

H. STRATER, Jr.
Direct-Acting Pump.

No. 215,026.

Patented May 6, 1879.

Fig. 1.

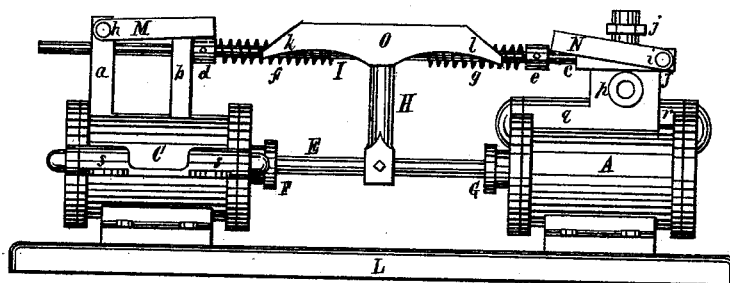


Fig. 2.

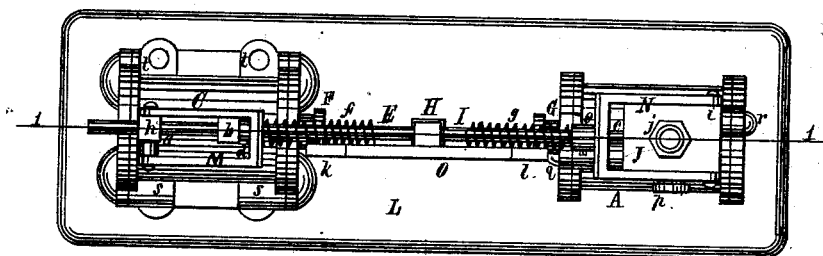
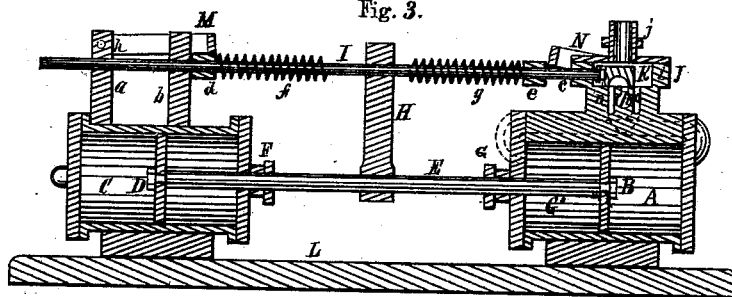


Fig. 3.



Witnesses;

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HERMAN STRATER, JR., OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN DIRECT-ACTING PUMPS.

Specification forming part of Letters Patent No. **215,026**, dated May 6, 1879; application filed September 4, 1876.

To all whom it may concern:

Be it known that I, HERMAN STRATER, JR., of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Direct-Acting Pumps, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to a direct-acting pump, intended especially for compressing air and to be operated by water under pressure; and it consists, mainly, in the mechanism for moving the valve connected with the cylinder in which the pressure of water or the motive power is exerted.

In the drawings, Figure 1 is a side view of a direct-acting pump for compressing air by the use of water under pressure as the motive power embodying my invention. Fig. 2 is a plan view of pump of Fig. 1. Fig. 3 is a vertical longitudinal section taken on the line 1 1 of Fig. 2.

A is the cylinder in which the pressure of the water is exerted, acting on the piston B. C is the cylinder wherein the air is pumped or compressed by means of the piston D. The cylinders are held in position by being fastened to the bed-plate L, as shown. The pistons B and D are connected by means of the straight rod E, which slides in the heads and packing F and G in the usual manner.

At a suitable position on the rod E is adjusted and fastened by the set-screw shown the arm H, which has at the other end an opening, through which the rod I slides freely. This valve-rod I rests so as to slide easily in the supports *a* and *b*, and is also supported in a tight packing in a bearing at *c*, connected to or a part of the valve-chest J. The valve-rod I is at this end connected to the valve K, being, as shown, an ordinary slide-valve. On the rod I are the collars or stops *d* and *e*. Between the arm H and the collars *d* and *e* are the springs *f* and *g*, which I prefer to be spiral about the rod I, as shown. The spring *f* will be compressed when the arm H approaches the collar *d*, and the spring *g* when the arm H approaches the collar *e*, the rod I being held from sliding.

The compression of the springs *f* and *g* is

designed to take place during the last part of the stroke of the pistons B and D and rod E.

Pivoted at *h* and *i* are the latches M and N, which are properly situated to rest on or fall down from the collars *d* and *e* to the rod I at the ends of the collars opposite those against which the springs *f* and *g* press.

Connected firmly to the arm H, and hence to the piston-rod E, is the arm O, extended each way, to have the inclined planes *k* and *l* at its extremities so formed and situated as to lift the latch M and the latch N near the end of the strokes of the pistons.

The water under pressure being let into the valve-chest J by the pipe *j*, and to the end G' of the cylinder A by the port *o*, the slide-valve being so set that it will allow the water not only to enter by the port *o*, but the exhaust-water to escape from the other end of the cylinder by the port *n* and exhaust-pipe *p*, the pressure exerted on the side of piston B toward the end G' of the cylinder will cause the arm H to approach the collar *e*, and at the last part of the stroke the spring *g* will be compressed. At the end of the stroke the latch N will be raised by the inclined plane *l*, and the compressed spring *g*, pressing against the collar *e*, no longer stopped by the latch N, will slide the rod I, and hence the slide-valve K, on its seat. By this same movement the latch M has slid along on the top and fallen down to the rear of the collar *d*, to hold the valve in position till at the end of the return stroke.

By thus changing the position of the valve, the pressure of the water will be exerted upon the other side of the piston B, and the return stroke will be made, near the end of which the valve will be slid back by the operation of the arm H, inclined plane *k*, spring *f*, and latch M, similar to that already described, and so on, the pump continuing to act, there being no dead-point at which it will stop as long as the motive power, such as water under pressure, be supplied.

It will be noticed that the ports *n* and *o*, leading from the cylinder A to the valve-chest, open into the cylinder at the opposite ends from what they open into the valve-chest. The dotted lines in the section show the direction

they take, (further shown by the outside conformation in the other figures at *q* and *r*.)

The piston D moving with piston B, air is drawn alternately in at the ends of cylinder C by the valves *s s*, constructed in the ordinary manner, and, being compressed on each side of the piston D, is pumped into a reservoir, passing through the ordinary valves at *t t*, and is there stored.

As already stated, I design my invention particularly for pumps operated by water and for compressing air; but it is also adapted in all its distinguishing features for pumps worked by other motive force, as steam or compressed air, and for pumping liquids.

I claim as my invention—

1. In a direct-acting pump or air-compressor, the valve K, operated by springs *f* and *g*, that are alternately compressed and released by the arm H, and the latches M and N, substantially as hereinbefore set forth.

2. The latches M and N, for holding the valve, in combination with the springs *f* and *g*, and the arm O, having the inclined planes *k* and *l*, substantially as hereinbefore described.

3. The combination of valve K, springs *f* and *g*, arm O, having the inclines *k* and *l*, and latches M and N, substantially as hereinbefore described.

4. The combination of piston-rod E, arm H, arm O, having the inclines *k* and *l*, valve-rod I, and springs *f* and *g*, substantially as described.

5. The combination of arm H, valve-rod I, springs *f* and *g*, collars *d* and *e*, arm O, having the inclines *k* and *l*, and latches M and N, substantially as and for the purpose hereinbefore set forth.

HERMAN STRATER, JR.

Witnesses:

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THEODORE G. STRATER.