downwardly between said cylinders with the arcuate guiding surfaces directly engaging the upper cylindrical surfaces of the feed cylinders, and a member secured to the bottom of the drill and having laterally spaced arcuate
105 guiding surfaces engaging the lower surfaces of the feed cylinders, and means for adjusting said member relative to said drill.

25. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having rearwardly extending piston rods, an element connecting the rear ends of said piston rods together, means for
120 slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, and means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to the rear
125 end of the drilling tool and to said connecting element and arranged parallel with and between said piston rods.

26. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having rearwardly extending piston rods, an element connecting the rear ends of said piston rods together, means for
135 slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, and means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to the rear
140 end of the drilling tool and to said connecting element and arranged parallel with and between said piston rods, said cylinders being so spaced as to permit said connecting member to move there-
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between as the drilling tool is fed forwardly along said feed cylinders.

27. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having rearwardly extending piston rods, an element connecting the rear ends of said piston rods together means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to the rear end of the drilling tool and to said connecting element and arranged parallel with and between said piston rods, and feed control mechanism including a valve carried by said connecting element for controlling the flow of pressure fluid selectively to the opposite ends of said cylinders to effect forward and reverse feed of the drilling tool.

28. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having rearwardly extending piston rods, an element connecting the rear ends of said piston rods together, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to the rear end of the drilling tool and to said connecting element and arranged parallel with and between said piston rods, and means for supplying pressure fluid to said cylinders and for regulating the pressure fluid supply thereto including a conduit formed in said connecting member, passages communicable with said conduit for supplying fluid to the cylinders and a valve carried by the drilling tool for controlling the flow of pressure fluid through said conduit.

29. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having rearwardly extending piston rods, an element connecting the rear ends of said piston rods together, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to the rear end of the drilling tool and to said connecting element and arranged parallel with and between said piston rods, means for supplying pressure fluid to said cylinders and for regulating the pressure fluid supply thereto including a conduit formed in said connecting member, passages communicable with said conduit for supplying fluid to the cylinders and a valve carried by the drilling tool for controlling the flow of pressure fluid through said conduit, and a reversing valve carried by said connecting element for controlling the flow of pressure fluid to the opposite ends of the cylinders.

30. A rock drilling mechanism of the drifter type comprising a drilling tool, a feed cylinder, a piston reciprocable in said cylinder, means for connecting the drilling tool to the feed piston for actuation thereby, and means for slidably supporting the drilling tool on said feed

cylinder and maintaining the same in position thereon comprising an arcuate guideway attached to the bottom portion of the drilling tool and directly slidably engaging the upper cylindrical surface of the feed cylinder, and a member secured to the drilling tool and having an arcuate guiding surface engaging the bottom cylindrical surface of the feed cylinder.

31. In a rock drilling mechanism of the drifter type comprising a drilling tool, a pair of parallel feed cylinders secured together in spaced relation, pistons reciprocable in said cylinders and having rearwardly extending piston rods, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, an element connecting the rear ends of said piston rods together, and means for connecting the drilling tool to said feed pistons for actuation thereby including a depending lug integral with the drilling tool and projecting downwardly between said feed cylinders, and a connecting member secured at its forward end to said lug and at its rear end to said connecting element.

32. In a rock drilling mechanism of the drifter type comprising a drilling tool, a pair of parallel feed cylinders secured together in spaced relation, pistons reciprocable in said cylinders and having rearwardly extending piston rods, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, an element connecting the rear ends of said piston rods together, and means for connecting the drilling tool to said feed pistons for actuation thereby including a depending lug integral with the drilling tool and projecting downwardly between said feed cylinders, and a connecting member secured at its forward end to said lug and at its rear end to said connecting element, said connecting member arranged parallel with said piston rods with its axis lying in a transverse plane including the piston rod axes.

33. In a rock drilling mechanism of the drifter type comprising a drilling tool, a pair of parallel feed cylinders arranged in transversely spaced relation, a bracket secured to said cylinders at the bottom portions thereof and extending transversely between said cylinders, a trunnion integral with said bracket for supporting the drilling mechanism, pistons reciprocably mounted in said cylinders and having rearwardly extending piston rods, and a connection between the rear ends of said piston rods and the rear end of the drilling tool.

34. A rock drilling mechanism of the drifter type comprising a drilling tool, a feed cylinder, means carried by the drilling tool for providing a concave bearing surface slidable directly on the periphery of said feed cylinder, a feed piston reciprocable in said cylinder and having a rearwardly extending piston rod, and means for operatively connecting the rear end of said piston rod to the rear end of said drilling tool to transmit feeding forces from one to the other.

35. A drilling mechanism comprising a drilling motor, feeding mechanism including a piston and cylinder for feeding said motor, means for slidably supporting said motor on the cylindrical surface of said cylinder whereby said cylinder supports and guides said motor during feeding, a connection between one end of said motor and said feeding mechanism for transmitting feeding forces from the latter to the former, and means for supplying fluid pressure to said drill-

ing motor and through said connection to said feed cylinder.

36. A rock drilling mechanism of the drifter type comprising a rock drill, and means for feeding and guiding said rock drill including a pair of feed cylinders secured together in transversely spaced relation, pistons reciprocally mounted in said cylinders and having projecting piston rods, a transverse member connecting the outer ends of said rods, a member arranged between and parallel with said piston rods and secured to said transverse member and extending longitudinally into engagement with one end of the rock drill for connecting the rock drill to the feeding means, and means for supplying pressure fluid to said feed cylinders to effect reciprocation of said pistons including a fluid conducting passage extending through said connecting member, communicating fluid conducting passages formed in said transverse member and communicating fluid conducting passages in said piston rods.

37. A rock drilling mechanism of the drifter type comprising a rock drill, and means for feeding and guiding said rock drill including a pair of feed cylinders secured together in transversely spaced relation, pistons reciprocally mounted in said cylinders and having projecting piston rods, a transverse member connecting the outer ends of said rods, a member arranged between and parallel with said piston rods and secured to said transverse member and extending longitudinally into engagement with one end of the rock drill for connecting the rock drill to the feeding means, means for supplying pressure fluid to said feed cylinders to effect reciprocation of said pistons including a fluid conducting passage extending through said connecting member, communicating fluid conducting passages formed in said transverse member and communicating fluid conducting passages in said piston rods, and a valve carried by said transverse member for alternatively connecting the passage in said connecting member with the passages in said piston rods.

38. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having rearwardly extending piston rods, an element connecting the rear ends of said piston rods together, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to the rear end of the drilling tool and to said connecting element and arranged parallel with and between said piston rods, and feed control mechanism including a valve carried by the drilling tool for controlling the flow of pressure fluid to the opposite ends of said feed cylinders.

39. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having rearwardly extending piston rods, an element connecting the rear ends of said piston rods together, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to the rear end of the drilling

tool and to said connecting element and arranged parallel with and between said piston rods, said cylinders being so spaced as to permit said connecting member to move therebetween as the drilling tool is fed forwardly along said cylinders, and feed control mechanism including a valve carried by the drilling tool for controlling the flow of pressure fluid to the opposite ends of said feed cylinders.

40. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having projecting piston rods, an element connecting the outer ends of said piston rods together, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to one end of the drilling tool and to said connecting element and arranged parallel with and between said piston rods, and feed control mechanism including a valve carrier by said connecting element for controlling the flow of pressure fluid selectively to the opposite ends of said cylinders to effect forward and reverse feed of the drilling tool.

41. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having projecting piston rods, an element connecting the outer ends of said piston rods together, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to one end of the drilling tool and to said connecting element and arranged parallel with and between said piston rods, and means for supplying pressure fluid to said cylinders and for regulating the pressure fluid supply thereof including a conduit formed in said connecting member, passages communicable with said conduit for supplying fluid to said cylinders, and a valve carried by the drilling tool for controlling the flow of pressure fluid to said conduit.

42. A rock drilling mechanism of the drifter type comprising a drilling tool, a pair of feed cylinders arranged in parallel side by side relation and rigidly secured together, pistons reciprocable in said cylinders and having projecting piston rods, an element connecting the outer ends of said piston rods together, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, means for connecting the drilling tool to the feed pistons for actuation thereby including a member secured to one end of the drilling tool and to said connecting element and arranged parallel with and between said piston rods, and means for supplying pressure fluid to said cylinders and for regulating the pressure fluid supply thereto including a conduit formed in said connecting member, passages communicable with said conduit for supplying fluid to said cylinders, a valve carried by the drilling tool for controlling the flow of pressure fluid to said conduit, and a reversing valve carried by said connecting element for controlling the flow of pressure fluid to the opposite ends of said cylinders.

43. A rock drilling mechanism of the drifter type comprising a drilling tool, a feed cylinder,

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- a piston reciprocable in said cylinder, means for connecting the drilling tool to the feed piston for actuation thereby, and means for slidably supporting the drilling tool on said feed cylinder and maintaining the same in position thereon comprising an arcuate guideway attached to the bottom portion of the drilling tool and directly slidably engaging the upper cylindrical surface of the feed cylinder, and a member secured to the drilling tool and having an arcuate guiding surface engaging the bottom cylindrical surface of the feed cylinder, said latter member being adjustable relative to said arcuate guideway to compensate for wear between the guideway and cylinder.
44. In a rock drilling mechanism of the drifter type comprising a drilling tool, a pair of parallel feed cylinders secured together in spaced relation, pistons reciprocable in said cylinders and having rearwardly extending piston rods, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, an element connecting the rear ends of said piston rods together, and means for connecting the drilling tool to said feed pistons for actuation thereby including a depending lug integral with the drilling tool and projecting downwardly between said feed cylinders, and a connecting member secured at its forward end to said lug and at its rear end to said connecting element and extending longitudinally in the space between said feed cylinders.
45. In a rock drilling mechanism of the drifter type comprising a drilling tool, a pair of parallel feed cylinders secured together in spaced relation, pistons reciprocable in said cylinders and having rearwardly extending piston rods, means for slidably supporting the drilling tool between and on said cylinders and maintaining the same in position thereon, an element connecting the rear ends of said piston rods together, and means for connecting the drilling tool to said feed pistons for actuation thereby including a depending lug integral with the drilling tool and projecting downwardly between said feed cylinders, and a connecting member secured at its forward end to said lug and at its rear end to said connecting element and extending longitudinally in the space between said feed cylinders.
46. In a rock drilling mechanism of the drifter type comprising a drilling tool, a pair of parallel feed cylinders arranged in transversely spaced relation, a bracket secured to said cylinders at the bottom portions thereof and extending transversely between said cylinders, a trunnion integral with said bracket for supporting the drilling mechanism, pistons reciprocably mounted in said cylinders and having rearwardly extending piston rods, and a connection between the rear ends of said piston rods and the rear end of the drilling tool and extending longitudinally in the space between said feed cylinders.
47. A rock drilling mechanism of the drifter type comprising a drilling tool, a feed cylinder, means carried by the drilling tool for providing a concave bearing surface slidable directly on the upper portion of the periphery of the feed cylinder, and a cooperating bottom element having a concave bearing surface slidable directly on the bottom portion of the cylinder periphery, a feed piston reciprocable in said cylinder and having a rearwardly extending piston rod, and means for operatively connecting the rear end of the piston rod to the rear end of said drilling tool for transmitting feeding forces from the one to the other.
- MERVIN C. HUFFMAN.

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