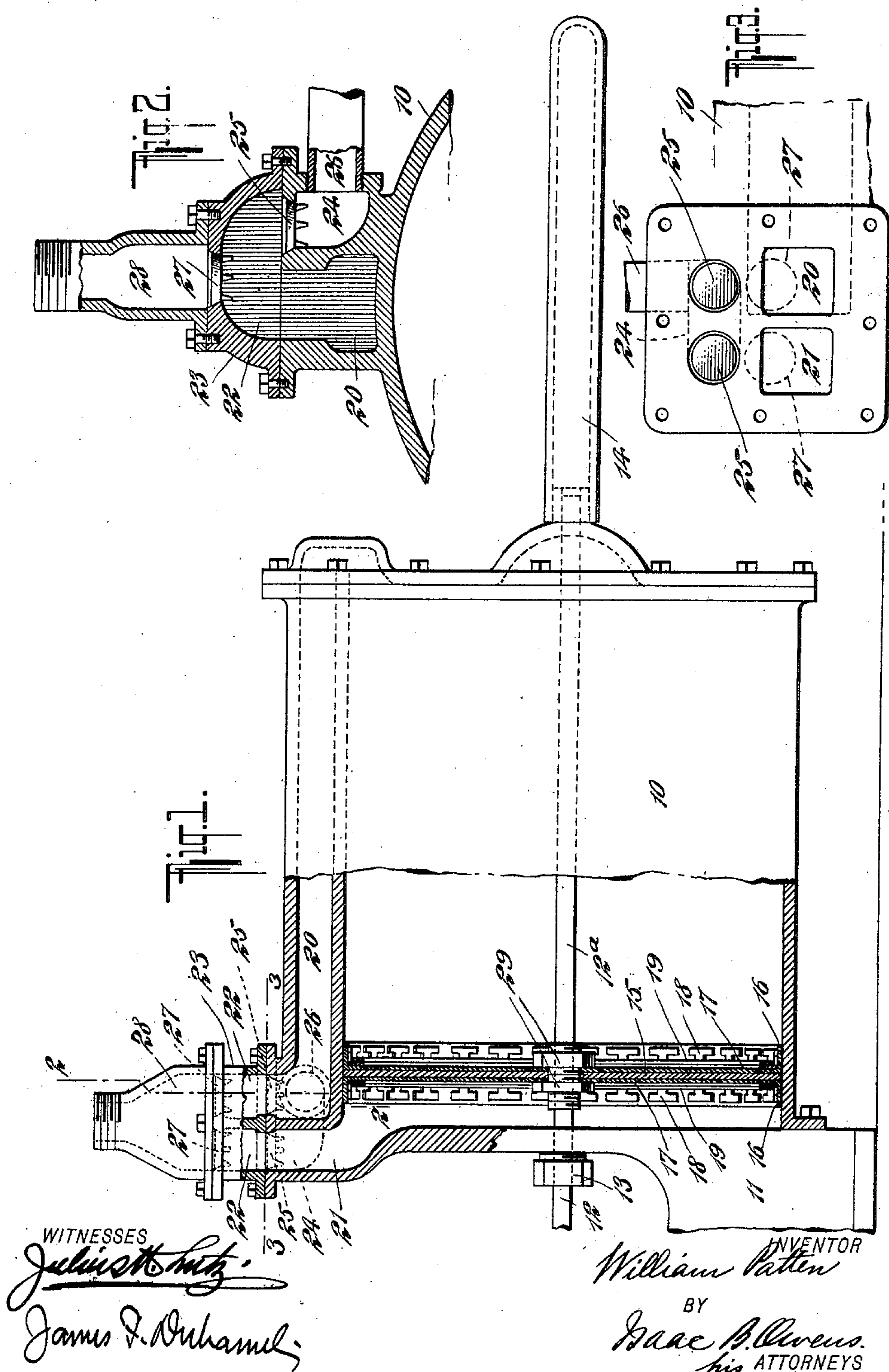


W. PATTEN.
PUMP.

APPLICATION FILED MAY 18, 1907.

921,883.

Patented May 18, 1909.



UNITED STATES PATENT OFFICE.

WILLIAM PATTEN, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO JAMES PATTEN, OF NEW YORK, N. Y.

PUMP.

No. 921,883.

Specification of Letters Patent.

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Application filed May 18, 1907. Serial No. 374,464.

To all whom it may concern:

Be it known that I, WILLIAM PATTEN, of the city of New York, borough of Manhattan, State of New York, have invented certain
5 new and useful Improvements in Pumps, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

10 My invention relates to a pump or compressor adapted to develop moderate pressures in gases. It is useful, for example, as a means of increasing the pressure in illuminating gas systems or as an air blower for
15 furnishing an air blast.

The apparatus is especially, though not necessarily, adapted to be direct-coupled to a driving motor, for example, to such a motor as is disclosed in my copending applica-
20 tion filed May 18, 1907, Serial Number 374,465.

An important object of my invention is to simplify as much as possible the construction of the pump or compressor, so that it
25 may be produced at slight cost, and will not be subject to the necessity of continual repair, thus adapting it particularly to domestic installations where constant attention cannot be expected. In attaining this
30 end, I provide induction and eduction valves which are wholly self operative requiring no valve actuating mechanism and dispensing with the use of springs and equivalent parts thus reducing the apparatus to the simplest
35 possible form and also provide the piston construction which involves peculiarly arranged "cup leathers" insuring a hermetic connection with the cylinder walls, without
40 involving the usual packing rings and avoiding the weight incident to a piston, the construction of which is adapted to such rings.

My invention involves various other features of major or minor importance, all of which will be fully set forth hereinafter and
45 particularly pointed out in the claim.

Reference is had to the accompanying drawings, which illustrate as an example, the preferred embodiment of my invention, in which drawings,

50 Figure 1 is a sectional elevation of the invention; Fig. 2 is a detail section on the line 2—2 of Fig. 1; and Fig. 3 is a sectional plan on the line 3—3 of Fig. 1, indicating by dot-

ted lines the relative position of the eduction valves.

10 indicates the cylinder of the pump or compressor and 11 the supporting frame. This frame may be of any desired construction, for example, it may form part of the motor frame and in such case the motor will
60 face the pump and be direct-coupled thereto through the rod 12 which will then be an extension of the piston rod of the motor. Said rod 12 passes through a stuffing box 13 at the
65 near end of the cylinder 10 and the extension or tail rod 12^a projects into a tubulous rod guide 14 fastened to the opposite head of the cylinder and avoiding, by this arrangement, the necessity of a second stuffing box. The parts 12 and 12^a carry the piston of the
70 pump or compressor and the tail rod 12 serves to guide the piston in its movement.

The piston is constructed of a metal disk or plate 15 secured on the piston rod by means of nuts 29 or the like, and at each side of the
75 plate 15 are arranged cup leathers 16, i. e. cup-like members of leather, rubber or similar material, adapted to be acted on by the pressure within the cylinder causing them to expand against the cylinder walls and thus
80 effecting a tight connection. For the purpose of holding the cup leathers against the cylinder walls at all times and in position which will insure the before described action of the pressure within the cylinder, I provide
85 rings 17 which are engaged with the sides of the cup leathers directly adjacent to the periphery of the piston, and which have spring fingers 18 formed integral therewith and bearing against the cup leathers to press
90 them outward. The rings 17 are held in place and the other parts of the piston kept in operative adjustment by means of spring rings 19 which are engaged against the inner
95 sides of the spring fingers 18 and retain their position by reason of their resiliency. This construction, it will be seen, provides an extremely light piston and avoids the loss of power due to friction and inertia and at the same time insures a gas tight connection
100 which prevents loss in the pump action.

The cylinder 10 is provided with ports 20 and 21 leading respectively to the cylinder ends and meeting directly adjacent to each other as shown in Figs. 1 and 3. These ports
105 20 and 21 communicate respectively with the

separate chambers 22 of a thimble 23 which is preferably formed separate from the cylinder and fastened thereto. The chambers 22 of the thimble 23 also communicate with an induction chamber 24, this communication being controlled by gravity seating check valves 25 opening from the induction chamber 24 respectively into the chambers 22 and ports 20 and 21.

26 indicates a pipe connection leading to the induction chamber 24. The chambers 22 of the thimble 23 are distinct from each other by reason of the separating well and discharged into the T-connection or the like 28, return flow being prevented by gravity seating eduction valves 27. One of these valves is shown by full lines in Fig. 2 and both are shown by dotted lines in Fig. 1, while in Fig. 3 their position relative to the ports 20 and 21 and the valves 25 are indicated by the dotted circles.

In the operation of the pump upon reciprocation of the piston, for example rightward from the position shown in Fig. 1, the gas in the cylinder at the right of the piston will be forced through the port 20 and into the communicating chamber 22. The valve 25 of such chamber will be seated by the pressure developed and reinforced by gravity and this pressure in the chamber 22 will lift the valve 27 permitting the compressed gas to pass into the connection 28 and from the same to the reservoir pipe line or other device into which the compressed gas is to be discharged. Simultaneously the rarefaction brought about in the left hand end of the cylinder, port 21, and the communicating chamber 22 will reinforce the action of gravity in seating the valve 27 communicating with said chamber at the same time lifting the induction valve 25 communicating with the chamber and drawing in a charge from the induction chamber 24 which charge, upon reversal of the piston movement, will be compressed and discharged from the pump in the same man-

ner as previously described with respect to the charge passing through and from the port 20.

It will thus be seen that I have provided an extremely simple and durable device by which moderate pressures may be effectually accumulated. The device, owing to its large broad areas and the absence of loaded valves, may be operated with very little power and is especially adapted to domestic and similar installations where low pressures are required and where constant attention cannot be given to the apparatus. A novel example of such use is afforded by the application of the device to municipal gas service plants for the purpose of increasing, or what is commonly termed "boosting", the gas pressure, effecting thereby an economy in gas consumption and increased lighting capacity.

Having thus described the preferred embodiment of my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

A pump having a cylinder with a port in each end, the port at one end leading along the side of the cylinder to a point directly adjacent to the other port said ports having a division wall between them, the cylinder also having a supply connection with two ports respectively related to the first named ports, a thimble fastened on the cylinder and having a division wall separating the first named and supply ports and meeting the first named division wall, check valves commanding the supply ports at opposite sides of said division walls and valve controlled outlets from the thimble at opposite sides of the division wall thereof.

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

WILLIAM PATTEN.

Witnesses:

ISAAC B. OWENS,
E. I. McLAUGHLIN.