

No. 670,796.

Patented Mar. 26, 1901.

W. R. LYNCH.
DOUBLE ACTING PUMP.

(Application filed Oct. 25, 1899.)

(No Model.)

2 Sheets—Sheet 1.

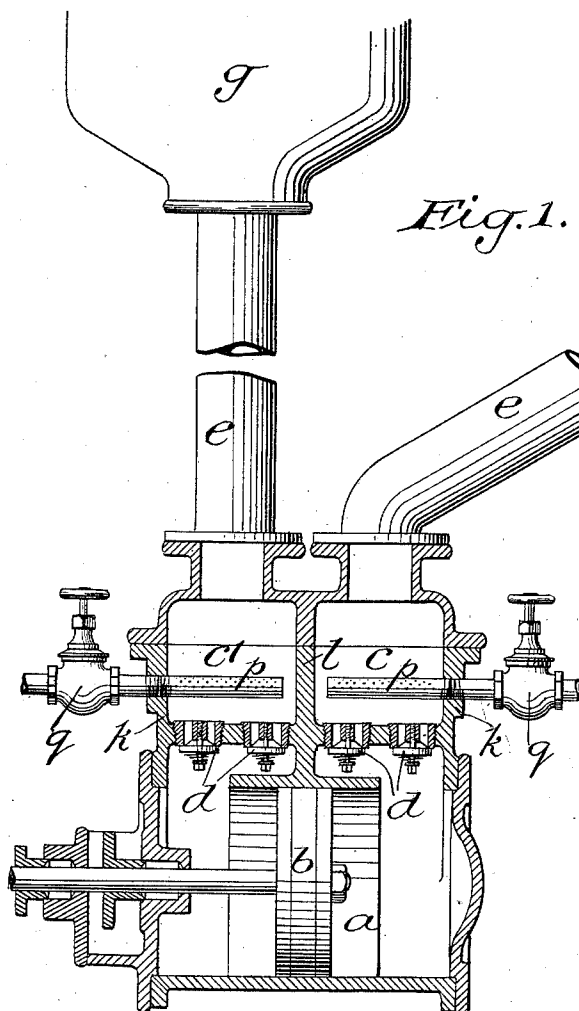


Fig. 1.

Fig. 2.

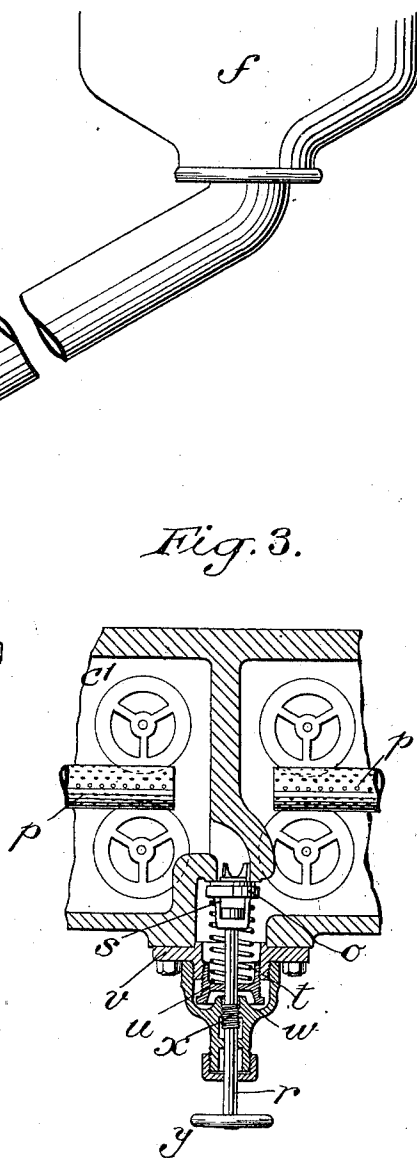
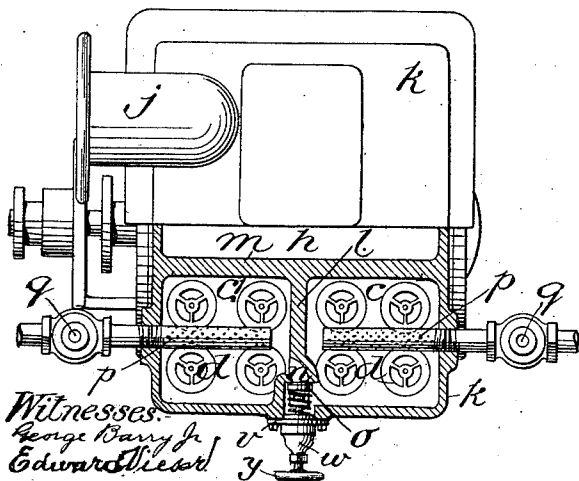


Fig. 3.



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Inventor:
William Richard Lynch
by attorney
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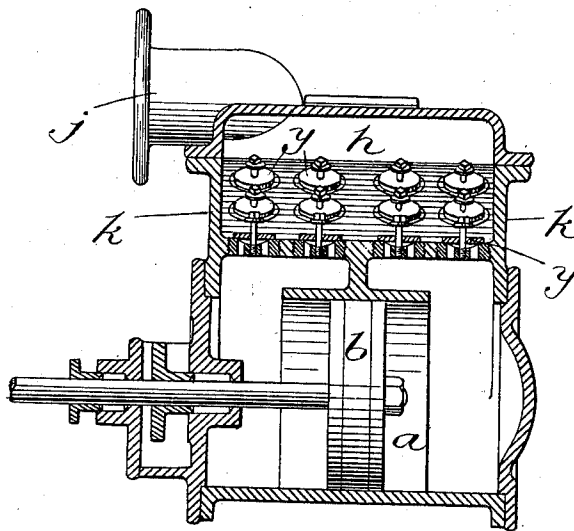
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2 Sheets—Sheet 2.

Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM RICHARD LYNCH, OF BROOKLYN, NEW YORK, ASSIGNOR TO
GUILD & GARRISON, OF SAME PLACE.

DOUBLE-ACTING PUMP.

SPECIFICATION forming part of Letters Patent No. 670,796, dated March 26, 1901.

Application filed October 25, 1899. Serial No. 734,721. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM RICHARD LYNCH, a citizen of the United States, and a resident of the borough of Brooklyn, in the city of New York and State of New York, have invented a new and useful Improvement in Double-Acting Pumps, of which the following is a specification.

This invention relates more particularly to pumps for withdrawing the water of condensation from what is known as "multiple effect" evaporating apparatus.

In the operation of the ordinary multiple effect evaporating apparatus consisting of a series of closed vessels so connected that the vapors produced in a preceding vessel of the series are condensed in the heating drum or coils of a succeeding one a difference of pressure and temperature obtains in the various heating-drums, and where the pressure is less than that of the atmosphere pumps are usually employed to remove the water of condensation. Such pumps are commonly known as "sweet-water" pumps and are, in effect, vacuum-pumps in connection with surface condensers. The maintenance of a difference in pressure and temperature between the various vessels and their heating-drums being essential to the successful action of the apparatus where mechanical circulation is not resorted to, each heating-drum or set of coils is usually provided with its own drain-pump in order that the conditions may not be disturbed, or when one pump is employed to drain all the drums the several connecting-pipes are furnished with valves which are intended to regulate the flow, but which by their partial closing restrict the free discharge of the water of condensation.

The object of this invention is to provide a double-acting pump having one cylinder or barrel and one reciprocating piston which will draw from two separate sources of supply—as, for instance, from the heating-drums of the second and third vessels of a triple-effect evaporator and to keep the conditions of each supply independent of the other.

To this end the principal feature of my improvement consists in providing such a pump with a valve-chest in which are three compartments, two of which constitute separate suction-chambers, each having its own

inlet and set of valves, one of said two chambers communicating with one end of the pump-cylinder and one source of supply—the second vessel of the evaporator, for example—and the other of said two chambers communicating with the other end of the pump-cylinder and another source of supply, as the third vessel of the evaporator, the third of said compartments constituting a discharge-chamber common to both ends of the cylinder. In operation the motion of the piston will cause suction to take place first through one chamber and then through the other, according to the direction in which said piston is moving, with the result of withdrawing the water of condensation from the two vessels or sources of supply alternately and without bringing the said vessels into communication.

My invention also consists in the provision of a means of communication between said separate suction-chambers and a valve for opening and closing said communication when desired, such valve to be operated by hand or to be loaded and so set as to open said communication when the pressure in one chamber shall exceed that for which the valve is set.

In the accompanying drawings, Figure 1 represents a longitudinal vertical section taken through the cylinder and suction-chamber of a pump embodying my invention, showing also parts of two of the evaporating vessels of a multiple-effect evaporating apparatus and the connections of such vessels with the two suction-chambers of the pump. Fig. 2 is a plan with the suction-chambers in section. Fig. 3 is a horizontal sectional view corresponding with Fig. 2, but on a larger scale, showing the valve for opening and closing communication between the two suction-chamber valves; Fig. 4, a longitudinal vertical section taken through the cylinder and discharge-chamber.

a designates the pump-cylinder; *b*, the piston; *c c*, the two separate suction-chambers, one for communication with one end of the cylinder and the other for communication with the other end thereof; *d d*, the induction-valves, of which there may be any number between each suction-chamber and its respective end of the cylinder; *e e*, the suction-

pipes, one for each suction-chamber for communication therewith from one of any two sources of supply, as the two vessels *f* and *g* of a multiple evaporating apparatus.

5 The two suction-chambers *c c'* are formed in the same valve-chest *k* with the discharge-chamber *h* and only separated from each other by a diaphragm or partition *l*, and separated from the discharge-chamber by a partition *m*. The discharge-chamber *h* and its
10 valves *y* and discharge-pipe *j* are common to both ends of the cylinder *a*, as shown in Fig. 4.

In the partition or diaphragm *l* there is a passage-way *n*, to which is fitted a valve *o*, by
15 which it may be closed to prevent communication between the two chambers or may be opened in case of the occurrence from any cause of a greater pressure in the chamber *c'*, which is in communication with the succeeding vessel *g* of a multiple-effect series, than in
20 the chamber *c*, which is in connection with the preceding vessel *f*. This valve *o* may be furnished with means for opening it by hand or may be so loaded that it will open auto-
25 matically when such excess of pressure as is hereinabove mentioned reaches a certain point. The valve *o* represented is self-opening by such excess of pressure and is also adapted to be opened by hand. It is con-
30 nected with its stem *r* by a yoke *s*, which permits it to move lengthwise thereon, and has applied behind it a coiled closing or loading spring *t*, which abuts against a cap *u*, which is screwed into a flange-piece *v*, attached to the
35 chest *k*. The stem *r* is screw-threaded at *x* on a part of its length to work in a corresponding female thread in the outer cap *w*, which is secured to the flange-piece *v*. By screwing the cap *u* in or out the spring *t* is more or less com-
40 pressed and its load on the valve increased or diminished. When the pressure in the valve-chamber *c'* exceeds the load of the spring *t* and the pressure in the chamber *c*, the said valve is permitted to open automatically by its yoke *s*
45 sliding on the stem, and so to make communication between the two chambers *c c'*. The valve *o* is opened by hand through the action of the screw-thread *x* on its stem by turning the latter in the proper direction by the handle
50 *y* on its outer end.

Each of the chambers is furnished with a separate spray-pipe *p*, furnished with a cock *q* for controlling the supply of water for the condensation in the chamber of any vapors
55 escaping thereinto from the evaporating vessels with the water of condensation. The

same pipes serve to supply the pump with the charging-water to be used therein.

What I claim as my invention is—

1. In a double-acting pump having one cyl- 60-
inder and one reciprocating piston working therein, the combination with such cylinder of a valve-chest in which are two compart-
ments constituting two independent suction- 65-
chambers one for communication with one end of the cylinder and with one source of supply and the other for communication with
the other end of the cylinder and with another source of supply and in which is also
a third compartment constituting a discharge- 70-
chamber common to both ends of the cylinder, induction-valves between each of said suction-chambers and its respective end of
the cylinder, and discharge-valves in said 75-
discharge-chamber common to both ends of the cylinder, substantially as and for the purpose set forth.

2. In a double-acting pump having one cyl-
inder and one reciprocating piston working therein, two independent suction-chambers 80-
one for communication with one end of the cylinder and the other for communication with the other end thereof, induction-valves
between each chamber and its respective end 85-
of the cylinder, a passage-way for communication between said two chambers, and a valve for opening and closing said passage-way,
substantially as and for the purpose herein described.

3. In a double-acting pump having one cyl- 90-
inder and one reciprocating piston working therein, two independent suction-chambers one for communication with one end of the
cylinder and the other for communication with the other end thereof, induction-valves 95-
between each chamber and its respective end of the cylinder, a passage-way for communication between said two chambers, a valve
normally closing said passage-way while the pressure in one chamber is in excess of that
100 in the other but opening automatically by a reversal of the excess of pressure, substantially as herein described.

In testimony that I claim the foregoing as
my invention I have signed my name, in pres- 105-
ence of two witnesses, this 20th day of October, 1899.

WILLIAM RICHARD LYNCH.

Witnesses:

FREDK. HAYNES,
EDWARD VIESER.