Dec. 31, 1929. E. G. GARTIN 1,742,166

DRILLING MECHANISM

Original Filed March 13, 1924

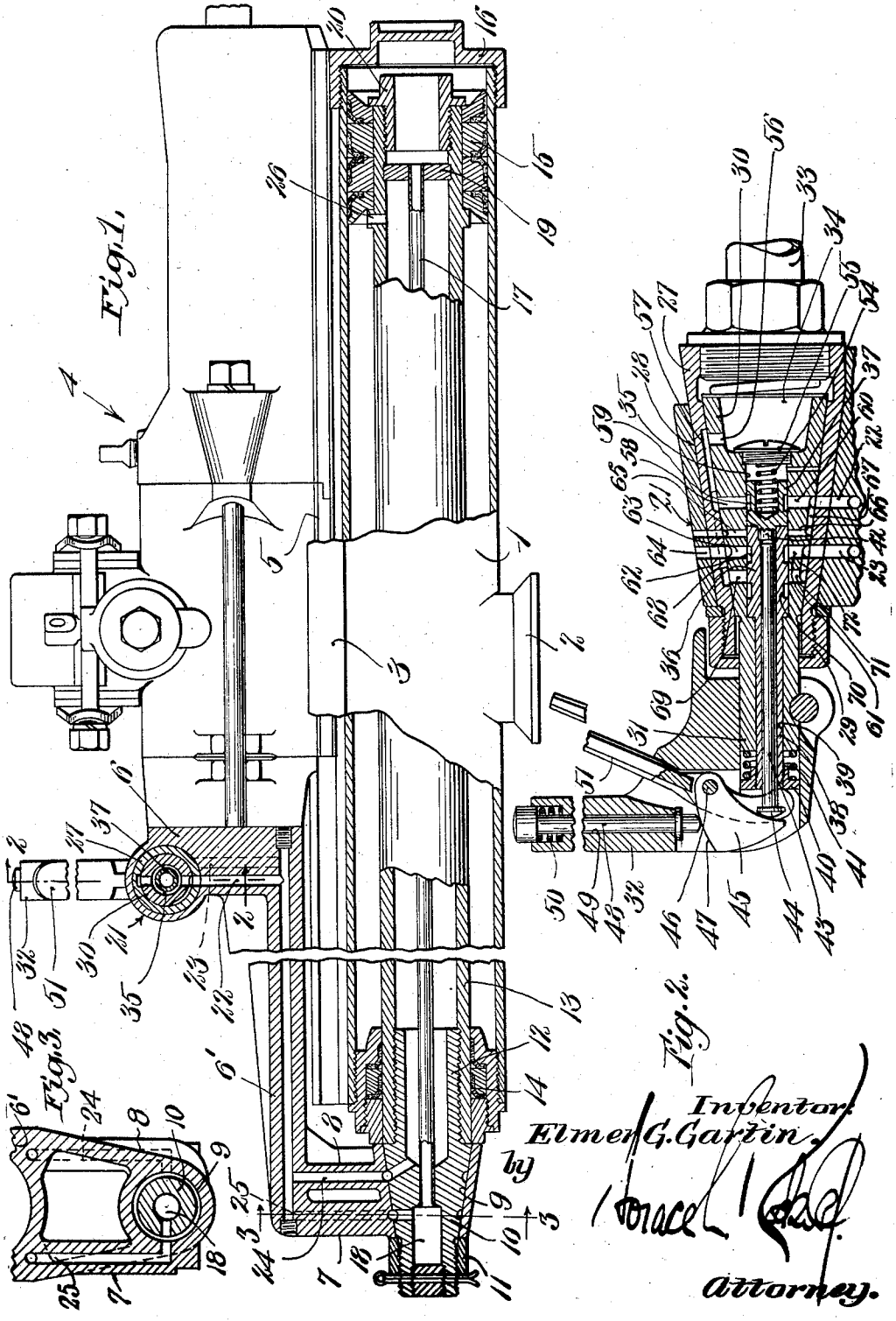


Fig. 1.

Fig. 2.

Fig. 3.

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Patented Dec. 31, 1929

1,742,166

UNITED STATES PATENT OFFICE

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DRILLING MECHANISM

Application filed March 13, 1924, Serial No. 699,114. Renewed January 13, 1928.

This invention relates to drilling mechanism.

It has for its object to provide an improved drilling mechanism. Another object is to provide a drilling mechanism having improved feeding means therefor. Another object is to provide improved means for controlling said feeding means. A further object is to provide improved forward and reverse feeding means having improved means for controlling one of said feeds independently of the other, or controlling both of said feeds simultaneously. A further object is to provide improved feed control means which is particularly adapted for a hole spotting operation, such as to bring the steel up to the face and hold the same thereto, my improved control means being manually operable.

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

In these drawings,—

Fig. 1 is a side elevation partly broken away to show details of construction.

Fig. 2 is a vertical transverse section on line 2—2 of Fig. 1.

Fig. 3 is a transverse vertical sectional view taken substantially on line 3—3 of Fig. 1.

In the illustrative form of my invention I have shown the same embodied in a drifter type of drill comprising a combined feed cylinder and supporting shell 1 having a depending bracket 2 and guideways 3 projecting upwardly therefrom and within which are longitudinally slidably mounted gibs 5 carried on the drilling mechanism 4. This drilling mechanism proper is of any usual type, herein shown as of the percussive motor type which has a usual rear cylinder head 6 from which an arm 6′ projecting rearwardly therefrom terminates in downwardly projecting members 7 and 8 which carry at their lower end a conical bored member 9 within whose bore a plug member 10 is held as by a nut 11. Threadedly connected to a reduced extension 12 of the plug 10 is a hollow piston rod 13 which projects forwardly through a combined rear cylinder head and packing member 14 and carries at its forward end a feed piston 15, the front end of the cylinder being closed as by a front head 16. Also carried by the plug member 10 is a fluid conducting tube 17 projecting forwardly from a chamber 18 and terminating in a head 19 fixed within the forward hollow portion of the piston rod 13 and adjacent a hollow flanged nut 20 threadedly connected to the rod 13 to hold the piston 15 on said rod. Suitable passage means are provided in the arm 6′ and piston rod for conducting fluid from an improved valve mechanism 21 to either the forward or rear side of the piston 15. These passages comprise vertical passages 22 and 23 leading from the main valve 21 and communicating with passages 24 and 25 formed in the arms 8 and 7, respectively, which in turn communicate with the hollow portion of the piston rod 13 and the fluid conducting tube 17. The hollow portion in turn communicates with the rear side of the piston 15 as by a port 26, while the tube 17 communicates with the front side through the hollow nut 20.

In order to control the flow of actuating fluid to and from the opposite sides of the piston 15 in accordance with the desire of the operator, I have provided the improved valve mechanism 21 which, as shown in Fig. 2, comprises a conical shaped sleeve 27 seated within a conical bore 28 in the head 6 and held against rotation as by a suitable combined packing gland and nut 29, while rotatably mounted within the conical bore of the sleeve 27 is a conical shaped rotatable control valve 30 having an outwardly projecting stem 31 to which is fixed a control lever 32. Connected to the opposite end of the sleeve 27 is a usual fluid supply hose 33 adapted to communicate with a chamber 34 formed in the forward end of the valve 30. In order to allow flow of fluid from the chamber 34 to one side of the piston while venting the other side to atmosphere, I have provided a bore 35 in the valve 30 and within which is reciprocably mounted a plurality of separately maually controlled valves 36 and 37, it being noted that the valve 36 has a rearwardly extending hollow stem 38 disposed within a reduced bore 39 projecting rearwardly from the bore 35 while threadedly

connected to the outer end of said stem 38 is a flanged nut 40 disposed within the outer end of the bore within which the stem 31 is disposed. A spring 41 is disposed within said bore between the flange 40 and the end of the stem 31 to hold the valve 36 in its rearward position. The valve 37 has a short stem 42 projecting rearwardly into the valve 36 and which is adapted to be engaged as by a stem 43 having at its outer end a head 44 adapted to be engaged by an intermediate member 45 pivoted at 46 to the valve lever 32, it being noted that this member 45 is of a substantially triangular shape so as to present a surface 47 at substantially right angles to a manually operable push rod 48 longitudinally movable in a bore 49 disposed within the handle portion of the lever 32 and held normally in its operative position by a spring 50. The stem 43 and consequently the member 45 are held in position against the rod 48 as by a spring 54 disposed within a recess in the valve 37 and adapted to seat against a plug 55 disposed within the forward end of the bore 35 adjacent the chamber 34. Also pivotally mounted upon the pivot 46 is an actuating lever 51, the inner end of which is adapted to engage the nut 40 to move the valve 36.

Thus, with the valves in the position shown in Fig. 2, fluid will flow from the chamber 34 to the rear side of the piston 15 as by port 56, passage 57, port 58, annular groove 59 formed in the periphery of the valve 37, port 60 and vertical passage 22 formed in the rear head 6, passage 24 and hollow portion of the piston rod and out through the port 26 to the rear side of said piston. The front end of the cylinder during such operation is vented to the atmosphere as by having the passage 23 communicating with port 61, annular groove 62 formed in the valve 36, and ports 63 and 64.

In the operation if it is desired to shut off the flow of live pressure to the forward feed and still keep the front end of the feed cylinder vented to the atmosphere, the rod 48 is pushed inwardly to thrust the rod 43 and valve 37 forwardly to shut off flow of fluid through the port 60. It will be noted that during this period the valve 36 will be maintained in its normal position as by the spring 41. If, however, it should be desired to vent the rear end of the cylinder 1 and allow live pressure fluid to flow to the front end thereof to obtain a reverse feed, the lever 51 will be actuated whereby both valve 36 and valve 37 will be thrust forwardly simultaneously, thereby cutting off flow of live pressure to the passage 22, bringing annular groove 62 into communication with vent passages 65 and 66 which communicate with the forward feed passage 22 as by a groove 67 formed in the periphery of the valve 30, which causes the passage 23 to be shut off from communication with the atmosphere and to be put into communication with the chamber 34 as by a continuation 68 of the live pressure fluid passage 57 which terminates in a port 69 communicating with an annular groove 70 formed in the valve 36 to allow flow of live pressure fluid to port 71 and passage 72 communicating with the reverse passage 23. It will thus be seen that by my improved valve arrangement I may instantly stop the forward feed without affecting the reverse feed or I can instantly and simultaneously shut off the forward feed and vent it to the atmosphere and cause actuation of the reverse feed.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in 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 motor, forward and reverse positive feeding means therefor, a main control valve including means for controlling both said motor and said feeding means, and auxiliary valve means comprising relatively movable valves having separate manual operating means for simultaneously controlling both of said feeding means or for controlling one of said feeding means independently of the other.

2. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, a main control valve including means for controlling both said motor and said feeding means, and auxiliary valve means dependent upon the operation of said main valve comprising relatively movable valves having separate manual operating means for simultaneously controlling both of said feeding means or for controlling one of said feeding means independently of the other.

3. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, a main control valve including means for controlling both said motor and said feeding means, and auxiliary valve means comprising relatively movable valves cooperating with and disposed within said main control valve for controlling one of said feeding means independently of the other.

4. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, a hollow main control valve including means for controlling both said motor and said feeding means, and auxiliary feed controlling means including relatively movable valve means reciprocably mounted in said main control valve for simultaneously controlling both of said feeding means or for

controlling one of said feeding means independently of the other.

5. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, a main valve including means for controlling both said motor and said feeding means, and auxiliary feed controlling valve means comprising independently operable valves disposed within said main valve for controlling either said forward or said reverse feeding means.

6. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, a main valve including means for controlling both said motor and said feeding means, and auxiliary feed controlling valve means disposed within said main valve and comprising a valve for controlling said forward feeding means, and a cooperating valve for controlling said reverse feeding means.

7. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, a main valve including means for controlling both said motor and said feeding means, said valve having a handle adapted to be grasped by the operator, and auxiliary valve means including relatively movable valves for independently controlling said forward and said reverse feeding means and including separate manual operating means arranged in juxtaposition to said main valve handle to enable the operator to control said latter valve means by but a single hand without removing said hand from said main valve handle.

8. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, a main control valve including means for controlling both said motor and said feeding means, said valve having a projecting operating handle adapted to be grasped by the operator, and auxiliary feed controlling valve means including relatively movable valves for simultaneously controlling both of said feeding means or for controlling one of said feeding means independently of the other, said valves having separate manual operating members disposed in juxtaposition to said main valve handle to enable the operator to control said latter valve means with but a single hand without removing said hand from said main valve handle.

9. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, a main valve including means for controlling both said motor and said feeding means, said valve having a handle adapted to be grasped by the operator, and auxiliary valve means including relatively movable valves for independently controlling said forward and said reverse feeding means and including separate manual operating means arranged in juxtaposition to said main handle to enable the operator to control said latter valves by but a single hand without removing said hand from said main valve handle.

10. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, said feeding means being pressure fluid actuated, manual means for adjustably controlling the flow of fluid to said forward feeding means independently of fluid flow to said reverse feeding means, manual means for adjustably controlling fluid flow to said reverse feeding means, and means for effecting the operation of said reverse feed control means to effect the operation of said forward feed control means.

11. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having passages formed therein leading to the feeding means, a main valve disposed in said casing including means for controlling said passages, and auxiliary valve means dependent upon the operation of said main valve comprising independently manually operable valves for also controlling said passages.

12. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having passages formed therein leading to the feeding means, a main valve disposed in said casing including means for controlling said passages, and auxiliary valve means dependent upon the operation of said main valve comprising independently manually operable valves one of which includes means for controlling certain of said passages while the other includes means for controlling others of said passages.

13. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having passages formed therein leading to the feeding means, a main valve disposed in said casing including means for controlling said passages, and auxiliary valve means dependent upon the operation of said main valve comprising independently manually operable valves one of which includes means for controlling certain of said passages while the other includes means for controlling others of said passages, and means whereby actuation of one of said valves will effect the operation of the other thereof.

14. A controlling valve mechanism for a rock drill feeding means comprising a casing having a bore, fluid supply and exhaust passages communicating therewith and leading to the feeding means, a main valve disposed in the bore of said casing including means for controlling said passages, and auxiliary valve means dependent upon the operation of said main valve comprising separate valves one of which includes means for controlling certain of said supply and exhaust passages while the other includes means for controlling others of said supply and exhaust passages, said valves having separate manual operating means.

15. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having fluid conducting passages formed therein leading to the feeding means, means disposed in said casing for controlling fluid flow through said passages including a plurality of longitudinally movable valves having separate manually operable control means, and means whereby actuation of one will directly effect operation of the other thereof.

16. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having fluid conducting passages formed therein leading to the feeding means, means disposed in said casing for controlling the flow of fluid through said passages including a main control valve and a plurality of auxiliary valves, and separate manual operating means for each of the same disposed in a common plane but movable in different directions for controlling said flow of fluid.

17. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having passages formed therein leading to the feeding means, a main valve disposed in said casing including means for controlling said passages, auxiliary control means for said passages including a bore in said main valve, a plurality of separate valves disposed in said bore one of said valves having a hollow projecting stem, a second stem projecting through said hollow stem and the valve carried thereby for actuating said other auxiliary valve, and means for operating both of said stems.

18. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having passages formed therein leading to the feeding means, a main valve including means for controlling said passages, auxiliary control means for said passages including a bore in said main valve, a plurality of separate valves disposed in said bore, one of said valves having a hollow longitudinally extending stem, a second stem projecting through said hollow stem and the valve carried thereby for actuating said other auxiliary valve, yieldable means for holding both of said stems in position, and means for operating both of said stems.

19. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having passages formed therein leading to the feeding means, a main valve disposed in said casing including means for controlling said passages, auxiliary control means for said passages including a bore in said main valve, a plurality of separate valves disposed in said bore, one of said valves having a hollow longitudinally extending stem, a second stem projecting through said hollow stem and the valve carried thereby for actuating said other auxiliary valve, and means for actuating one of said stems independently of the other.

20. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having passages formed therein leading to the feeding means, a main control valve disposed in said casing including means for controlling said passages, auxiliary control means for said passages including a bore in said main valve, a plurality of separate valves disposed in said bore, one of said valves having a hollow longitudinally extending stem, a second stem projecting through said hollow stem and the valve carried thereby for actuating said other auxiliary valve, and means for actuating one of said stems independently of the other or for actuating the other of said stems to actuate both stems.

21. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having fluid conducting passages formed therein leading to the feeding means, a main valve arranged in said casing and having an operating handle adapted to be grasped by the operator, said valve including means for controlling the fluid flow in said passages, and supplemental controlling valve means including a plurality of separate valves arranged within said main valve and reciprocable axially relative thereto for controlling fluid flow in certain of said passages, said latter valves having separate controlling members located in juxtaposition to said main valve handle including a lever pivotally connected to said handle to swing toward or from the latter and operating to close one of said supplemental valves when said lever and handle are brought together.

22. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having fluid conducting passages formed therein leading to the feeding means, a main valve arranged in said casing and having an operating handle adapted to be grasped by the operator, said valve including means for controlling the fluid flow in said passages, and supplemental controlling valve means including a plurality of separate valves arranged within said main valve and reciprocable axially relative thereto for controlling fluid flow in certain of said passages, said latter valves having separate controlling members located in juxtaposition to said main valve including a lever pivotally connected to said handle to swing toward or from the latter and operating to close one of said supplemental valves when said lever and handle are brought together and having means for automatically opening said latter supplemental valve when said lever is released.

23. A drilling mechanism comprising a motor, forward and reverse positive feeding means therefor, a main valve including means for controlling the flow of fluid to said motor

and said feeding means, said valve having a grasping handle, and means including relatively movable valves having separately operable manual controlling means associated with said grasping handle for enabling the operator to independently control the flow of fluid to both said forward and said reverse feeding means with but a single hand without removing said hand from said main valve handle.

24. A controlling valve mechanism for a rock drill feeding means comprising a hollow casing having passages formed therein leading to the feeding means, a main valve arranged in said casing including means for controlling fluid flow through said passages, said valve having a bore therein, auxiliary valve means including separate valves arranged in said bore, each of said latter valves including means for controlling certain of said passages, and means for actuating said valves.

In testimony whereof I affix my signature.

ELMER G. GARTIN.