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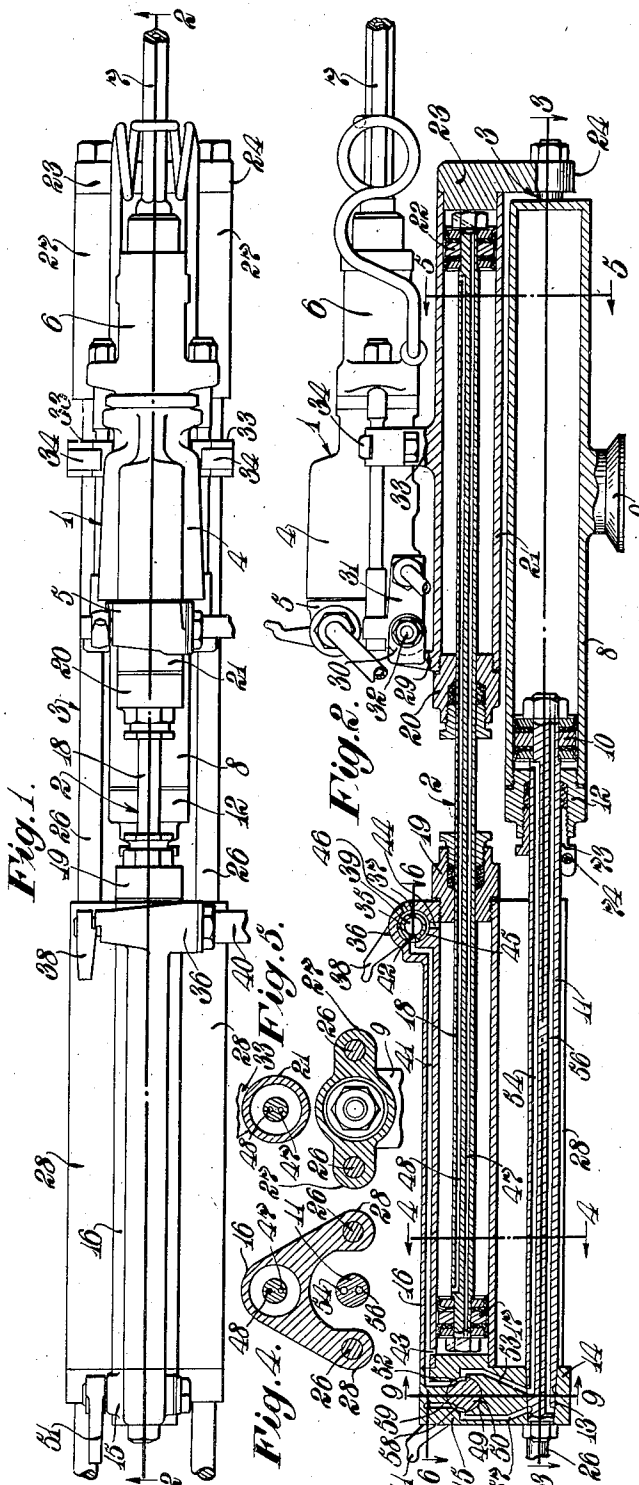
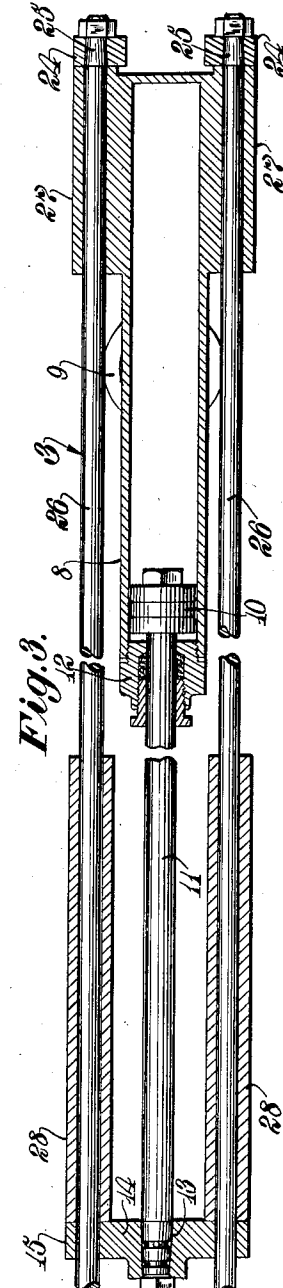
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2,108,058

ROCK DRILLING MECHANISM

Filed Jan. 4, 1936

4 Sheets-Sheet 1



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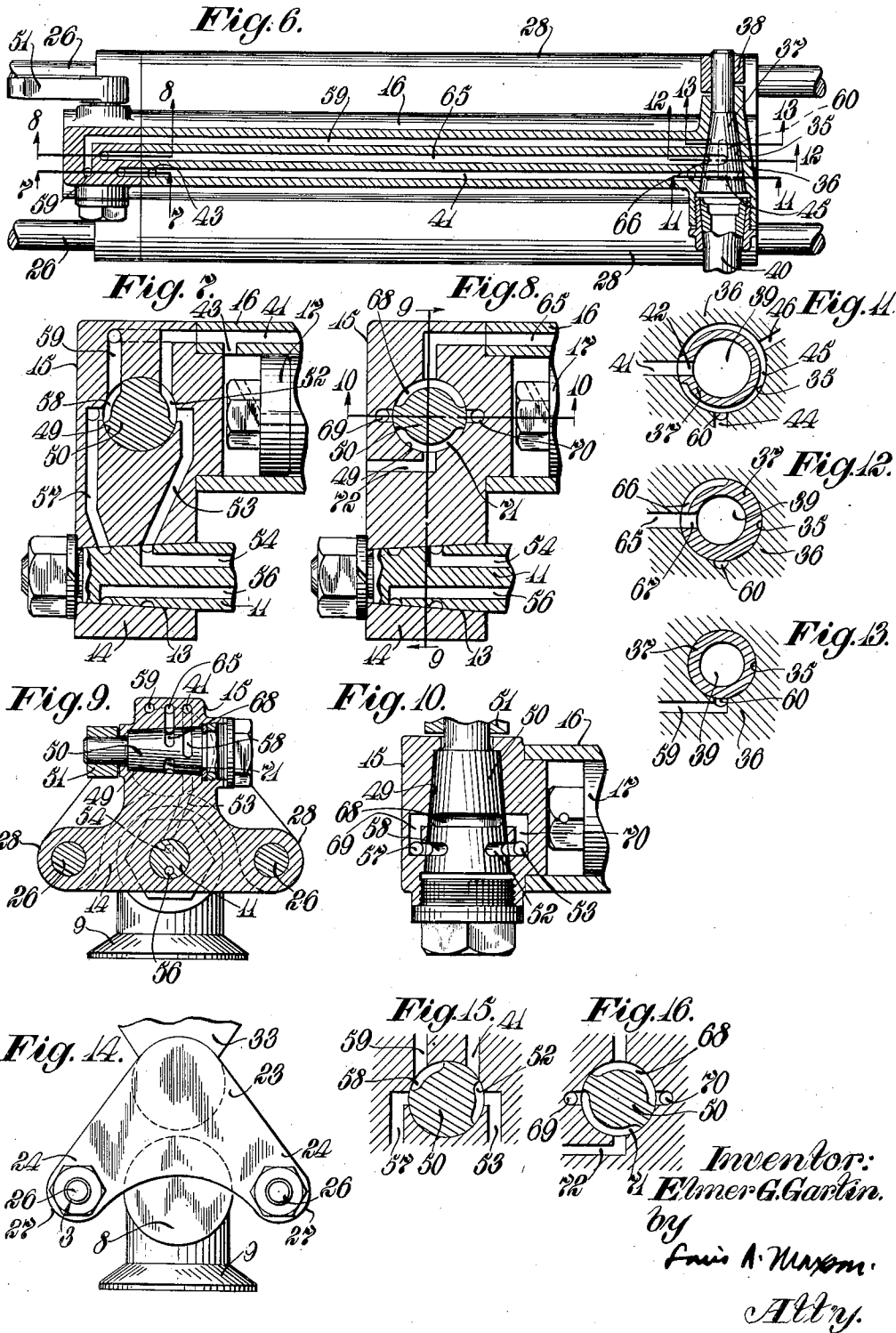
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2,108,058

ROCK DRILLING MECHANISM

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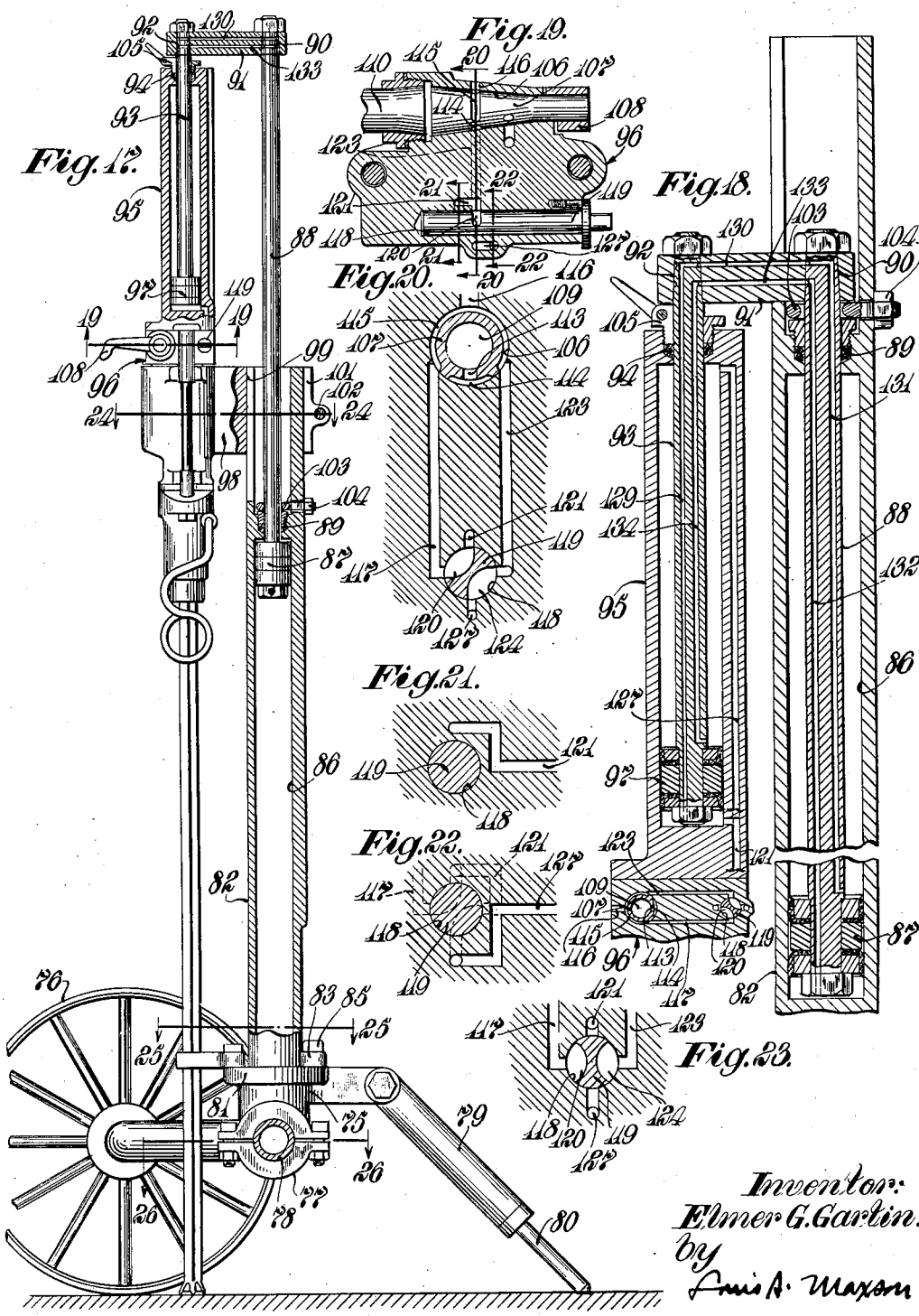
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ROCK DRILLING MECHANISM

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4 Sheets-Sheet 3



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ROCK DRILLING MECHANISM

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Fig. 24.

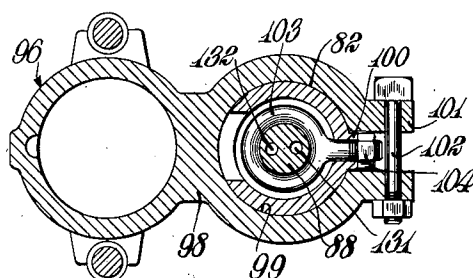


Fig. 25.

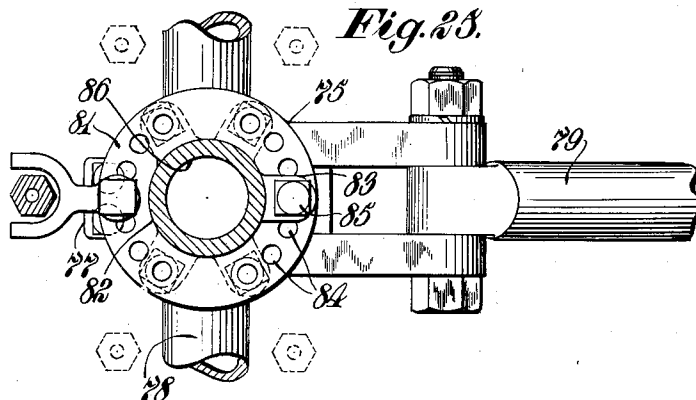
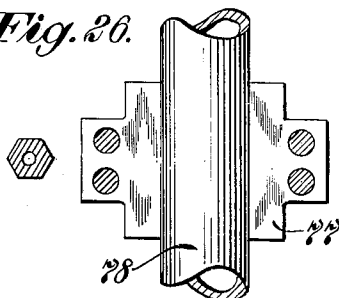


Fig. 26.



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UNITED STATES PATENT OFFICE

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ROCK DRILLING MECHANISM

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Application January 4, 1936, Serial No. 57,563

25 Claims. (Cl. 121-9)

This invention relates to rock drilling mechanisms, and more particularly has reference to improvements in the feeding mechanism of a rock drill of the mounted type and improved supporting, adjusting and guiding means for the drill.

An object of this invention is to provide an improved rock drill feeding mechanism whereby with an extremely compact construction a relatively long range of feeding travel of the drill is attained. Another object is to provide an improved supporting and guiding means associated with the feeding mechanism for supporting and guiding the rock drill during the feeding operation. A further object is to provide an improved rock drill feeding mechanism of the pressure fluid actuated cylinder and piston type wherein a plurality of coacting cylinders and pistons are employed, together with improved means for controlling the supply of pressure fluid to the various cylinders. A still further object is to provide an improved rock drill feeding mechanism of the multi-cylinder type wherein one of the cylinders may be employed as an adjusting cylinder for positioning the rock drill with respect to the work prior to the operation of the other cylinders of the feeding means and having embodied therein means for locking the piston of the adjusting cylinder in adjusted position during the feeding operation. A further object is to provide an improved adjustable supporting structure for a rock drill. These and other objects will, however, hereinafter more fully appear.

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

In these drawings,—

Fig. 1 is a plan view of one illustrative form of the invention.

Fig. 2 is a view in longitudinal section taken substantially on line 2-2 of Fig. 1, the rock drill being shown in side elevation.

Fig. 3 is a longitudinally extending horizontal sectional view taken substantially on line 3-3 of Fig. 2.

Fig. 4 is a cross sectional view taken on line 4-4 of Fig. 2.

Fig. 5 is a cross sectional view taken on line 5-5 of Fig. 2.

Fig. 6 is a longitudinally extending horizontal sectional view taken substantially on line 6-6 of Fig. 2.

Fig. 7 is a detail sectional view taken on line 7-7 of Fig. 6.

Fig. 8 is a detail sectional view taken on line 8-8 of Fig. 6.

Fig. 9 is a cross sectional view taken on line 9-9 of Figs. 2 and 8.

Fig. 10 is a horizontal sectional view taken on line 10-10 of Fig. 8.

Figs. 11, 12 and 13 are detail sectional views taken on lines 11-11, 12-12 and 13-13 respectively, of Fig. 6.

Fig. 14 is an end elevational view of the mechanism shown in Fig. 2, with the rock drill removed.

Fig. 15 is a fragmentary sectional view taken in the plane of Fig. 7, showing the valve in a different position.

Fig. 16 is a fragmentary sectional view taken in the plane of Fig. 8, showing the valve in a different position.

Fig. 17 is a view similar to Fig. 2 showing a modified form of the invention.

Fig. 18 is an enlarged fragmentary view in longitudinal section taken in the plane of Fig. 17.

Fig. 19 is a cross sectional view taken on line 19-19 of Fig. 17.

Fig. 20 is a detail sectional view taken substantially on line 20-20 of Fig. 19.

Fig. 21 is a detail sectional view taken on line 21-21 of Fig. 19.

Fig. 22 is a detail sectional view taken on line 22-22 of Fig. 19.

Fig. 23 is a detail sectional view taken in the plane of Fig. 20, showing the neutral position of the reversing valve.

Fig. 24 is an enlarged cross sectional view taken on line 24-24 of Fig. 17.

Fig. 25 is an enlarged horizontal sectional view taken substantially on line 25-25 of Fig. 17.

Fig. 26 is an enlarged horizontal sectional view taken on line 26-26 of Fig. 17.

In the illustrative embodiment of the invention shown in Figs. 1 to 16, inclusive, 1 designates a hammer rock drill of a conventional design, the improved drill feeding means is generally designated 2, and 3 generally designates the drill guiding means.

The hammer rock drill is of the pressure fluid actuated type comprising a motor cylinder 4 having a rear head 5 and a front chuck housing 6, the motor cylinder containing a reciprocatory hammer piston for delivering impact blows to the shank of a usual drill steel 7 supported within the chuck housing. The drill motor is provided, in a usual manner, with a suitable pressure fluid supply connection and throttle valve mechanism.

The feeding means 2 comprises a stationary feeding or adjusting cylinder 8 having an integral bottom trunnion support or swivel plate 9

adapted to be clamped in a known manner in the saddle mounting of a suitable drill support. Contained in the cylinder 8 is a reciprocable piston 10 having a piston rod 11 extending rearwardly through the packed rear head 12 of the cylinder, and this rod is fixed at 13 within a depending projection 14 formed integral with the rear head block 15 of a reciprocable feed cylinder 16. The cylinder 16 is rigidly secured through the head block 15 to the piston rod 11 and arranged parallel with the stationary cylinder 8, and contains a reciprocable feed piston 17 having a piston rod 18 extending forwardly through the packed front head 19 of the cylinder 16. The piston rod 18 extends forwardly through the packed rear head 20 of a reciprocable feed cylinder 21 aligned with the feed cylinder 16 and reciprocable with respect thereto. Contained in the cylinder 21 is a feed piston 22 fixed to the forward end of the piston rod 18. The cylinder 21 has a front head block 23 formed with depending arms 24, 24 to which are secured at 25 elongated parallel guide rods 26, 26 of the guiding means 3. These guide rods extend rearwardly longitudinally along the opposite sides of the stationary cylinder 8 and are guided for reciprocation within elongated guides 27, 27 projecting laterally from the opposite sides of the stationary cylinder 8. As shown most clearly in Figs. 3, 4 and 5, the cylinder 16 has parallel guides 28, 28 depending from the opposite sides thereof and slidably engaging the parallel guide rods 26, 26. It will thus be seen that the cylinder 21 is supported and guided by the parallel guide rods 26, 26 for sliding movement therewith with respect to the stationary cylinder 8, while the cylinder 16 is slidably guided for longitudinal movement along the guide rods 26, 26.

The rock drill 1 is preferably detachably mounted on the feed cylinder 21 for movement therewith and the mounting means for the rock drill, in this instance, comprises an upstanding lug 29 integral with the rearward portion of the cylinder, and having lateral perforated arms 30, 45 and a depending lug 31 on the drill head 5 projects down between the arms and is held thereon by a holding bolt 32 passing through the perforations in the arms and lug. Upstanding projections 33 formed on the cylinder 21 in advance of the lug 31 and straddling the sides of the rock drill carry clamps 34 for engaging projections on the drill for securing the drill down on the cylinder. By releasing the holding bolt 32 and the clamps 34 the rock drill may be readily dismounted from the feed cylinder.

Now referring to the means for supplying and controlling the flow of pressure fluid to the cylinders, it will be noted that arranged in a transverse bore 35 formed in a lateral boss 36 integral with the upper forward surface of the feed cylinder 16 is a rotary control valve 37 having an operating handle 38. Pressure fluid is adapted to be supplied to a pressure chamber 39 formed internally within the valve through a suitable pipe connection 40 from any suitable pressure fluid source. A passage 41 communicating with the valve bore and connectible by a passage 42 in the valve with the pressure chamber 39 communicates through a port 43 with the rear end of the bore of the cylinder 16. A passage 44 communicable through the passage 42 in the valve with the pressure chamber 39 leads to the forward end of the bore of the cylinder 16. When the valve 37 is in the position shown, the passage 42 communicates with the passage 41,

while the passage 44 is connected through a circumferentially extending groove 45 on the valve with a vent passage 46. When the valve 37 is in its opposite position, the passage 42 communicates with the passage 44 while the passage 41 is connected to the vent passage 46 through the groove 45. The rear end of the bore of the cylinder 16 at the rear side of the piston 17 is connected to the forward end of the bore of the cylinder 21 at the forward side of the piston 22 through a passage 47 extending longitudinally through the piston rod 18, while the forward end of the bore of the cylinder 16 at the forward side of the piston 17 and the rear end of the bore of the cylinder 21 at the rear side of the piston 22 are connected by a passage 48 in the piston rod. Formed in the rear head block 15 of the feed cylinder 16 is a bore 49 containing a rotary control valve 50 having an operating handle 51, and when this valve is in the position shown in Figs. 2 and 7, the passage 41 is connected through a circumferential groove 52 on the valve 50 with a passage 53 communicating with a longitudinal passage 54 formed in the piston rod 11 and leading to the bore of the cylinder 8 at the rear side of the piston 10. The bore of the cylinder 8 at the forward side of the piston 10 is connected by a longitudinal passage 56 in the piston rod 11 to a passage 57 in the rear head block 15 (see Fig. 7). This passage 57 is communicable through a circumferential groove 58 on the valve 50 with a passage 59 in turn communicable through a longitudinal groove 60 in the wall of the valve bore 36 (Figs. 11, 12 and 13) with the circumferential groove 45 communicating with the vent passage 46. It will thus be seen that when the valves 37 and 50 are in the position shown in Fig. 2, pressure fluid may flow from the central valve chamber 39 through passage 42 in the valve, passage 41, groove 52 in the valve 50 and passages 53 and 54 to the bore of the cylinder 8 at the rear side of the feed piston 10 to effect forward feed of the piston 10 with respect to the cylinder 8, the forward end of the bore of the cylinder 8 at this time being connected to exhaust through passages 56 and 57, groove 58, passage 59, groove 60 in the wall of the valve bore 35, groove 45 and vent passage 46. When the position of the valve 37 is reversed, the passage 41 leading to the rear end of the bore of the cylinder 8 is connected to exhaust through groove 45 and vent passage 46, while the passage 59 leading to the forward end of the bore of the cylinder 8 is connected with the pressure chamber 39 in the valve 37 through passage 42 and longitudinal groove 60 in the wall of the valve bore 36.

The supply of pressure fluid to and the exhaust of fluid from the feed cylinder 8 may be controlled by the valve 50 independently of the valve 37, and the means for accomplishing this function comprises a passage 65 arranged parallel with the passages 41 and 59 therebetween communicating constantly with the pressure chamber 39 in the valve 37 through a circumferential groove 66 on the valve connected by a passage 67 with the pressure chamber 39. The passage 65 is communicable through a circumferential groove 68 on the valve 50 with by-pass passages 69 and 70 communicating, as shown in Fig. 10, with the passages 57 and 53 respectively. The passages 69 and 70 are connectible by a circumferential groove 71 on the valve 50 with a vent passage 72. When the valve 50 is in the position shown in Fig. 8, communication of the

supply passage 65 with the passages 69 and 70 is cut off, and when the valve 50 is turned into the position shown in Fig. 15 communication of the passages 41 and 59, through the grooves 58 and 52, respectively, on the valve 50 with the passages 57 and 53 is cut off by the valve 50, while the passage 65 communicates with the passage 70 through the groove 68 on the valve 50. At the same time the passage 69 is connected to the vent passage 72 by the groove 71. When the valve 50 is in this position, pressure fluid may flow from the pressure chamber 39 in the valve 37 through passage 67, groove 66, passage 65, groove 58 on the valve 50, passage 70, passage 53 and passage 54 in the piston rod 11 communicating with the bore of the cylinder 8 at the rear side of the feed piston 10, thereby to effect forward feed of the piston with respect to the cylinder, the forward end of the bore of the cylinder 8 being connected to exhaust through passage 56 in the piston rod 11, passage 57, passage 69, groove 71 on the valve 50 and vent passage 72. When the valve 50 is turned into its position reversed from that shown in Fig. 16, the passage 65 is connected through the groove 68 on the valve 50 with the passage 69 communicating with the passage 57 leading to the bore of the cylinder 8 at the forward side of the feed piston 10, while the rear end of the feed cylinder bore is connected to exhaust through passage 53, passage 70, groove 71 on the valve 50 and the vent passage 72. It is accordingly evident that feed of the feed piston 10 is either forwardly or rearwardly with respect to the feed cylinder 8 and may be controlled by the valve 50 wholly independently of the valve 37.

When the feed cylinder 8 is utilized as an adjusting cylinder for positioning the rock drill with respect to the work prior to the feeding operation, it is desirable to hold the feed piston 10 in its stationary adjusted position with respect to the cylinder 8 after such adjustment of the rock drill with respect to the work has been made. To accomplish this function a clamping device 73 is provided for gripping the piston rod 11 to hold the feed piston 10 against movement with respect to the cylinder 8. This clamping device comprises a split clamp having a tightening bolt 74 and threadedly secured within the rear head 12 of the feed cylinder 8. In this instance, the clamp threaded within the cylinder head 12 forms a means for compressing the packing of this head into tight sealing engagement with the piston rod 11.

The general mode of operation of the form of the invention above described will be clearly apparent from the description given. When the feeding means is collapsed, the rock drill 1 assumes its rearmost position, as shown in Fig. 2. When the parts are thus disposed and it is desired to move the rock drill into its operative drilling position with respect to the work prior to the feeding operation, the operator rotates the valve 50 into its position to supply pressure fluid to the bore of the cylinder 8 at the rear side of the feed piston 10, thereby causing the latter to move forwardly with respect to the cylinder 8. When the rock drill 1 is in the desired adjusted position with respect to the work, the operator tightens the bolt 74 to bring the clamp 73 into tight engagement with the piston rod 11 to lock the feed piston 10 against movement with respect to the feed cylinder 8. The operator then rotates the control valve 37 into the position shown in Figs. 2 and 11, thereby to supply pres-

sure fluid to the rear end of the bore of the cylinder 16 at the rear side of the feed piston 17, and through the longitudinal passage 47 in the piston rod 18 to the forward end of the bore of the cylinder 21 at the forward side of the feed piston 22, and as a result, the feed cylinder on which the rock drill 1 is mounted is fed forwardly with respect to the feed piston 22, while the feed piston 17 is fed forwardly with respect to the feed cylinder 16, thereby feeding the rock drill forwardly with respect to the feed cylinder 8. During this forward feeding movement, the rock drill and the cylinder 21 are guided by the guide rods 26, 26 engaging the guideways 27, 27 on the feed cylinder 8. When the position of the control valve 37 is reversed, pressure fluid is supplied to the forward end of the bore of the cylinder 16 at the forward side of the feed piston 17 and through the passage 48 in the piston rod 18 to the rear end of the bore of the cylinder 21 at the rear side of the feed piston 22, and as a result, the feed piston 17 is fed rearwardly with respect to the feed cylinder 16 and the feed cylinder 21 is fed rearwardly with respect to the feed piston 22, thereby moving the rock drill into its retracted position. If desired, the clamping device 73 may be released and the feed cylinder 8 utilized in conjunction with the cylinders 16 and 21 to obtain a triple feed, so that when pressure fluid flows to the cylinders 16 and 21 to effect drill feed, pressure fluid at the same time flows to the third feed cylinder 8.

In the modified form of the invention shown in Figs. 17 to 26, inclusive, there is shown a rock drilling mechanism of the so-called tower mounted type generally comprising a frame 75 mounted on a pair of wheels 76 and adjustably secured by a clamp 77 to the wheel axle 78. Pivotaly connected to the frame 75 is a leg 79 having an adjustable ground engaging point 80. As shown in Figs. 17 and 25, the frame 75 is provided with a circular flange 81 on which is rotatably mounted a tubular column or standard 82, the standard having a lateral lug 83 having an opening adapted to register with openings 84 formed in the circular flange 81, a through bolt 85 passing through the openings in the lug and flange to hold the column in its adjusted position about its axis with respect to the circular flange 81. Formed in the column 82 is a feed cylinder bore 86 containing a reciprocable feed piston 87, the latter having a piston rod 88 extending upwardly through the packed upper head 89 of the feed cylinder. The upper end of the piston rod 88 is secured at 90 within a transverse connecting frame 91 in turn secured at 92 to the upper end of a piston rod 93 herein arranged parallel with the feed piston rod 88. In this instance, the upper portion of the column above the cylinder head 89 is longitudinally slotted to receive the transverse frame 91, when the feed piston assumes its forward position within the feed cylinder bore. The piston rod extends downwardly forwardly through the packed rear head 94 of a feed cylinder 95 herein secured to the rear head 95 block of a rock drill generally designated 96 herein similar in design to that disclosed in Figs. 1 and 2. Contained in the bore of the feed cylinder 95 and secured to the forward end of the piston rod 93 is a feed piston 97. The rock drill is secured to a guide member 98 having a circular guiding surface 99 slidably engaging an exterior surface of the tubular column 82. The column has a longitudinal key 100 engaging the side edges of a split clamp 101 formed on the guide for pre-

venting rotative movement of the guide with respect to the column. The clamp 101 has a clamping bolt 102 whereby the clamp may be tightened to secure the guide 98 in any desired adjusted position with respect to the column 82. Mounted in the upper portion of the column above the packed feed cylinder head 89 is a ring clamp 103 having a clamping nut 104 for clamping the piston rod 88 to the column, thereby to lock the feed piston 87 in any desired adjusted position with respect to the feed cylinder 86. Mounted on the upper end of the feed cylinder 95 is a split clamp 105 for clamping the piston rod 93 to the cylinder, thereby to hold the feed piston 97 in any desired adjusted position with respect to the feed cylinder.

Now referring to the improved means for supplying pressure fluid to the feed cylinders to effect feed of the rock drill with respect to the column 82, it will be noted that mounted in a transverse bore 106 within the rear head block of the rock drill 96 is a rotary control valve 107 having an operating handle 108. This valve has an internal pressure chamber 109 communicating through a pipe connection 110 with any suitable source of pressure fluid supply. The pressure chamber 109 communicates through a passage 113 with a circumferential groove 114 on the valve. A circumferential groove 115 on the valve communicates with a vent passage 116. Leading from the valve bore 106 is a passage 117 communicating with a bore 118 in which is mounted a rotary reversing valve 119. The passage 117 is communicable through a groove 120 in the valve 119 with a passage 121 leading to the bore of the cylinder 95 at the forward side of the feed piston 97. Communicating with the valve bore 106 (see Fig. 20) is a passage 123 parallel with the passage 117 and communicating through a groove 124 in the valve 119 with a passage 127 leading to the rear end of the bore of the cylinder 95 at the rear side of the feed piston 97. When the valve 137 is turned to the left from the position shown in Fig. 20, pressure fluid may flow from the pressure chamber 109 in the valve through passage 113, groove 114, passage 117, groove 120 in the valve 119 and passage 121 to the forward end of the bore of the cylinder 95 to effect feed of the rock drill with respect to the column 82, the rear end of the bore of the cylinder 95 being connected to exhaust through passage 127, groove 124 in the valve 119, passage 123, groove 115 in the valve 107 and vent passage 116. The forward end of the bore of the cylinder 95 is connected through a passage 129 in the piston rod 93 with a transverse passage 130 in the connecting frame 91 in turn communicating through a passage 131 in the piston rod 88 with the rear end of the bore of the cylinder 86 at the rear side of the feed piston 87. The forward end of the bore of the cylinder 86 at the forward side of the feed piston 87 is connected through a passage 132 in the piston rod 88 with a transverse passage 133 in the connecting member 91, the passage 133 in turn communicating through a passage 134 in the piston rod 93 with the rear end of the bore of the cylinder 95 at the rear side of the feed piston 97. It will thus be seen that whenever pressure fluid is supplied to one end or the other of the bore of the cylinder 95, pressure fluid is at the same time supplied to one end or the other of the bore of the cylinder 86. By reversing the position of the reversing valve 119 the flow of pressure fluid to the cylinder 95 may be reversed wholly independently of the control valve 107. When the reversing valve is in the position shown in Fig.

23, supply of pressure fluid to both ends of the feed cylinder is cut off.

The general mode of operation of the modified form of the invention shown in Figs. 17 to 26, inclusive, is as follows: When the rock drill 96 is in the position shown in Fig. 17, with the feed cylinder 95 in its retracted position and the clamp 105 is set, pressure fluid may be supplied to the rear end of the feed cylinder 86 to effect forward feeding movement of the feed piston 87 to adjust the rock drill with respect to the work. When the rock drill is in operative drilling position, the clamp 103 may be tightened to hold the feed piston 87 in its adjusted position. The clamp 105 may then be released and the valves 107 and 119 turned into a position to supply pressure fluid to the forward end of the bore of the cylinder 95 to effect forward feed of the rock drill downwardly along the column 82. If desired, both of the clamps 105 and 103 may be released and the valves 107 and 119 moved into a position to supply pressure fluid simultaneously to the forward end of the bore of the cylinder 95 and the rear end of the bore of the cylinder 86 to effect feeding movement of the piston 87 relative to the cylinder 86 and of the cylinder 95 relative to the piston 97. The clamp 101 may be tightened by the adjusting bolt 102 to secure the rock drill in its raised position with respect to the column 82, thereby to prevent forward movement of the rock drill downwardly with respect to the column due to leakage of pressure fluid past the pistons when the supply of pressure fluid to the feed cylinders is cut off. By removing the bolt 85 from the perforated lug 83, the column 82 may be rotated about its longitudinal axis relative to the supporting frame 75 to move the rock drill into any desired drilling position about the longitudinal axis of the column, the holes 34 being provided for locking the column in its adjusted position. The reversing valve 119 may be operated at will independently of the throttle valve 107 to effect reversal of the feed and to regulate the rate of feed.

As a result of this invention, it will be noted that an improved rock drill feeding mechanism is provided having an improved compact feeding arrangement whereby a relatively long range of feeding travel of the rock drill is attained. It will further be noted that by providing a plurality of feeding motors, it is possible to use one motor as the adjusting motor to adjust the rock drill and feeding motor with respect to the work prior to the feeding operation, it thereafter being possible to clamp the adjusting motor in its adjusted position. It will further be evident that by providing the improved guiding means associated with the feeding and adjusting motors, it is possible to guide the rock drill in an improved manner during the feeding operations. Other uses and advantages of the improved feeding mechanism will be clearly apparent to those skilled in the art.

While there are in this application specifically described two 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, a support presenting a guideway, a rock drill guided for move-

ment along said support guideway, a feeding motor for feeding the rock drill along the support guideway, and a feeding motor for moving said first mentioned feeding motor and rock drill into adjusted position with respect to the work prior to the feeding operation of said first mentioned feeding motor, said feeding motors having motive medium supply-controlling means including means for limiting motive medium delivery to one of the same exclusively.

2. In a rock drilling mechanism, a support presenting a guideway, a rock drill guided for movement along said guideway, a feeding motor for feeding the rock drill along the support guideway, and a feeding motor arranged in offset parallel relation with respect to said first mentioned feeding motor for feeding the latter and the rock drill along the support guideway prior to the operation of said first mentioned feeding motor.

3. In a rock drilling mechanism, a support presenting a guideway, a rock drill guided for movement along said guideway, a feeding motor for feeding the rock drill along the support guideway, and a feeding motor arranged in offset parallel relation with respect to said first mentioned feeding motor and adapted to coact with the latter in the feeding of the rock drill along the support guideway.

4. In a rock drilling mechanism, a support providing guiding means, a rock drill mounted on said support for feeding movement along said guiding means, a pair of sequentially operable feeding motors supported on said support and arranged in offset parallel relation to each other for feeding the rock drill along said guiding means, and means for effecting sequential operation of said feeding motors.

5. In a rock drilling mechanism, a support providing guiding means, a rock drill mounted on said support for feeding movement along said guiding means, a pair of sequentially operable feeding motors supported on said support and arranged in offset parallel relation to each other for feeding the rock drill along said guiding means, said feeding motors each comprising a feed cylinder containing a feed piston, and means for effecting sequential operation of said feeding motors.

6. In a rock drilling mechanism, a rock drill, and means for feeding the rock drill comprising a feed cylinder containing a feed piston, a second feed cylinder on which said first mentioned feed cylinder is supported for guided movement during the feeding operation, said second feed cylinder providing, for the said guiding of said first cylinder, longitudinally extending guiding means to the rear of its own forward end and likewise containing a feed piston, and said feed cylinders and pistons cooperating to effect feed of the rock drill.

7. In a rock drilling mechanism, a rock drill, and means for feeding the rock drill including a pair of alined feeding motors cooperating to effect drill feed, and a third motor for adjusting said pair of alined feeding motors and the rock drill with respect to the work prior to the feeding operation of said aligned feeding motors.

8. In a rock drilling mechanism, a rock drill, and means for feeding the rock drill including a pair of alined feeding motors, a third feeding motor arranged in parallel offset relation with respect to said alined feeding motors, said motors cooperating to effect drill feed.

9. In a rock drilling mechanism, a rock drill, a column presenting a guideway along which the

rock drill is guided, a feed cylinder contained in said column, a feed piston reciprocable in said feed cylinder, a feed cylinder parallel with said column and to which the rock drill is connected, a feed piston contained in said last mentioned feed cylinder, and means for connecting said feed pistons together.

10. In a rock drilling mechanism, a rock drill, a pair of alined feed cylinders, pistons contained in said feed cylinders respectively, a common piston rod connecting said feed pistons together, means for connecting the rock drill to one of said alined feed cylinders, a third feed cylinder arranged in parallel offset relation with respect to said alined feed cylinders, and a feed piston contained in said parallel feed cylinder and connected to the other of said alined feed cylinders.

11. In a rock drilling mechanism, a rock drill, a pair of alined feed cylinders, pistons contained in said feed cylinders respectively, a common piston rod connecting said feed pistons together, means for connecting the rock drill to one of said alined feed cylinders, a third feed cylinder arranged in parallel offset relation with respect to said alined feed cylinders, a feed piston contained in said parallel feed cylinder and connected to the other of said alined feed cylinders, and guiding means connected to said feed cylinder to which the rock drill is connected and slidably mounted in guideways on said parallel feed cylinder.

12. In a rock drilling mechanism, a rock drill, a pair of alined feed cylinders, pistons contained in said feed cylinders respectively, a common piston rod connecting said feed pistons together, means for connecting the rock drill to one of said alined feed cylinders, a third feed cylinder arranged in parallel offset relation with respect to said alined feed cylinders, a feed piston contained in said parallel feed cylinder and connected to the other of said alined feed cylinders, guiding means connected to said feed cylinder to which the rock drill is connected and slidably mounted in guideways on said parallel feed cylinder, and guides on said other alined feed cylinder slidably mounted on said guiding means.

13. In a rock drilling mechanism, a rock drill, a pair of alined feed cylinders, pistons contained in said feed cylinders respectively, a common piston rod connecting said feed pistons together, means for connecting the rock drill to one of said alined feed cylinders, a third feed cylinder arranged in parallel offset relation with respect to said alined feed cylinders, a feed piston contained in said parallel feed cylinder and connected to the other of said alined feed cylinders, and a pair of parallel guide rods secured to said alined feed cylinder to which the rock drill is connected, and guideways on said parallel feed cylinder in which said rods are slidably guided.

14. In a rock drilling mechanism, a rock drill, a pair of alined feed cylinders, pistons contained in said feed cylinders respectively, a common piston rod connecting said feed pistons together, means for connecting the rock drill to one of said alined feed cylinders, a third feed cylinder arranged in parallel offset relation with respect to said alined feed cylinders, a feed piston contained in said parallel feed cylinder and connected to the other of said alined feed cylinders, a pair of parallel guide rods secured to said alined feed cylinder on which the rock drill is mounted, guideways on said parallel feed cylinder in which said rods are slidably guided, and guides on said

other alined feed cylinder slidably mounted on said rods.

15. In a rock drilling mechanism, a rock drill, a pair of alined feed cylinders, one reciprocable with respect to the other, feed pistons contained in said feed cylinders respectively, a common piston rod connecting said feed pistons together, means for mounting the rock drill on the reciprocable alined feed cylinder, a parallel feed cylinder, and a feed piston contained in said parallel feed cylinder and connected to said other alined feed cylinder.

16. In a rock drilling mechanism, a rock drill, a pair of alined feed cylinders, one reciprocable with respect to the other, feed pistons contained in said feed cylinders respectively, a common piston rod connecting said feed pistons together, means for mounting the rock drill on the reciprocable alined feed cylinder, a parallel feed cylinder, a feed piston contained in said parallel feed cylinder and connected to said other alined feed cylinder, and means for clamping said last mentioned feed piston in adjusted position with respect to said parallel feed cylinder.

17. In a rock drilling mechanism, a support presenting a longitudinal guideway, a rock drill guided for movement along said support guideway, feeding motors acting cumulatively for feeding the rock drill along the support guideway, means for effecting cumulative operation of said feeding motors, and a motor for moving said feeding motors and rock drill into adjusted position with respect to the work prior to the feeding operation of said feeding motors.

18. In a rock drilling mechanism, a rock drill, motor operated means for feeding the rock drill, and motor operated means for adjusting the rock drill and said feeding means with respect to the work prior to the feeding operation of said feeding means, said motor operated means having controlling means including means for precluding operation of said feeding means during operation of said adjusting means.

19. In a rock drilling mechanism, a rock drill, motor operated means for feeding the rock drill comprising a pair of cooperating feeding motors acting cumulatively to effect drill feed, means for effecting cumulative operation of said feeding motors, and motor operated means for adjusting the rock drill and said feeding means with respect to the work prior to the feeding operation of said feeding means.

20. In a rock drilling mechanism, a rock drill, a pair of alined feeding motors each comprising relatively reciprocable cylinder and piston elements, said motors acting sequentially to effect drill feed, means for effecting sequential operation of said motors, means for connecting the rock drill to one of said feeding elements, and a third motor comprising relatively reciprocable cylinder and piston elements coacting with said alined feeding motors, and means for connecting one of said cylinder and piston elements of said last mentioned motor to another element of said alined feeding motors from that to which said rock drill is connected.

21. In a rock drilling mechanism, a rock drill, a pair of alined feeding motors each comprising relatively reciprocable cylinder and piston ele-

ments, said motors acting sequentially to effect drill feed, means for effecting sequential operation of said motors, means for connecting the rock drill to one of said feeding elements, and a third motor arranged in parallel offset relation and comprising relatively reciprocable cylinder and piston elements coacting with said alined feeding motors, and means for connecting one of said cylinder and piston elements of said last mentioned motor to another element of said alined feeding motors from that to which said rock drill is connected.

22. In a rock drilling mechanism, a rock drill, a pair of alined feeding motors each comprising relatively reciprocable cylinder and piston elements, said motors acting sequentially to effect drill feed, means for effecting sequential operation of said motors, means for connecting the rock drill to one of said feeding elements, and a third motor comprising relatively reciprocable cylinder and piston elements coacting with said alined feeding motors, means for connecting one of said cylinder and piston elements of said last mentioned motor to another element of said alined feeding motors, from that to which said rock drill is connected, and guiding means connected to the feeding element to which the rock drill is connected and slidably mounted in guideways on the cylinder element of said third motor.

23. In a rock drilling mechanism, a support presenting a longitudinal guideway, a rock drill guided for movement along said support guideway, pressure fluid actuated means for feeding the rock drill along said support guideway, and pressure fluid actuated means for adjusting said feeding means and the rock drill with respect to the work prior to the feeding operation of said feeding means, said pressure fluid actuated means having controlling means including means for precluding operation of said feeding means during operation of said adjusting means.

24. In a rock drilling mechanism, a support presenting a longitudinal guideway, a rock drill guided for movement along said support guideway, pressure fluid actuated means arranged parallel with the support guideway for feeding the rock drill along said support guideway, and pressure fluid actuated means for adjusting said feeding means and the rock drill with respect to the work prior to the feeding operation of said feeding means, said pressure fluid actuated means having controlling means including means for precluding operation of said feeding means during operation of said adjusting means.

25. In a rock drilling mechanism, a support presenting a longitudinal guideway, a rock drill guided for movement along said support guideway, pressure fluid actuated means arranged parallel with the support guideway for feeding the rock drill along said support guideway, and pressure fluid actuated means also arranged parallel with the support guideway for adjusting said feeding means and the rock drill with respect to the work prior to the feeding operation of said feeding means, said pressure fluid actuated means having controlling means including means for precluding operation of said feeding means during operation of said adjusting means.

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