

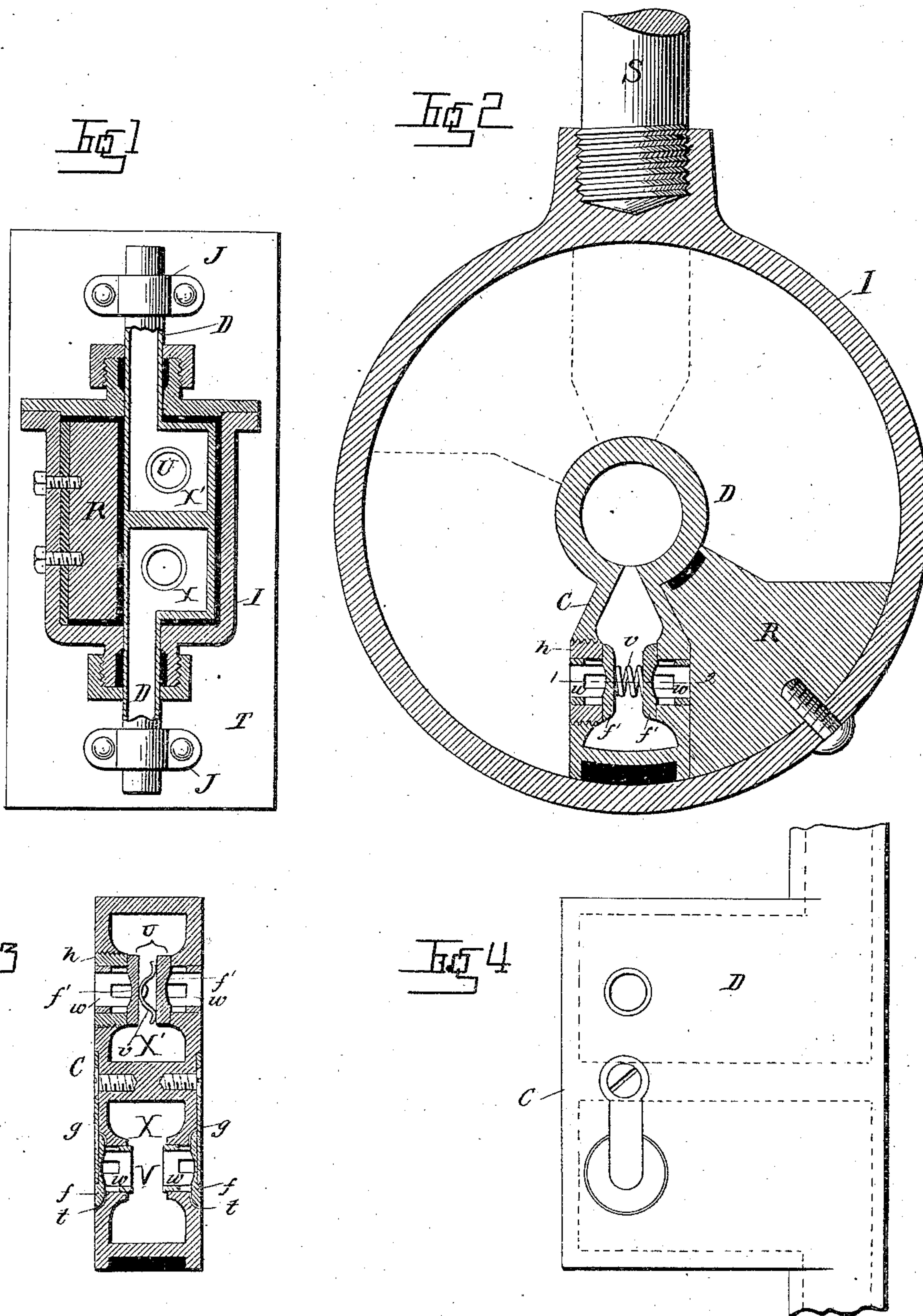
(No Model.)

F. D. MALTBY.

AIR PUMP.

No. 313,603.

Patented Mar. 10, 1885.



Witnesses:

John Hinkel
H. C. F. Farnham.

Inventor:

Frank W. Maltby
By Foster & Freeman
Attorneys.

UNITED STATES PATENT OFFICE.

FRANK D. MALTBY, OF NEW YORK, N. Y.

AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 313,603, dated March 10, 1885.

Application filed March 7, 1884. (No model.)

To all whom it may concern:

Be it known that I, FRANK D. MALTBY, a citizen of the United States, and a resident of the city, county, and State of New York, have
5 invented certain Improvements in Air-Pumps, of which the following is a specification.

My invention is an air-pump constructed, as fully described hereinafter, so as to permit the ready application of great operating force
10 and effectually expel at each stroke all the air in contact with the piston.

In the drawings, Figure 1 is a sectional elevation of my improved air-pump. Fig. 2 is a transverse section. Fig. 3 is a vertical section
15 on the line 1 2, Fig. 2. Fig. 4 is an elevation of the stem and abutment.

The pump consists of a hollow stem or standard, D, a chambered and valved abutment, C, extending radially therefrom, a cylinder or
20 case, I, inclosing the abutment, and a radial piston, R, secured within the cylinder. Either the cylinder or the stem and its attachments is stationary and the other part movable. In the drawings the stem and its abutment constitute the stationary part of the pump, being
25 supported by brackets J, adapted to be secured to a vertical or horizontal support, T. When the cylinder is stationary, it is also bolted to the support. The abutment C contains two
30 separate chambers, X X', the former communicating with the inlet end of the tubular stem D, and the latter with the discharge end of said stem, and there are openings at the side of the abutment leading from each chamber.

35 To the discharge-openings are fitted suitable valves opening inward, and to the inlet-openings are fitted other valves opening outward. The valves may be of any suitable construction. As shown, the valves U consist each of
40 an inner head or disk, *f'*, and a hollow slotted cylindrical stem, *w*, fitting nicely the opening in the sides of the abutment. Into one opening screws a detachable bushing, *h*, which is removed to permit the insertion of the valves,
45 and a spring, *v*, between the valves forces each outward. The valves V are similar to the valves U; but the disks are outward and lie within somewhat larger recesses *t* in the faces of the abutment, and springs *g* press them in-
50 ward. The ends of the stems *w* of the valves U are flush with the outer faces of the abutment,

as are the outer faces of the disks or heads *f* of the valves V, and the springs *g* lie and fit nicely in recesses in the sides of the abutment, so that when the valves are closed there will
55 be no unoccupied recesses in the sides of the abutment, except the annular recesses round the heads of the valves V. The abutment and the piston R are so formed that either side of the piston, when brought against the corre-
60 sponding side of the abutment, will be in contact therewith at all points, so that there is practically no space for air, which, being therein confined under great pressure, would
65 expand on the separation of the piston and abutment and exert a pressure preventing the opening of the valves and reducing the efficiency of the pump. The piston R has at the inner edge and at each end a channel receiving
70 a suitable packing, as has also the abutment C, as shown, and the cylinder I is provided with a radial handle, S, whereby the cylindrical part of the pump may be rocked upon the stationary part to carry the piston first to one
75 side of the abutment and then to the other. As the piston moves toward the abutment the air is forced from between them through the
80 valves U into the chamber X', and when the piston leaves the abutment the valves V lift and the air passes from the chamber X to the space between the piston and abutment, the operations on the other side being reversed.

By the construction described great pressure may be readily applied to exhaust and expel the air. There is no means afforded for
85 any air to remain in the chamber in which it is compressed. The valves will therefore work easily and effectually, and the packings secure tight joints without undue friction.

To secure a more uniform action, there may
90 be two pistons and two abutments, as shown in dotted lines, Fig. 2, whereby the air is taken into and forced from two chambers at once.

Without limiting myself to the precise construction and arrangement of parts shown, as
95 they may be varied without departing from the main features of my invention, I claim—

1. An air-pump consisting of a hollow stem carrying a radial chambered abutment provided with outlet and inlet valves, a casing
100 inclosing said abutment and provided with a radial piston, the sides of the latter and of the

abutment conforming to each other, so as to expel all the air from the casing, substantially as set forth.

2. The combination of the casing carrying a
5 radial piston and the stem carrying a radial
chambered abutment having side openings,
and valves and springs fitted to recesses in the
faces of the abutment, so as to present flat un-
interrupted sides, substantially as set forth.
10 3. The combination, with the chambered
abutment, of valves having tubular slotted

stems with heads or disks at their inner ends
and provided with detachable bushings, where-
by the valves may be removed, substantially
as described.

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

FRANK D. MALTBY.

Witnesses:

DANIEL E. DELAVAN,
D. B. WILMOT.