(No Model.)

2 Sheets—Sheet 1.

W. F. STARK.

STORAGE AIR PUMP.

No. 342,714.

Patented May 25, 1886.

Fig. 2.

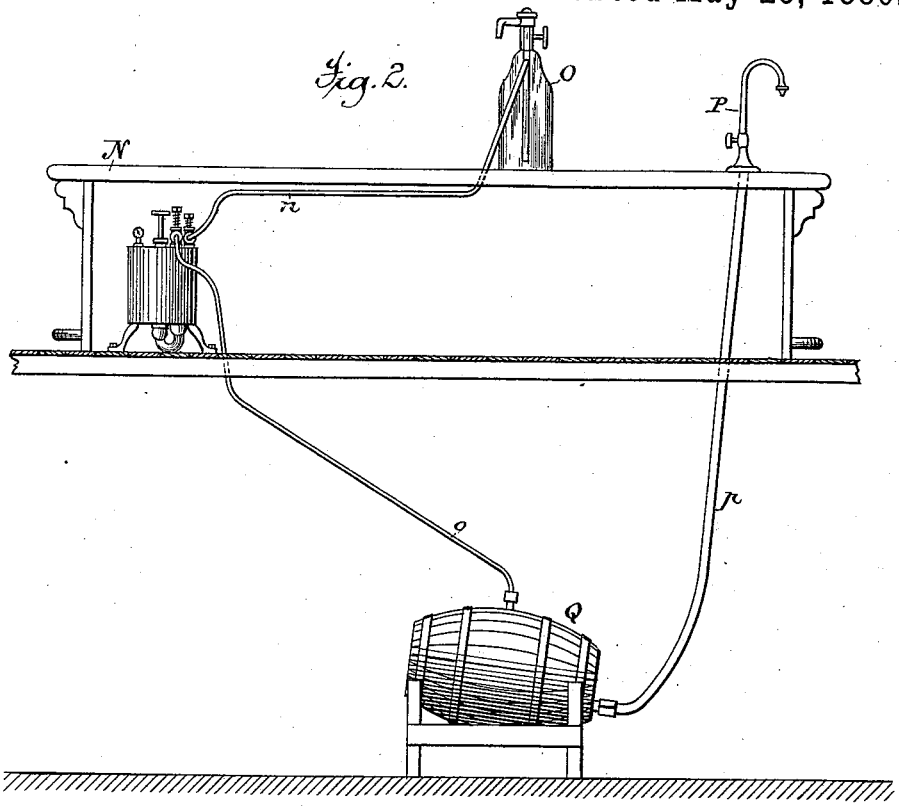
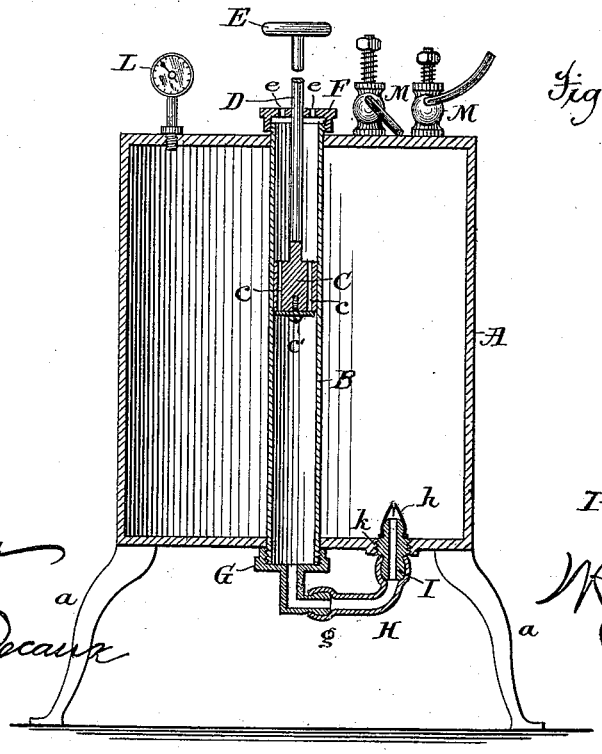


Fig. 1.



Attest:

J. Ellis Bonner

John Decaux

Inventor.

W. F. Stark

(No Model.) 2 Sheets—Sheet 2.

W. F. STARK.

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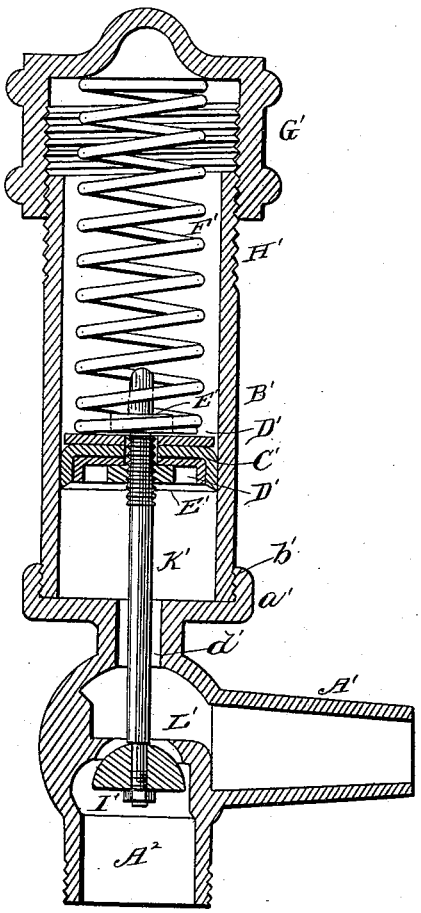
Fig. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM F. STARK, OF NEW YORK, N. Y., ASSIGNOR TO THE STANDARD PUMP MANUFACTURING COMPANY, OF SAME PLACE.

STORAGE AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 342,714, dated May 25, 1886.

Application filed July 25, 1884. Serial No. 138,818. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. STARK, a citizen of the United States of America, and a resident of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Storage Air-Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of said description, and in which—

Figure 1 is a vertical section of the pump; Fig. 2, an elevation showing one of the uses to which the pump is applicable, as will be more fully explained hereinafter; and Fig. 3 is a sectional elevation of one form of pressure-regulator which may be employed in my organization.

In the drawings like parts are indicated by like letters.

My present invention relates to apparatus for compressing and storing air for uses in the arts, the object being to produce a combined pump and storage-reservoir which shall involve no complications of structure, and shall be portable and easily manipulated. It is especially designed for preserving lager-beer, ale, and mineral waters, and for discharging such liquids as are not sufficiently impregnated with gases to permit their discharge without extraneous instrumentalities. The apparatus will also be useful as an adjunct to the laboratory, and for many purposes in the arts where it is desirable to produce a comparatively small air-pressure at slight cost.

There are many types of air-compressing apparatus for producing compressed air in limited quantities for immediate use and for storage in receivers; but where independent receivers are employed considerable space is necessary for the proper adjustment and operation of the apparatus, and in cases where no receiver is used, the air being applied directly from the pump to the liquid to be affected, the air-supply cannot be regulated so as to discharge liquid without spurting, because the act of pumping produces unequal quantities of air of varying degrees of pressure.

By storing the air under a pressure greater than that at which it is required for use, the twofold object is attained of economy in its use—because no more than just the quantity desired need be permitted to pass through the discharge-outlet—and its application at a regular and pre-determined degree of pressure.

By my apparatus I aim to overcome the disadvantages herein enumerated, and am enabled, by use of pressure-regulators applied to the outlets for the compressed air, to utilize every pound of pressure to the best advantage, as will be obvious from the description following.

In my Patent No. 301,767, granted July 8, 1884, I show a portable siphon designed for containing and dispensing liquids such as lager-beer, or still liquids which will not discharge from their own pressure. My present invention will be useful in discharging such siphons, and may be substituted for the rubber bulb shown in said patent with the advantages hereinbefore set forth.

Referring to the drawings, the letter A represents a vessel of suitable capacity, made of tin or any other material, and so constructed as to be air-tight, and provided with legs *a*, whereby it may be screwed to a stand or to the floor.

B is a pump-cylinder, which, as shown, extends through the vessel A, projecting at top as well as at bottom. This cylinder is soldered securely where it comes in contact with the vessel A, so as to insure an air-tight connection between the two.

C is the pump-piston, of any approved pattern; D, the piston-rod, and E the operating-handle. In this instance I have shown the piston C provided with holes *c*, extending lengthwise through it, for the passage of air into the vessel A, and also provided with a flexible disk-valve, *c'*, secured at its center to the bottom of the piston, so as to alternately cover and uncover the opening *c* as the piston is depressed or elevated in a manner readily understood. I adopt this form of vavle *c'* because of its simplicity. The top of cylinder B is screw-threaded to receive the cap F, which is placed in position by being passed over the piston-rod, the handle E being first removed for that purpose. This cap is pro-

vided with a series of small holes, *e*, for the admission of atmospheric air into the cylinder B. The bottom of cylinder B is covered by the screw-cap G, and from the latter extends a small nipple, *g*, for receiving one end of the tube H, of any suitable flexible or rigid material. The other end of the tube H is securely attached to one end of the nipple I, which carries at its other end the valve *h*, in this instance a well-known form of rubber valve. The nipple I is screw-threaded exteriorly, and is of a size to fit the interior of the screw-plug opening *k*, as shown. By this construction but very little space is required between the floor and the bottom of the vessel A, and consequently the legs of said vessel may be made quite short.

L represents a pressure-gage for determining the amount of pressure within the vessel A, and M M are pressure-regulators of any satisfactory type, whereby the discharge of compressed air may be regulated according to the necessities for its use.

I show in Fig. 3 of the annexed drawings a form of pressure regulating or reducing device which is adapted for my present purposes. This, however, is only one of many well-known devices of the character in question which I may employ.

In Fig. 3, A′ A² is made in the form of an ordinary globe-valve having smooth or screw inlet and outlet and a socket, *a′*, cast on the upper side to receive the cylinder B′, to which it is made fast by a thread at the point *b′ b′*. C′ is a cupped leather packing, which, expanding with the pressure, prevents leakage into the upper part of the cylinder B′. D′ D′ are brass cup and plate to keep the leather in form. E′ E′ are nuts to hold all on stem. F′ is a spring, which is compressed to the proper point by means of the cap G′ turning on the screw-threads at H′. I′ is a rubber, leather, or metal valve attached to stem K′ and filling the water-way in the diaphragm L′ when raised, as shown in drawings.

The operation of this device is as follows: When screwed into the opening in the top of the vessel A, the compressed air within said vessel finds a passage to the under side of the piston-leather C′ through the opening *d′* for the stem K′. If the outlet communicating with the nipple A′ be closed, the pressure acting on the piston C will raise it up against the force of the spring F′, thereby shutting the passage-way *d′* with the valve I′. Then, when an outlet is opened, by manipulating the siphon, the faucet in the beer-keg, or the like, the pressure on the lower side of the piston is reduced, so that the spring F′ is able to force it down and open the valve I, thereby allowing the air to flow at any pressure that may be determined upon. The cylinder, piston, and spring are proportioned to each other in such a manner as to admit of the nicest adjustment of pressure.

It will be noticed that the construction and arrangement of the various features of my storage-pump are such that a compact and easily-operated apparatus is produced, and that the various operative parts may be removed for repairs or for cleaning without disturbing the air-tight qualities of the vessel A, this being made possible by reason of the pump-cylinder extending entirely through the vessel A, and having its piston easily removed therefrom, and the check-valve and connecting-tube between the pump-cylinder and storage-reservoir exterior to said cylinder and reservoir.

In Fig. 2 I have shown an application of my apparatus to a practical use. The vessel A, equipped as already described, is secured by its legs *a*. At the elevation N is a siphon, O, and a faucet, P, the latter of which connects by a suitable tube, *p*, to the cask Q, located in the cellar. From the top of this cask extends an air-tube, *o*, the other end of which is secured to one of the series of pressure-regulators upon the storage-pump A.

To raise the liquid in cask Q to the faucet on the floor above will require air at the pressure of, say, ten pounds. Exactly this pressure is allowed to pass the regulator M, which is adjusted to permit that to take place. There is, then, a constant and uniform air-pressure exerted upon the liquid, just sufficient, and no more, to discharge the entire contents of the cask.

To discharge the contents of the siphon, which is at a higher elevation than the cask, will require, say, five (5) pounds of air-pressure. The regulator connecting with tube *n*, which extends to the siphon, is adjusted for the requisite degrees of pressure and limits the discharge of compressed air to the requirements of the work to be done. There is no uncertainty of pressure, consequently no spurting or uneven flow, and no waste of stored energy, since the exact amount necessary for the work to be accomplished is what is permitted to be used. Air may be pumped into this reservoir A to any practicable degrees of pressure, and the degree of pressure will be indicated by the gage L.

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

1. A combined air-pump and storage-reservoir comprising an air-tight vessel, a pump, the cylinder of which extends through the vessel and is detachably secured thereto between its top and bottom, and a valved conduit between the two externally connected to said cylinder and vessel, substantially as described.

2. A portable air-tight vessel provided with a pump extending through the vessel and detachably secured between its top and bottom, and having a perforated cap to admit air to the cylinder, and a perforated and valved piston, in combination with a conduit between the two externally connected to the pump-cylin-

der and the vessel, and provided with a suitable check-valve, substantially as described.

3. An air-storage reservoir, A, provided with a pump, the cylinder of which extends entirely through the vessel and is detachably secured between its top and bottom, and having a perforated screw-cap, F, to admit air to the cylinder, and a perforated and valved piston, in combination with a screw-cap, G, tube H, externally connected to the said cylinder and vessel, and provided with a check-valve, *h*, substantially as described.

Signed at New York, in the county of New York and State of New York, this 23d day of July, A. D. 1884.

WILLIAM F. STARK.

Witnesses:
JOS. WEYAND, Jr.,
J. S. SHERBURNE.