(No Model.)

W. C. MACKINNEY.

VACUUM VALVE.

No. 284,452. Patented Sept. 4, 1883

FIG. 1.

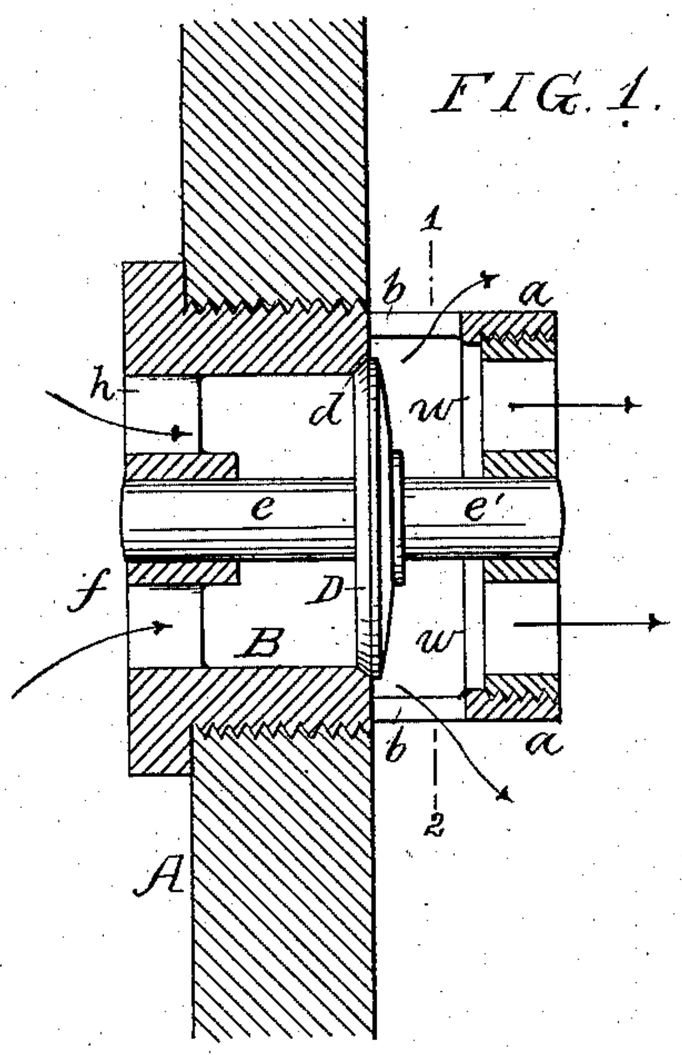


FIG. 2.

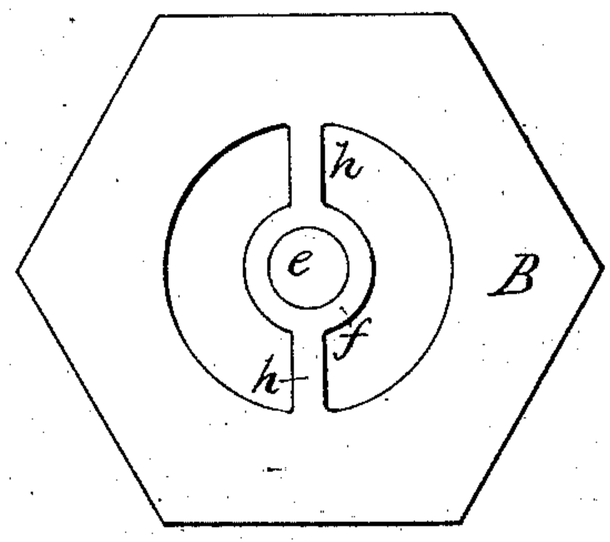


FIG. 4.

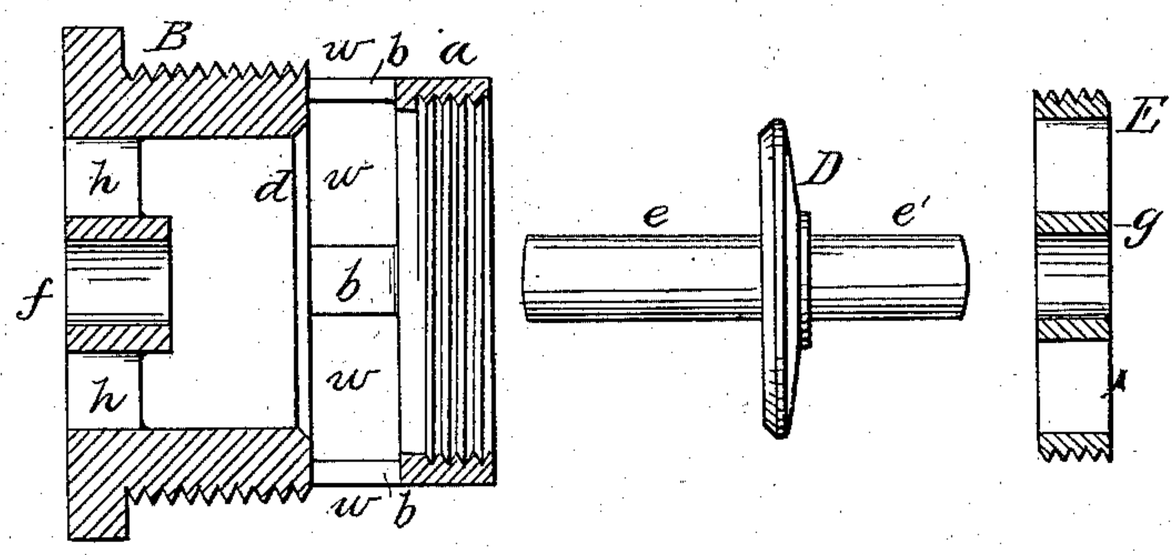
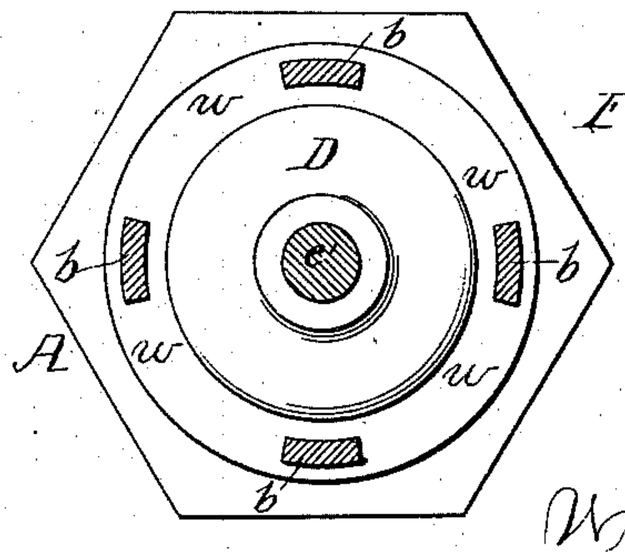


FIG. 3.



Witnesses
James F. Fobin
Harry Drury

Inventor.
William C. Mackinney
by his Attorneys
Howson and Sons

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM C. MACKINNEY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JAMES BUTTERWORTH, CHARLES C. BUTTERWORTH, AND WILLIAM B. BUTTERWORTH, ALL OF SAME PLACE.

VACUUM-VALVE.

SPECIFICATION forming part of Letters Patent No. 284,452, dated September 4, 1883.

Application filed April 2, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. MACKINNEY, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Vacuum-Valves, of which the following is a specification.

My invention consists of certain improvements, fully described hereinafter, in vacuum-valves for drying-cylinders; and the object of my improvements is to so construct the casing of the valve and to so combine it with the latter that the direct and instantaneous admission of air into the drying-cylinder will be assured whenever a partial vacuum occurs therein, all danger of the collapsing of the cylinder being thus obviated.

In the accompanying drawings, Figure 1 is a sectional view of my improved vacuum-valve; Fig. 2, a view of one end of the valve-casing; Fig. 3, a section on the line 1 2, Fig. 1; and Fig. 4, views of the several parts detached from each other.

My invention is intended, mainly, for hollow steam-heated cylinders for drying fabrics, paper, &c., A in Fig. 1 representing part of one of the ends or heads of such cylinder.

The casing of the valve consists of the externally-threaded and flanged ring B and the smaller ring, *a*, which is connected to the main ring by legs *b*—four in the present instance—as shown in Fig. 3, so that there are openings *w* between the legs. A seat, *d*, is formed on the inner end of the main ring B of the casing, for the valve D, which has two stems, *e* and *e'*, the former being adapted to a guide, *f*, connected to the ring B by webs *h*, and the spindle *e'* being adapted to a guide, *g*, connected by webs to and forming a part of an externally-threaded ring, E, which is screwed into the ring *a* of the casing, the latter ring being of such a diameter internally as to permit the withdrawal of the valve from and its introduction into the casing when the ring E has been detached therefrom.

When a machine of which a drying-cylinder forms a part is in operation, steam at a comparatively low pressure is maintained within the cylinder; but occasionally the latter becomes cooled—by wet fabrics, for instance—and this causes a condensation of steam, and consequently a partial vacuum, and if this is not at once neutralized by the admission of air the collapsing of the cylinder will take place. A vacuum-valve for this purpose should be instantaneous in its action and simultaneous with the formation of the partial vacuum; otherwise the collapsing of the cylinder may not be avoided. A vacuum-valve with tortuous passages might retard the admission of air for an instant, but long enough to permit the collapsing of the cylinder—a result which my improved valve has been designed to obviate.

The threaded ring B of the valve-casing is screwed into or otherwise secured to the head A of the drying-cylinder, the valve remaining closed by the pressure of steam in the said cylinder; but should a partial vacuum be created therein, owing to the above-mentioned causes, there will be an instant opening of the valve by the pressure of the atmosphere on its exterior surface, and an instant rush of air into the cylinder to neutralize the partial vacuum before any collapsing of the cylinder can take place. In the first place it will be noted that the valve is so guided that it will be operated by the slightest effort either of steam at a comparatively low pressure to maintain it in contact with its seat, or of the external air to move the valve from the seat when a partial vacuum occurs within the cylinder, and the moment the valve leaves its seat under these circumstances there will be an instantaneous and direct introduction of a large and diffused volume of air into the cylinder to neutralize the partial vacuum, for it will be seen that the ring B of the valve-casing terminates at the inner face of the cylinder-head, and that the seat of the valve is at the inner end of this ring and close to the openings *w* between the legs *b* of the casing; hence the movement of the valve induced by a partial vacuum in the cylinder will permit the air to pass directly into the same through the said openings *w* in the direction pointed out by the inclined arrows, as well as through the openings

of the ring E. When steam is introduced into the cylinder, it will close the valve; but there will be sufficient hesitation in this movement of the valve to cause the steam to expel the air from the cylinder before the valve is actually closed.

I claim as my invention—

1. The combination of the valve D and its two stems *e e'* with a casing open at its outer end, and affording a seat for the valve and guides for its two stems, and having openings *w* close to the said seat, all substantially as set forth.

2. The combination of the casing, consisting of the cylinder B, open at its outer end, its guide *f*, legs *b*, ring *a*, and detachable ring E, having a guide, *g*, with the valve and its two stems, substantially as specified.

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

WILLIAM C. MACKINNEY.

Witnesses:
HARRY L. ASHENFELTER,
HENRY HOWSON, Jr.