(No Model.) 2 Sheets—Sheet 1.

F. PHILLIPS.

ESCAPE VALVE FOR DASH POTS.

No. 420,887. Patented Feb. 4, 1890.

Fig. 1.

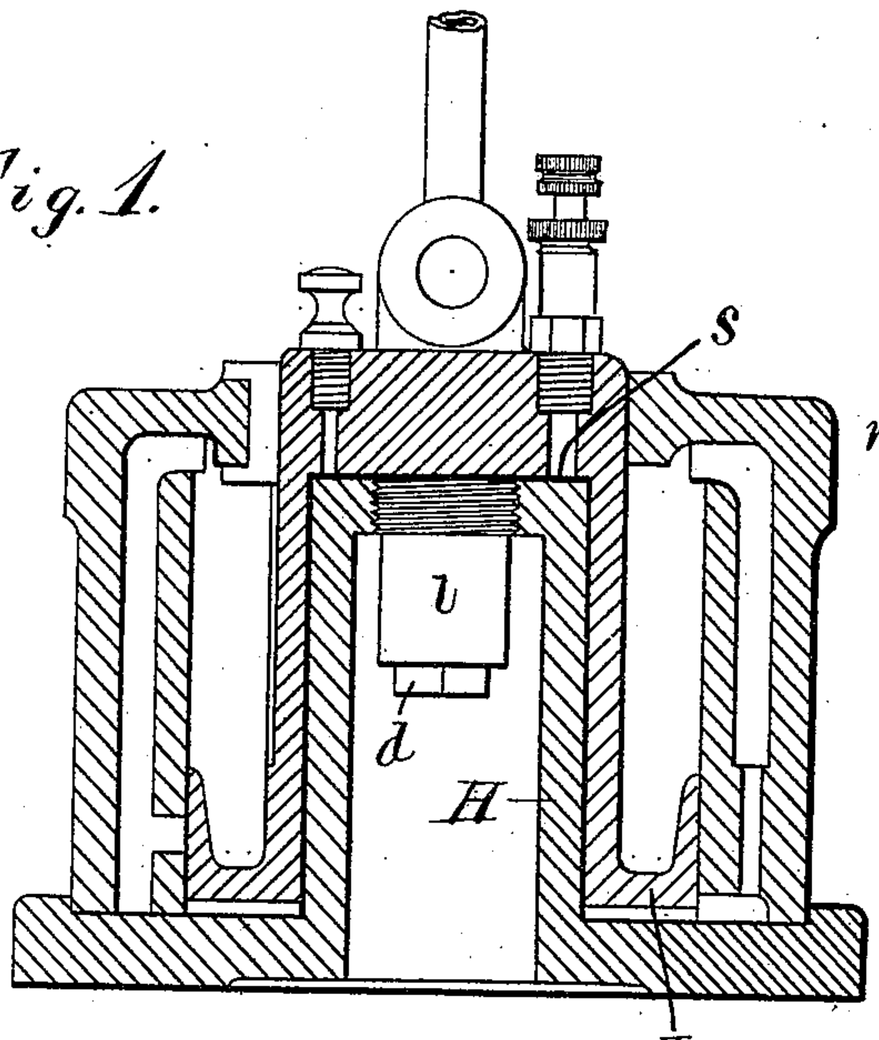


Fig. 2.

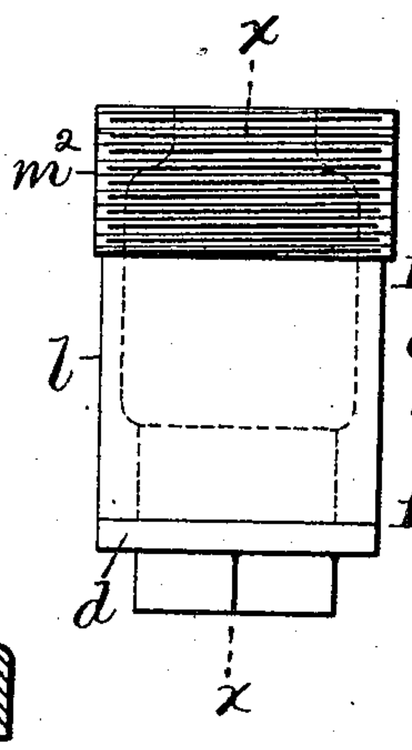
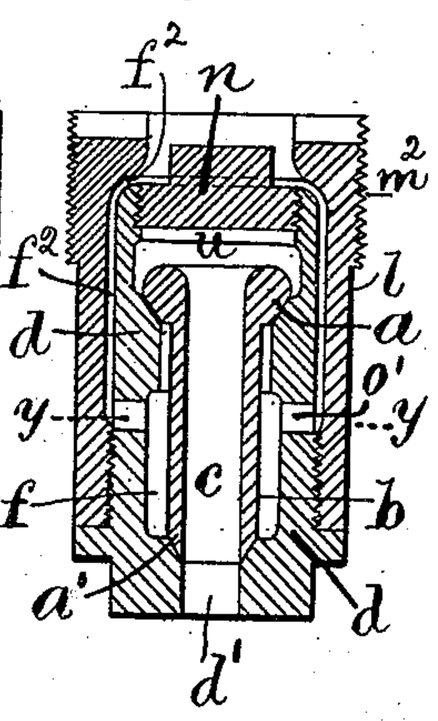


Fig. 3.



I

Fig. 6.

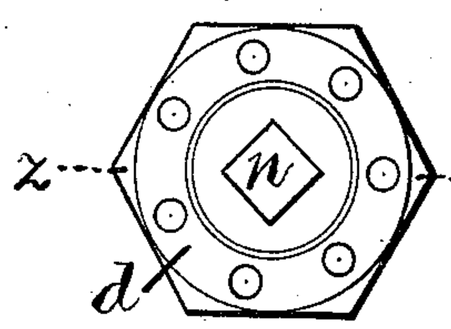


Fig. 4.

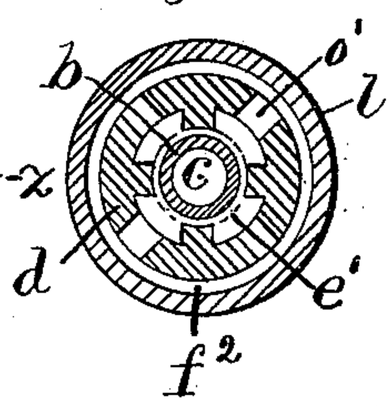
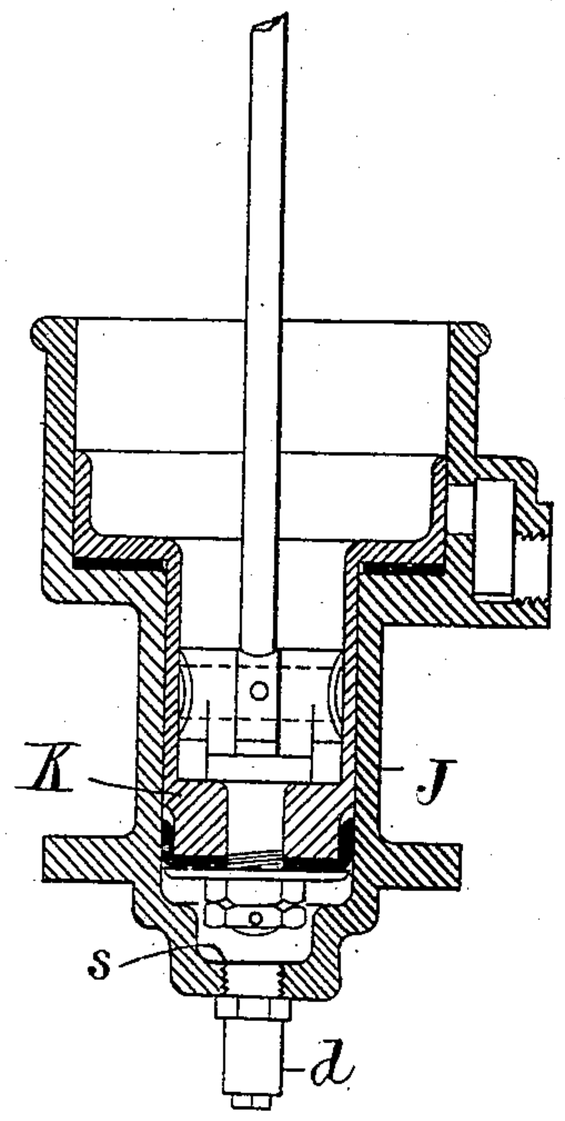


Fig. 5.



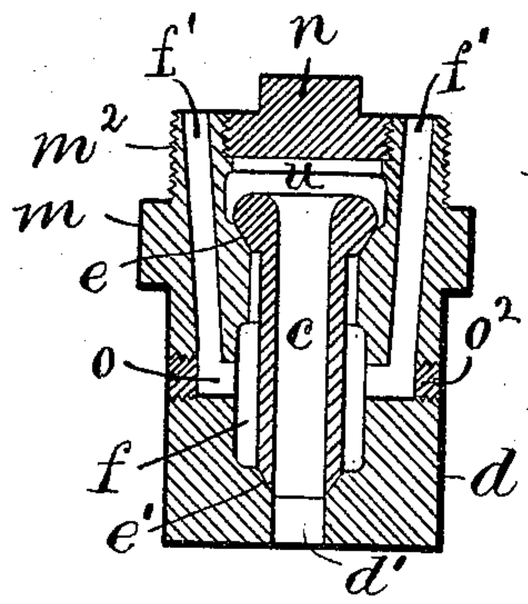


Fig. 8.

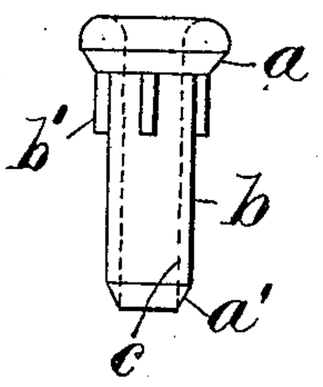


Fig. 7.

Attest:
L. Lee.
F. C. Fischer.

Inventor.
Franklin Phillips,
per Crane & Miller, attys.

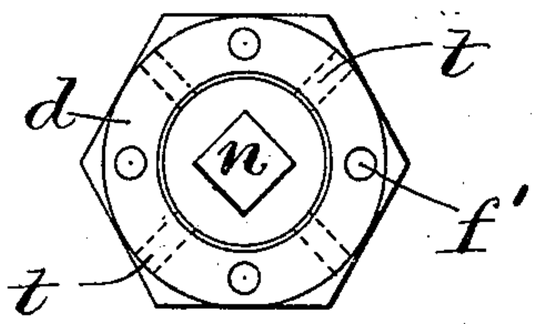
(No Model.) 2 Sheets—Sheet 2.

F. PHILLIPS.

ESCAPE VALVE FOR DASH POTS.

No. 420,887. Patented Feb. 4, 1890.

Fig. 9.



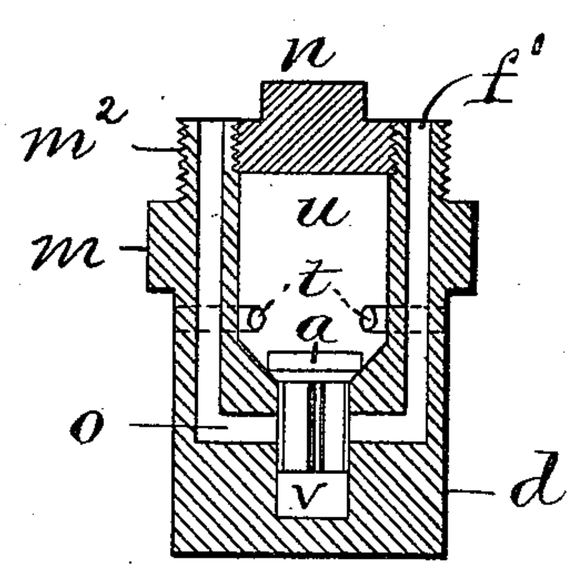


Fig. 10.

Attest:
L. Lee.
F. C. Fischer

Inventor.
Franklin Phillips.
per Crane & Miller, attys.

UNITED STATES PATENT OFFICE.

FRANKLIN PHILLIPS, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE HEWES & PHILLIPS IRON WORKS, OF NEW JERSEY.

ESCAPE-VALVE FOR DASH-POTS.

SPECIFICATION forming part of Letters Patent No. 420,887, dated February 4, 1890.

Application filed November 24, 1888. Renewed August 16, 1889. Serial No. 320,940. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN PHILLIPS, a citizen of the United States, residing at Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Escape-Valves for Dash-Pots, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates especially to the relief-valve, which is applied to the vacuum-chamber of a dash-pot used in regulating the movement of the valves in Corliss engines and others of analogous construction.

The object of the invention is to furnish a valve that may be wholly independent of any spring or extraneous assistance to close it positively, and thus with certainty relieve the vacuum-chamber from any accumulation of air that gains access thereto.

Heretofore the relief-valves applied to vacuum dash-pots have, in order to avoid the use of long passages which would retain an objectionable amount of air, been attached directly to the under side of the bottom of the dash-pot, and the valves have been constructed to open downward, so that their seats might be in close proximity to the compression-surface in the bottom of the dash-pot. With such construction a spring is unavoidably used to hold the valve to its seat, and as the operation of the steam-engine is wholly dependent upon the uniform working of the dash-pot it is obvious that the whole operation of the engine depends upon the permanence of the spring applied to such valve.

In my invention the valve-seat is placed just as close to the compression-surface in the dash-pot as in previous constructions, but is faced in the opposite direction, so that the valve is held thereon by its own weight, and the air channels or passages which connect the compression-surface with the valve are led to the under side of the valve-seat and operate to lift the valve in opposition to gravity. Two valves united by a tubular stem are preferably employed and fitted to seats of different sizes, the larger valve being arranged at the top, so that air admitted between the seats may operate by its pressure upon the larger valve to lift them both, and the air then escapes past the larger seat to the bore of the stem, and also through the smaller seat directly to the atmosphere. The air passages or channels leading from the compression-chamber to the valve-seat may be formed by surrounding the valve-box with a casing or by drilling holes downward in the sides of the valve-box, both of which constructions are shown in the annexed drawings, in which—

Figure 1 is a vertical section of an annular dash-pot resembling that patented to me on February 21, 1888, with the relief-valve inserted in the hub. Fig. 2 is an outside view of the same valve. Fig. 3 is a section of the same on line *x x* in Fig. 2. Fig. 4 is a transverse section of the same on line *y y* in Fig. 3. Fig. 5 is a vertical section of an ordinary plunger dash-pot, with a valve of modified form inserted in its bottom plate. Fig. 6 is a view of the upper end of such modified valve. Fig. 7 is a vertical section on line *z z* in Fig. 6, and Fig. 8 is a detached outside view of the double valve employed in both the constructions. Figs. 1 and 5 are drawn upon a smaller scale than the other figures. Figs. 9 and 10 show an alternative construction.

The double valve shown herein is formed with valve-surfaces or bearings *a a'*, united by a sleeve *b* with central bore *c*. The upper end of the valve-box *d* is held in close proximity to the compression-surface *s*, which in Fig. 1 is upon the top of the hub H in the center of the annular piston I, and in Fig. 5 is in the bottom of the cup J, containing the plunger K.

The valve-box (shown in Figs. 5, 6, and 7) is shown formed with a hexagon collar *m* and a screw-thread *m'* at its upper end to screw it into the bottom of the cup J. Valve-seats *e e'* are provided in the valve-box to fit the valve-bearings *a a'*, the upper valve seat and bearing being made the larger of the two. An aperture or chamber *u*, closed by a plug *n*, is formed in the top of the valve-box to introduce the valve to such seats, a space being left between the plug and the valve to

permit it to lift. By screwing the valve-box into the bottom of the cup J the upper end of the box is brought close to the compression-surface *s*, and the chamber between the valve-seats is connected with the interior of the dash-pot at such surface by holes *f'*, extended downward from the top end of the valve-box into connection with the chamber *f*, from which holes *o* are extended laterally by drilling and their outer ends afterward closed by plugs o^2. Any air accumulating in the dash-pot is thus forced through the holes into the chamber *f* between the valve-bearings *a a'*, and operates by its pressure upon the larger area of the upper valve-bearing to lift the double valve from its seats. When thus lifted, the air immediately escapes to the atmosphere past both the valve-bearings, the air which passes the valve-seat *e* gaining access to the atmosphere through the chamber *u* and bore *c* and the outlet-aperture *d'*, formed below the seat *e'*. Ribs *b'* are formed upon the sleeve *b*, adjacent to the valve-bearing *a*, to guide the valve in its seat and permit the passage of air to the valve-bearing *a*, as is common.

The construction shown in Figs. 1 to 4, inclusive, operates in precisely the same manner; but in place of the holes or passages *f'*, which, with the holes *o*, lead the air to the chamber *f*, a shell *l* is attached to the base of the valve-box by a screw-thread formed near the lower end of the latter, and is extended up above the plug *n* and provided with an external screw-thread m^2. Such screw-thread operates the same as if formed directly upon the valve-box to secure the valve-box in proximity to the impression-surface. An annular space f^2 is formed between the shell *l* and the valve-box *d*, and holes *o'* are formed through the sides of the valve-box to connect the chamber *f* with such space or passage in the same manner as the holes *o* connect with the passages *f'*. The air discharged from the compression-surface passes into the annular passage f^2 and chamber *f*, to lift the valve the same as in the other constructions.

There is no object in using a double valve, except to increase the area of discharge from the valve-box when the valves are lifted, as the essential part of my invention consists in arranging the valve in relation to the dash-pot so that the valve may be seated exclusively by gravity, and such a construction can be secured as effectually by the use of a single valve as by the use of a double valve, shown herein. It will be understood, however, that where the passage from the compression-surface to the under side of the valve is formed as an annular space f^2 it is necessary to provide a central discharge for the air that passes the valve-seat *e*, and such central discharge can only be effected through the bore of the valve by providing an auxiliary valve *e'*, which is kept closed to retain the air in the chamber *f* until the valve which rests upon the seat *e'* is lifted.

In Figs. 9 and 10 is shown a construction with a single valve, the chamber *v* below the valve being closed at the lower end, and the air is led thereto through passages *f'* and *o*, as in Fig. 7. The air admitted to the chamber *v* thus operates to raise the valve and discharge the air into the chamber *u*, from which it escapes to the atmosphere by holes *t*, formed laterally through the walls of the box *d* between the vertical passages *f'*.

My escape-valve is adapted to a dash-pot of any construction, provided the axis of the valve-box be arranged vertically, so that the valve may be pressed by gravity to its seat, and the passage from the compression-surface being extended from the upper end of the valve-box to the chamber beneath the valve, so as to lift the valve in the required manner.

The relief-valve would be of little value in maintaining a vacuum in the dash-pot if the passage connecting the compression-surface *s* and the valve-seat were of any considerable magnitude, as the air contained therein would, upon the lifting of the dash-pot piston, expand and materially diminish the vacuum.

In the drawings, the head I' upon the top of the annular piston I is shown in contact with the top of the hub H, and in like manner the plunger in Fig. 5 is shown in contact with the bottom plate J' of the cup J, with a leather disk *l'* applied to the compression-surface to soften the concussion.

By conducting the passage *f'* or f^2 from the top of the valve-box downward to the chamber *f* below the escape-valve *a*, I am enabled to screw the valve-box directly into the plate or part that forms the compression-surface, and thus secure the shortest possible connection between the compression-surface and the valve-seat, and avoid the use of pipes and fittings to connect the valve with the dash-pot.

Having thus set forth my invention, what I claim herein is—

1. An escape-valve for dash-pots, having a vertical valve-box, a valve pressed to its seat therein by gravity, a chamber *u* above the valve in connection with the atmosphere, and a passage extended from the upper end of the valve-box into a chamber below the valve, as and for the purpose set forth.

2. An escape-valve for dash-pots, having a valve-box provided with the seats *e e'*, and intermediate chamber *f*, the valves *a a'*, connected by the sleeve *b*, having bore *c*, an outlet from said bore to the atmosphere, and a passage extending from the upper end of the valve-box to the chamber *f* between the valve-seats, as and for the purpose set forth.

3. An escape-valve for dash-pots, having a valve-box provided with the seats *e e'*, and intermediate chamber *f*, the valves *a a'*, connected by the sleeve *b*, having bore *c*, an outlet from said bore to the atmosphere, holes *o'*, extended from the chamber *f* out-

ward, and a shell *l*, secured upon the outside of the valve-box and forming an annular passage f^2, extending from the top of the valve-box downward to the holes *o'*, and adapted at its upper end for screwing into the metal adjacent to the compression-surface of the dash-pot, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FRANKLIN PHILLIPS.

Witnesses:
JAS. A. THOMSON,
THOS. S. CRANE.