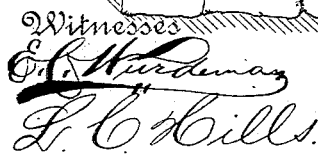


M. LONG.  
HYDRAULIC FORCE PUMP.

Patented June 7, 1892.



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# UNITED STATES PATENT OFFICE.

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## HYDRAULIC FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 476,398, dated June 7, 1892.

Application filed July 9, 1891. Serial No. 398,875. (No model.)

*To all whom it may concern.*

Be it known that I, MONTGOMERY LONG, a citizen of the United States, residing at Spartanburg, in the county of Spartanburg, State of South Carolina, have invented certain new and useful Improvements in Hydraulic Force-Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in hydraulic force-pumps for elevating water, used as a power-lift, operating ropeways, and other purposes.

It has for its objects, among others, to provide a simple, cheap, durable, and efficient pump of this character having provisions for increasing or diminishing the leverage at will to conform to the water-supply, which from natural sources is always a variable quantity, and the owner is thus enabled to utilize such supply to the best advantage and not diminish the duty of the pump.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a front elevation with portions in section and parts broken away, showing my improved pump. Fig. 2 is a side elevation of the same with parts in section and portions broken away.

Like letters of reference indicate like parts in both of the views.

Referring now to the details of the drawings by letter, A designates a suitable framing for the pump-house A', and rising therefrom is the upright A<sup>2</sup>, at the upper end of which is supported the cross-head A<sup>3</sup> in any suitable manner. Suitably journaled on shafts B' in this cross-head are the grooved pulleys B, over which the chains or cords B<sup>2</sup> are supported, as shown. These chains or ropes are attached at one end to a receiver C and at their other ends are attached to the levers D, which are arranged with their upper ends extended substantially horizontally, as seen best in Fig. 1. These levers can be connected with

the chains or ropes in any suitable manner, a simple hook a being shown in the present instance. These levers are provided with a plurality of notches or analogous provisions a' to provide for adjustment of the connections which support the receivers E, which are supported therefrom, as seen in Fig. 1, and suitable means of support being employed, so that the leverage may be easily and quickly changed when desired. These receivers are provided with valved openings in their bottoms, as seen in Fig. 1, and these openings are controlled by the valves b, which are normally held to their seats by springs b', as seen in said view, the valves being connected with the cords or chains b<sup>2</sup>, which are attached to the levers, as seen in Fig. 1.

The receiver C has in its bottom valve-controlled openings c, the valves c' being suitably hinged, as seen in Fig. 1, and acted upon by the springs c<sup>2</sup> to normally hold them to their seats, pins d being provided at the top of the pump-house, with which these valves contact as the receiver C reaches its lowest point of descent, as seen in Fig. 1, and the valves thus opened.

F are chains or cords connected to the receiver C and to the pump-house, as shown, and for a purpose hereinafter explained.

G is the pump-barrel within the pump-house and provided with a valve g at its lower end and near its upper end with the discharge-pipe g', as seen best in Fig. 2.

H is the piston working in the pump-barrel and provided with two lip-valves h, which open and receive the water as the piston or plunger descends and close as it ascends.

I is the piston-rod working through an opening in the top of the pump-barrel and provided with a double-racked bar I', as shown in both views, and with which engage the teeth of the mutilated pinions I<sup>2</sup>, which are journaled upon suitable shafts i on the upright A<sup>2</sup> and to which the lower ends of the levers D are connected eccentrically, as seen in Fig. 1.

K is the supply-gate or head-water.

With the parts arranged as above described, and as shown in the drawings, the operation is as follows: The receivers E E, which may be of any convenient capacity commensurate with the water-supply or the duty demanded

or power required, receive their momentum and power from the supply K, of which there are two, one over each receiver, and when the receivers are full or partially full of water they fall a certain prescribed distance, actuating through the lever-arms and their connection with the pinions the rack and piston and the plunger of the pump, forcing the same upward and discharging the water from the pump through the outlet  $g'$ . As the receivers E make their downward stroke they carry up by means of the chains or cords the receiver C to the same height and under the supply K, which now discharges into the said receiver C, and when it is full or partially full causes it to fall, reversing the position of the receivers E E and the pump-plunger, when the supply discharges into the receivers E E and the operation is repeated. The valves in the receivers E are lifted from their seats by the cords  $b^2$  near the limit of the downstroke, while, vice versa, the valve-lifting pins in the top of the pump-house raise the valves in the receiver C as it comes to rest thereupon. The stroke-regulator chains or cords F limit the downward stroke of the receivers E E by prescribing the distance through which they may fall equal to the throw of the pump-plunger.

Various modifications in detail may be resorted to without departing from the spirit of

the invention or sacrificing any of its advantages.

What I claim as new is—

1. The combination, with a force-pump, of the piston-rod of said pump, having rack portion, the pinions, the levers connected with the pinions, the receivers carried by the levers, the counterbalance-receiver connected with the receivers, and means for adjusting the leverage, as set forth.

2. The combination, with the piston-rod having rack, of the pinions meshing therewith, the levers connected with the pinions, the receivers adjustable on the levers, the counterbalance-receiver, and the cords connecting the levers and counterbalance-receiver, as set forth.

3. The combination, with the force-pump, the racked piston-rod thereof, the pinions, and the levers connected therewith, of the receivers, the counterbalance-receiver, the valves and their operating means, and the stroke-regulating cords, all substantially as and for the purpose specified.

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

MONTGOMERY LONG.

Witnesses:

J. L. HAYNES,

J. C. ARCHER.