2 Sheets—Sheet 1.

W. THOMAS.

Air-Compressor.

No. 217,834. Patented July 22, 1879.

Fig. 1.

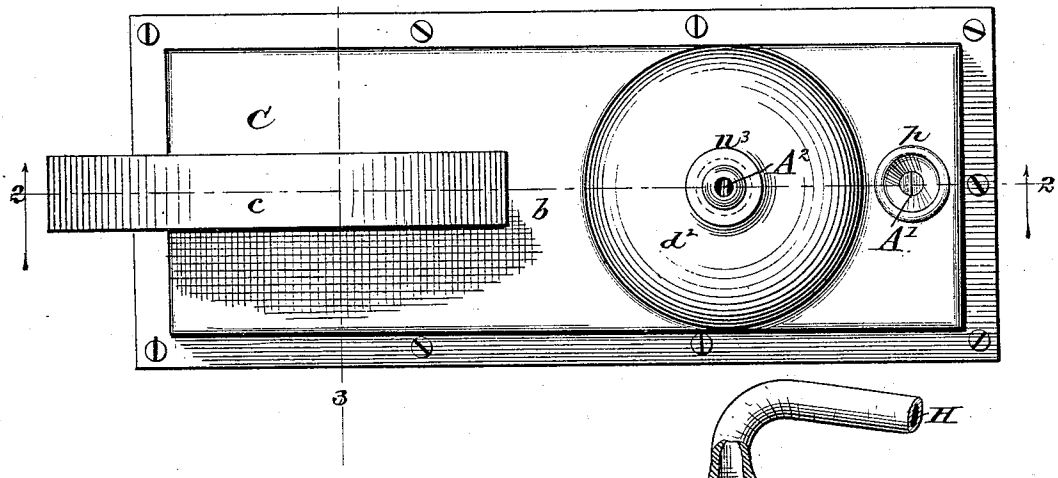
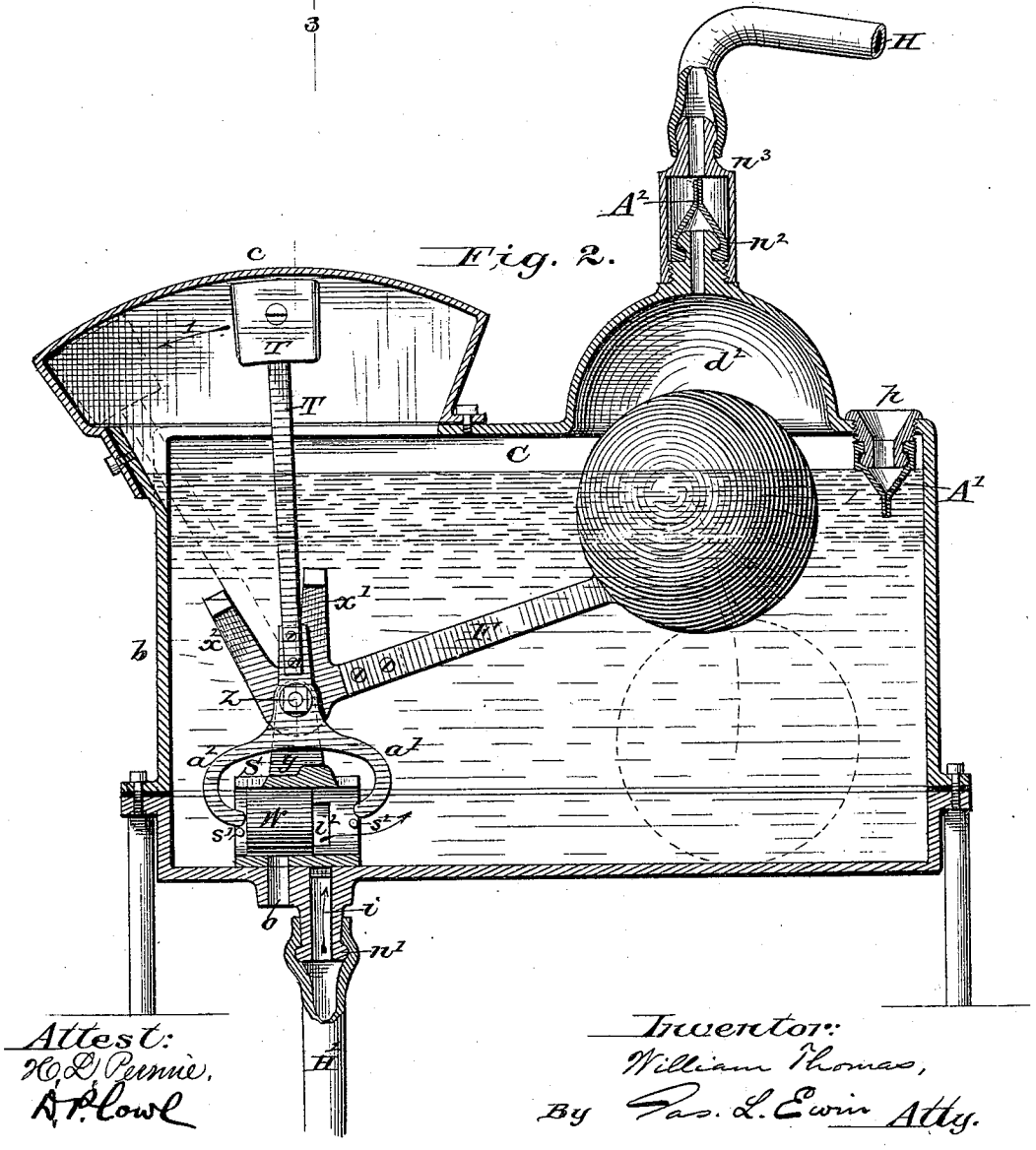


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 3.

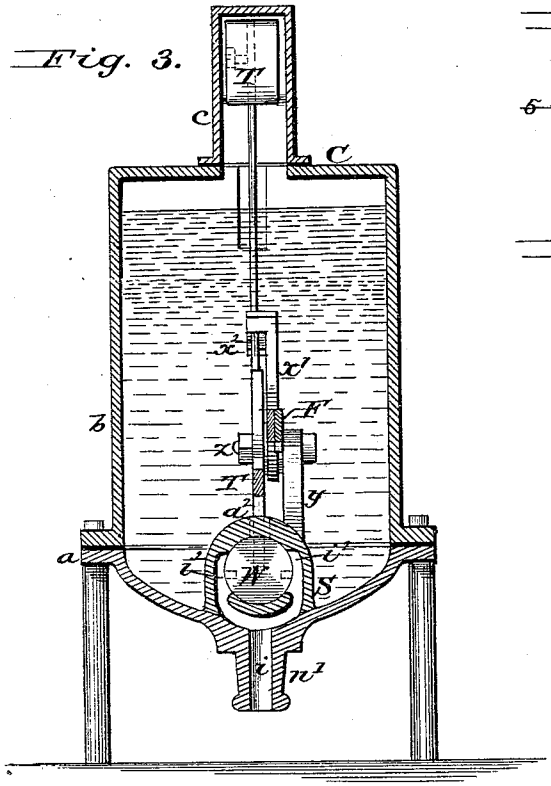


Fig. 4.

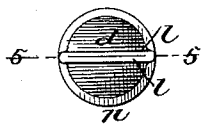


Fig. 5.

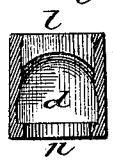


Fig. 7.

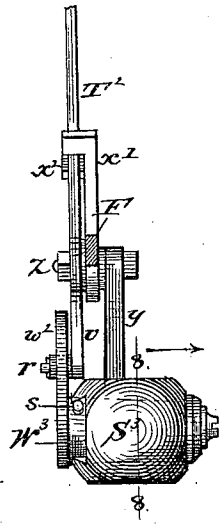


Fig. 8.

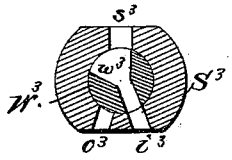


Fig. 6.

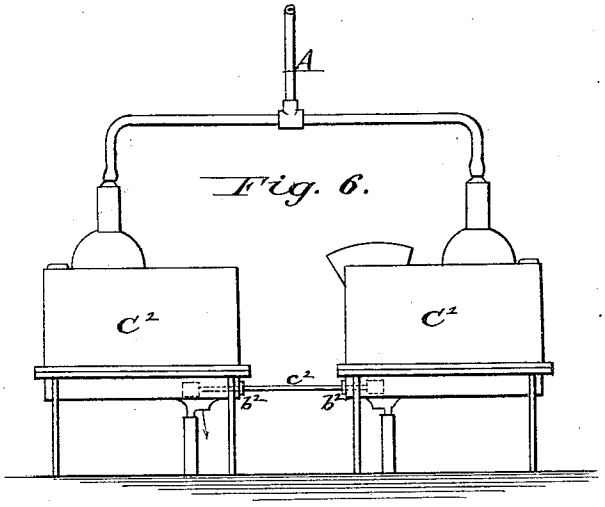
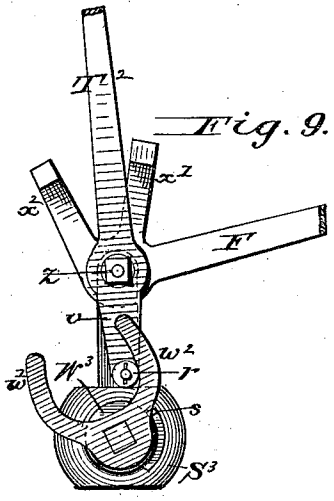


Fig. 9.



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UNITED STATES PATENT OFFICE.

WILLIAM THOMAS, OF JERSEY CITY, NEW JERSEY.

IMPROVEMENT IN AIR-COMPRESSORS.

Specification forming part of Letters Patent No. **217,834**, dated July 22, 1879; application filed June 6, 1879.

To all whom it may concern:

Be it known that I, WILLIAM THOMAS, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Air-Compressors; and I do hereby declare the following to be a full, clear, and exact description of the said invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to hydraulic air-compressors; and consists in the combination of an oscillating float and a lost-motion oscillating weight, for actuating the water valve or valves automatically and instantaneously at the proper moments in a peculiar manner, as hereinafter set forth, said mechanism being also applicable to similar valves in other apparatus.

Figure 1 of the accompanying drawings is a plan view of a small hydraulic air-compressor, illustrating this invention. Fig. 2 is a vertical longitudinal section of the same on the line 2 2, Fig. 1. Fig. 3 is a vertical transverse section on the line 3 3, Fig. 1. Fig. 4 is an end view, and Fig. 5 a longitudinal section, of one of the valves on a larger scale. Fig. 6 is a side view of two adjoining compressors on a small scale, illustrating a modification. Fig. 7 is an elevation, Fig. 8 a vertical section, and Fig. 9 a face view, of another valve and valve mechanism, illustrating an additional modification.

Like letters of reference indicate corresponding parts in the several figures.

This improved air-compressor is designed for use in relatively small sizes for compressing air by means of water from the ordinary service-pipes of cities. It consists of an air-tight and water-tight vessel, C, termed the "reservoir," provided with automatic air-valves A^1 A^2 and a water-valve, W, with an oscillating float, F, and a lost-motion oscillating weight, T, for actuating said water-valve automatically.

The reservoir C is preferably composed of a flanged base, *a*, a flanged body, *b*, and a removable weight-cover, *c*, united by screws, as shown; but the shape of the respective parts is considered wholly unessential.

The removable weight-cover gives convenient access to the head of the weight, for adjusting the same and working it back and forth by hand to loosen the water-valve should the latter fail to act properly.

The air-valves A^1 A^2 are, by preference, of the construction clearly represented by Figs. 4 and 5, in connection with Figs. 1 and 2. These valves are of vulcanized rubber, and each has an inwardly-flanged neck, *n*, a dome, *d*, which prevents introversion in the outlet-valve, and thin lips *l l*. They are formed in molds, except the passages between the lips *l*, which are cut by means of a sharp knife, as illustrated by Fig. 5, so as to close perfectly air-tight under pressure against the outer surfaces of the lips.

The inlet-valve A^1 is attached to a hollow screw-plug, *p*, and may be removable from the air-chamber therewith. The outlet-valve A^2 is applied to a nipple, n^2, at the top of an air-dome, d^2, which also accommodates the ball of the float in its highest position, and said valve is inclosed within a commodious chamber in a removable nozzle, n^3, from which the compressed air is conducted by a hose, H.

The valve W is a solid cylindrical slide working in a horizontally-bored shell, S, which, in the illustration, is soldered within the trough of the base *a* over inlet and outlet ports *i o*, with which the base-casting is provided. The inlet-port *i* extends through a nipple, n^1, to which a hose, H′, is applied to conduct water under pressure thereto, and passages i^2 lead from said inlet-port into the interior of the shell S, so as to afford a free entrance for the water and to equalize the pressure on the valve. The outlet-port *o* is extended laterally, so as to give it ample capacity.

Stop-pins s^1 s^2 limit the stroke of the valve W. When the latter rests against the pin s^1 the inlet-ports i^2 are fully opened, as shown in Fig. 2, and it is held in this position for an instant at the start by one arm, a^1, of the oscillating weight T.

A horizontal pivot-bolt, *z*, supported by an upright, *y*, on the valve-shell S, forms the axis of the weight T, and also of the float F,

and a pair of laterally-bent arms, x^1 x^2, projecting upward from the hub of the latter, engage successively with the stem of the weight during each rise and fall of the float. As the float F rises with the inflowing water from the position indicated by dotted lines in Fig. 2 to the position in which it is shown in full lines in said figure, it operates, by means of its arm x^1, to carry the weight T from its extreme right-hand position to the position in which it is shown in full lines in Fig. 2. The weight is now just past its center of gravity, and the second arm, a^2, of its hub is in contact with the outlet end of the valve W. From this position the head of the weight falls, as indicated by arrow 1 in Fig. 2, to its left-hand position, (indicated by dotted lines in said figure,) sliding the valve W by means of said arm a^2 against the stop-pin s^2, so as to instantaneously reverse the flow of water.

As the water escapes the ball of the float F falls, and its arm x^2 lifts the weight T to vertical position, and carries it beyond the center of gravity on the inlet side, whence it drops to its right-hand position, closing the outlet o and opening the inlet-passages i^2, and thus the operation proceeds, the air entering behind the receding water through the valve A^1, and escaping in a compressed condition through the valve A^2 and hose H, until the supply of water is cut off or the unused air reaches a density sufficient to counterbalance the water-pressure.

It will be observed that the entire stroke of the float is utilized in gradually lifting the weight from the respective low extremities of its movement, and that the water-valve remains perfectly stationary and the respective ports fully opened until said float reaches the respective extremities of its stroke, when said valve is thrown by means of the falling weight, so as to reverse the flow of the water instantaneously at the proper moment.

Permanent air and water pipes will ordinarily take the place of the hose H H′, and a waste-water pipe may be added.

I also propose securing a continuous flow of air when desired, as illustrated by Fig. 6. In this figure, C^1 represents the compressor above described; C^2, a second compressor, like the first, except that it has no valve mechanism; b^2 b^2, stuffing-boxes inserted in the contiguous ends of the bases of the two compressors in line with the water-valves, (shown in dotted line;) and c^2, a connecting-rod coupled to the respective valves, said valves being so arranged that when one opens its inlet the other opens its outlet, and vice versa. In the illustration water is flowing into C^1 and escaping from C^2. A pipe, A, or the storing-reservoir, receives the discharges of both compressors and combines their force.

As an inferior modification I have shown, in Figs. 7, 8, and 9, an oscillating valve actuated by a lost-motion oscillating weight, in combination with an oscillating float, according to my invention. The plug W^3 of this valve is provided with curved arms w^1 w^2, and the hub of the weight T^2 with a single arm, v, carrying a horizontal friction-roller, r, to engage with said arms w^1 w^2, the same float F being employed, with arms x^1 x^2, to engage with the stem of the weight. A single stop-pin, s, works in a notch in the shell S^3, in the customary way. The operation is substantially the same as that already described, the motion of the valve-plug being simply oscillatory instead of reciprocatory, and water-ports s^3 w^3 operating in connection with the inlet-port i^3 and the outlet-port o^3 alternately, as in three-way cocks.

My valve mechanism may be applied to other forms of reciprocating and oscillating valves in substantially the same way.

In view of the above I do not limit myself to the use of any particular form of lost-motion oscillating weight, nor to any particular valve; and shoulders, lugs, or the like, of any description, are considered mechanical equivalents of the arms x^1 x^2.

The following is what I claim as new and of my own invention, and desire to secure by Letters Patent, namely:

The oscillating float F, with its arms x^1 x^2, or their equivalents, in combination with a lost-motion oscillating weight, carried to and beyond its center of gravity by the movements of said float, and a valve reversed instantaneously by the falling of said weight at the proper moments, substantially as herein specified.

WILLIAM THOMAS.

Witnesses:
JOHN P. GRUBER,
JOHN P. VOLLHARD.