W. P. BARCLAY.

Hydraulic and Wire Rope Pumping System.

No. 208,704. **Patented Oct. 8, 1878.**

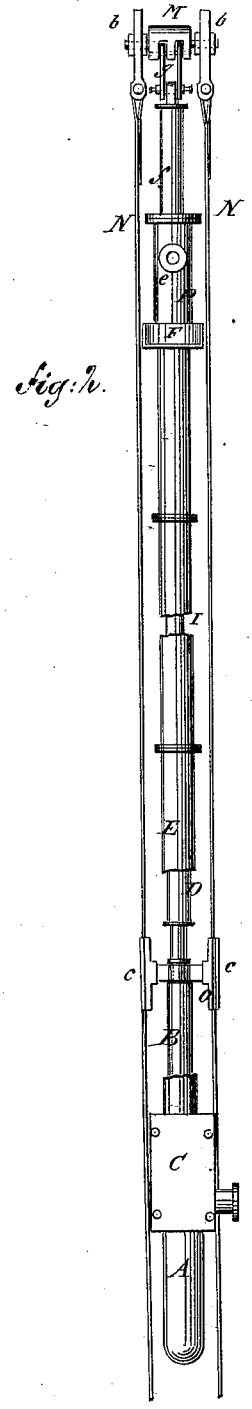


Fig: 2.

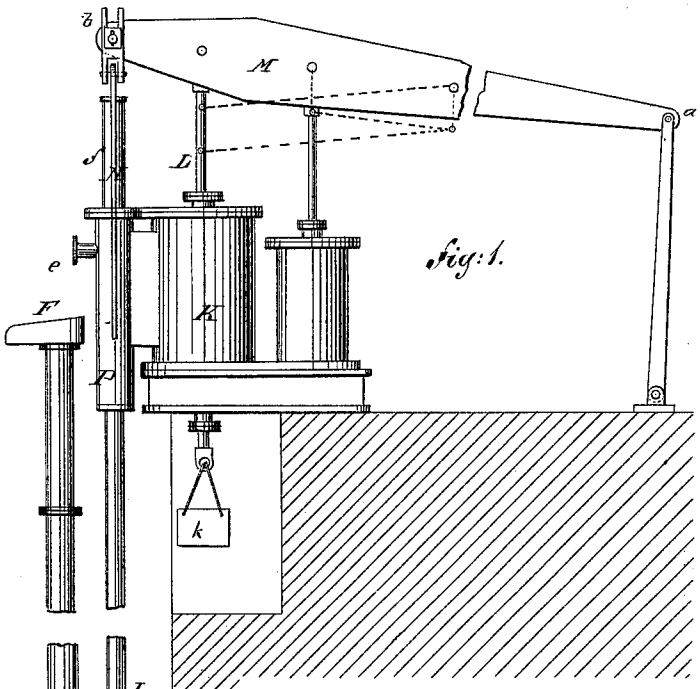


Fig: 1.

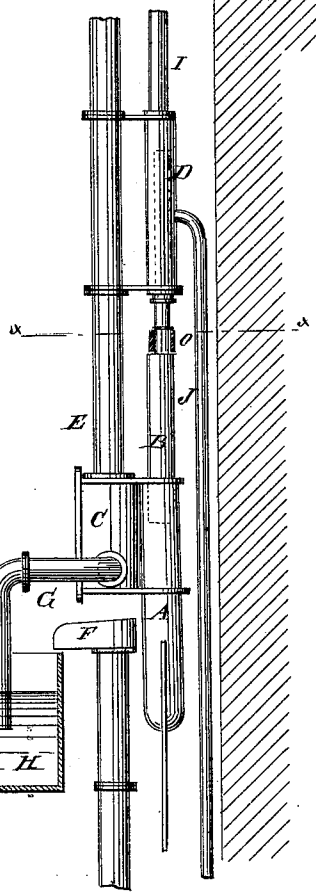
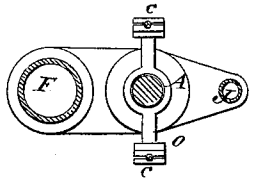


Fig: 3.



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UNITED STATES PATENT OFFICE.

WILLIAM P. BARCLAY, OF VIRGINIA CITY, NEVADA.

IMPROVEMENT IN HYDRAULIC AND WIRE-ROPE PUMPING SYSTEMS.

Specification forming part of Letters Patent No. **208,704**, dated October 8, 1878; application filed May 21, 1878.

To all whom it may concern:

Be it known that I, WILLIAM P. BARCLAY, of Virginia City, in the county of Storey and State of Nevada, have invented a new and Improved Hydraulic and Wire-Rope Pumping System, of which the following is a specification:

Figure 1 is a side elevation of my improved pumping apparatus. Fig. 2 is a front elevation. Fig. 3 is an enlarged horizontal section taken on line *x x* in Fig. 1.

Similar letters of reference indicate corresponding parts.

The object of my invention is to provide apparatus for economically raising water from mines and deep shafts; and it consists in a combination of force-pumps and compound pump-rods, as hereinafter described.

In pumping machinery such as is commonly employed in freeing mines from water, heavy rods of wood, joined and bolted together by iron plates, are used. These rods, to have the requisite strength, become excessively heavy, requiring counterbalancing, thus throwing into the pumping apparatus a quantity of heavy material that requires to be oscillated at each stroke of the pumps, thereby consuming an excessive amount of power and rendering the action of the pump slow.

By my improvements these difficulties are overcome and the pumping is effected economically. I employ as many force-pumps in the mine or shaft as may be required, placing them one above the other at suitable distances apart. The pumps are provided with the usual inlet and discharge valves placed one above the other.

Referring to the drawing, A is a pump-barrel, having the solid plunger B and valve-chest C, which contains the usual supply and discharge valves, placed one above the other. The plunger B passes through a stuffing-box in the upper end of the pump-barrel and barrel D, that is placed axially in line with the pump-barrel, the latter being supported by brackets attached to the delivery-pipe E, that is bolted to the top of valve-chest C.

The delivery-pipe E extends upward, and is provided with a discharge-spout, F, and the valve-chest C is provided with a suction-pipe, G, which takes water from the bottom of the mine, or from a tank, H, which receives it from the next pump below.

The working barrel D is provided with a pressure-pipe, I, that extends upward, and with a pipe, J, that extends downward, and is connected with the top of the next working-barrel below.

At the mouth of the shaft or mine in which the pumping system is employed there is a steam-cylinder, K, whose piston-rod L is connected with the working-beam M, which is provided with any of the well-known devices for producing parallel motion. The longer end of the beam is pivoted at *a*, and the shorter end thereof projects over the axial line of the pressure-pipe I, and is connected by links *b*, one at each side, with wire ropes N, which extend downward, one upon each side of the delivery-pipe E. O are cross-heads, each of which is provided with clamps *c*, that securely bind with the wire ropes. To one side of the steam-cylinder K is attached a hydraulic cylinder, P, which is connected with the upper end of the pressure-pipe I, and is provided with a branch pipe, *e*, which is connected with a force-pump.

The plunger *f*, which is fitted to the cylinder P, and works through a stuffing-box in upper end thereof, is connected with the end of the beam M by links *y*.

The piston-rod of the steam-cylinder K extends through a stuffing-box in the lower head of the cylinder, and is provided with a weight-box, *k*, in which weights are placed to increase the pressure on the plunger *f*, and thus increase the pressure in the pipe I.

The operation of the pump is as follows: Steam being admitted to the cylinder K, so as to act upon the under surface of the piston, the beam M is forced upward. The upward movement of the plunger B draws the water from the bottom of the mine or shaft, also from the tanks H. When the steam-piston descends the pressure created by the downward movement of the plunger *f* forces water up the delivery-pipe E. The lowest pump in the series delivers water to the lower tank, H, and the next above draws the water from the tank H and delivers it to another tank above, and so on to the upper pump in the series, which delivers the water to a sluice or conduit, that

conveys it away from the mouth of the shaft or mine.

It will be observed that the wire ropes may always be kept under more or less tension by the pressure of the water in the pipe.

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

1. The combination of the steam-cylinder K, beam M, and hydraulic cylinder P, having the plunger *f*, pressure-pipe I, and auxiliary cylinder D, for operating the water-forcing plungers, as herein shown and described.

2. The combination of the wire ropes N, cross-heads, and plungers *f* B, as and for the purpose set forth.

3. A series of auxiliary working-barrels and pressure-pipe connecting the same, for operating a series of mine pumps, as herein shown and described.

4. The combination of the steam-cylinder K, rod L, lever M, plunger *f*, pressure-pipe I, and cylinder P, as and for the purpose specified.

WILLIAM PARIS BARCLAY.

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