

(No Model.)

2 Sheets—Sheet 1.

E. G. SHORTT.

PUMP.

No. 306,540.

Patented Oct. 14, 1884.

fig. 1.

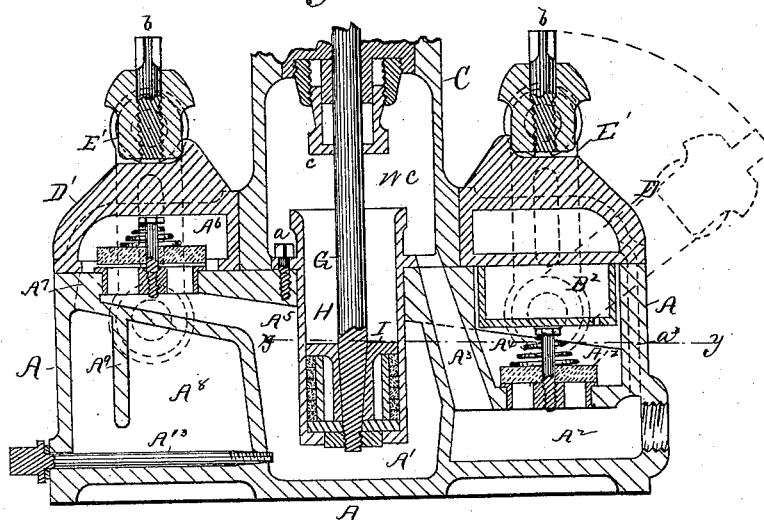
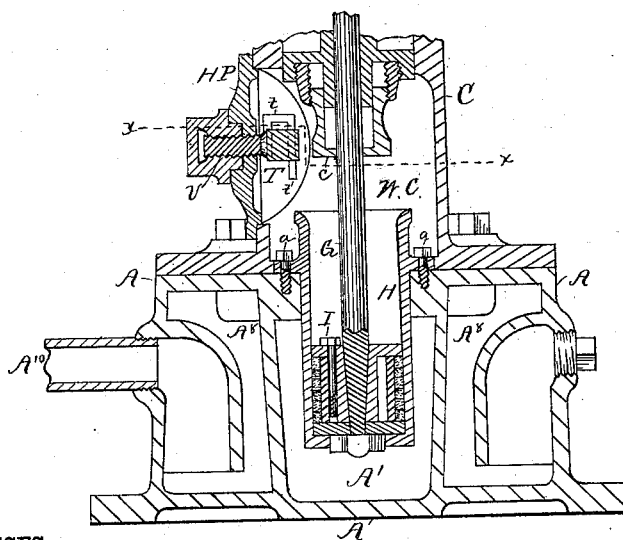


fig. 2.



**WITNESSES:**

Mr. Brown  
Edw. W. Ryan

INVENTOR:

E. L. Shortt  
BY *Munn &*  
ATTORNEYS.

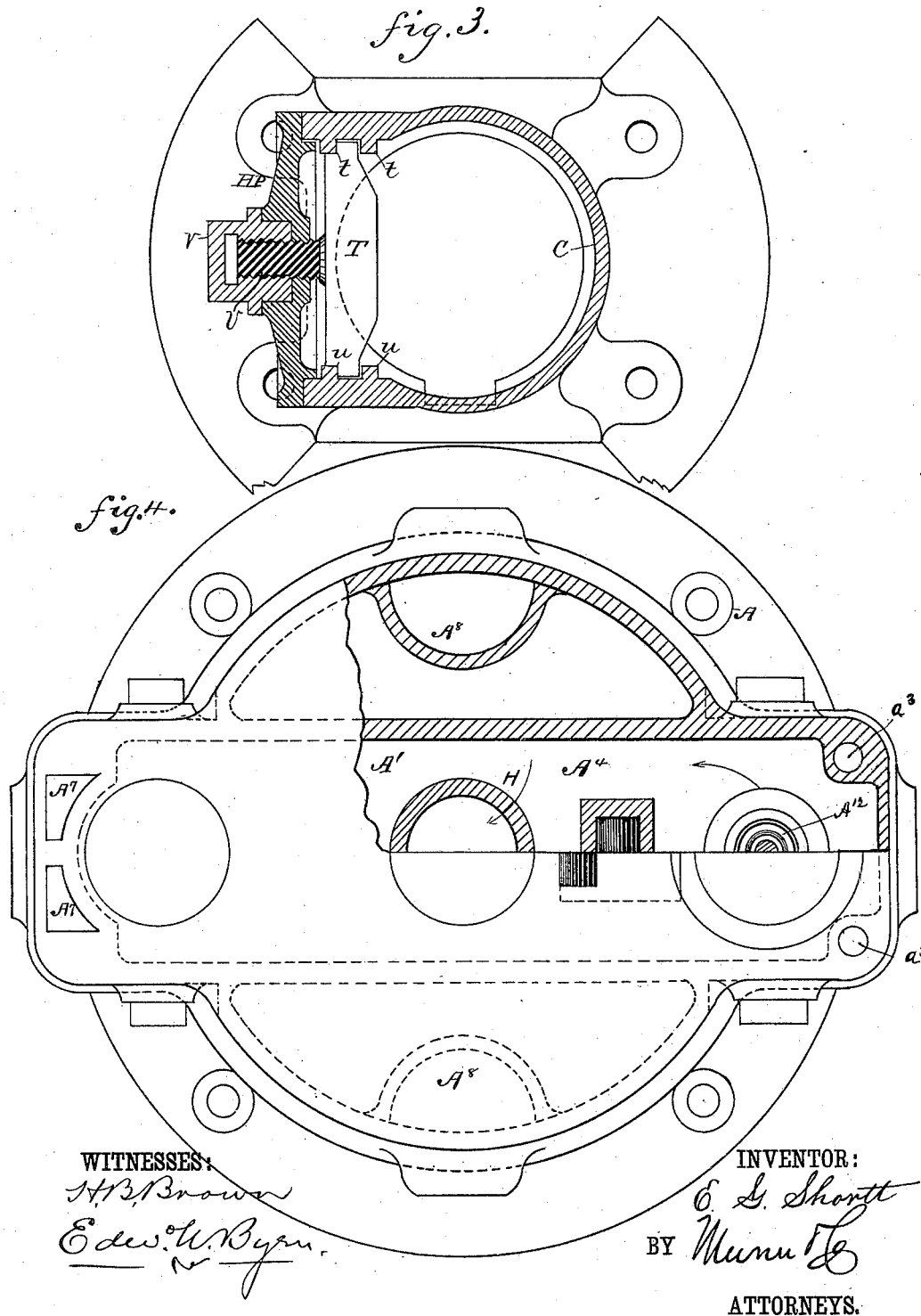
(No Model.)

2 Sheets—Sheet 2.

E. G. SHORTT.  
PUMP.

No. 306,540.

Patented Oct. 14, 1884.



# UNITED STATES PATENT OFFICE.

EDWARD G. SHORTT, OF CARTHAGE, NEW YORK.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 306,540, dated October 14, 1884.

Application filed November 7, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD G. SHORTT, of Carthage, in the county of Jefferson and State of New York, have invented a new and useful Improvement 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 accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical central section. Fig. 2 is a similar view, taken at right angles to the view shown in Fig. 1. Fig. 3 is a horizontal section through line *xx* of Fig. 2, on a larger scale; and Fig. 4 is a plan view of the base, partly in horizontal section through the line *yy* of Fig. 1, on the same scale as Fig. 3.

My invention relates to hydraulic pumps, and, while applicable to general use as a pump for drawing and forcing liquids, it is designed more especially for use in connection with a direct-acting steam-engine whose piston is on the same rod with the pump-plunger, and which pump is combined with the steam-engine as a complete direct-acting pumping-engine. This completely-organized engine I have already made the subject-matter of a separate application, filed July 17, 1883, and the illustration here given shows the lower or pump portion of the same.

In the drawings, A represents a cast-metal base, upon the middle portion of which is fastened by bolts an upright cylinder, C, while upon each side thereof are arranged caps D D', which cover openings in the base that give access to the valve, and which caps are held down by screws *b*, that pass through pivoted bails E', which may be swung over to one side to permit the caps to be lifted off for giving access to the interior of the base, as shown in dotted lines. The cylinder C, at its lower end, forms a water-chamber, W C, and has a stuffing-box, *c*, through which passes the plunger-rod G. In the bottom of this cylinder, and attached to base A by screws *a*, is the plunger-barrel H, containing the water-plunger I. This barrel is open at both ends, and projects a short distance up into the water-chamber W C, and depends downwardly through a central hole in the base into a central chamber, A', of said base. In this base is formed the inlet-passage A<sup>2</sup>, which communicates with the water-chamber W C through an upwardly-inclined pas-

sage, A<sup>3</sup>, and which inlet-passage A<sup>2</sup> also communicates through valve A<sup>12</sup> and side passages, A<sup>4</sup>, with the central chamber, A'. Leading from this central chamber there is a passage, A<sup>5</sup>, which, through valve A<sup>6</sup>, leads into the chamber beneath cap D', and this chamber communicates through passage A<sup>7</sup> with an air-chamber, A<sup>8</sup>. This air-chamber has a pendent skirt or wall, A<sup>9</sup>, with an opening at the bottom, which prevents the cushion of air in this chamber from escaping through passage A<sup>7</sup>, and at the outlet A<sup>10</sup> has another such skirt or wall, that prevents the air-cushion from escaping from the chamber A<sup>8</sup> by this outlet. Now, in the operation of this pump, when the plunger I descends it sucks water through inlet-passage A<sup>2</sup> and the passage A<sup>3</sup> into the water-chamber W C, and when said plunger rises it displaces or forces out the water above the plunger in chamber W C down the passage A<sup>3</sup>, and at the same time this movement of the plunger creates a suction in A' and the passages A<sup>4</sup>, which lifts the valve A<sup>12</sup> and allows the water expelled from W C to pass through this valve and the passages A<sup>4</sup> to the chamber A' or lower side of the plunger. As the plunger now descends it again fills chamber W C by suction from the source of supply, and expels the water in chamber A' through passage A<sup>5</sup>, valve A<sup>6</sup>, and passage A<sup>7</sup> down into the air-chamber A<sup>8</sup>, and here this water compresses the air-cushion, which in expanding causes the water to issue at the outlet A<sup>10</sup> in a nearly continuous stream.

It will be seen in the operation of this pump that in expelling the water from chamber A' the plunger I is single-acting in effect only, but in filling this chamber it is double-acting, since it fills this chamber in rising both by displacing or expelling the water from chamber W C, and also by creating a partial vacuum in A' and the passages A<sup>4</sup>, which causes the valve A<sup>12</sup> to rise and the water from chamber W C to be transferred therethrough to chamber A'. This water it will be seen passes through the valve A<sup>12</sup> in preference to passing out the inlet-passage for two reasons—first, for the reason that a suction exists upon the other side of the valve, and secondly, because it meets the ramming action or momentum of the water entering the inlet-passage A<sup>2</sup>.

For draining the two chambers A' and A<sup>8</sup>,

when the pump is not in use, a long screw-plug,  $A^{12}$ , is removed. The valves  $A^6$  and  $A^{12}$  are in the nature of disks playing upon a stem rising from spider-frame seats and backed by springs, as shown. The valve  $A^{12}$  is located at a lower level than  $A^6$ , and has above it a hollow filling-block,  $B^2$ . The cap  $D$  also, has within it an air-chamber having a communicating passage,  $a^3$ , to the water-inlet  $A^2$ . This allows the water in its ramming action in entering inlet  $A^2$  to surge up into the chamber in cap  $D$  through passage  $a^3$ , compressing the air and storing up water therein as in a reservoir, which causes the suction of the pump to fill its chamber more quickly.

In working this pump it is very desirable to have means provided for affording access to the stuffing-box  $c$  and the water-plunger  $I$  for tightening up the same, and for this purpose I construct the lower end of the cylinder  $C$  with a laterally-opening hand-hold opening into the chamber  $W C$ , as follows:

Referring to Figs. 2 and 3, the chamber  $W C$  has a lateral opening of circular form covered by a head-plate,  $H P$ , which is held upon the face of the opening by a turn-bar,  $T$ , having a screw-stem,  $U$ , which passes through the head-plate and is provided with a nut,  $V$ , which forces the head-plate to a solid and tight bearing against the face of the opening. The turn-bar  $T$  has at each end a tongue that fits in the recess between the flange  $t t u u$  and one of the said sets of flanges  $t t$  has an outlet at the bottom and the other at the top, so that in fitting the turn-bar it is inserted in a nearly vertical position and is then turned horizontally into the grooves between the flanges. This hand-hole, it will be seen, is not formed in the barrel or cylinder within which the plunger works, but in the enlarged water-chamber  $W C$  formed around the end of the plunger-barrel, which gives a better access to the parts.

Having thus described my invention, what I claim as new is—

1. A pump consisting of a barrel,  $H$ , open at both ends and having its ends surrounded by independent chambers, a plunger playing in said barrel, a valve opening outward from one of said end chambers, and a valve opening outward from the other end chamber and inward to the first end chamber, whereby the pump is made on one stroke to expel the water from one end chamber and fill the other chamber from the main supply, and on the other stroke is made to transfer the water from one end chamber to the other, as described.

2. The combination of the base  $A$ , having chambers  $A' A^2 A^8$ , and passage-ways  $A^3 A^4 A^5 A^7$ , the valves  $A^6 A^{12}$ , the barrel  $H$ , open at both ends and arranged as described, the plunger  $I$ , and chamber  $W C$ , substantially as shown and described.

3. The combination, with the base  $A$  and valve  $A^{12}$ , of the filling-block  $B^2$ , cap  $D$ , and bail  $E$ , as and for the purpose described.

4. The water-chamber  $W C$ , having a hole in its side provided with ribs or flanges  $t t$  and  $u u$ , in combination with the turn-bar  $T$ , having screw-stem  $U$ , the head-plate  $H P$ , and nut  $V$ , substantially as shown and described.

5. The combination of a pump-plunger, having an adjustable packing, the pump-barrel  $H$ , having open ends, and enlarged water-chamber around one of its ends having a hand-hole in the same, and a head-plate and fastening devices for closing said hole, substantially as shown and described.

6. The combination, with a pump-barrel and plunger, of the base  $A$ , having a passage-way,  $a^3$ , and inlet  $A^2$ , and a valve opening inwardly from said inlet to one end of the pump-barrel, and the hollow cap  $D$ , communicating with the passage-way  $a^3$ , as and for the purpose described.

EDWARD G. SHORTT.

Witnesses:

JOHN C. FULTON,  
ALLEN E. KILBY.