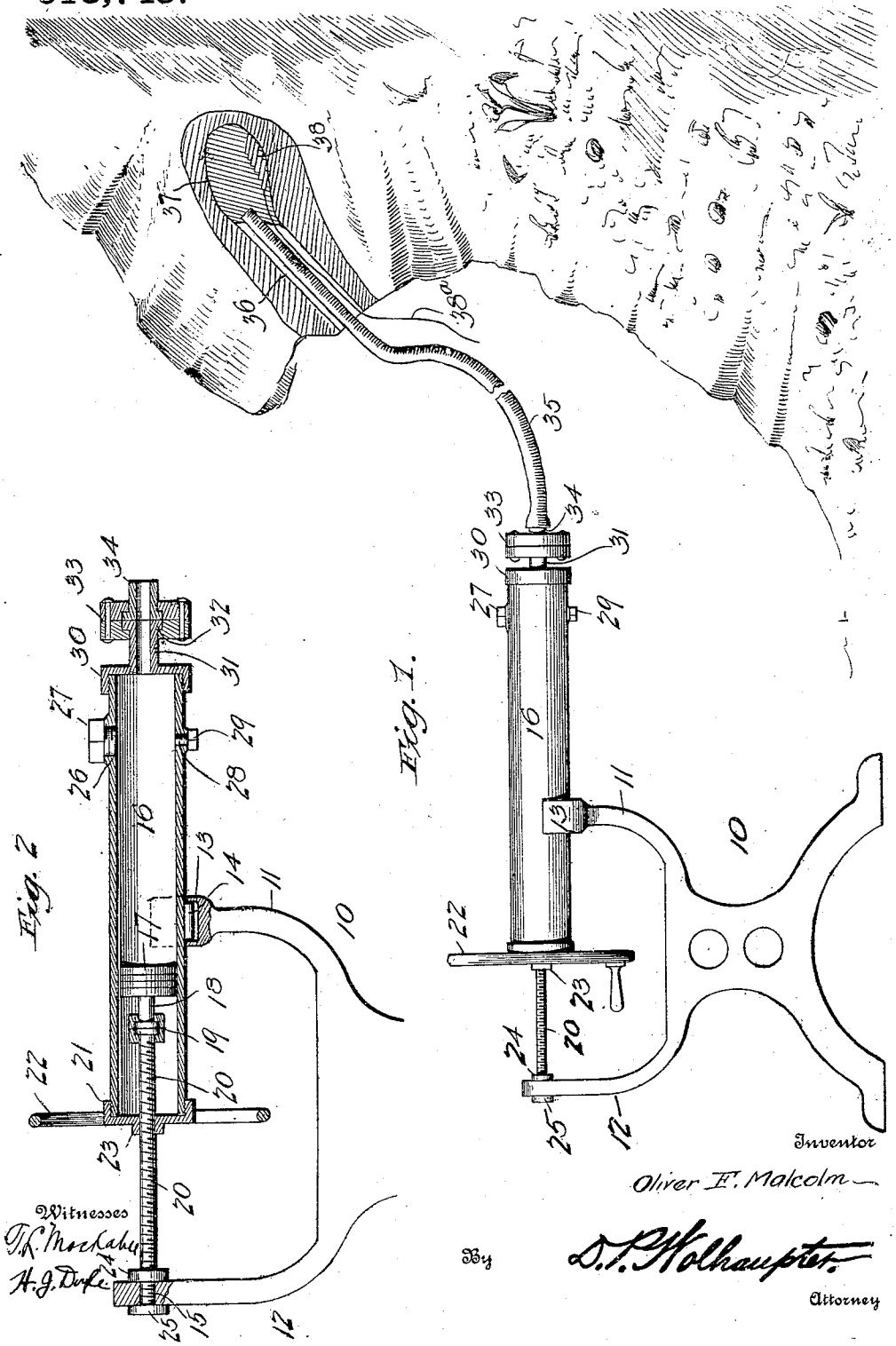
O. F. MALCOLM.

MACHINE FOR FIXING BLASTING CHARGES.

APPLICATION FILED FEB. 11, 1908.

913,745. Patented Mar. 2, 1909.



NORRIS PETERS CO., WASHINGTON, D. C

UNITED STATES PATENT OFFICE.

OLIVER F. MALCOLM, OF JOPLIN, MISSOURI.

MACHINE FOR FIXING BLASTING CHARGES.

No. 913,745. Specification of Letters Patent. Patented March 2, 1909.

Application filed February 11, 1908. Serial No. 415,328.

To all whom it may concern:

Be it known that I, OLIVER F. MALCOLM, a citizen of the United States, residing at Joplin, in the county of Jasper and State of Missouri, have invented certain new and useful Improvements in Machines for Fixing Blasting Charges, of which the following is a specification.

This invention relates to mining, and has special reference to a machine to be used for forcing a quick setting confining material into a blast hole to cause a blasting charge to be closely embedded therein.

With the above and many other objects in view, the invention contemplates a machine provided with a cylinder in which the confining material is placed and carrying a discharge outlet adapted to be placed in communication with a blast hole, and a piston working in said cylinder and adapted to force the confining material through said discharge outlet.

Other objects and advantages of the invention will be apparent from the following detailed description and accompanying drawing, wherein a preferred embodiment of the invention has been described and illustrated, like characters of reference being used to indicate corresponding parts.

In said drawings:—Figure 1 is a side elevation of a machine showing the same in the act of forcing the confining material into a blast hole. Fig. 2 is a sectional view of the machine, the discharge tube being detached therefrom.

The present machine is a manually operable one designed primarily for use where mechanical power is not available, and the invention contemplates in its general organization a portable stand or rest 10, provided with upwardly and outwardly diverging arms 11—12. The outer end 13 of the arm 11 is bifurcated, and within such bifurcated portions anti-friction rollers 14 are journaled, and the outer end of the arm 12 is provided with an opening 15, the functions of all of which will be presently explained.

A pressure cylinder 16, which is of a diameter to permit of its being placed within the bifurcated portion 13 of the arm 11 and rest upon the anti-friction rollers 14, is provided with a piston 17 carrying a short stem or rod 18 which has a loose connection 19 with a shaft 20. The shaft 20 is screw threaded, and projects through, and beyond, a detachable cylinder end cap 21 carrying a hand wheel 22 and a central nut extension 23 which is provided with a threaded opening 24, and has its end rigidly fastened within the opening 15 in the arm 12 by means of the nuts 24—25.

The front end portion of the cylinder 16 is provided with a threaded feed inlet 26 which may be closed by means of a threaded plug or closure 27, and also with a threaded clean-out opening 28 which may be provided with a threaded plug or closure 29.

An end cap 30 is detachably connected with the end of the cylinder 16 adjacent to the feed inlet 26, and carries a tube extension 31 provided with a flanged end 32 having a loose coupling 33 with a similarly shaped nipple 34 of a flexible tube 35.

The described machine has special utility in connection with confining blast charges in opening such as 36, in which an end pocket 37 has been previously formed by means of the usual preliminary blasting charge. And in the operation of the machine the end of the flexible tube is passed through the said blast opening or hole 36 and into the end pocket 37 into which the main blast charge 38 has been previously placed with its fuse 38[a] projecting out beyond the entrance to the main opening.

The confining material used in the machine is preferably liquid cement or concrete owing to their quick setting qualities, and the same is introduced into the cylinder 16 through the feed inlet 26, and a rotary motion is applied to said cylinder through the medium of the hand wheel 22, causing the same to be moved longitudinally rearwardly on the fixed threaded shaft 20. The piston 17, owing to its loose coupling 19 with the shaft 20, may rotate with the cylinder 16 but cannot move longitudinally therewith, thereby causing the end of the cylinder carrying the confining material to approach said piston, which results in said confining material being forced out of the cylinder through the discharge tube 35 and into the end pocket 37 of the blast hole 36 with sufficient force to cause the material to be tightly compacted therein, and consequently embedding the main blasting charge 38. A continued movement of the cylinder will of course cause the material to flow through the said discharge tube, with the result that said tube slowly retreats through said blast opening, while continuing

its discharge of confining material until the entrance is reached, at which point said tube is retained sufficiently long enough to cause the material to be tightly packed, after which a temporary stopping of clay or its equivalent is placed over the blast hole entrance, to hold the material till it becomes thoroughly set.

To return the cylinder to its initial position the hand wheel 22 is rotated in a direction opposite to that just described, which imparts a forward longitudinal movement to said cylinder and moves the feeding end thereof away from the piston.

It will be understood that through the loose coupling connection 33 between the cylinder 16 and the flexible discharge tube 35, the rotary movement of the cylinder is not communicated to the tube, thereby permitting its discharge end to remain in the blast hole 36 until the pressure of the discharge material forces it slowly to retreat. It will also be understood that the rotation of the cylinder 16 in addition to causing itself to be moved longitudinally on the fixed threaded shaft, also serves to effectively mix the confining material which has been fed into the cylinder prior to being forcibly discharged therefrom by the piston 17.

It will be further understood that as the only portion of the material discharging apparatus which comes in contact with the blast opening and the blasting charge therein is of soft material, such as rubber or the like, there is no danger of a premature explosion during the tamping, or packing operations, or destruction of the blast fuse, such as frequently occurs when tamping tools of wood or metal are used to pack the confining material with the resulting danger of sparks being caused by the contact therewith of gravel or other gritty material, or the constant rubbing against the said fuse.

The invention has been shown as used for forcing the confining material into an opening the entrance of which is lower than its end, such illustration being used to show the special utility thereof when the forces of gravity have to be contended with. It is to be understood, however, that the invention is also well adapted for use in connection with blast openings which incline below the horizontal, in which case the pressure exerted upon the material by the piston will be ample to cause said material to be tightly compacted in all parts of the opening, thereby dispensing with the usual manual tamping and packing.

I claim:

1. A machine for fixing blasting charges comprising a rotating and longitudinally movable material mixing and feeding cylinder, a stationary piston, and a discharge outlet.

2. A machine for fixing blasting charges comprising a support or stand carrying arms, one of which is bifurcated, bearing devices in said bifurcated arm, a cylinder resting on said bearing devices, a piston in said cylinder carrying an extended shaft, the end of which is fastened to one of the arms of the stand or support, means for imparting a longitudinal and rotary movement to the cylinder to effect a mixing and feeding of the material, and a discharge outlet carried by said cylinder.

3. A machine for fixing blasting charges comprising a support or stand provided with arms, a mixing and feeding cylinder supported in one arm and provided with a feed inlet and a discharge outlet, a shaft fixed in the other arm, a piston in said cylinder and having a swivel coupling with said fixed shaft, and adapted to coöperate with said discharge outlet, and means for imparting a longitudinal and rotary movement to said cylinder to effect a mixing and feeding of the material therein.

4. A machine for fixing blasting charges comprising a support or stand provided with arms, a mixing and feeding cylinder supported in one of said arms and provided with a feed inlet and a discharge outlet, a threaded shaft fixed in the other of said arms, said threaded shaft being extended into said cylinder, a piston in said cylinder having a swivel connection with said threaded shaft and adapted to coöperate with said discharge outlet, and means for imparting a rotary movement to said cylinder to cause the same to have a longitudinal movement upon said threaded shaft and mix and feed the material therein.

5. A machine for fixing blasting charges comprising a support or stand provided with arms, a mixing and feeding cylinder supported by one of said arms and provided with a feed inlet and a discharge outlet, a threaded shaft having a fixed connection with the other of said arms, a piston in said cylinder having a swivel connection with said fixed shaft and coöperating with said discharge outlet, and a hand wheel carried by the cylinder and adapted to communicate a rotary movement thereto to move the cylinder longitudinally on the threaded fixed shaft to mix and feed the material therein.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

OLIVER F. MALCOLM.

Witnesses:
B. H. ESTERLY,
J. D. PERKINS.