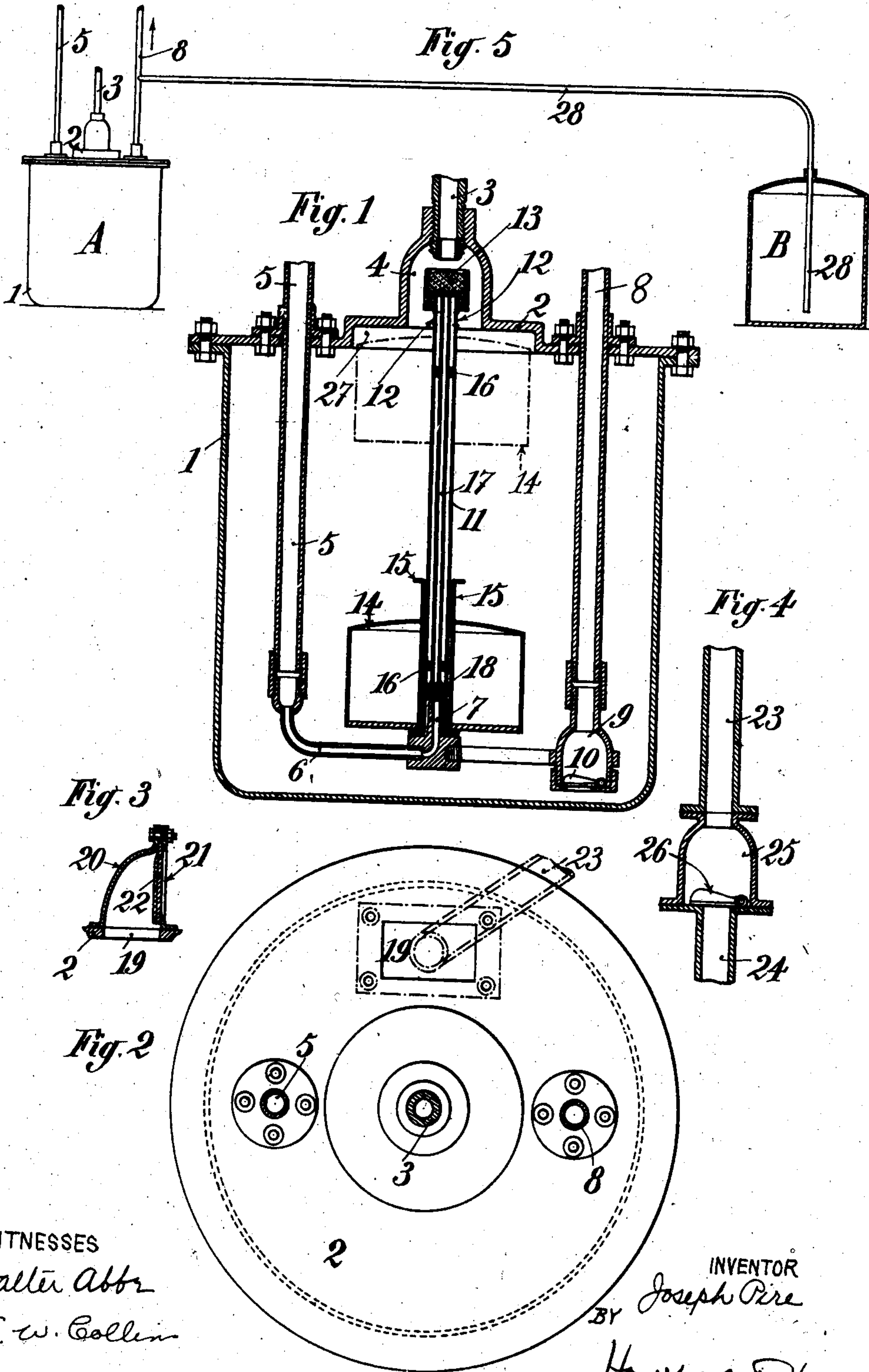


No. 834,749.

PATENTED OCT. 30, 1906.

J. PIRE.  
APPARATUS FOR LIFTING LIQUIDS.  
APPLICATION FILED OCT. 11, 1904.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

JOSEPH PIRE, OF PARIS, FRANCE.

## APPARATUS FOR LIFTING LIQUIDS.

No. 834,749.

Specification of Letters Patent.

Patented Oct. 30, 1906.

Application filed October 11, 1904. Serial No. 228,070.

*To all whom it may concern:*

Be it known that I, JOSEPH PIRE, joiner, a subject of the Grand Duke of Luxembourg, residing at Paris, in the Republic of France, whose full postal address is 112 Rue Caulaincourt, Paris, aforesaid, have invented certain new and useful Improvements in and Connected with Apparatus for Lifting Liquids, of which the following is a specification.

This invention consists in improvements in automatic apparatus intended for lifting liquids in general by the use of compressed air. These improvements have for their object to simplify the construction of such automatic apparatus, to perfect the working, and to render them available not only by immersing them in the liquid to be elevated, but also by feeding them directly by means of a low-pressure pipe.

In the accompanying drawings, to which reference will be made in the following specification and by aid of which the invention will be described, Figure 1 is a vertical section of the improved apparatus; Fig. 2, a corresponding plan view; Figs. 3 and 4, details of certain parts; Fig. 5, a diagram of a method of arrangement with a view to obtaining a continuous discharge.

The apparatus comprises a metal container or vessel 1, the bottom of which is intended to rest directly on the ground and which is closed by a lid or cover 2, held in place by screws or bolts.

All the accessory parts are fixed on the lid or cover 2, which facilitates the mounting and dismounting of the apparatus and renders inspection practical.

3 is a tube communicating at its upper end with outside air and serving for the escape of air contained in the vessel 1 at the moment of the entrance of the liquid to be elevated, as will be hereinafter seen. This pipe ends a little below its entrance into the apparatus at the center of a cavity 4, formed in the lid 2.

A second pipe 5 conveys compressed air derived either from a compressor or a main end and is connected by a pipe 6 to a nozzle 7. A third pipe 8 serves for discharging the liquid and ends near the bottom of the vessel 1 and is terminated at this point by a small chamber 9, provided internally with a retaining-valve 10.

On the nozzle or pipe 7 a pipe 11 is mounted, which is capable of a slight vertical displacement. It is prolonged toward the upper part of the apparatus and is arranged so

as to be guided by the walls of the cavity 4. This tube is perforated at 12 and carries an india-rubber plug 13 for closing the pipe 3, as will be hereinafter explained. A loaded float 14, provided with shoes or projections 15, can slide on this pipe 11. A hollow rod 17, terminated at its lower end by an india-rubber valve 18, is fixed on the interior of the tube 11 by the intermediary of perforated rings or star-pieces 16. The liquid enters by an aperture 19, formed in the lid or cover 2, Fig. 2.

If the apparatus is to be immersed in the mass of liquid to be elevated, a hood 20, like the one shown in Fig. 3, is fixed, by means of screws or bolts, on the cover or lid 2 opposite the aperture 19, the said hood being open at 21 and having a closing-valve 22.

The working of the apparatus immersed in the liquid to be elevated is as follows: This liquid pressing back the valve 22 fills the vessel 1. Its level rises and expels the air contained therein by the pipe 3 and raises the float 14, which slides on the pipe 11. When the float comes near the top of its course, the shoes or projections 15 come in contact with the under part of the plug 13, which then shares in the upward movement of the tube 11 and all connected therewith. The plug 13 very soon comes to press on the aperture of the tube 3 and closes it. This displacement is facilitated by the compressed air, which, escaping by the pipe 7, tends to push the valve 18 upward. The air under pressure mounts in the pipe 11, reaches the container or vessel 1, passing through the perforations 12, and causes instantaneous closing of the valve 22, which blocks the liquid-inlet 21. From this moment the liquid is expelled from the apparatus and is discharged by the pipe 8, which directs it toward the place where it is to be consumed or into a vessel situated at a higher point. The lowering of the liquid allows the float 14 to descend; but by reason of the presence of the compressed air in the interior of the apparatus the pipe 11 is maintained in place, the plug 13 remaining against the mouth of the pipe 3. The closing of this pipe only ceases when the said float rests on the flange formed at the lower extremity of the pipe 11 and adds its weight to that of the parts 11 to 18. At this moment the plug or stopper 13 is quickly removed from its seat, the pipe 7 is closed by the valve 18, the air contained in the apparatus escapes by the pipe 3, the pressure falls in the vessel 1, and the liquid



penetrates therein afresh, passing through the hood 20. The working recommences and continues in the manner hereinbefore indicated as long as the apparatus is fed with compressed air and liquid and the pipes 3 and 8 are kept open. This working is absolutely automatic and requires no supervision. The apparatus is always ready for use and is capable of numerous applications. It may be utilized not only for lifting water from rivers, wells, cisterns, basins, and the like, but also for distributing water to various stories of a house when the pressure in the water-mains proper is insufficient. In this latter case it would be useless to immerse the apparatus in the liquid itself to be lifted, and it will suffice to dispense with the box 20 on the lid 2 and arrange in its place a pipe 23, (indicated in mixed dotted lines, Fig. 2 of the drawings,) connected with the town main 24, Fig. 4, a chamber 25 provided internally with a retaining-valve 26 being interposed.

With this special arrangement the apparatus behaves in the same manner as that hereinbefore described. When the plug 13 uncovers the tube 3 the pressure of the main 24, however feeble, is always sufficient to lift the valve 22 and fill the apparatus. The moment compressed air is admitted to the latter the valve 26 is pushed back on its seat by the action of the internal pressure coming from the vessel 1 and the liquid which cover it prevents the fluid under pressure from passing into the pipe 24.

It will be noticed that the lid or cover 2 is arranged so as to allow the float 14 when it is at the top of its course (which position is indicated in mixed dotted lines in Fig. 1) to penetrate into a central recess 27, which insures an almost complete filling of the apparatus, and consequently a maximum discharge for each ejection of liquid.

It is easy to understand that if the pipe 5 is constantly in communication with a suitable source of compressed air (pump, reservoir, special pipe, or the like) the apparatus will behave in the manner hereinbefore stated, and it will be possible to receive at any desired point, by a branch pipe mounted on the pipe 8, the water forced under pressure. If the taps of the branch pipes are closed, the working of the apparatus is suspended, but it remains under pressure and is ready to work when one or other of these taps is opened.

Another and simpler method for enabling continuity in the discharge or distribution of the liquid to be obtained is shown diagrammatically in Fig. 5 of the drawings. According to this arrangement the apparatus A, hereinbefore described, is combined by

vessel B of variable form, hermetically closed, arranged at a suitable place and in any suitable manner. This vessel is provided with a pipe 28, discharging near its bottom and at its other end connected with the ejection or force pipe 8, as shown in the drawings. At the commencement of working the vessel B is empty. As soon as the apparatus A commences to work, the liquid is forced back not only into the pipe 8, in order to be distributed in the manner hereinbefore described, but also into the vessel B by means of the pipe 28. The air contained in this vessel B is thus compressed under such conditions that the moment the ejection is interrupted, which has been shown is the moment which corresponds to the filling of the vessel 1, the pipe 8 is always fed with liquid, but this latter comes from the said vessel B, and it is expelled by the air which is therein contained under pressure. The filling of the vessel 1 being operated very rapidly, the size of the vessel B may be very inconsiderable.

In applying the invention it is thus possible to lift automatically and without supervision the liquid to a higher level. Of course the discharge will vary with the size of the apparatus. Similarly for great differences of level one or more relays or intermediate apparatus may be arranged.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an apparatus for lifting liquids in general the combination of a vessel hermetically closed by a lid or cover provided with an aperture for the entrance of the liquid, pipes for introducing and discharging air, and a pipe for forcing the liquid having two loaded, movable, valves closing one or other of the orifices of the two air-pipes, said valves being attached one with another and connected by tubular pieces substantially as described.

2. In an apparatus intended for lifting liquids in general, a vessel provided with an aperture for the introduction of the liquid, inlet and outlet air-tubes, valves for closing and opening said tubes, and a tubular piece connecting said valves one with another, in combination with a float sliding on said tubular piece adapted to alternately open and close the valves thereon.

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

JOSEPH PIRE.

Witnesses:

JOHN BAKER,  
ANTONIN MONTEILHETZ.