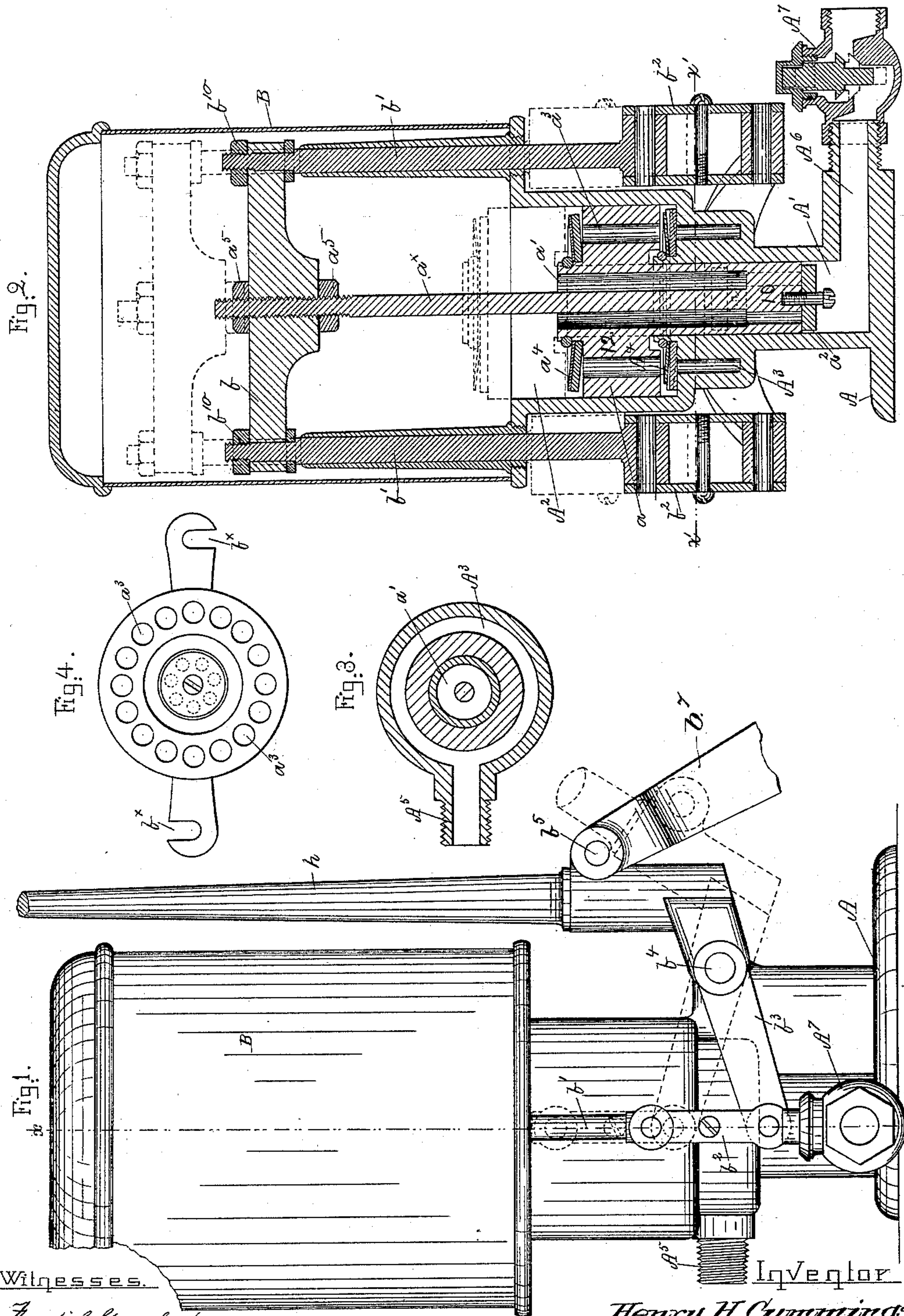


(No Model.)

H. H. CUMMINGS.  
PUMP.

No. 483,666.

Patented Oct. 4, 1892.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## PUMP.

SPECIFICATION forming part of Letters Patent No. 483,666, dated October 4, 1892.

Application filed October 14, 1890. Serial No. 368,060. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY H. CUMMINGS, of Malden, county of Middlesex, State of Massachusetts, have invented an Improvement in Pumps, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

In condensing-engines, more particularly marine engines, as at present arranged and constructed it is customary to exhaust the steam from the cylinder into a condenser, wherein a vacuum is maintained by an air-pump which draws the water of condensation, together with any air or gases therewith, from the condenser and forces it into a hot-well, from which it is forced as feed-water into the boiler by a separate force or feed pump.

This invention has for its object to construct a pump which shall fulfill the functions both of the air-pump and the force-pump referred to and which shall embrace in its construction the hot-well, to thus make a more compact and desirable arrangement especially adapted for small boats, &c.

My invention consists in the combination, with the chamber and two cylinders leading therefrom, an inlet for one and an outlet for the other of said cylinders and valves controlling the same, of a plunger for said cylinders and mechanism to reciprocate the same and co-operating valves on the said plunger, to operate substantially as will be described.

Other features of my invention will be hereinafter pointed out in the claims at the end of this specification.

Figure 1 shows in side elevation a pump embodying this invention; Fig. 2, a vertical section of the same, taken on the dotted line  $xx$ , Fig. 1; Fig. 3, a partial cross-section on the dotted line  $x'x'$ , Fig. 2; and Fig. 4, a detail of the pump-plunger.

Referring to the drawings, the base  $A$ , of suitable shape, has formed within it the two concentric cylinders  $A'$   $A^2$ , located one above the other, the uppermost of the said cylinders being, however, of greater diameter than the lower one, as shown, the said base above the cylinders supporting the preferably-cylindrical shell  $B$ , forming the hot well or chamber to be referred to. A chamber  $A^3$  is

formed in the base  $A$ , surrounding the cylinder  $A'$ , which chamber opens into the cylinder  $A^2$  above it, the mouth of said chamber being controlled by a circular flap-valve  $A^4$ , to be referred to, the said chamber  $A^3$  having an inlet  $A^5$ . (See Figs. 1 and 3.) The cylinder  $A'$  has an outlet  $A^6$ , in which is placed a check-valve  $A^7$ .

Plungers 10 and 12, herein shown as formed in a single body or T-shaped plunger, (indicated by the letter  $a$ ,) are fitted to slide in the cylinders  $A'$   $A^2$ , as shown. The plunger  $a$  has a preferably-central vertical opening  $a'$ , controlled at its lower end in the cylinder  $A'$  by a disk valve  $a^2$ , to be referred to, and the head or flanged portion of the plunger  $a$ , comprising the plunger 12, which moves in the cylinder  $A^2$ , has a series of vertical openings  $a^3$ , controlled by the circular flap-valve  $a^4$  on the top of the plunger. The plunger or piston rod  $a^x$  is threaded at its upper end to receive the nuts  $a^5$ , holding adjustably between them the yoke  $b$ , secured at its ends to the rods  $b'$ , passing through the lower head of the hot well or chamber  $B$ , through suitable stuffing-boxes and are jointed to the links  $b^2$ , in turn jointed at their opposite ends to the forked arm of the lever  $b^3$ , pivoted at  $b^4$  on the base and connected at  $b^5$  to an eccentric-rod  $b^7$ , moved by an eccentric on the main shaft. (Not shown.)

An auxiliary handle  $h$  is provided by which to operate the pump by hand. In practice the inlet  $A^5$  is connected with the condenser and the outlet  $A^6$  is connected with the boiler, and assuming the plunger  $a$  to be at the end of its downward stroke, as shown in the drawings, the operation of the pump is as follows: As the plunger  $a$  is raised the valve  $a^4$  will close and the valve  $A^4$  will open, the rising plunger drawing water of condensation from the condenser through the open valve into the cylinder  $A^2$  behind it, and as the plunger reaches the end of its up stroke and begins its return or downward stroke the valve  $A^4$  will close and the water previously drawn into and filling the cylinder  $A^2$  will lift the valve  $a^4$  as the plunger descends and pass into the hot well or chamber  $B$ , overflowing into the central opening  $a'$  in the plunger, from whence upon the next upward stroke of the plunger it will pass out through the valve



$a^2$  into the passage  $A^6$ , to be forced into the boiler by the succeeding downward stroke.

The pump described performs work to accomplish which ordinarily requires two separate pumps, and my improved apparatus also embodies as part of its construction the hot well or chamber, the apparatus being very desirable, owing to its compactness. The yoke  $b$  at its ends is provided with slots  $b^x$ , (see Fig. 4,) opening in opposite directions, so that to disconnect the yoke from the rods  $b'$  it is only necessary to slacken the nuts  $b^{10}$ , when the yoke may be rotated sufficiently to clear the same, when the yoke-plunger may be readily removed.

I do not limit this invention to the particular valves nor to the exact construction in general shown, as the same may be varied without departing from the scope of the invention.

I claim—

1. A pump containing the following instrumentalities, viz: two cylinders, each having an open end and a valve-controlled end, a chamber intermediate said cylinders and communicating with their open ends, a piston-rod having an apertured plunger for each cylinder, independent valves to open the apertures in one plunger and close them in the other simultaneously at each stroke of the piston, and means to reciprocate the piston, substantially as described.

2. A pump containing the following instrumentalities, viz: two cylinders, an inlet-valve at one end of one of said cylinders and an outlet-valve at the delivery end of the other of said cylinders, a chamber communicating with and contiguous to the opening of the cylinders opposite the said valves, and a piston-rod having plungers for said cylinders and each provided with valves to control the communication between said chamber and cylinders, and means to reciprocate the said piston-rod, to operate substantially as described.

3. In a pump, the combination of the following instrumentalities, viz: a chamber, a cylinder leading therefrom and in unobstructed communication therewith, a second cylinder leading from and of smaller diameter than

the first, a plunger for the said cylinders having a passage intermediate and connecting the said chamber with said second cylinder beyond said plunger and a valve to control said passage, co-operating valves in said cylinders and on said plunger to control the passage of the fluid from the first to the second cylinder, and means to reciprocate said plunger, to operate substantially as described.

4. The chamber B, cylinders  $A'$   $A^2$ , leading therefrom, and valves  $A^4$  and  $A^7$ , combined with a plunger  $a$ , having a valve  $a^4$ , a passage  $a'$ , and valve  $a^2$ , said valves  $a^4$  and  $a^2$  controlling the passage of fluid through the plunger, and mechanism to reciprocate the said plunger, substantially as described.

5. The chamber B and cylinders  $A'$   $A^2$ , combined with a plunger  $a$ , having openings  $a^3$ , central opening  $a'$ , connecting said chamber B and cylinder  $a'$ , and valves controlling the same, and by which valves and openings communication between cylinder  $A^2$ , chamber B, and cylinder  $A'$  is established, substantially as described.

6. The combination of the chamber B, cylinders  $A'$   $A^2$ , communicating therewith, the plunger  $a$  in said cylinders, its plunger-rod  $a^x$ , yoke  $b$  in the chamber B, and the bars  $b'$ , the bars  $b'$  extended beyond said chamber, guides therefor in said chamber, links  $b^2$ , connected to said bars, and pivoted levers  $b^3$ , to operate substantially as described.

7. In a pump, a chamber, two cylinders of different diameters placed substantially in line, inlets and outlets for the said cylinders, the outlet of one cylinder leading to the said chamber and to the inlet of the other cylinder, and valves controlling the same, combined with a plunger for the said cylinders and means to reciprocate the same, to operate substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY H. CUMMINGS.

Witnesses:

JAS. H. CHURCHILL,  
FREDERICK L. EMERY.