June 11, 1940. A. FEUCHT 2,203,954

ROCK DRILL

Filed Oct. 21, 1938

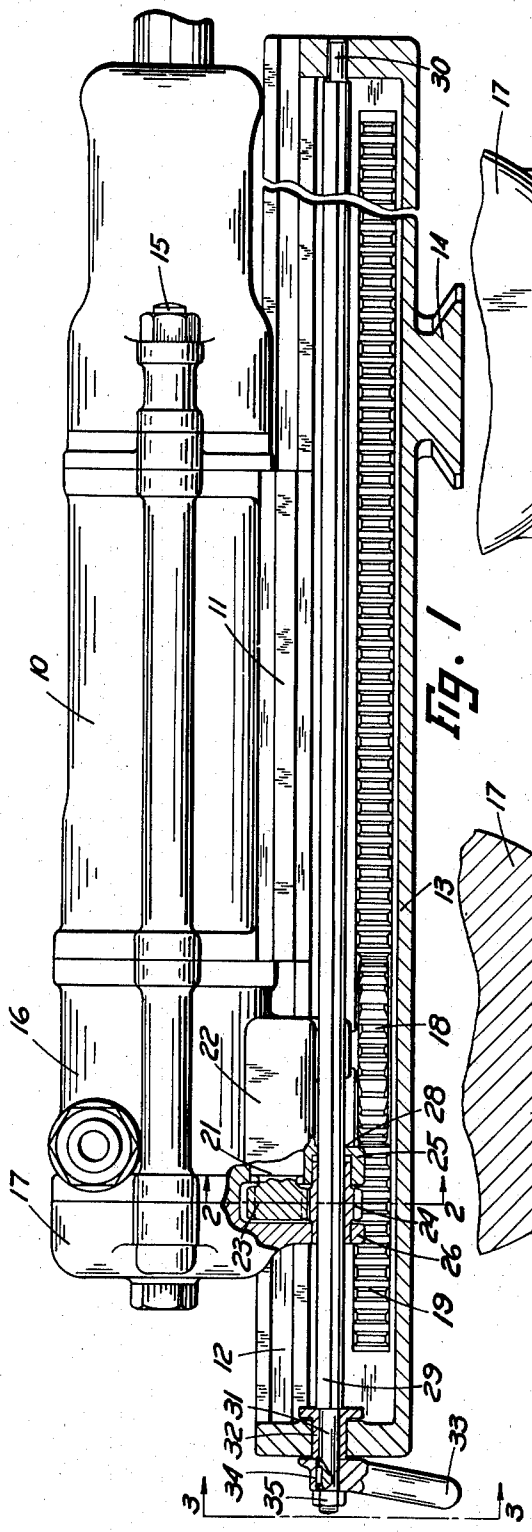


Fig. 1

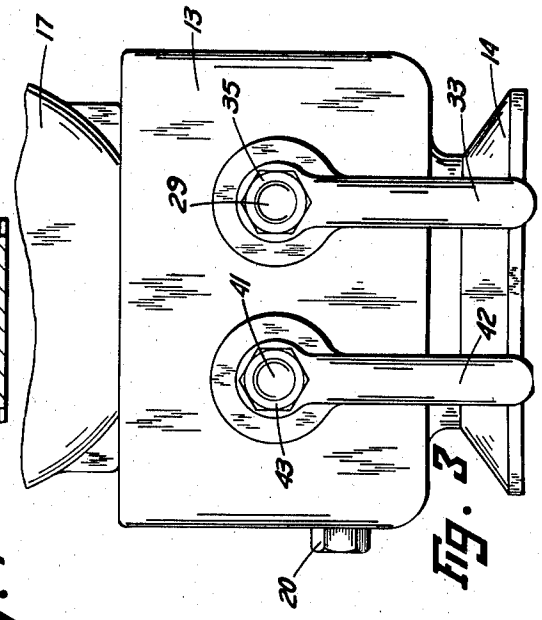


Fig. 3

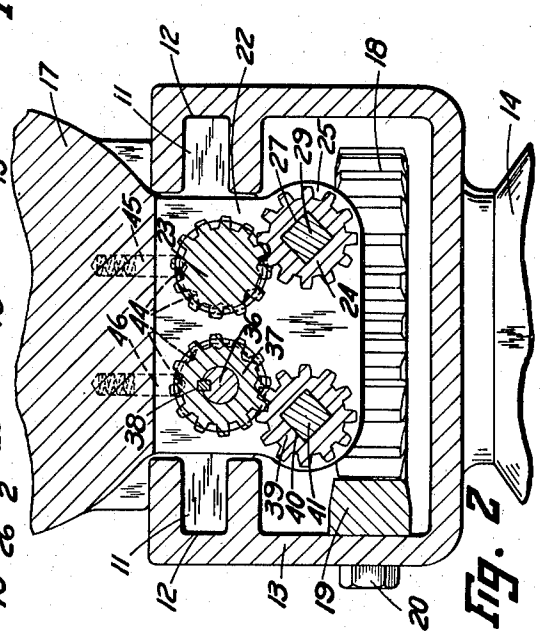


Fig. 2

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Patented June 11, 1940 2,203,954

UNITED STATES PATENT OFFICE

2,203,954

ROCK DRILL

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Application October 21, 1938, Serial No. 236,221

7 Claims. (Cl. 121—9)

This invention relates broadly to fluid actuated rock drills of the drifter type equipped with an automatic feed, but more particularly to remote controls operable for governing the direction of feeding motion of the rock drill and the operation thereof.

Rock drills of the drifter type generally include a fluid actuated drilling motor provided with guides for slidable movement on a support or shell. Hand operated feeding devices through which slidable or feeding movement is imparted to the rock drill relative to its support, are today gradually replaced by what is generally termed automatic feeding mechanism. In practice, automatic feeding mechanisms are usually of the "jump feed" type where in actuation of the mechanism depends upon the vibration imparted thereto by the drilling motor, or of the "power feed" type, wherein the actuation of the mechanism depends upon the action of the motive fluid, such as compressed air, admitted therein.

The types of feeding mechanism above referred to are further divided into two distinct types generally known as "stationary" when carried by the support, and "movable" when carried by the drilling motor. In the "stationary" type, the feeding motor-housing is generally rigidly secured to the rear end of the shell and connected to the drilling motor by any suitable feed transmitting means such as a screw, cable, chain or the like. With this stationary type of feeding motor, the control operable for governing the direction of the feed motion imparted to the rock drill and hereafter referred to as the feed control, is generally located near the rear end of the support at a place readily accessible by the operator. On the other hand, the throttle valve operable for controlling the admission of the motive fluid is located within the back head of the drilling motor, and therefore movable back and forth with the drilling motor. In practice, this "stationary" type of feeding mechanism has been found objectionable not only because of the position of the throttle relative to that of the feed control, but also due to the additional weight on the rear end of the shell tending to amplify the extent of the vibrations transmitted thereto from the drilling motor, thereby requiring the use of a stronger and consequently heavier shell.

In the "movable" type of feeding mechanism, the feed motor-housing is generally carried by the back head of the drilling motor and consequently moves back and forth with the drilling motor, thereby overcoming the objection encountered with the "stationary" type due to the additional weight carried by the rear end of the shell. In this instance, because of the throttle valve already located within the rear end or back head of the drilling motor, difficulty has been encountered to position the feed control where it would be readily accessible to the operator irrespective of the location of the drilling motor relative to the work. This type of "movable" feed control has also been found objectionable because, in order to operate the control, the operator had to follow the drilling motor back and forth, and in cases where it was located at certain angles or in confined areas, it was almost impossible for the operator to reach the feed control.

It is therefore one object of this invention to produce a rock drill equipped with an automatic feeding mechanism carried by the rock drill for slidable movement therewith, but having a remote feed control located near the rear end of the shell at a place readily accessible by the operator.

Another object of this invention is to provide such a rock drill with feed and throttle valve controls operable from the rear end of the drill-support irrespective of the position of the drill on its support.

Other objects more or less ancillary to the foregoing and the manner in which the various objects are attained, reside in the specific construction and aggroupment of the elements peculiar to this structure as will become apparent from a more complete examination of this specification, in the claims of which there are assembled certain specific combinations of parts and specific construction indicative of the scope and spirit of the invention.

In the drawing which illustrates a preferred form of the invention:

Fig. 1 is a side elevational view of a rock drill embodying the invention shown partly in section to illustrate details of construction.

Fig. 2 is an enlarged cross sectional view taken in a plane indicated by the line 2—2 in Fig. 1.

Fig. 3 is an end elevational view looking in the direction of the arrows 3—3 in Fig. 1.

Referring to the drawing, 10 represents a fluid actuated rock drill or drilling motor of the drifter type having guides 11 slidable within corresponding guideways 12 of a guide shell or support 13, which support is provided with the usual cone 14 depending therefrom.

Secured to the rear end of the drilling motor 10 by a pair of through bolts 15 one of which is

shown in Fig. 1, there is a feed motor housing 16 and a backhead 17 within which is accommodated a feeding mechanism or feed motor of any suitable type. For the purpose of illustration the feeding mechanism is shown to include a rotatable gear 18 depending from the housing 16 in operative engagement with a rack 19 extending longitudinally in the shell 13 and secured to the side wall thereof by one or more cap screws 20. Since the feeding mechanism does not form a part of this invention, no further description of the same is thought necessary other than pointing out that the feeding mechanism may be either fluid actuated or depend for its operation upon the jars or vibration resulting from the reversal of the piston stroke within the drilling motor 10, which feeding mechanisms always include a feed control manually operated for selectively controlling the direction of the feeding motion. For the purpose of illustration there is shown a feed control 21 rotatable within a substantially rectangular body portion 22 depending from the housing 16 and extending into the shell 13. The control 21 is formed at one end with a gear 23 meshing with a gear 24 journaled within lugs 25 and 26 depending from the boss 22 and head 17 respectively. The gear 24 is mounted between the lugs 25 and 26 against longitudinal movement relative thereto, and is formed with a square bore 27 extending centrally therethrough, while the lug 25 is provided with a cylindrical bore 28 enabling free rotation of a square rod 29 extending longitudinally of the shell 13 through the gear 23 and lug 25. The ends of this rod are turned down smooth with the front end 30 thereof journaled within the front end of the shell 13, while the rear end 31 is journaled within a bushing 32 carried by the rear end of the shell, and extends therethrough to receive a handle 33 secured thereon against rotation by a key 34 and a nut 35. The rod 29 is of a size calculated to enable free slidable movement of the gear 23 thereon, and prevent, due to the polygonal cross section of the gear-bore 27 and rod 29, relative rotation therebetween.

Within the body portion 22, there is also a throttle valve 36 rotatable therein for controlling the admission of the motive fluid to the drilling motor. This throttle valve is also equipped with a gear 37 secured thereon by a key 38 and meshing with a gear 39 journaled within lugs similar to the lugs 25 and 26. The gear 39 is also formed with a square bore 40 having a square rod 41 extending therethrough with its ends journaled within the corresponding ends of the shell 13 similarly to the ends of the rod 29. To the rear end of the rod 41 is also secured a handle 42 locked thereon by a nut 43, and located exteriorly of the shell beside the handle 33.

To prevent accidental rotation of the feed control 21 and throttle valve 36, the hubs of gears 23 and 37 have been provided with a series of detents 44 adapted to receive the free end of spring pressed plungers 45 and 46 respectively, which are slidably mounted within the housing 16.

In the operation of the mechanism, it will be understood that the direction of the feeding motion imparted to the rock drill 10 by the feed motor within the housing 16, may be controlled by rotating the feed control 21 in one or the other direction. In the present construction, this rotation may be effected by simply rotating the handle 33, thereby transmitting rotation to the feed control 21 through the rod 29, the gear 24 and the gear 23. With the handle 33 positioned as shown in Fig. 3, the feed control 21 will assume a position effecting the rearward feeding motion of the drilling motor 10. When the handle is rotated into the three o'clock position, the corresponding position of the feed control 21 will prevent any feeding motion of the drilling motor, and when the handle is rotated into a twelve o'clock position, the feed control 21 will assume a position causing forward feeding motion of the drilling motor 10.

With reference to the throttle valve 36, it will also be understood that its rotation for controlling the admission of the motive fluid into the drilling motor 10 may be effected by rotating the handle 42, thereby resulting in the rotation of the rod 41, the gear 39 and the gear 37 which is secured on the throttle valve by the key 38.

From the foregoing description, it will now be understood that in practice the operator may stand back of the rear end of the shell 13 and control the direction of feeding motion and actuation of the drilling motor 10 by simply manipulating the handles 33 and 42 located on the rear end of the shell 13.

Although the foregoing description is necessarily of a detailed character, in order to completely set forth the invention, it is to be understood that the specific terminology is not intended to be restrictive or confining and it is to be further understood that various rearrangements of parts and modifications of structural detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

I claim:

1. The combination with a support having a drill slidable thereon, of a feeding mechanism for the drill capable of imparting feeding motion thereto in two directions, of a feed direction control carried by the drill for movement therewith movable for selectively controlling the direction of feed imparted to the drill, and means carried by the support operatively associated with said control and operable from one end of said support for effecting movement of said control irrespective of its position relative to the support.

2. The combination with a support having a drill slidable thereon, of a feeding mechanism for the drill capable of imparting feeding motion thereto in two directions, of a feed direction control carried by the drill for movement therewith and movable relative thereto for selectively controlling the direction of feed imparted to the drill, a manually movable handle carried by the support near one end thereof, and movement transmitting means between said handle and control operative irrespective of the position of said control relative to the support.

3. The combination with a support having a drill slidable thereon, of a feeding mechanism for the drill capable of imparting feeding motion thereto, of a feed control for said mechanism carried by the drill for slidable movement therewith, said control being movable into feeding mechanism operative and inoperative position, and a rod extending longitudinally of the support operatively associated with said control, said rod being selectively movable for shifting said control into either of the positions aforesaid.

4. The combination with a support having a fluid actuated drilling motor slidable thereon, of a throttle valve rotatably carried by the motor for controlling admission of the motive fluid

therein, a rotatable handle carried by the support near one end thereof, and rotation transmitting means between said handle and throttle valve operative irrespective of the position of the motor on the support.

5. The combination with a support having a motor slidable thereon, a valve carried by the motor for slidable movement therewith, a movable handle carried by the support, and means for transmitting movement from said handle to said valve.

6. The combination with a support having a motor slidable thereon, a rotatable valve carried by the motor for slidable movement therewith, a manually rotatable handle carried by the support, and rotation transmitting means between said handle and valve.

7. The combination with a support having a drill slidable thereon, of a feeding mechanism for the drill including a feed motor secured to the drill for slidable movement relative to the support, a motor control carried by said motor, a movable handle carried by the support, and means for transmitting movement from said handle to said control.

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