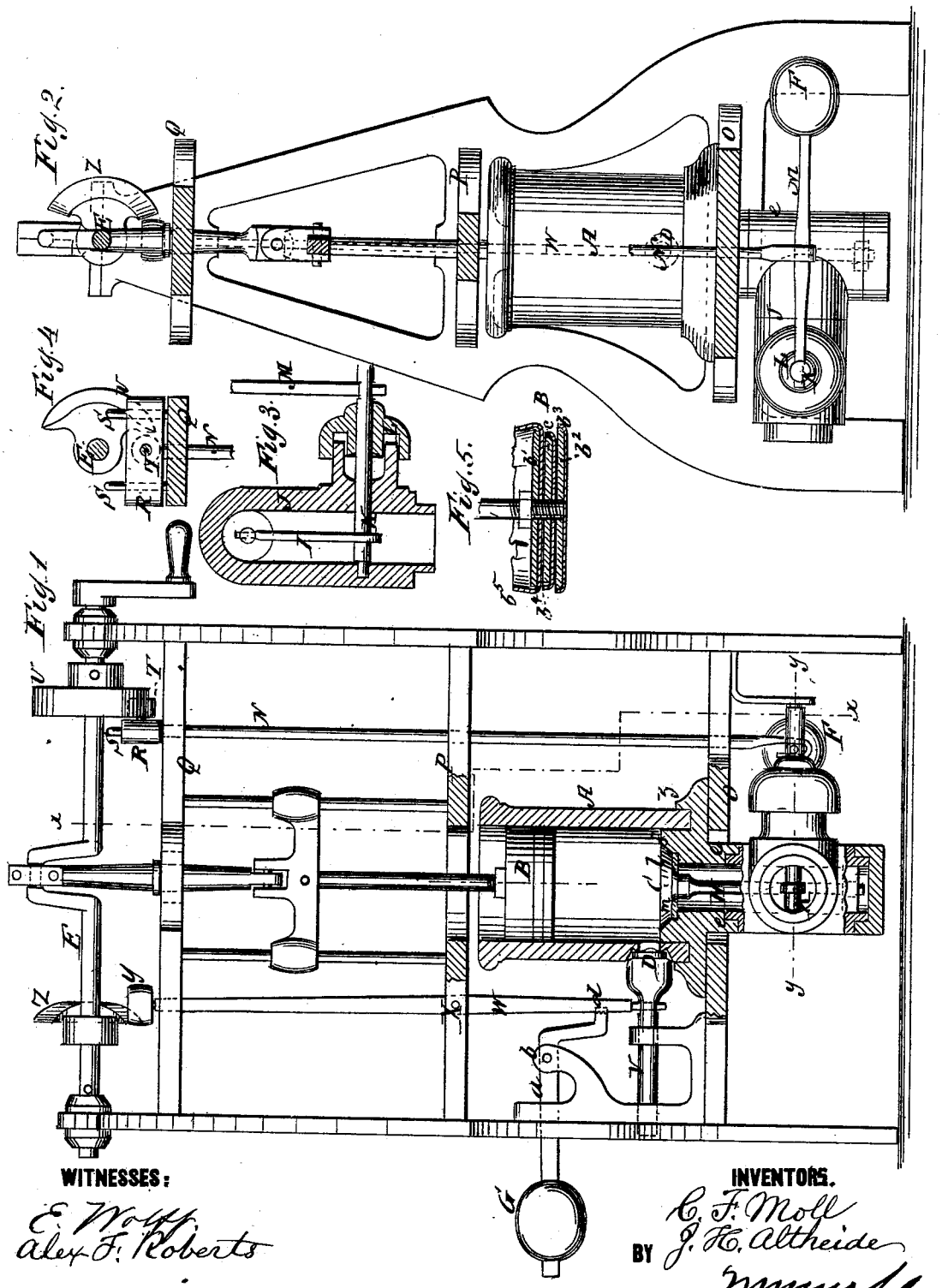
C. F. MOLL & J. H. ALTHEIDE.

AIR-PUMP.

No. 190,610. Patented May 8, 1877.



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UNITED STATES PATENT OFFICE.

CHARLES F. MOLL AND JOSEPH H. ALTHEIDE, OF QUINCY, ILLINOIS.

IMPROVEMENT IN AIR-PUMPS.

Specification forming part of Letters Patent No. 190,616, dated May 8, 1877; application filed July 15, 1876.

To all whom it may concern:

Be it known that we, CHARLES F. MOLL and JOSEPH H. ALTHEIDE, of Quincy, in the county of Adams and State of Illinois, have invented a new and useful Improvement in Air-Pumps, of which the following is a specification:

This invention relates to improvements in air-pumps in which the induction and eduction ports and valves are so controlled and operated by mechanical means, hereinafter described, as to insure the production of a practically perfect vacuum in the receiver, and to allow of the use of valves of any desired weight, without regard to the ability of the air to open and close them.

Figure 1 is partly a side elevation and partly a sectional elevation of our improved pump. Fig. 2 is a section taken on line *x x* of Fig. 1. Fig. 3 is a horizontal section taken on the line *y y*, Fig. 1. Fig. 4 is a detail view of the cam and connections for operating the induction-valve. Fig. 5 is a detail section of the piston.

Similar letters of reference indicate corresponding parts.

A is the pump-cylinder; B, the piston; C, the induction-valve, and D the eduction-valve. The piston is connected to the crank-shaft E, for being operated, and the valves are opened by the same shaft, and closed by weights F G. The stem H of valve C connects with the arm I in the suction-pipe J, and is fitted on the rock-shaft K, extending out through the stuffing-box L, and having the weighted lever M attached to it. From the lever a lifting-rod, N, extends up through the cross-bars O P Q of the frame to a point below the crank-shaft E, and it has a cross-head, R, having guide-rods S working in the cross-bar Q, and carrying a friction-roller, T, which is lifted by the cam U to open the valve C.

The valve D is formed on the horizontally-sliding rod V, with which the lever W engages for opening and closing the valve, the said lever being pivoted to the frame at X, and having a friction-roller, Y, at the upper end, which is acted on by the cam Z to open the valve D. The weighted lever *a*, pivoted to the frame at *b*, and bearing against lever W at *d*, closes said valve.

The shell *e* of the chamber of the induction-valve C extends up into the cylinder A at *f*, above the outside rim *g*, to permit the eduction-valve to be arranged down to the bottom of the space in the cylinder without having to cut away and weaken the rim *g*, as illustrated in Fig. 1.

The stuffing-box L is attached to the side of the suction-pipe J entering the induction-valve chamber, so that it forms the bearing for the horizontal shaft K, and at the same time avoids interference with, or obstruction to, the connection of the suction-pipe with the receiver.

The valves consist of a conical portion, *l*, with a cylindrical face, *m*, of elastic material, with correspondingly-shaped seats, the conical form being to guide the valves in closing, and the elastic material being to compress, and thus close perfectly.

The washer *c* of the piston B is made of a little less diameter than the washers b^1 b^2, placed above and below it. The lower washer, b^2, is padded with a flexible material, b^3, the edge of which is turned up against the edge of the washer.

b^4 is a flexible material clamped between the washer *c* and the washer b^2, the edge of which extends up around the edge of the washer *c*, and forms chambers around said edge. b^5 is a flexible material, clamped between the washer *c* and the upper washer b^1, the edge of which projects above said washer b^1 and forms a cup, as shown in Fig. 5.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The part *f* of the chamber *e*, extended up into the pump-cylinder A above the rim *g*, in combination with eduction-valve D, substantially as specified.

2. The stuffing-box L, arranged on the side of the pipe J, in combination with rock-shaft K, arm I, and valve-stem H, substantially as specified.

3. The valves made of a conical portion, *l*, and cylindrical face *m*, in combination with corresponding-shaped seats, substantially as specified.

4. The piston B, formed of the washer *c*, provided with the flexible material b^4, forming

chambers around its edge, the padded washer b^2 b^3, and the upper washer b^1, provided with the flexible material b^5, forming a cup, the said washers being of a diameter a little greater than that of the washer c, substantially as herein shown and described.

5. The valve-stem H, inclosed arm I, rock-shaft K, exterior weighted lever M, and lifting-rod N, combined and arranged substantially as specified.

6. The lifting-rod N, cross-head R, guide-rods S, roller T, and cam U, combined with weighted lever M, rock-shaft K, arm I, and valve-stem H, substantially as specified.

7. The cam Z on the driving-shaft, roller Y, lever W, weighted lever a, and valve-stem V, combined and arranged substantially as specified.

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Witnesses:
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