

(No Model.)

T. A. WALTHER.
COMBINED MOTOR AND PUMP.

No. 538,633.

Patented Apr. 30, 1895.

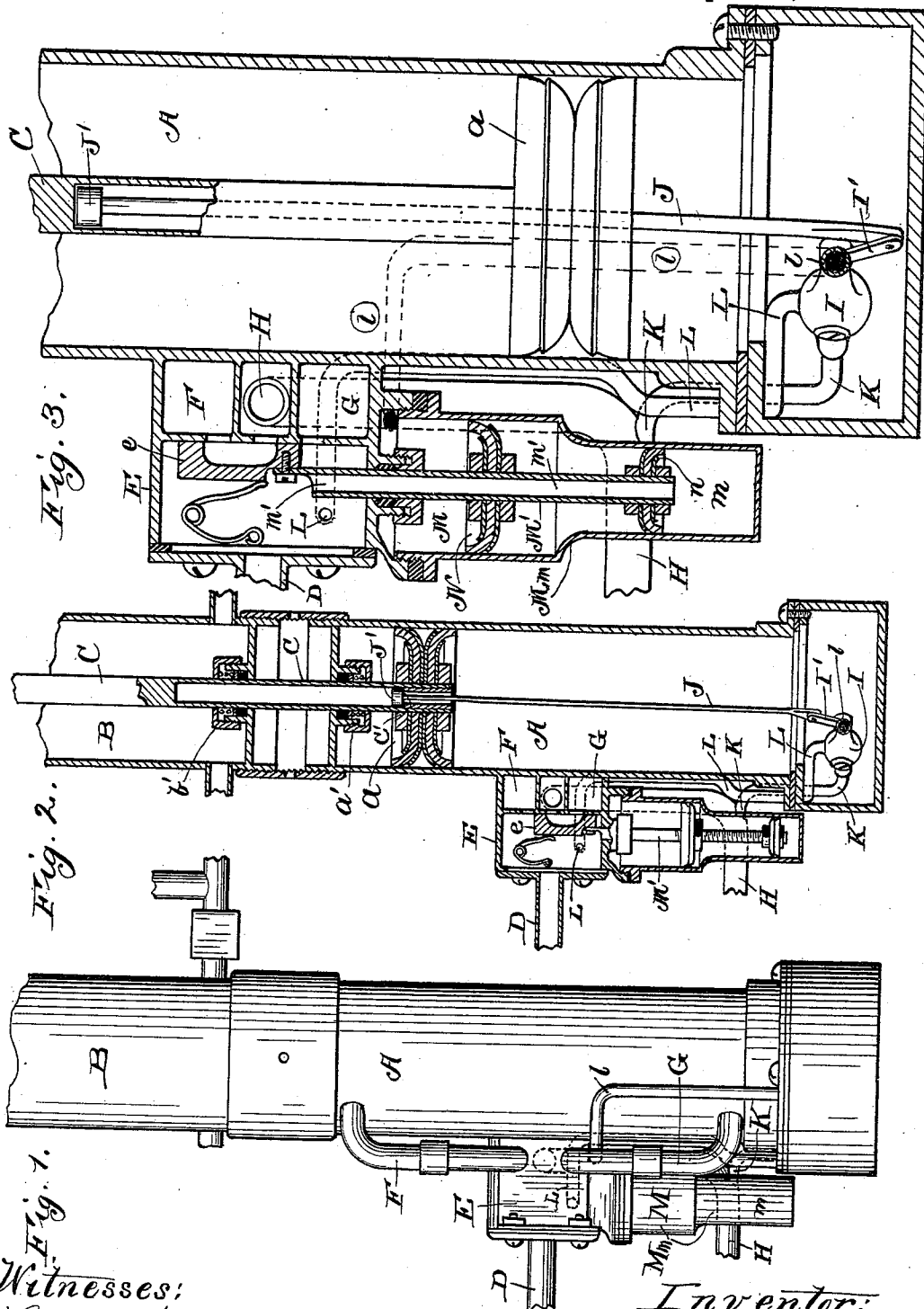


Fig. 1.
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UNITED STATES PATENT OFFICE.

THEODORE A. WALTHER, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-FIFTHS
TO CHARLES TURNER BROWN, OF SAME PLACE.

COMBINED MOTOR AND PUMP.

SPECIFICATION forming part of Letters Patent No. 538,633, dated April 30, 1895.

Application filed July 31, 1894. Serial No. 519,072. (No model.)

To all whom it may concern:

Be it known that I, THEODORE A. WALTHER, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Combined Motor and Pump, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete description, sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

This invention relates to machines designed to be actuated by a supply, under pressure of motive fluid, preferably water, whereby the motor of the machine is automatically started and stopped to force through the pump of the machine fluid, either gaseous or liquid, to a given pressure, and there maintained; and the object of this invention is to obtain a machine of the character named wherein the motive fluid used to actuate the motor forming a part thereof shall be economically used, the piston of such motor shall move uniformly its full travel in the cylinder thereof, and shall reverse at each end of its stroke in substantially equal time, and a machine which shall be simple in construction and not liable to get out of order.

In the drawings referred to as forming a part of this specification, Figure 1 is a front elevation of a combined motor and pump embodying my invention; Fig. 2, a vertical sectional view thereof; and Fig. 3, a vertical sectional view, on an enlarged scale, of the slide-valve of the motor of the machine, and of the cylinder and piston whereby the position of the slide-valve is determined and controlled.

A reference letter applied to designate a given part is used to indicate such part in all the figures of the drawings wherever the same appears.

A is the motor cylinder.

B is the pump cylinder.

C is a piston rod common to cylinders A and B.

a is the piston-head on piston rod C in cylinder A. There is also a piston-head on such piston rod in cylinder B.

a' *b'* are stuffing-boxes through which piston rod C extends.

The motor of my combined motor and pump

is constructed with special reference to being actuated by water under pressure, and hence, although I do not confine myself to the use of water as motive fluid, I shall hereinafter assume that water will be used for such purpose.

D is a supply pipe extending from a suitable water supply to chest E.

e is a slide-valve in chest E, by which water is directed alternately through passage-ways F, G, to the two sides of piston-head *a*, and to waste pipe H.

I is a three-way cock in motor cylinder A. The piston rod C is hollow and J is a rod extending from arm I' of three-way cock I into piston rod C. J' is a sleeve forming a shoulder on rod J adapted to engage with shoulder C' on piston rod C. As piston rod C moves from end to end of cylinder A, the position of three-way cock I is thus thereby determined.

K is a waste-pipe from the three-way cock I and L is a supply pipe extending from chest E to three-way cock I, and *l* is a pipe adapted to serve as a supply or waste pipe extending from the three-way cock I to part M of cylinder M *m*.

M' is a piston rod, having passage-way *m'* therethrough, in cylinder M *m*. Piston rod M' extends through the head of cylinder M *m*, through the casing of chest E and is attached to valve *e*. N is a piston-head secured on piston rod M' in part M, of cylinder M *m*, and *n* is a piston-head of different area secured on such piston rod M' in part *m* of cylinder M *m*.

In order to obtain uniform reversing action of piston rod C, I have found that the area of piston-head N should be substantially twice the area of piston-head *n*.

The position of the slide-valve *e* determines, in the ordinary way, to which end of the cylinder A motive fluid (preferably water) shall be directed, and from which end it shall be exhausted; and the position of the slide valve *e* is determined and controlled by the piston rod M' as such piston rod is moved in unison with the movement of the three-way cock I, in the manner hereinafter described.

The operation of the motor is:—Assuming slide-valve *e* to be in the lower of the two positions in which it can be placed by piston rod

M', the motive fluid in chest E will then extend therefrom through passage-way F to the upper end of cylinder A, and above piston-head *a*. Such piston-head will be thereby forced
 5 down. At the same time the motive fluid in cylinder A at the other end thereof can and will extend through passage-way G to valve *e* through such valve and to waste through waste-pipe H. At the same time, motive fluid
 10 will extend from chest E through pipe L to and through the three-way cock I and through pipe *l* to part M of cylinder M *m*, and such motive fluid will also extend through passage-way *m'* in piston rod M' to part *m* of cylinder M *m*. The pressure of the motive fluid
 15 on piston-head N in part M of cylinder M *m* will tend to force such piston-head, and the piston rod M' on which it is secured, downward, (that is, maintain valve *e* in the position thereof assumed,) while the pressure of
 20 the motive fluid on piston-head *n* will tend to force such piston-head and piston rod M' on which it, in common with piston-head N, is secured, upward. As the piston-head N is, as
 25 hereinbefore stated, of double the area of piston-head *n*, so long as the pressure of motive fluid is maintained on both piston-heads N *n*, the piston rod M' will remain in the position
 30 assumed. When piston *a* descends sufficiently to turn the three-way cock I (by means of connecting-rod J or its equivalent) so that the motive fluid in part M of cylinder M *m*
 35 can run to waste through pipe *l*, three-way cock I and waste pipe K, pressure on piston-head N is thereby relieved and pressure on piston-head *n* continuing such piston-head and piston
 40 rod M' will be moved upward, there to remain until the piston rod C in its upward movement consequent on the change in position of valve E, again moves three-way cock
 45 I so that motive fluid is again admitted to part M of cylinder M *m*. When motive fluid is thus again admitted to part M of cylinder M *m* the piston-head N will force piston rod
 50 M' and piston-head *n* thereon down, and the motive fluid in part *m* of cylinder M *m* will return through passage-way *m'* in piston rod M' to chest E.

The pump part of my combined motor and
 50 pump contains no peculiar features requiring special explanation or description and may be used for forcing either air or water into any receptacle with which it is suitably connected.

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

1. The combination in a combined motor and pump of a motor cylinder, a piston rod
 60 common to the motor and pump-cylinders, a piston-head in the motor-cylinder and a piston-head in the pump-cylinder, both of such piston-heads secured on the piston rod, a sup-

ply and waste-valve within the motor-cylinder, a connection between the piston rod and
 65 the valve whereby the position of the valve is determined by the piston rod, a motive-fluid chest, a valve in such chest controlling the inlet and exhaust-ports of the motor cylinder, an auxiliary cylinder of two diameters,
 70 a hollow piston rod in the cylinder extending into the motive-fluid chest and connected to the valve in such motive-fluid chest piston-heads of different area secured to the hollow
 75 piston rod, a passage-way communicating with and extending from the larger end of the auxiliary cylinder to the valve within the motor cylinder, and a waste-pipe extending from
 80 such valve; substantially as described.

2. The combination of a motor-cylinder, a
 80 motive fluid-chest, passage-ways therefrom to the ends of the motor-cylinder, a valve in the motive fluid-chest controlling by its position the movement of motive-fluid into and out of
 85 the motor-cylinder, an auxiliary cylinder of two diameters, a hollow piston rod in the auxiliary cylinder extending therefrom into the motive fluid-chest, and connected to the valve
 90 therein, piston-heads of different diameter on the hollow piston rod, whereby motive-fluid is at all times in the use of the motor present in
 95 the smaller part of the auxiliary-cylinder, and a passage-way extending into the part of such auxiliary cylinder of larger diameter, a valve
 100 in such passage-way and mechanism connected to such valve and the piston rod in the motor-cylinder whereby the position of such
 105 valve and the consequent admission of motive fluid to or exhaust thereof from the end of the auxiliary cylinder having the larger
 110 diameter is controlled by the piston rod in the motor-cylinder; substantially as described.

3. The combination of a motive fluid-chest, a valve therein, whereby motive-fluid is directed into the motor-cylinder and to waste,
 105 an auxiliary cylinder of two diameters, a hollow piston rod in the cylinder extending therefrom into the motive fluid-chest and communicating therewith so that motive-fluid may
 110 extend through the hollow piston rod to the smaller end of the auxiliary cylinder, a connection between the hollow-piston rod and the valve, piston-heads of different diameter on
 115 the hollow piston rod in the auxiliary cylinder, a passage-way from the motive-fluid supply into the larger end of the auxiliary cylinder, a valve interposed in such passage-way whereby motive fluid is directed into such
 120 auxiliary cylinder and to waste therefrom, and a connection between such valve and the piston rod of the motor cylinder; substantially as described.

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Witnesses:

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