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ADJUSTABLE DRILL MOUNTING

Filed July 9, 1945

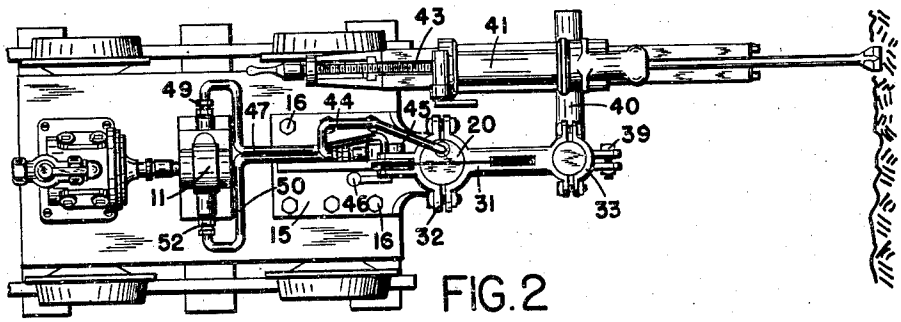


FIG. 2

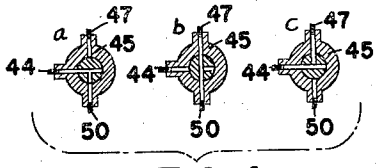


FIG. 4

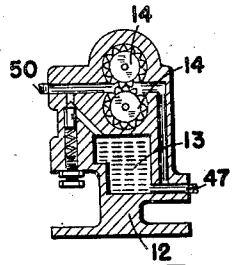


FIG. 3

FIG. 1

INVENTOR
ALBERT FEUCHT
BY
ATTORNEY

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ADJUSTABLE DRILL MOUNTING

Albert Feucht, Garfield Heights, Ohio, assignor to The Cleveland Pneumatic Tool Company, Cleveland, Ohio, a corporation of Ohio

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4 Claims. (Cl. 255—51)

1

The present invention relates broadly to rock drilling equipment, but more particularly to a drilling apparatus including a rock drill of the drifter type having an adjustable mounting for supporting and moving the drill.

In work necessitating the use of such equipment, namely tunneling operations requiring the removal of rock or ore, holes must be drilled for the blasting charges in the face of the workings to drive the tunnel or drift. The form of the tunnel face produced by such a blast will be governed primarily by the depth to which the holes are drilled. Flat perpendicular tunnel faces are particularly desirable, but to obtain the same it is necessary to have the blind ends of the holes lie in the same vertical plane extending laterally of the tunnel, so that the rock or ore body will break cleanly in approximately the same plane when the charges are fired.

Means for rapidly raising and lowering the rock drill in the process of drilling holes for a blasting round are well known in the art. One type of supporting means used heretofore to control the position of the drill has been of the nature of an arm, or boom-like member, pivoted about a fixed point on the base or frame of the supporting structure. A drill so held moves in a vertical arc which sometimes necessitates shifting the position of the base or frame to compensate for variations in the distance between the drill and the work face. Another type of supporting means which overcomes the disadvantage of arcuate movement of the drill is disclosed in my Patent No. 2,379,137, granted June 26, 1945. The present invention is an improvement thereover in that the source of power fluid used to operate the rock drill is also used to move the drill from one position to another in the desired fashion, thus eliminating practically all of the manual effort heretofore involved in the process.

The primary object of the invention, therefore, is to provide improved means for mounting the drill whereby the mounting can be maintained in a constant vertical plane parallel to the face of the work when moving from one drilling position to another.

Another object of the invention is to provide an improved mounting for rock drills and fluid operated means associated therewith for moving the drill in a vertical plane parallel to the face of the work when moving from one drilling position to another.

Other objects and advantages more or less ancillary to the foregoing reside in the specific

2

construction and aggroupment of the elements peculiar to this structure, as will become apparent from a more complete examination of this specification.

In the drawing:

Figure 1 is a side elevational view, with parts in section, of the improved drill mounting means shown associated with a mine car;

Figure 2 is a plan view thereof;

Figure 3 is a vertical sectional view through the pump being taken substantially on line 3—3 of Figure 1;

Figure 4 is an aggregate sectional view illustrating three positions of the valve for controlling the flow of fluid to and from the mounting means.

Referring to the drawing for a more detailed description of the invention, a mine car of conventional construction is generally designated by the reference numeral 6, the same being movable within a mine B on the tracks 7. The mine car includes a horizontally disposed platform 8 and wheels 9, the platform supporting a motor 10 operated by means of compressed air or the like for driving the pump 11. The motor 10 and pump 11 are of conventional construction but for purposes of illustration, the pump has been shown in section in Figure 3 of the drawing. The pump includes a base 12 and chamber 13 for containing the fluid, the fluid being discharged to and from the container by means of the gear wheels 14.

A plate 15 is secured by means of cap screws or the like 16 on the front end of the car platform 8, said plate having bracket arms 17 extending upwardly therefrom for supporting a guide sleeve 18. This guide sleeve 18 provides a means of attaching the rock drill and mounting to the car, said rock drill and mounting being detachably associated with the sleeve 18.

Mounted for slidable movement within the sleeve 18, there is a cylinder 19 closed at its upper end 20 and telescopically receiving within its lower end 21 a tubular post 22. The post 22 carries a pedestal 23 on its lower end adapted to rest on the floor of the mine B while the upper end thereof carries a piston 24 of a diameter equal to the inner diameter of the cylinder 19. This piston carries packing rings 25 for preventing the escape of the fluid 26 from within the cylinder. An arm 27 is attached by means of a clamp 28 to the lower end of the cylinder 19 and said arm is provided with a second clamp 29 for retaining the guide shaft 30, said guide shaft being mounted so as to be parallel with the cyl-

inder 19 at all times. A second arm 31 disposed parallel to the arm 27 is carried on the upper ends of the cylinder 19 and guide shaft 30. This second arm is attached to the closed end of the cylinder 19 by means of a U-shaped clamp 32 and is attached to the upper end of the guide shaft 30 by means of U-shaped clamp 33. The arm 31 and clamp 32 form supports for a pair of pulleys 34 around which is trained a cable 35. One end of the cable 35 is connected to an ear 36 extending laterally of the sleeve 18, while the other end of said cable is connected to an ear 37 attached to and extending laterally of a slide 38 clamped by means 39 on the guide shaft 30. The slide 38 carries an arm 40 on which is supported the rock drill 41. The rock drill 41 is attached to the arm 40 by any desired means well known in the art, the rock drill being also of conventional construction and including a drill steel 42 and feeding mechanism 43. As is well known in the art, the drill steel 42 is moved into engagement with the work by means of the feeding mechanism 43 and transmits to the work the reciprocating hammer impulses created in the rock drill 41.

In accordance with the present invention, a hydraulic means has been provided for raising and lowering the drill mounting means, the fluid being fed to and from the cylinder 19 under the control of the operator. Extending from the closed end of the cylinder 19 there is a fluid pressure line 44 which extends downwardly along the cylinder and then branches off therefrom as shown in Figure 1 for connection with a three-way valve 45. This valve 45 is provided with a handle 46 adapted to be rotated by the operator when changing the position of the drill. A pipe 47 extends from a connection 48 on the valve 45 with its other end terminating at 49 on one side of the pump 11. A second pipe 50 has one end connected to the valve at 51 and its other end connected at 52 to the other side of the pump 11. In Figure 4 of the drawing the valve 45 is shown in three positions. With the valve in the position designated *a*, fluid from the pump 11 will be discharged through the pipe 50 into the valve 45 and through the pressure line 44 into the cylinder 19. As fluid is admitted into the cylinder 19, said cylinder will be raised relative to the tubular member 22 carrying with it the guide shaft 30 and drill 41. In order to lower the drill to a new drilling position, the fluid must be exhausted from the cylinder 19, which necessitates rotating the valve 45 to the position *c*, at which time fluid will flow from the cylinder 19 through the pressure line 44 into the valve 45, and through the pipe 47 to be returned to the receptacle 13. When the cylinder has been lowered a sufficient distance so as to locate the drill for a new drilling position, the valve 45 is then rotated to the new position *b* in Figure 4 of the drawing, in which position it will be noted that the pressure line leading to the cylinder 19 has been cut off from its supply and any fluid emanating from the pump will travel from the pipe 50 through valve 45 and be returned to the pump through the pipe 47. The valve 45 is highly sensitive, thereby enabling the operator at all times to effectively control the amount of fluid being admitted to or exhausted from the cylinder 19 and thereby controlling the upward and downward movement of the drill.

The manner of mounting the drill including the cylinder 19, tubular post 22 and guide shaft 30, assures that movement of the drill will at all times be maintained in a constant vertical plane parallel to the face of the work when moving from one drilling position to another. As before indicated, the pump 11 is operated by means of the motor 10, which motor is also within easy reach of the operator and can be readily turned on and off by means of the lever 53. The motor 10, pump 11 and plate 15 are fixedly secured in spaced relation on the car platform 8 while the cylinder 19 and tubular post 22 are detachably held in the sleeve 18.

The adjustment of members supporting the rock drill and guide shell is as follows: the clamping means 18*a* around the cylinder 19 and the clamping sleeve 33 around the shaft 30 are both loosened; then the three-way valve 45 is operated to raise or lower the cylinder 19 against the floor support offered by the tubular post 22; movement of the cylinder 19 in either direction is transmitted two-fold to the supporting bar 40 through the cable 35, for the cable and pulleys 34 are arranged in the manner of a single block and tackle wherein the single block moves and induces twice as much movement on the free end of the tackle; and when the proper elevation of the drill has been reached, the clamps around the cylinder 19 and the shaft 30 are tightened.

The supporting truss, comprising the cylinder 19 and the shaft 30, is left undisturbed at all times and is moved up or down as a unit, at which times the support arm 40 moves twice as far upon the shaft 30. The fluid pressure line 44 is intended to be a length of high pressure air hose possessing the necessary flexibility to cooperate with the vertical movement of the cylinder.

It is, then, apparent from the foregoing disclosure that, for a given length of movement available in the cylinder 19, there will be twice the amount of movement imparted to the slide 38 and the rock drill 41. Furthermore, the construction of elements is such as to permit the entire range of positions for the rock drill from that shown in Figure 1 to a position very close to the floor of the mine B.

It is of course to be understood that when initially starting a drilling operation, the tubular post 22 and cylinder 19 are movable relative to one another so as to position the pedestal 23 on the floor of the mine in a firm and secure manner. From that point on the admission and exhaustion of fluid from the cylinder 19 controls the positioning of the drill 41 and its drill steel 42.

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. In mechanism of the character described, a post adapted to bear against the ground, a unit mounted to travel vertically on said post, a pulley on the upper end of said unit, a slide, a drill carried thereby, said unit comprising a guide track for said slide, and a cable running over said pulley, one end of said cable being fixed and the other being attached to said slide, whereby a given travel of said unit produces double that travel of said slide and drill.

2. In mechanism of the character described, a cylindrical post adapted to bear against the ground, a vertically movable unit comprising a

cylinder telescoping with said post, a pulley on the upper end of said unit, a slide, a drill carried thereby, said unit comprising a guide track for said slide, pressure fluid means for moving said cylinder up and down on said post, and a cable running over said pulley, one end of said cable being fixed and the other being attached to said slide, whereby a given travel of said unit produces double that travel of said slide and drill.

3. In mechanism of the character described, a cylindrical post adapted to bear against the ground, a vertically movable unit comprising a cylinder telescoping with said post, a pulley on the upper end of said unit, a slide, a drill carried thereby, said unit comprising a guide track for said slide, pressure fluid means for moving said cylinder up and down on said post, comprising a flexible fluid conductor connected to

said cylinder, and a cable running over said pulley, one end of said cable being fixed and the other being attached to said slide, whereby a given travel of said unit produces double that travel of said slide and drill.

4. In mechanism of the character described, a post adapted to bear against the ground, a unit mounted to travel vertically on said post, said unit comprising a guide shaft parallel to said post, a pulley on the upper end of said unit, a slide on said guide shaft, a drill carried by said slide, and a cable running over said pulley, one end of said cable being fixed and the other end being attached to said slide, whereby a given travel of said unit produces double that travel of said slide and drill.

ALBERT FEUCHT.