

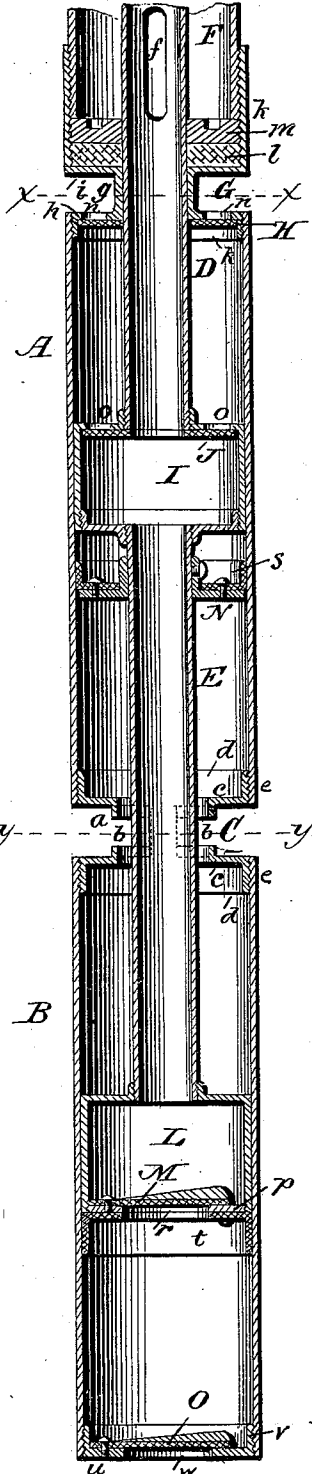
(No Model.)

# D. LIPPY. PUMP.

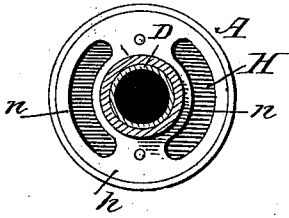
No. 574,251.

Patented Dec. 29, 1896.

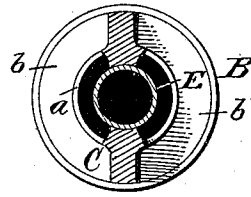
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses  
 J. Williamson  
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Inventor  
 David Lippy.  
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 Attorney.

# UNITED STATES PATENT OFFICE.

DAVID LIPPY, OF MANSFIELD, OHIO.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 574,251, dated December 29, 1896.

Application filed December 28, 1895. Serial No. 573,647. (No model.)

To all whom it may concern:

Be it known that I, DAVID LIPPY, a citizen of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

My invention relates to an improvement in double-acting force-pumps; and it consists in two cylinders separated from each other at their inner ends and which are placed in a line with each other, combined with a piston which is divided into two parts and these parts connected by a tube or pipe which passes through the inner end of each cylinder and a solid piston secured to the tube or pipe and placed in the upper cylinder, as will be more fully described hereinafter.

The objects of my invention are to divide the piston into two parts, so as to give it a steadier and easier movement, and to place a solid piston in the upper portion of the cylinder, in addition to the hollow one, for the purpose of carrying the packing and to leave a larger space for the inlets to the hollow piston.

Figure 1 of the drawings represents a sectional elevation of a pump constructed in accordance with my invention; Fig. 2, a horizontal section taken on line *x x* of Fig. 1; Fig. 3, a similar section taken on line *y y* of same figure.

In the accompanying drawings, A B represent two pump-cylinder sections which may be of any suitable length and diameter, said sections being connected together at their inner ends by a coupling-head C. This coupling-head C has a central contracted neck *a*, provided with openings *b* to serve as ports, the neck connecting or formed with disks *c*, which have screw-threaded circumferential flanges *d* to engage with screw-threaded ends *e* of the cylinder-sections A B.

The tubular or hollow plunger-rod is constructed in two sections D E, the upper one of said sections having one or more discharge-openings *f* through its sides, the water passing therefrom into the discharge-cylinder F,

which discharge-cylinder is connected with the cylinder-section A by a coupling-head G. This coupling-head G has a contracted neck *g* which joins the disks *h i*, which disks have screw-threaded flanges *k* for connecting thereto the ends of the cylinder-section A and the discharge-cylinder F.

The disk *i* has its screw-threaded flange elongated to receive a suitable packing *l*, which is supported on said disk and held in place by a screw-threaded washer *m* engaging with the screw-threads upon the interior of the flange of the disk. The extension of the flange of the disk *i* forms a cup-shaped receptacle for containing the packing, the washer, and still leave sufficient space of the screw-threaded flange for attaching the screw-threaded end of the discharge-cylinder F.

The packing and washer together with the neck of the coupling-head G form a very long or wide bearing for the section D of the tubular or hollow plunger-rod and enable it to have a steady stroke. The disk *h* of the coupling-head G has openings *n* to form inlet-ports for the water, said disk having a flexible valve H which closes the ports by bearing against the under surface of the disk, as shown in Fig. 1 of the drawings, which surface forms a seat for the valve.

The section D of the plunger-rod has connected to its lower end a hollow plunger I, which plunger has openings *o* to form inlet-ports, said openings being controlled by a valve J similar in construction to the valve H.

The section E of the plunger-rod is connected to the under side of the plunger I, said section having attached to its lower end a plunger L provided with a valve-seat *p*, having an inlet *r* for the water, which inlet is controlled by a hinged valve M.

The piston is divided into two parts I L and each part provided with a cylinder of its own for the purpose of giving an easier and steadier stroke than is possible where the piston is made in a single short portion.

Immediately below the plunger I and to the plunger-rod section E is suitably attached a flanged plate N, to which is secured a flexible packing *s*, and to the bottom of the plunger L or to the valve-seat *p* is secured a flexible packing *t*. This plate N forms the real piston in the cylinder A, and not the part I,

upon which no packing is used. By placing the packing S upon the solid piston the upper end of the hollow piston I is left entirely unobstructed, and hence larger openings *o* can be made for the entrance of the water from the upper portion of the cylinder A, and the pump will work easier than where small openings are made. The chamber between the hollow and the solid pistons serves to protect the packing from grit and dirt and receives any water that may leak past the hollow piston.

To the lower end of the pump-cylinder section B is secured a valve-seat *u*, which is provided with a screw-threaded flange *v* to engage with interior screw-threads upon the lower end of said section, said valve-seat having an opening *w* for the passage of water into the cylinder-section, which opening is controlled by a suitable valve O.

In operation the pump is submerged in water above the upper end of the cylinder-section A, so that water will be taken in at the outer ends of both cylinder-sections A B. Now on the downward stroke of the plunger-rod and plungers the water in the cylinder-section B below the plunger L will be forced up into the hollow plunger, through the tubular or hollow plunger-rod section E into the plunger I, through the plunger-rod section D, out through the opening or openings *f* into the cylinder F to the point of discharge. On this downward stroke of the tubular or hollow plunger-rod and plungers water is passing into the cylinder-section A at the top thereof through the valve-openings *n*, the pressure of water on the valve H opening it. As the water passes into the cylinder-section A to fill the space above the plunger I as the latter descends the water in said cylinder-section below the plunger I is forced down through the contracted neck C and out through the side openings *b* thereof, the contracted neck and openings for the escape of the water on the downward stroke of the plunger-rod preventing all back pressure, the water passing freely in and out at the lower end of the cylinder-section A. The upward stroke or reverse movement of the plunger-rod and plungers will cause the water in the cylinder-section A above the plunger I to close the valve H and open the valve J, the water passing into the plunger-rod and plungers and closing the valve M in the plunger

L and the valve O at the lower end of the cylinder-section B opening and the water passing into the cylinder-section to fill the space below the plunger L, to be again forced into the plunger on the downward stroke of the same.

The two pump-cylinder sections, the coupling-head with contracted neck and openings therein as a means for connecting the two sections together, form an essential and important feature of the invention; also the two plunger-rod sections and the two plungers provided with their respective valves render together a most valuable adjunct to the pump to insure its perfect operation and effectiveness in raising and discharging the water without any back pressure.

I make no claim in this application to a piston composed of two water-chambers connected by a pipe which forms an extension of the hollow piston-rod, an inwardly-opening valve in each chamber, space formed between the two chambers, and suitable packings, one of which is placed in the space between the chambers, for this is shown in my pending application, filed December 28, 1895, and bearing Serial No. 573,648.

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

In a pump, the two cylinder-sections A, B, provided with valved openings in their outer ends; the contracted neck *a* for connecting the cylinders at their inner ends and which neck is provided with valveless openings for admission of water to the inner ends of the cylinders, the two hollow pistons I, L, provided with valves at their outer ends, and the hollow piston-rod divided into sections which extend in a line with each other, and one of which connects the inner ends of the two pistons; combined with the disk N, secured to the piston-rod, and provided with the packing S, there being a space left between the inner end of the cylinder I, and the disk, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

DAVID LIPPY.

Witnesses:

BYRON J. BALLIETT,  
H. W. MATEER.