

No. 719,709.

PATENTED FEB. 3, 1903.

C. L. WILKINS.
AIR PUMP.

APPLICATION FILED FEB. 17, 1902.

NO MODEL.

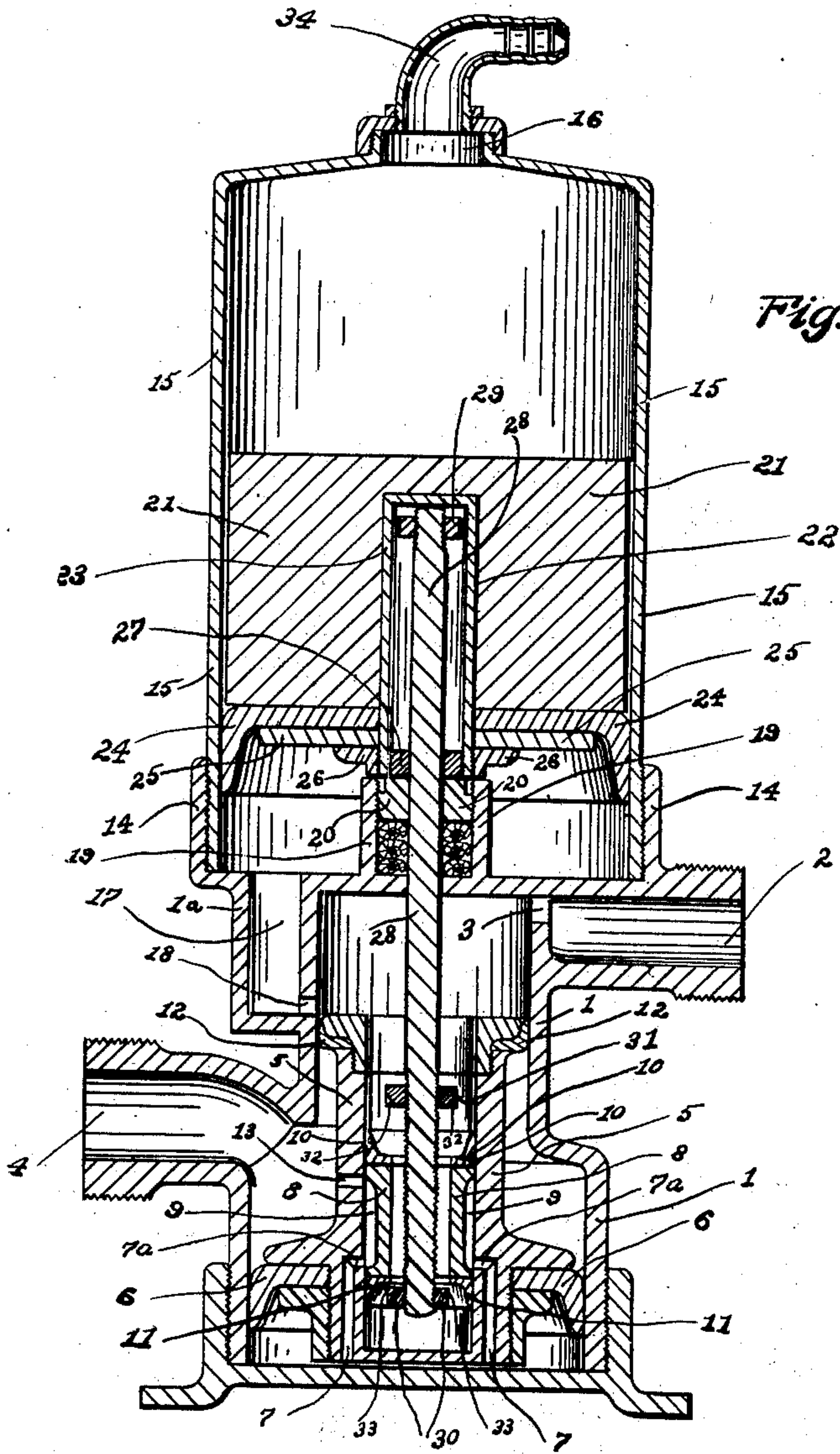
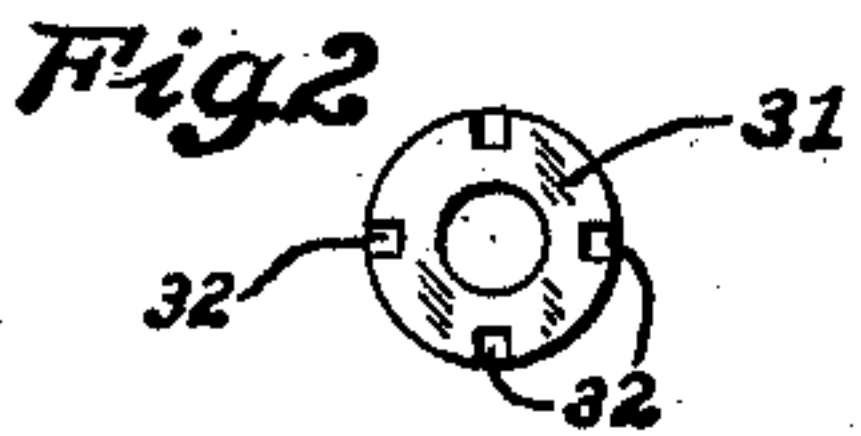


Fig.1



WITNESSES:

F. D. Zwerner
A. L. Phelps

INVENTOR.

Charles L. Wilkins

BY

C. C. Shepherd
ATTORNEY.

ATTORNEY.

UNITED STATES PATENT OFFICE.

CHARLES L. WILKINS, OF COLUMBUS, OHIO, ASSIGNOR TO THE OHIO PUMP & BRASS COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 719,709, dated February 3, 1903.

Application filed February 17, 1902. Serial No. 94,429. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. WILKINS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Air-Pumps, of which the following is a specification.

My invention relates to the improvement of air-pumps of that class which are particularly adapted for pumping air into beer-casks and similar vessels.

The objects of my invention are to provide a simple, reliable, and effective hydraulic air-pump, to so construct the same as to avoid undesirable friction and to insure the positive operation of the parts, and to provide certain improvements in details of construction, which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical section of my improved pump; and Fig. 2 is a plan view of one of the rod-rings, which I employ in the manner hereinafter described.

Similar numerals refer to similar parts throughout the several views.

In carrying out my invention I employ a lower external body or casing 1, the lower portion of which is somewhat enlarged, as shown. Leading into the side of the upper or neck portion of the casing 1 is a water-inlet 2, the inner end of which communicates with the interior of said casing 1 in its upper portion through the medium of a port 3. Leading laterally from the casing 1, at or adjacent to the junction of the upper and smaller and lower and larger portions of said casing, is an outlet or exhaust pipe neck 4.

Within the casing 1 and of less height than the latter I provide a tubular or cylindrical valve-plunger 5, the body of the latter being of less diameter than the body of said casing and its lower and enlarged end portion carrying externally a cup-leather 6, which is adapted to fit, as shown, within the enlarged lower portion of said casing 1. The lower and cup-leather-carrying end portion of the plunger 5 is closed, with the exception of the formation therein on opposite sides of its center of two vertical water-passages 7, the latter ex-

tending upward for a short distance within the body of said valve-plunger and terminating in short inwardly-extending horizontal ports or passages 7^a, which communicate with the interior of the valve-plunger 5.

Within the valve-plunger 5 is provided a tubular or substantially spool-shaped valve-body 8, the latter, with the exception of its end portions, being of such size as to result in the formation of an annular space or continuous passage 9 between the walls of said valve and valve-plunger 5. The upper end of the valve 8 is provided with a ring-like cup-leather 10, while the lower end of said valve-body is likewise provided with a similar cup-leather 11, these cup-leathers being adapted to fit and slide within the tubular valve-plunger 5 and said valve-body being of less length than said valve-plunger.

As indicated at 12, the upper end of the valve-plunger body 5 carries externally a cup-leather or head, which is adapted to fit and slide within the upper portion of the casing 1. Leading through the wall of the valve-plunger 5 and communicating with the space between said valve-plunger and the external casing 1, and likewise with the exhaust-outlet 4, is a port 13.

In forming the upper end portion of the casing-body 1 the same is provided with an internally-threaded cup or socket extension 14, into which is adapted to be screwed the externally-threaded lower end portion of an upright cylinder 15, the latter having an upper end outlet-opening 16. Leading from the lower end of the cylinder 15 downward through the lateral extension 1^a of the casing-body 1 is a passage 17, the lower end of which communicates through a port 18 with the interior of the casing 1 at a point above the exhaust-outlet 4. The upper side of the casing 1 is also provided about its center with an upwardly-extending stuffing-box or packing-neck 19, into the upper end of which is screwed a suitable packing-ring 20. Above this stuffing-box I provide within the cylinder 15 a piston or plunger 21, which is in the nature of a weight fitting loosely within said cylinder. This weighted piston has formed centrally therein and leading from its under side a socket 22, with which is provided a

close-fitting tubular body 23, the latter having its lower portion extending below the piston 21 and carrying below the latter a cup-leather 24, which is embraced between a washer 25 and said piston, said washer being held in place by a nut 26 on the lower externally-threaded portion of said tubular body 23. Within the lower end of the tubular body 23 I provide a guide-ring 27, which is adapted to bear, as shown, upon the packing-ring 20 of the stuffing-box 19.

28 represents a vertically-arranged rod which extends through the central portion of the casing 1, the cylindrical valve-plunger 5, and tubular valve 8 and also through an opening in the upper side of the casing 1, thence through the stuffing-box 19, the packing and guide rings 20 and 27, thence into the tubular body 22 of the piston 21. This rod has threaded onto its upper end a guide-ring 29 and on its lower end carries a stop-ring 30. The rod 28 is also provided with a ring 31, which is adapted when said rod is in its lowest position to contact with the cup-leather 10. As indicated in the drawings at 32, the ring 31 has its lower side adjoining its periphery grooved or recessed, so as not to form a water-tight contact between said ring and the cup-leather 10, and the lower end ring 30 likewise has its upper end similarly recessed at 33.

With the neck-opening 16 at the upper end of the cylinder 15 may be connected a suitable hose-receiving nozzle 34 or other air-conductor, and within the pipes of this nozzle or within the pipe or conductor which may be connected therewith may be provided the usual air inlet and outlet pump-valves, which are not herein shown.

In order to illustrate the operation of my improved pump, I will assume that the parts are in the position shown in the drawings—that is, with the piston 21 in its lowest position within the cylinder 15 and with the rod-ring 31 above the cup-leather 10. Water under pressure is introduced through the inlet 2 and port 3 into the casing 1. From this casing the water passes through the port 18 and passage 17 to the under side of the cup-leather 24, resulting in raising the weighted piston 21 in its cylinder 15. When said piston has been raised to such height as to cause a contact of the rings 29 and 27, it is obvious that the rod 28 will be likewise elevated, and this upward movement of said rod 28 continuing until through contact of its lower end ring 30 and tubular valve 8 the lower flanged and cup-leather end of the latter is elevated above the passage-arms 7^a. In this manner communication is established between the interior of the valve 5 and the passages 7^a and 7, so that the pressure-water may flow from the interior of said valve through said passages into the space between the bottom of the casing 1 and the cup-leather 6. The lifting pressure thus exerted on said cup-leather 6 and the lower side of the valve-

plunger 5 results in lifting said plunger until the cup-leather 12 is above the port 18. The parts being in this position, it will be observed that the under side of the piston is relieved from the pressure of the live water and that the water may pass from beneath said piston downward through the passage 17 and port 18 to the space between the valve-plunger 5 and the casing 1, thence out through the exhaust-opening 4. In its travel upward the valve-plunger 5 carries with it the valve 8. The space between the collars 30 and 31 on rod 28 is greater than the length of the valve 8 by the distance traveled by the valve-plunger 5, and this space between the collars 30 and 31 thus allows the valve-plunger 5, carrying with it valve 8, to travel upward the necessary distance without coming in contact with collar 31 on rod 28 and without altering the relative position of valve 8 to valve-plunger 5. This is also true in the downward travel of the valve-plunger 5. It does not have to move the rod 28 or overcome the friction of valve 8, working in the interior of valve-plunger 5. The only friction to which the valve-plunger 5 is subjected results from the contact of its cup-leathers with the interior of the cylinder 1, thus giving said valve-plunger greater efficiency and power and making it more positive in its operation. The piston being relieved of the live-water pressure in the manner heretofore described, it is obvious that the same may descend of its own weight to the lowered position shown in the drawings, and in such descent the rod 28 will be again carried downward until by contact of the ring 31 and cup-leather 10 the valve 8 is again moved downward to open communication between the space 9 and passage 7, thus permitting the exhaust of the water from beneath the plunger 5 through the port 13 and the release of the pressure on the under side of said plunger, permitting the latter to assume its normal position.

From this construction and operation it will be seen that a pumping or reciprocating motion of the piston 21 will be produced within the cylinder 15 and that the air will be alternately drawn in and forced out of said cylinder through this movement of said piston. It will also be observed that in accomplishing this operation the movements of the valve 8, plunger 5, and rod 28 are substantially independent, said parts being so arranged and operated, as hereinbefore described, as to permit of their operation with comparatively slight friction.

It will be observed that the construction of the various parts of my improved air-pump and the manner of uniting the same are simple and that said parts are of such construction and arrangement as to decrease the tendency toward the same becoming inoperative.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an air-pump, the combination with

the casing 1 having a water-inlet, an exhaust-outlet below said water-inlet and a passage 17 leading through the upper end of said casing and connecting with the latter by a port 18, a hollow plunger 5 within the casing having an enlarged lower end portion, cup-leathers carried on opposite ends of said plunger, the lower end of the plunger having passages 7 7^a adapted to communicate with the interior of the plunger and an outlet-port 13 formed in said plunger, of the tubular valve 8 working within the plunger, and cup-leathers on opposite ends of said valve, of an air-cylinder surmounting said casing 1 and having an outlet-opening in its upper portion, a weighted piston in said air-cylinder having a central under side socket, a rod 28 extending through the upper side of said casing 1 into said piston-socket and within said casing 1 and valve 8, and projections 29, 31 and 30 carried on said rod, substantially as specified.

2. In an air-pump, the combination with the casing 1 having a water-inlet, an exhaust-outlet below said water-inlet and a passage 17 leading through the upper end of said casing and connecting with the latter by a

port 18, a hollow plunger 5 within the casing having an enlarged lower end portion, cup-leathers carried on opposite ends of said plunger, the lower end of the plunger having passages 7 7^a adapted to communicate with the interior of the plunger and an outlet-port 13 formed in said plunger, of the tubular valve 8 working within the plunger, and adapted to be carried by the latter when said plunger is moved, and cup-leathers on opposite ends of said valve, of an air-cylinder surmounting said casing 1 and having an outlet-opening in its upper portion, a weighted piston in said air-cylinder having a central under side socket, a rod 28 extending through the upper side of said casing 1 into said piston-socket and within said casing 1 and valve 8, and projections 29, 31 and 30 carried on said rod, the valve-plunger 5 being in its upward-and-downward movement out of frictional contact with said rod 28, substantially as specified.

CHARLES L. WILKINS.

In presence of—

C. C. SHEPHERD,
A. L. PHELPS.