G. E. Mills,

Pump Lift.

No. 48,826. Patented July 18, 1865.

Fig: 1

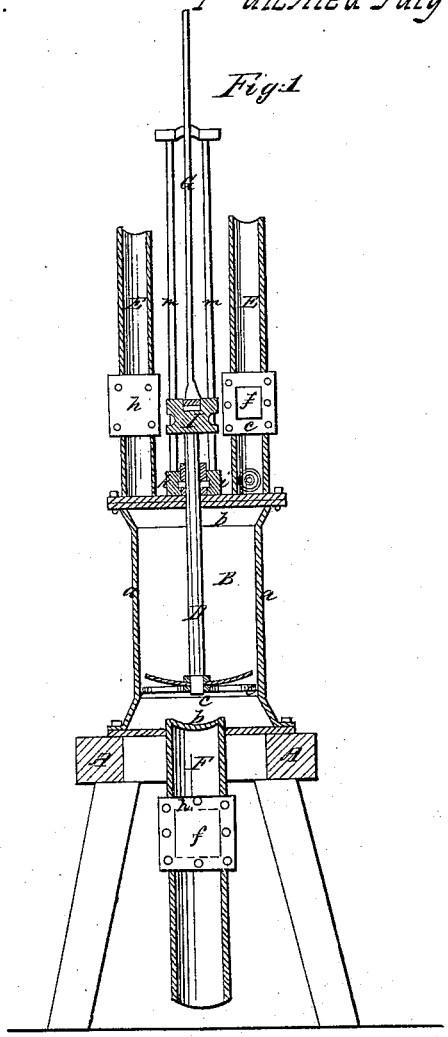


Fig: 3.

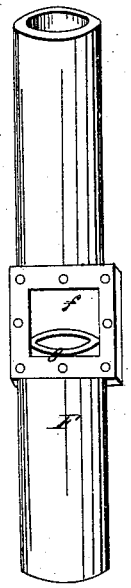


Fig: 2.

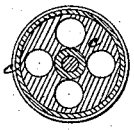
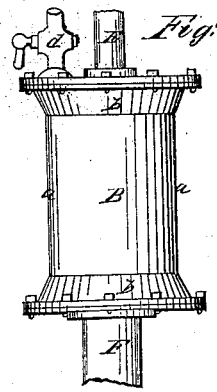


Fig: 4.



Witnesses.
D. McMofford
Jacob B Hall.

Inventor.
George E. Mills.
By Attorney J. B. Woodruff

UNITED STATES PATENT OFFICE.

GEORGE E. MILLS, OF NEW YORK, N. Y.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. **48,826**, dated July 18, 1865.

To all whom it may concern:

Be it known that I, GEORGE E. MILLS, of the city, county, and State of New York, have invented certain new and useful Improvements in Mining-Pumps; and the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a side elevation, showing a section through the top and bottom cone-cylinder and the other necessary appliances for operating the pump. Fig. 2 shows a detached view of the piston-valve head. Fig. 3 shows an enlarged view of pipe and man-hole to valve-seat. Fig. 4 shows the cone-shaped ends of the pump-cylinder with the air stop-cock.

The object of my invention is to supply a most powerful and efficient mining-pump for keeping the shaft clear from water, to be operated at any depth that may be requisite by a rod extending to it from the surface or top of the shaft, the water being lifted out and discharged through one or more discharging-pipes by the action of the air and water, as hereinafter described.

My invention consists in the mode of attaching the guide-rods for the piston of the upper head of the cylinder and packing-box, so that it will swivel or turn in any position. The crank may be placed for working it above at the surface of the earth, or where the water is elevated to be discharged.

To enable others skilled in the art to make and use my invention, I will describe it more fully, referring to the drawings, and to the letters marked thereon.

For the purpose of raising to the surface and keeping deep mines free of the water, so as to be in a condition for working, it is often necessary to employ the most powerful steam-engines and equally powerful pumps, and from their construction and the manner in which and the amount of labor they are often required to perform it has been found almost impossible to keep them in working order for any great length of time, and the consequence is that when the pumps fail or the valves get choked or disarranged the water often accumulates, so as to stop the work of mining for many days, and when the apparatus has to be taken up for repairs there is much labor, delay, and expense attending it; and, furthermore, the discharge-pipes are very liable to burst from the pressure of raising too large a column of water in one body, there being no air distributed in the cylinder or pipe to give it any elasticity.

By my improvements, as hereinafter described, the pump is easily kept in good working order, and a large flow of water is effected by the power applied.

I make a strong frame, A A, which I place in that portion of the mine where the water concentrates. On the top of the frame A A is supported the pump-cylinder B, which may be of any required dimensions, the ends, both top and bottom, being enlarged cone-shaped, *b b*, so that the valve-head C, which is attached to the piston-rod D, will just relieve the pressure of its packing *c c* against the parallel sides of the cylinder *a a* at the turning-point both of its upward and downward stroke of the piston C, so that air may be let into the cylinder at the top through the stop-cock *d*, which mixes with the water in the pump-cylinder B, forming bubbles, which rise with the water into the discharge-pipes E E, thus rendering the water elastic, and by their tendency upward help to carry up the current of water and take the great pressure off from the valve *e e*, and the lower portion of the discharge-pipe E and pump-cylinder B.

The suction-pipe F, placed underneath the cylinder B, I make large, so as to easily supply the cylinder with all of the water it will receive. In the suction-pipe F, and in the discharge-pipes E E, I make man-holes *f' f f'*, in close proximity to the valve-seat *g*, for the purpose of being able at any time by taking off the cap or plate *h* to get at the valves to keep them in good working order.

On the stuffing-box *i* I fit a ring or yoke, *k*, which supports the guide-rods *m m* on which the cross-head I slides, to which the rod *g* is attached that connects with and works the piston D, the rod G extending to the crank or engine that works the pump, the yoke *k* being fitted onto the stuffing-box *i*, so that it will

turn on it and bring the guide-rods and cross-head in any desired position.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The mode of attaching guide-rod *m m* to the head of the pump-cylinder and stuffing-box *k*, so that they will turn to allow the cross-head I to be worked by a crank in any position, as set forth.

GEORGE E. MILLS.

Witnesses:

N. WILLIAM BUSTEED,

ALEXANDER ALLEN.