2 Sheets—Sheet 1.

# W. D. SEAL.

## AUTOMATIC AIR-COMPRESSOR.

No. 182,333. Patented Sept. 19, 1876.

Fig. 2.

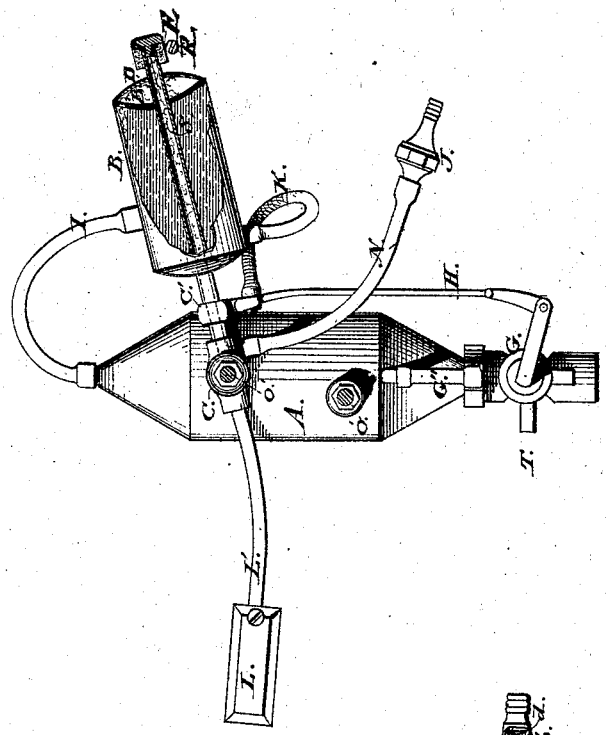



Fig. 3.

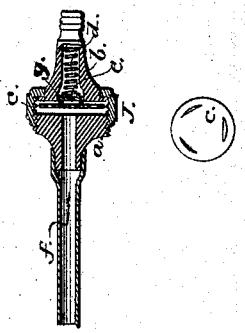
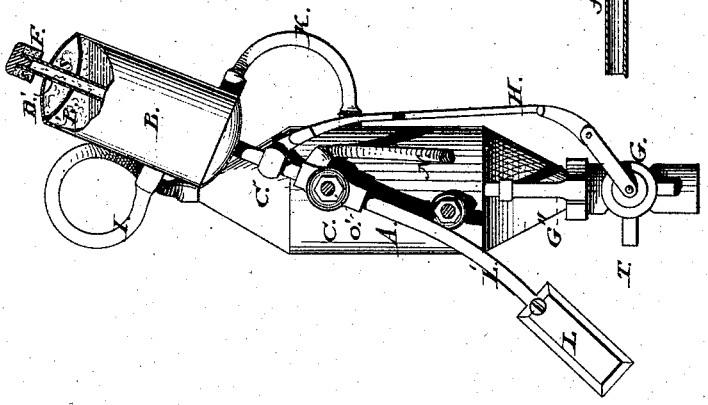



Fig. 1.

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Jos. G. Pettibone

2 Sheets—Sheet 2.

# W. D. SEAL.

## AUTOMATIC AIR-COMPRESSOR.

No. 182,333. Patented Sept. 19, 1876.

Fig. 4.

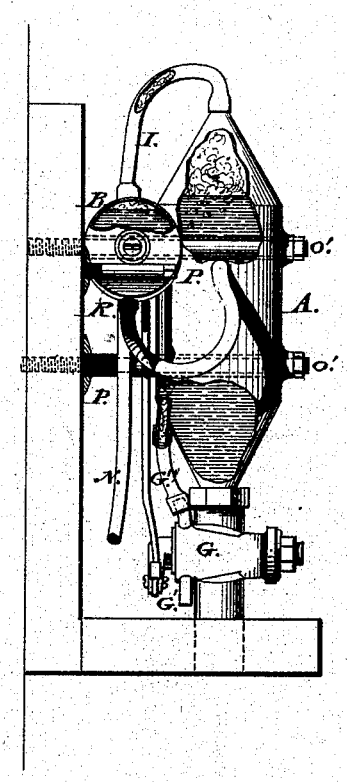



Fig. 5.

Fig. 6.

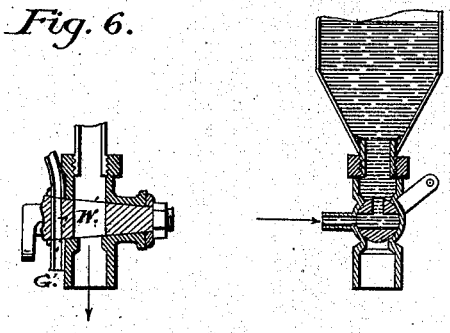
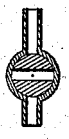



Fig. 7.



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# UNITED STATES PATENT OFFICE.

WILLIAM D. SEAL, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO HIMSELF AND WASHINGTON T. NAILOR, OF SAME PLACE.

## IMPROVEMENT IN AUTOMATIC AIR-COMPRESSORS.

Specification forming part of Letters Patent No. **182,333**, dated September 19, 1876; application filed July 24, 1876.

*To all whom it may concern:*

Be it known that I, WILLIAM D. SEAL, of Washington city, in the District of Columbia, have invented a new and useful apparatus, which I term an "Automatic Air-Compressor," designed for forcing liquids from cellars or vaults by means of hydraulic pressure, the same being an improvement on Letters Patent of the United States granted to me on the 14th day of March, A. D. 1876, and numbered 174,860. The said invention is fully set forth in the following specification, reference being had to the accompanying drawing, in which—

Figure 1 is a side elevation, looking from the support, with chamber B elevated and broken away to show air-space in said chamber. Fig. 2 is a side elevation, looking from the support, with chamber B down or in a nearly horizontal position. Fig. 3 is a sectional view of the exit-pipe N and double-seated valve J. Fig. 4 is a rear elevation, with both chambers broken away, in parts, to show the air and water spaces. Fig. 5 is a section of cock G, showing the influx of water from the fountain-head. Fig. 6 is a section, showing cock G in the act of taking in a fresh supply of air and discharging waste-water. Fig. 7 is a section, showing the cut-off of air-supply.

The object of my invention is to automatically compress air by means of hydraulic pressure; and to carry out the same I have two air-tight chambers of cylindrical form, but of different size, one being about eight times the capacity of the other, the larger one being stationary, the smaller one being movable, and connected together, as will be more fully described hereafter.

The chambers are made of sheet metal—chamber A with cone-shaped heads to insure strength, chamber B with rounding heads. I do not confine myself to the use of metal, but contemplate using glass for chamber B. The largest chamber, A, is firmly secured to a wall or other suitable place by means of bolts O′ O′ running through horizontally-casing pipes P P, which are parts of chamber A, and are slipped over the bolts O′ O′ and firmly secured by nuts. The smaller chamber B vibrates on the top bolt of chamber A by means of pipe S running parallel through said chamber, connected with a journal-box and weighted lever, L′. The upper projection of pipe S is encircled with a rubber collar, F, secured with a flange-screw, for the purpose of breaking the fall or jar, when said chamber strikes rest R.

The lower projection of pipe S is screwed into the upper part of loose journal-box C. In this instance the journal-box has an airway running through the upper portion, and coming out of the side. The weight L and arm of lever L′ are secured into the lower part of the journal-box C. The weight L, being heavier than chamber B, keeps said chamber in a vertical position when empty. Clamp-joint C′ is slipped on pipe S before being screwed into the journal-box C. Rod H is secured to pipe S by means of clamp-joint C′ and screw. This clamp can be raised or lowered to regulate the flow of water. Changing the position of said clamp does not make any change when chamber B is in a horizontal position.

The operation of said chamber is as follows: When the water rises to a point sufficient to start the same, it gradually moves the chamber from the nearly-perpendicular position when at rest, and as it moves downward it increases in momentum and velocity. The advantage is that, in case the water-way T should become obstructed by any hard substance, the increase of velocity by the increased momentum will cut off the same, thereby letting the chamber fall to its proper rest, and prevent water from flowing to the liquids.

Check-valve J, Fig. 3, prevents air from returning to the apparatus. This valve is made in halves, *a* and *b*, and connected together with swivel-nut. A circular piece of sheet-rubber, *c*, with elongated holes near the outside edge, is inserted between the halves. A cupped washer, *g*, with raised rim, is placed against the sheet-rubber *c*. This cupped washer has a hole, *e*, through the center, to admit the compressed air evenly over the surface of the sheet-rubber *c*. A spiral spring, *d*, is then inserted in the cup of the washer, which insures a constant and even pressure against the rubber. Air is forced through air-

way *f*, between face *a* and sheet-rubber *c*, out through elongated holes, and thence on, as will be more fully described hereafter.

When the apparatus is emptying water and taking in a fresh supply of air, the spiral spring keeps the rubber in place, and the compressed air sends the rubber hard against the face of *a*, thus preventing the escape of air back to the apparatus. This check-valve is double-seated, both at the elongated holes and over the airway *f*. The cupped washer *g* is perforated in the center, for the purpose of allowing the compressed air to force the center of the sheet-rubber in. Cock G is constructed with the air-vent G′ running parallel with the waste-water way W. The other parts of the cock are made similar to the ordinary stop and waste cock; but I use, for the supply of water, the way designated at T, the arrangement being such that air is admitted through the cock while the water is running out of the cylinder, and the air-port is closed while water is being admitted.

I will now proceed to describe the operation, which is as follows: I cause a stream of water to flow into chamber A, through cock G, from any suitable reservoir. The water, rising, compresses the air in both chambers A and B to the same degree of pressure as at the fountain-head; then water ceases to flow. As the air is exhausted at check-valve J the water continues to rise in chamber A, thence, through flexible tubes I and K, to chamber B. When the water arrives at or near the top of chamber B, the accumulated weight of water overcomes the gravity of weight L, thereby causing chamber B to drop or fall to rest R; at the same time carries cock-rod H down, and opens water-way W and airway G′ in cock G; also shuts off water-supply T. This action allows the water from both chambers to run off to the sewer, or other convenient place. As water is running out of water-way W a vacuum is produced in the top of chamber A, thereby causing air to be drawn in through air-pipe G″, which bubbles up through the water, thereby rendering the air free of all impurities, cool, and of sufficient moisture to keep beer or ale barrels tight. Air is supplied to chamber B through flexible tube I. Water empties from said chamber B, through flexible tube K, into chamber A; thence on, as before described. When the water has run out of chambers A and B, the gravity of weight L causes chamber B to resume a vertical position, as shown in Fig. 1, chamber A emptying first by reason of the waste-water way W in cock G being four times as large as the water-way through the flexible tube K. The compressed air is forced through hole B′ in counter-shell of top head of chamber B, (this hole is at the extreme top of the shell when the chamber is in a horizontal position, as shown in Fig 2, and prevents water from getting between the counter-shell and top head of chamber; therefore, it brings it on the left-hand side when in a vertical position, as shown in Fig. 1;) thence on through hole D in pipe S, (this pipe passes through the center, and parallel with the sides of chamber B to journal-box C;) thence downward through pipe S to the upper part of journal-box; thence through said box and flexible tube N, to and through check-valve J, to the surface of liquids.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the air-compressing stationary chamber A, connected with the movable chamber B by means of tubes I and K, pipe S, journal-box C, airway in journal-box, and bolt O′, combined and arranged substantially as set forth.

2. The combination of the stationary air-compressing chamber A, bolts O′ O′, and casing-pipes P P, securing the parts as and for the purpose specified.

3. In combination with the air-compressing chambers A and B the pipe S, journal-box C, airway, and clamp-joint C′, in connection with the rod H, arranged and operating substantially as set forth.

4. In combination with the air-compressing chambers A and B, the cock G, with an air-vent, G′, waste-water way W, and inlet-water way T, and rod H, all arranged and operating as described and set forth.

5. In combination with cock G, having air-vent G′ running parallel with waste-water way W, the air-pipe G″, connecting the cock with the lower part of chamber A, as and for the purpose set forth and described.

6. In combination with the air-compressing chambers A and B, the tubes I and K, journal-box C, airway in journal-box, exit-pipe N, and double-seated valve J, all arranged and operating substantially as described and set forth.

7. In connection with the air-compressing chamber B, the rubber collar F on projection of pipe S, arranged to operate as described.

In testimony whereof I have hereunto subscribed my name.

WM. D. SEAL.

Witnesses:

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H. SISSON.