

March 15, 1938.

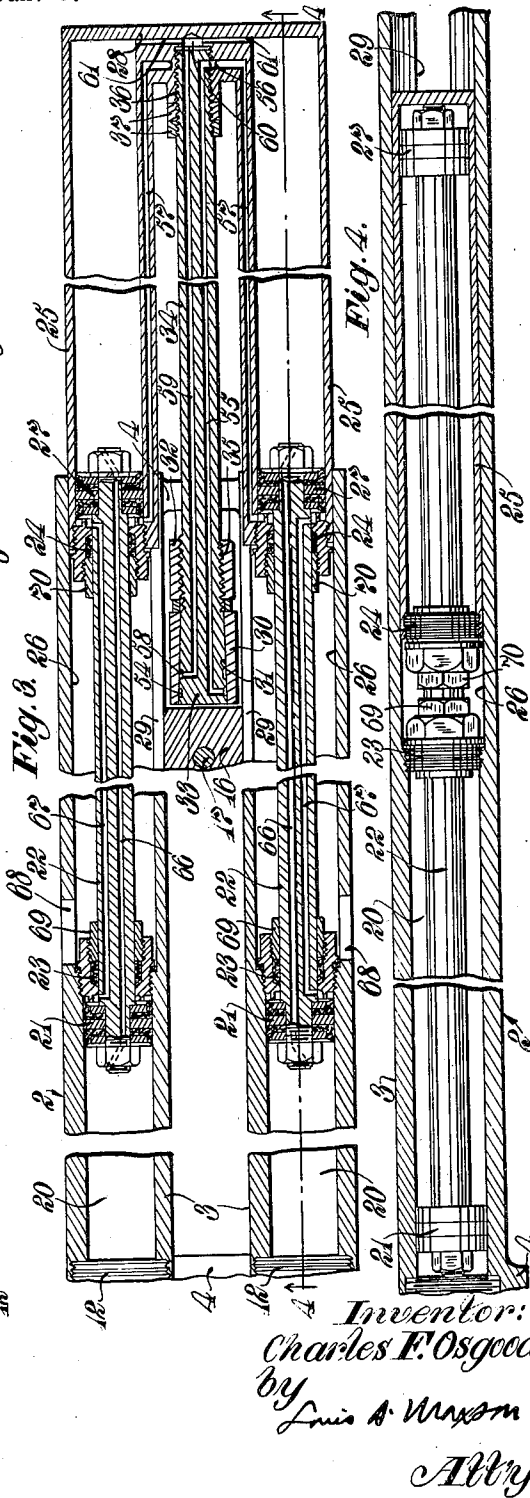
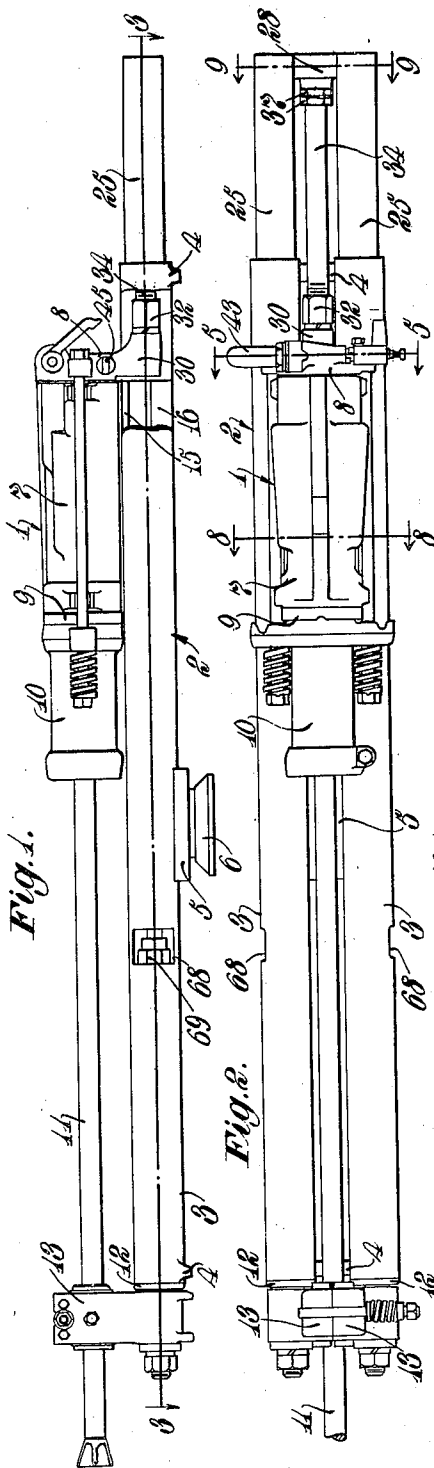
C. F. OSGOOD

2,111,033

ROCK DRILLING MECHANISM

Filed Jan. 3, 1936

4 Sheets-Sheet 1



March 15, 1938.

C. F. OSGOOD
ROCK DRILLING MECHANISM
Filed Jan. 3, 1936

2,111,033

4 Sheets-Sheet 2

Fig. 5.

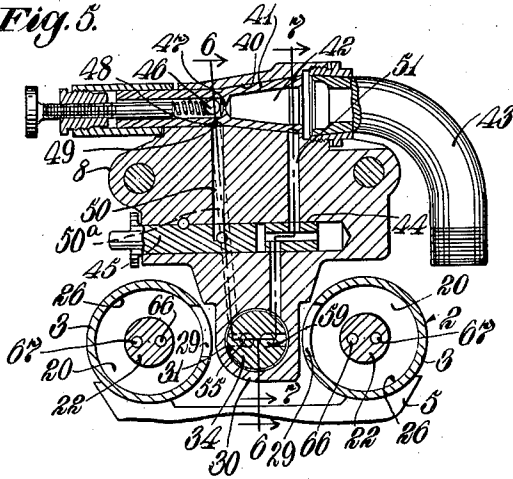


Fig. 6.

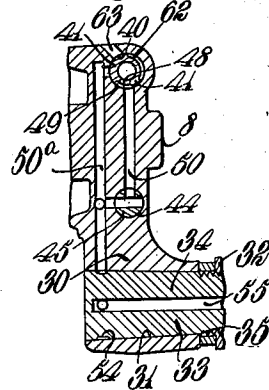


Fig. 8.

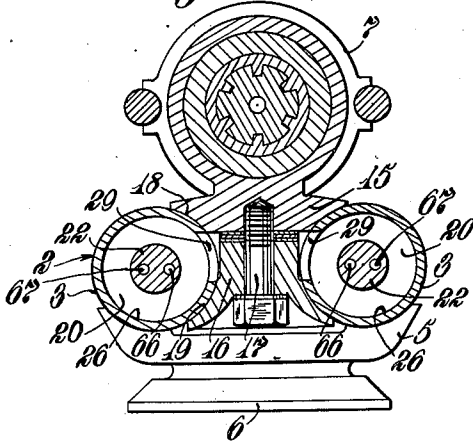


Fig. 7.

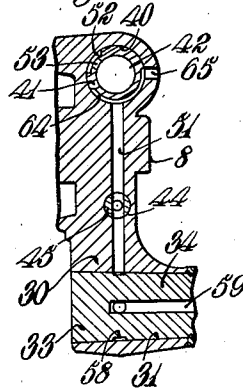
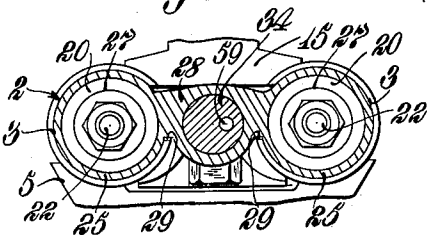


Fig. 9.



Inventor:
Charles F. Osgood.
By Louis A. Maxon.
Atty.

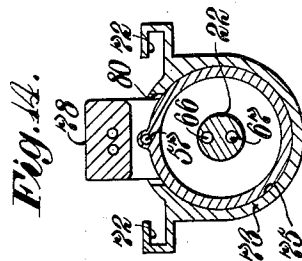
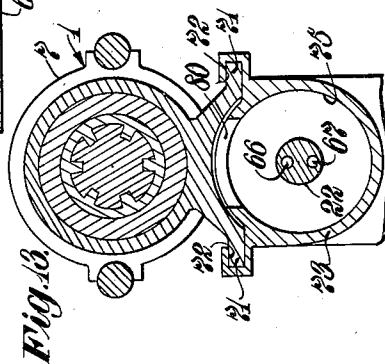
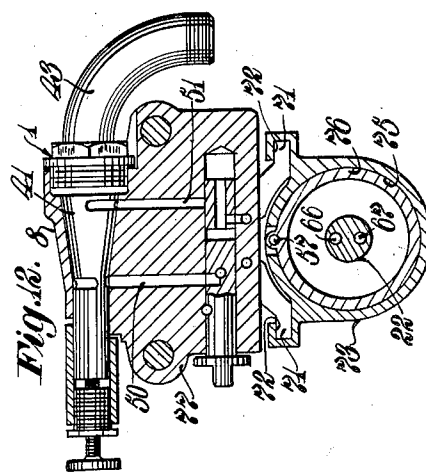
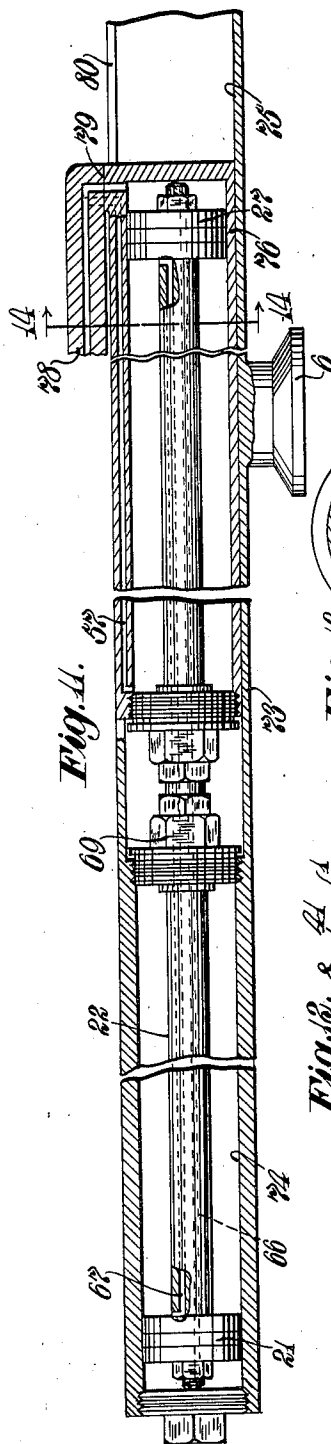
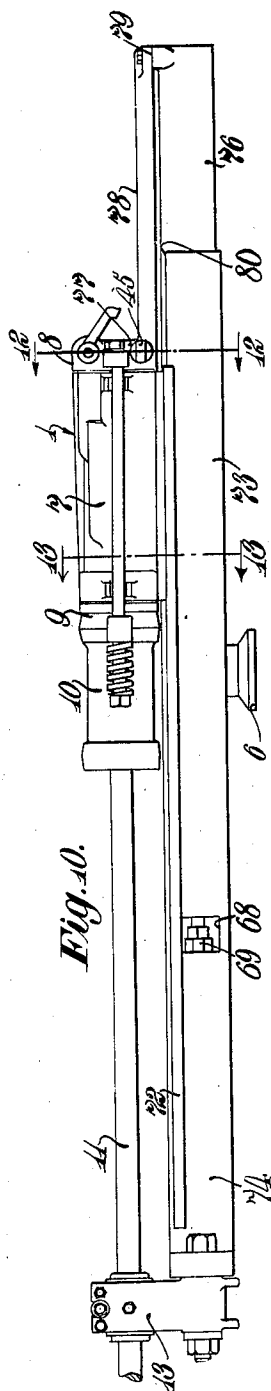
March 15, 1938.

C. F. OSGOOD
ROCK DRILLING MECHANISM

Filed Jan. 3, 1936

2,111,033

4 Sheets-Sheet 3



Inventor:
Charles F. Osgood
by Louis A. Maxson.
Atty.

March 15, 1938.

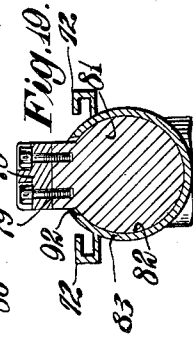
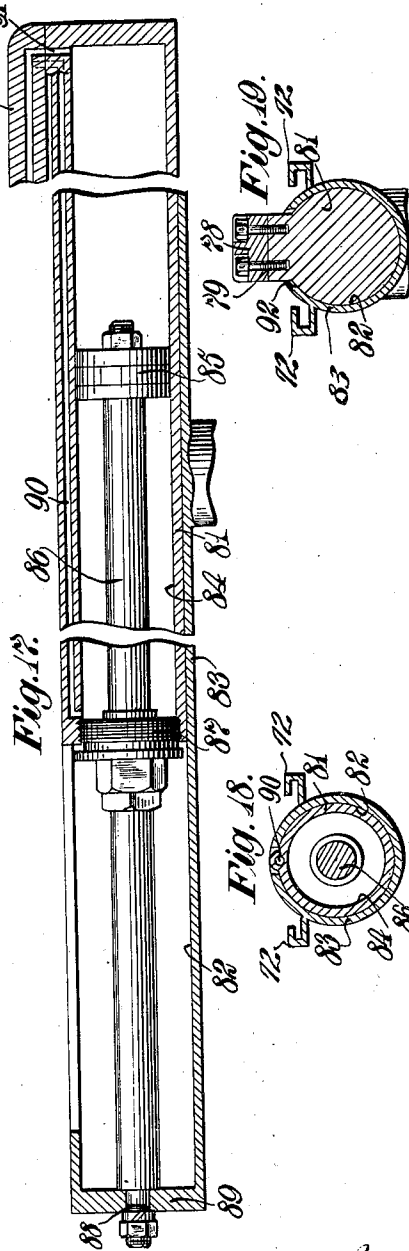
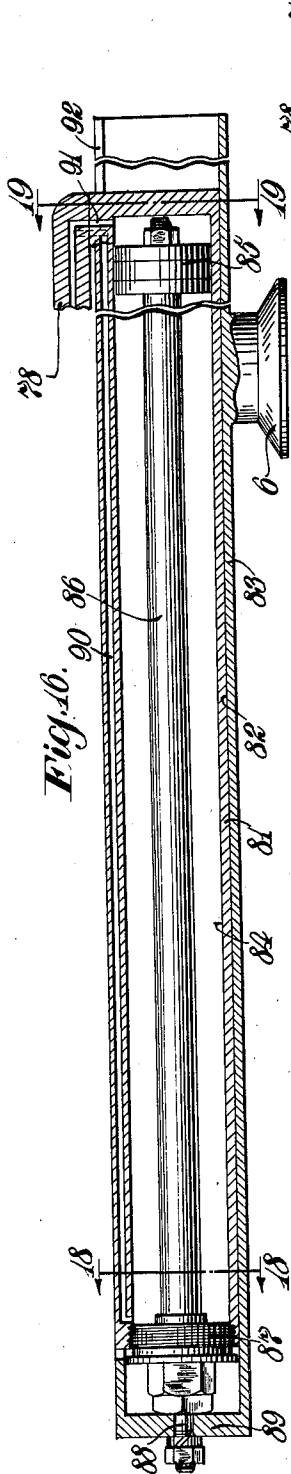
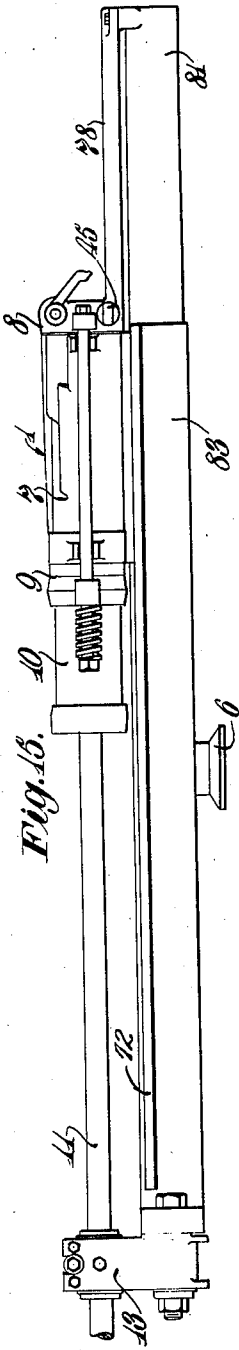
C. F. OSGOOD

2,111,033

ROCK DRILLING MECHANISM

Filed Jan. 3, 1936

4 Sheets-Sheet 4



Inventor:
Charles F. Osgood.
by Louis A. Wexler.
Atty.

UNITED STATES PATENT OFFICE

2,111,033

ROCK DRILLING MECHANISM

Charles F. Osgood, Claremont, N. H., assignor to
Sullivan Machinery Company, a corporation of
Massachusetts

Application January 3, 1936, Serial No. 57,394

20 Claims. (Cl. 121—9)

This invention relates to rock drilling mechanisms, and more particularly to improved feeding and guiding means for a hammer rock drill of the mounted type.

5 An object of this invention is to provide an improved rock drilling mechanism having improved feeding and guiding means whereby the rock drill is fed and guided in an improved manner. A further object is to provide an improved
10 tubular guiding structure having a guiding surface for guiding a feeding element of the feeding means and a guideway along which the rock drill is guided during the feeding operation and improved connections between said feeding element
15 and the rock drill. Yet another object is to provide an improved rock drill guide structure embodying a tubular guide member having a guiding surface along which the reciprocable feeding element of the feeding means is guided and hav-
20 ing improved guiding means for the rock drill and improved connections between said reciprocable feeding element and the rock drill. Yet another object is to provide an improved drill guide structure having a guiding surface within
25 its rearward portion for guiding the reciprocable feeding element of the feeding means and having extending along its forward portion a guiding surface for the rock drill and a connection between the rearward portion of the reciprocable
30 feeding element and the rear end of the rock drill. Another object is to provide an improved feeding and guiding structure for a rock drill whereby, with an extremely compact mechanism, a relatively long feeding travel for the drill is
35 attained. Other objects and advantages of the invention will, however, hereinafter more fully appear.

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

In these drawings:—

Fig. 1 is a side elevational view of one illustrative embodiment of the improved rock drilling mechanism.

45 Fig. 2 is a plan view of the rock drilling mechanism shown in Fig. 1.

Fig. 3 is an enlarged horizontal sectional view taken substantially on line 3—3 of Fig. 1, showing the feeding means in its fully extended position.
50

Fig. 4 is a view in longitudinal section taken substantially on line 4—4 of Fig. 3, showing the feeding means in its collapsed position.

Fig. 5 is an enlarged cross sectional view taken
55 substantially on line 5—5 of Fig. 2.

Fig. 6 is a detail sectional view taken substantially on line 6—6 of Fig. 5.

Fig. 7 is a detail sectional view taken substantially on line 7—7 of Fig. 5.

Fig. 8 is an enlarged cross sectional view taken
substantially on line 8—8 of Fig. 2.

Fig. 9 is an enlarged cross sectional view taken
substantially on line 9—9 of Fig. 2.

Fig. 10 is a view similar to Fig. 1 showing a
modified form of the invention. 10

Fig. 11 is an enlarged view in longitudinal section illustrating the improved feeding and guiding structure shown in Fig. 10, the rock drill being omitted to facilitate illustration.

Fig. 12 is a cross sectional view taken substantially on line 12—12 of Fig. 10.

Fig. 13 is a cross sectional view taken substantially on line 13—13 of Fig. 10.

Fig. 14 is a cross sectional view taken substantially on line 14—14 of Fig. 11.

Fig. 15 is a view similar to Figs. 1 and 10 showing a further modified form of the invention. 20

Fig. 16 is an enlarged view in longitudinal section illustrating the improved feeding and guiding structure shown in Fig. 15.

Fig. 17 is a view in longitudinal section taken in the plane of Fig. 16 showing the feeding means in partially extended position.

Fig. 18 is a cross sectional view taken substantially on line 18—18 of Fig. 16.

Fig. 19 is a cross sectional view taken substantially on line 19—19 of Fig. 16.

In the illustrative embodiment of the invention shown in Figs. 1 to 9, inclusive, the rock drill is generally designated 1 and the improved feeding and guiding means is generally designated 2. The drill guiding means comprises a pair of tubular guiding members 3, 3 of cylindrical form arranged in parallel side by side relation and rigidly fixed together at their ends by transverse connecting portions 4, 4. Secured to the lower portions of the tubular guides 3, 3 intermediate their ends is a transverse frame 5 having an integral swivel plate or trunnion 6 adapted to be clamped in the saddle mounting of a conventional drill support. The rock drill 1 is of a conventional design comprising a hammer motor having a motor cylinder 7 provided with a rear head block 8, a front head 9 and a front chuck housing 10, the latter supporting, in a usual manner, a chuck for receiving the shank of a rock drill steel 11. As the particular construction of the rock drill does not, per se, enter into this invention, an illustration and description thereof is not considered necessary. The forward ends of the parallel
55

tubular guides 3, 3 are closed by heads 12, 12 suitably threaded therein, and these heads have cylindrical forward projections on which are pivotally mounted a pair of guide members 13 adapted when in closed position to embrace the drill steel 11 to guide the latter during the drilling operation. The rock drill 1 in this embodiment of the invention is supported directly on and between the parallel tubular guide members 3, 3 by the provision of a depending portion 15 which may be of suitable longitudinal length so as to provide sufficient bearing surface, and projecting between the guide members, while a cooperating clamping and guiding element 16 is removably secured to and spaced from the portion 15 as by screw bolts 17. The elements 15 and 16 present arcuate bearing surfaces 18 and 19 slidably engaging the inner adjacent sides of the outer peripheries of the tubular guide members. It will thus be seen that the rock drill is entirely supported by and slidable directly on the parallel guide members directly on the exterior peripheries of the latter without the intermediation of any other guiding elements, thereby greatly simplifying the guiding structure of the drill. Formed within the forward portions of the tubular guide members 3, 3 are parallel feed cylinders 20, 20, stationary with respect to the guide members, and each containing a reciprocable feed piston 21. The piston rods 22 of the feed pistons 21 extend rearwardly through the rear packed heads 23 of the feed cylinders 20 and through the packed front heads 24 of parallel feed cylinders 25, 25 aligned with the cylinders 20 and reciprocably mounted in the parallel guide bores 26 of the tubular guide members. Fixed to the rear ends of the piston rods 22 and contained in the cylinders 25 are feed pistons 27. The rear ends of the parallel feed cylinders 25, 25 are rigidly connected together by a transverse connecting frame 28 extending between the cylinders, when the latter are in a forward position, through longitudinal slots 29 formed along the inner adjacent sides of the outer peripheries of the tubular guide members, the slots permitting movement of the transverse connecting frame 28 with respect to the tubular guide members during reciprocation of the feed cylinders 25. The rear head 8 of the rock drill 1 is formed with a depending boss or lug 30 having a conical bore 31 in which is secured, as by a nut 32, a conical front end portion 33 of a connecting rod 34, the nut 32 being threaded at 35 on this connecting rod. This connecting rod extends rearwardly longitudinally between the guide members 3, 3 and is threadedly connected at its rear end at 36 within the transverse frame 28 and is held therein by lock nuts 37 threaded on the connecting rod. It will thus be seen that as the feed cylinders 25, 25 are reciprocated within the guide bores 26 of the parallel guide members, the rock drill 1 is slid along its guiding surfaces on the exterior peripheries of the guide members.

Now referring to the means for supplying pressure fluid to the feeding cylinders and the rock drill, it will be noted that arranged in a transverse bore 40 formed in the rear head block 8 of the rock drill 1 is a rotary control valve 41 having an internal pressure chamber 42 to which pressure fluid is supplied through a pipe connection 43 from any suitable source of supply. Arranged in a bore 44 parallel with the valve bore 41 is a rotary feed control valve 45, while mounted within the control valve 41 is a valve means 46 for regulating the feeding pressure. The rotary valves 41 and 45 and the valve means 46 are gen-

erally similar to those described in Patent No. 2,015,678, granted October 1, 1935, to M. C. Huffman and as the specific structures of these valve means are clearly described in that patent, a description thereof herein is considered unnecessary, other than to state that the feeding pressure reducing valve 46 may be adjusted to regulate the feeding pressure and the feed control valve 45 may be operated to control the flow of feeding pressure to the feeding cylinders to effect reversal in the direction of feed irrespective of the feeding position of the control valve 41. The control valve 41 may be operated to control the supply of pressure fluid to the hammer motor of the rock drill and to the feeding cylinders. Pressure fluid is adapted to flow from the pressure chamber 42 in the control valve 41 through an axial passage 47 (see Fig. 5) under the control of the feeding pressure reducing valve 46 to a passage 48 in the valve 41 communicating with a circumferential groove 49 (see Fig. 6), the latter in turn communicating with a forward feed supply passage 50. A reverse feed supply passage 51 is communicable through a circumferential groove 52 on the valve 41 (see Fig. 7) in turn communicating through a passage 53 in the valve 41 with the pressure chamber 42. The forward feed passage 50 is communicable through passages in the control valve 45 with an annular groove 54 on the forward portion of the connecting rod 34 in turn communicating through a passage 55 in the connecting rod with a groove 56 in the connecting frame 28 and surrounding the rearward portion of the connecting rod. The groove 56 is connected by passages 57, 57 formed in the walls of the reciprocable feed cylinders 25, 25, with the forward ends of the bores of the reciprocable feed cylinders at the forward sides of the feed pistons 27. The reverse feed passage 51 is communicable through passages in the control valve 45 with an annular groove 58 on the forward portion of the connecting rod, in turn communicating through a passage 59 in the connecting rod with a recess 60 in the connecting frame at the rear end of the connecting rod, this recess connected by transverse passages 61, 61 in the connecting frame 28 with the rear ends of the bores of the reciprocable feed cylinders 25, 25 at the rear sides of the feed pistons 27. The control valve 41 has a circumferential groove 62 (see Fig. 6) for connecting through a passage 50^a the passage 55, with an exhaust passage 63, while the reverse feed passage 51 is communicable through a circumferential groove 64 (see Fig. 7) on the control valve 41, when the valve is turned into its position opposite from that shown in Fig. 7, with an exhaust passage 65. Passages 66 extending longitudinally through the piston rods 22 (Fig. 3) connect the forward ends of the bores of the stationary feed cylinders 20 with the rear ends of the bores of the reciprocable feed cylinders 25, while parallel passages 67 in the piston rods connect the rear ends of the bores of the stationary feed cylinders 20 with the forward ends of the bores of the reciprocable feed cylinders 25. The opposite side walls of the guide members 3, 3 are cut away at 68 to permit access to the adjusting plugs 69 for the packings of the rear heads 23 of the stationary feed cylinders 20, 20, it being possible to insert a wrench through the opening 68 to effect adjustment of the adjusting plug 69. The adjusting plugs 70 for the packings of the front heads 24 of the reciprocable feed cylinders 25, 25 may be adjusted by insertion of a wrench through the longitudinal slots 29, 29 cut in the side walls of

the guide members. The throttle valve, as described in the above mentioned patent, has a passage for supplying pressure fluid from the pressure chamber 42 in the valve to the supply passage of the hammer motor of the rock drill, as is usual in rock drills of the type disclosed.

The mode of operation of the rock drilling mechanism above described will be clearly apparent from the description given. When the valves are in the position shown in Figs. 6 and 7, pressure fluid may flow from the pressure chamber 42 in the throttle valve 41, axial passage 47 past the feeding pressure regulating valve 46 and through passage 48, groove 49, forward feed passage 50, valve 45, passage 50^a, groove 54, passage 55 in the connecting rod, groove 56 and passages 57 to the forward ends of the bores of the reciprocable feed cylinders 25, 25, the pressure fluid flowing from the bores of the cylinders 25 through the passages 67 in the piston rods 22 to the rear ends of the bores of the stationary feed cylinders 20, 20. At the same time the opposite ends of the bores of the cylinders 20 and 25 are connected to exhaust through the passages 66 in the piston rods, passages 61, 61, recess 60, passage 59 in the connecting rod, groove 58, valve 45, passage 51, groove 64 and exhaust passage 65. The pressure fluid in the bores of the reciprocable cylinders acts on the pressure surfaces of the cylinder heads 24 to move the cylinders 25 forwardly within the guiding bores 26 in the tubular guide members, while the pressure fluid flowing to the bores of the cylinders 20 act on the rear pressure areas of the pistons 21 to move the latter forwardly within their cylinder bores, moving therewith the cylinders 25, upon completion of the forward movement of the latter with respect to the feed pistons 27, and as a result, the rock drill 1 is fed forwardly along the guiding surfaces of the tubular guide members. During relatively free feeding movement, the cylinders 25, 25 may more rapidly move relative to their respective pistons than do the pistons 21 relative to the cylinders 20, due to the effect of the long passages in the piston rods, but it will be understood that simultaneous movements between each piston and its respective cylinder probably occur during much of the feeding operation. When it is desired to effect reverse feed of the rock drill along its guideways relative to the parallel guide members, the throttle valve 41 is turned into the position opposite from that shown in Figs. 6 and 7, so that the groove 52 connects the reverse feed passage 51 with the passage 53 communicating with the pressure chamber 42 in the control valve 41, and the passage 50^a is connected by the groove 62 with the exhaust passage 63. When the throttle valve is in this position, pressure fluid may flow from the pressure chamber 42 through passage 53, groove 52, reverse feed passage 51, groove 58, valve 45, passage 59 in the connecting rod 34, recess 60 and transverse passages 61, 61 to the rear ends of the bores of the reciprocable cylinders 25, pressure fluid at the same time flowing through passages 66 in the piston rods 22 to the forward ends of the bores of the stationary cylinders 20, 20. Simultaneously, the rear ends of the bores of the feed cylinders 20, 20 and the forward ends of the bores of the feed cylinders 25, 25 are connected to exhaust through passages 67 in the piston rods, passages 57, groove 56, passage 55 in the connecting rod 34, groove 54, the passage 50^a, groove 62 on the control valve 41 and exhaust passage 63. The pres-

sure fluid flowing to the rear ends of the bores of the feed cylinders 25 acts on the rear end walls of the cylinder bores to move the cylinders 25 rearwardly with respect to the pistons 27, while the pressure fluid flowing to the forward ends of the bores of the cylinders 20 acts on the forward pressure areas of the pistons 21 to move the latter rearwardly with respect to their cylinders, moving therewith the cylinders 25, when the latter reach their extreme limit of rearward movement with respect to the pistons 27, and as a result, the rock drill 1 is moved rearwardly along the guiding surfaces of the tubular guide members. The pressure fluid acting on the rear end walls of the bores of the cylinders 25 is admitted substantially directly thereto while the pressure flowing to the forward ends of the bores of the cylinders 20 must pass through the passages 66 in the piston rods. Accordingly, the cylinders 25 may move more rapidly relative to the pistons 27 than do the pistons 21 relative to the cylinders 20, particularly during relative free retractive movement, and during retraction, as well as during forward feed, simultaneous relative movement between the elements of each cylinder and piston couple probably occurs to a large extent. It will be evident that the forward feeding pressure may be regulated by the reducing valve 46, and the feeding pressure may be controlled at will and the feed reversed by the control valve 45, all in the manner described in the patent above referred to.

In the modified form of the invention shown in Figs. 10 to 14, inclusive, the rock drill and the specific structure of the feeding means are similar to those disclosed in the form of the invention above described. In this instance, however, the rock drill has formed on the cylinder of its hammer motor lateral guides 71, 71 slidably mounted in longitudinal guideways 72, 72 formed on the upper forward portion of but a single tubular guide member 73. The forward portion of the tubular guide member 73 has formed therein a feed cylinder 74, while the rearward portion of the tubular guide member has reciprocably mounted in its bore 75 a feed cylinder 76. The rear head 77 of the rock drill has an integral rearward extension 78 connected at 79 to the rearward end of the reciprocable feed cylinder 76, this connection extending through a longitudinal slot 80 formed in the upper surface of the tubular guide member. As the specific feed cylinder and piston structure and the passage means for supplying pressure fluid to the feed cylinders and the control valves therefor are identical to those described above in the form of the invention disclosed in Figs. 1 to 9, inclusive, the main difference in this form of the invention being that but a single guide member together with a single cylinder and piston couple, is employed, further description thereof is submitted to be unnecessary.

In the modified form of the invention shown in Figs. 15 to 19, inclusive, the rock drill and tubular guide member are similar to those disclosed in Fig. 10 of the form of the invention above described. In this instance, however, there is shown but a single elongated feed cylinder 81 guided within a bore 82 of a guide member 83, the guiding bore extending substantially throughout the length of the guide member. This feed cylinder is of a length substantially equal to the combined lengths of the cylinders 74 and 76 and contains in its bore 84 a stationary feed piston 85. This feed piston has a piston rod 86 extend-

ing forwardly through the packed front head 87 of the feed cylinder and secured at its forward end at 88 to the forward end wall 89 of the tubular guide member 83. The rock drill is connected by the connecting frame 78 with the rear end of the feed cylinder 81, and the forward and reverse feed passages communicate respectively with a passage 90 communicating with the cylinder bore at the forward side of the feed piston 85 and a passage 91 communicating with the rear end of the cylinder bore at the rear side of the feed piston. The guide member is formed with a longitudinal slot 92 through which the drill connection extends into connection with the rear end of the feed cylinder, this slot permitting movement of the connecting frame with respect to the guide member during reciprocation of the feed cylinder. The means for supplying pressure fluid to the passages 90 and 91 and the control valves therefor are the same as those above described.

The mode of operation of the modified form of the invention shown in Figs. 10 to 14, inclusive, is substantially the same as that described above in connection with the form of the invention shown in Figs. 1 to 9, inclusive. When pressure fluid is supplied through the supply passages to the forward end of the bore of the cylinder 76 and to the rear end of the bore of the stationary cylinder 74, the cylinder 76 is slid forwardly within the guiding bore 75 of the guide member, and as a result, the rock drill 1 is moved forwardly along its guideways 72, 72 relative to the guide member. When the position of the control valve 41 is reversed, pressure fluid is supplied to the rear end of the bore of the cylinder 76 and to the forward end of the bore of the cylinder 74, and as a result, the rock drill is fed rearwardly along its guideways.

In the form of the invention shown in Figs. 15 to 19, inclusive, when pressure fluid is supplied to the forward end bore of the cylinder 81, the latter is moved forwardly within the guiding bore 82 of the guide member 83 relative to the stationary feed piston 85, and as a result, the rock drill 1 is fed forwardly along its guideways relative to the guide member 83. When pressure fluid is supplied to the rear end of the bore of the feed cylinder 81, the latter is moved rearwardly in the guiding bore 82 of the guide member 83 with respect to the stationary feed piston 85, thereby moving the rock drill rearwardly along its guideways. As in the form of the invention described above, the forward feeding pressure may be regulated by the pressure reducing valve 46 and the feeding pressure may be controlled and the direction of feed reversed at will independently of the control valve 41, by means of the control valve 45.

As a result of this invention, it will be noted that an improved rock drilling mechanism is provided having a novel feeding and guiding structure for the rock drill whereby the rock drill may be fed relative to the guiding means in an improved manner. It will further be noted that by the provision of the extremely compact arrangement of the feeding and guiding elements, it is possible by an extremely compact structure, to obtain a relatively long range of drill feed. It will still further be noted that by the particular arrangement shown, it is possible to guide the rock drill directly on the tubular guiding means and to effect feed of the rock drill directly by the reciprocable feed cylinder which is guided in the guiding means; it being possible by the particu-

lar arrangement shown to guide the rock drill on the forward portion of the guiding means and to feed the rock drill through a connection between the rear end of the reciprocable feed cylinder and the rear end of the rock drill. Other uses and advantages of the improved rock drilling mechanism will be clearly apparent to those skilled in the art.

While there are in this application specifically described several forms which the invention may assume in practice, it will be understood that these forms of the same are shown for purposes of illustration and that the invention may be further 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 rock drilling mechanism, guiding means comprising a tubular guide member having a longitudinal drill guiding surface and a guiding bore, a rock drill guided on said guiding surface for movement longitudinally therealong, and feeding means for feeding the rock drill along said guiding surface comprising a feed cylinder reciprocable in said guiding bore of said guide member and containing a feed piston, and an elongated rigid connection extending longitudinally of said guide member between the rear end of said feed cylinder and the rear end of the rock drill for connecting the latter to the feed cylinder for movement therewith relative to said guide member.

2. In a rock drilling mechanism, guiding means comprising a tubular guide member having a longitudinal drill guiding surface and a guiding bore, a rock drill guided on said guiding surface for movement longitudinally therealong, and feeding means for feeding the rock drill along said guiding surface comprising a feed cylinder reciprocable in said guiding bore of said guide member and containing a feed piston, and an elongated rigid connection extending longitudinally of said guide member between the rear end of said cylinder and the rear end of the rock drill for connecting the latter to the feed cylinder for movement therewith relative to said guide member, said guide member having a longitudinal slot through which said connection between the feed cylinder and the rock drill passes, said slot permitting longitudinal movement of said connection relative to the guide member during reciprocation of the feed cylinder in said guiding bore.

3. In a rock drilling mechanism, guiding means comprising a tubular guide member having a longitudinal drill guiding surface and a guiding bore, a rock drill guided on said guiding surface for movement longitudinally therealong, and feeding means for moving said rock drill along said guiding surface comprising a feed cylinder reciprocable in said guiding bore in said guide member and having a bore containing a feed piston, an elongated rigid connection extending longitudinally of said guide member between the rear end of said feed cylinder and the rear end of the rock drill for connecting the latter to the feed cylinder for movement therewith relative to said guide member, and means including passage means in said connection for supplying pressure fluid to the bore of said feed cylinder to effect reciprocation of the latter.

4. In a rock drilling mechanism, guiding means comprising a tubular guide member having a longitudinal guide way and a guiding bore, a

rock drill guided on said guideway, and means for feeding the rock drill along said guideway comprising, a stationary feed cylinder within said guide member, a reciprocable feed cylinder coaxial with said stationary feed cylinder and guided in said guiding bore, by the walls of the latter, independently of the drill guideway, said drill being guided by its guideway independently of said reciprocable cylinder, feed pistons contained in said cylinders respectively, a common piston rod connecting said pistons together, and a connection between said reciprocable cylinder and the rock drill.

5. In a rock drilling mechanism, guiding means comprising a guide member, a rock drill guided on said guide member, and means for feeding the rock drill along said guide member comprising a stationary feed cylinder, a reciprocable feed cylinder coaxial with said feed cylinder and guided by said guide member, pistons contained in said feed cylinders respectively, a common piston rod connecting said pistons together, an elongated rigid connection extending longitudinally between the rear end of said reciprocable feed cylinder and the rear end of the rock drill, and means for supplying pressure fluid to said cylinders to effect reciprocation of the piston contained in said stationary cylinder relative to the latter and reciprocation of said reciprocable cylinder relative to its piston.

6. In a rock drilling mechanism, guiding means comprising a guide member, a rock drill guided on said guide member, and means for feeding the rock drill along said guide member comprising a stationary feed cylinder within the forward portion of said guide member, a reciprocable feed cylinder coaxial with said feed cylinder and guided within the rearward portion of said guide member, pistons contained in said feed cylinders respectively, a common piston rod connecting said pistons together, a connection between the rear end of said reciprocable feed cylinder and the rear end of the rock drill, and means for supplying pressure fluid to said cylinders to effect reciprocation of the piston contained in the stationary cylinder relative to the latter and reciprocation of said reciprocable cylinder relative to its piston.

7. In a rock drilling mechanism, guiding means comprising a guide member having longitudinal guideways extending longitudinally along different portions thereof, a rock drill guided on one of said guideways, and means for feeding the rock drill along its guideway comprising a stationary feed cylinder on the guide member, a reciprocable feed cylinder coaxial with said stationary cylinder and guided on the other of said guideways independently of the guideway on which the drill is guided, said drill being guided by its guideway independently of said reciprocable cylinder, feed pistons contained in said cylinders respectively, a common piston rod connecting said feed pistons together, a connection between said reciprocable cylinder and the rock drill, and means for supplying pressure fluid to said cylinders to effect reciprocation of the piston contained in the stationary cylinder relative to the latter and reciprocation of said reciprocable cylinder relative to its piston.

8. In a rock drilling mechanism, guiding means comprising a guide member, a rock drill guided on the forward portion of said guide member, and means for feeding the rock drill along said guide member comprising a stationary feed cylinder within the forward portion of said guide

member, a reciprocable feed cylinder coaxial with said stationary cylinder and guided within the rearward portion of said guide member, pistons contained in said cylinders respectively, a common piston rod connecting said pistons together, and a connection between the rear end of said reciprocable cylinder and the rear end of the rock drill.

9. In a rock drilling mechanism, guiding means comprising a guide cylinder, a rock drill guided on said guide cylinder, and means for feeding the rock drill along said guide cylinder comprising a stationary feed cylinder within the forward portion of said guide cylinder, a reciprocable feed cylinder coaxial with said stationary cylinder and guided within the rearward portion of said guide cylinder, pistons contained in said cylinders respectively and connected together for movement in unison, and a connection between the rear end of said reciprocable cylinder and the rear end of the rock drill, said guide cylinder having a longitudinal slot opening through the wall thereof and through which said connection passes, said slot permitting longitudinal movement of said connection relative to said guide cylinder.

10. In a rock drilling mechanism, guiding means comprising a pair of parallel guide members, a rock drill guided on said guide members, and feeding means for feeding said rock drill along said guide members including reciprocable feed cylinders guided on said guide members respectively, and an elongated arm-like connection extending longitudinally of said guide members therebetween and between said cylinders for connecting the rock drill to said reciprocable cylinders for movement therewith relative to said guide members.

11. In a rock drilling mechanism, guiding means comprising a pair of parallel guide members, a rock drill guided on said guide members, and feeding means for feeding said rock drill along said guide members including stationary feed cylinders on the guide members, reciprocable feed cylinders coaxial with said stationary cylinders respectively and guided by said guide members, pistons contained in said stationary cylinders, pistons contained in said reciprocable cylinders, piston rods connecting the pistons in said reciprocable cylinders to the pistons in said stationary cylinders, and a connection between said reciprocable cylinders and the rock drill.

12. In a rock drilling mechanism, guiding means comprising a pair of parallel guide members, a rock drill guided on said guide members, and feeding means for feeding said rock drill along said guide members including stationary feed cylinders within the forward portions of said guide members, reciprocable feed cylinders coaxial with said stationary feed cylinders respectively and guided by the rearward portions of said guide members, pistons contained in said stationary cylinders, pistons contained in said reciprocable cylinders, piston rods connecting said pistons in said reciprocable cylinders to the pistons in said stationary cylinders, and a connection between the rear ends of said reciprocable cylinders and the rear end of the rock drill.

13. In a rock drilling mechanism, guiding means comprising a guide cylinder having a bore and an end wall, a rock drill guided on said guide cylinder, and means for feeding the rock drill relative to said guide cylinder including a feed cylinder reciprocably mounted in the bore of said guide cylinder, a feed piston contained in

said feed cylinder, a piston rod connected to said piston and to the end wall of said guide cylinder for holding said piston stationary, and an elongated rigid connection extending longitudinally of said guide cylinder between said reciprocable cylinder and the rock drill for connecting the latter to said feed cylinder for movement therewith relative to said guide cylinder.

14. In a rock drilling mechanism, guiding means comprising a guide cylinder having a bore and a front end wall, a rock drill guided on the forward portion of said guide cylinder, and means for feeding the rock drill relative to said guide cylinder including a feed cylinder reciprocably mounted in the bore of said guide cylinder, a feed piston contained in said feed cylinder, a piston rod connected to said piston and to said front end wall of said guide cylinder for holding said piston stationary, and an elongated rigid connection extending longitudinally of said guide cylinder between the rear end of said reciprocable feed cylinder and the rear end of the rock drill for connecting the latter to said feed cylinder for movement therewith relative to said guide cylinder.

15. In a rock drilling mechanism, guiding means comprising a guide member having a longitudinal drill guideway, a rock drill slidably guided on said drill guideway, and means for feeding the rock drill along said guideway comprising a stationary feed cylinder on the forward portion of said guide member, a reciprocable feed cylinder coaxial with said stationary feed cylinder and guided on the rearward portion of said guide member, pistons contained in said coaxial cylinders respectively, a common piston rod connecting said pistons together, and a connection between the reciprocable feed cylinder and the rock drill.

16. In a rock drilling mechanism, guiding means comprising a guide cylinder having a bore and an end wall, a rock drill guided on said guide cylinder wholly externally thereof, and means for feeding the rock drill relative to said guide cylinder including a feed cylinder reciprocably mounted in the bore of said guide cylinder and guided wholly internally within the guide cylinder, a feed piston contained in said feed cylinder, a piston rod connected to said piston and to the end wall of said guide cylinder for holding said piston stationary, and a connection be-

tween said reciprocable feed cylinder and the rock drill.

17. In a rock drilling mechanism, guiding means comprising a cylindrical guide member having a guideway and a bore, a rock drill guided on said guideway wholly externally of said guide member, and means for feeding the rock drill along said guideway including aligned, cylinder and piston feeding motors having their cylinders arranged internally within said guide member and acting accumulatively to effect drill feed.

18. In a rock drilling mechanism, guiding means comprising a guide member having a guideway, a rock drill guided on said guideway wholly externally of said guide member, and means for feeding the rock drill along said guideway including aligned, cylinder and piston feeding motors acting accumulatively to effect drill feed, one of said motors having its feed cylinder guided for reciprocation on said guide member and the cylinders of both motors arranged internally within said guide member, and a connection between said reciprocable feed cylinder and the rock drill.

19. In a rock drilling mechanism, guiding means comprising a pair of parallel guide members, a rock drill guided on said guide members wholly externally of the latter, and feeding means for feeding the rock drill along said guide members including reciprocable feed cylinders guided on said guide members respectively wholly internally within the latter, and a connection between said cylinders and the rock drill.

20. In a rock drilling mechanism, guiding means comprising a pair of tubular guide members arranged in parallel side by side relation, a rock drill guided directly on the exterior surfaces of said guide members therebetween, and feeding means for feeding the rock drill along said guide members including stationary feed cylinders, aligned reciprocable feed cylinders, said stationary cylinders mounted within said guide members and said reciprocable feed cylinders guided within said guide members, pistons contained in said cylinders respectively, piston rods connecting the pistons in the stationary cylinders with the pistons in the reciprocable cylinders, and a rigid connection between said reciprocable cylinders and the rock drill.

CHARLES F. OSGOOD.