

(No Model.)

S. SAWYER.
AUTOMATIC AIR AND VACUUM VALVE.

No. 540,760.

Patented June 11, 1895.

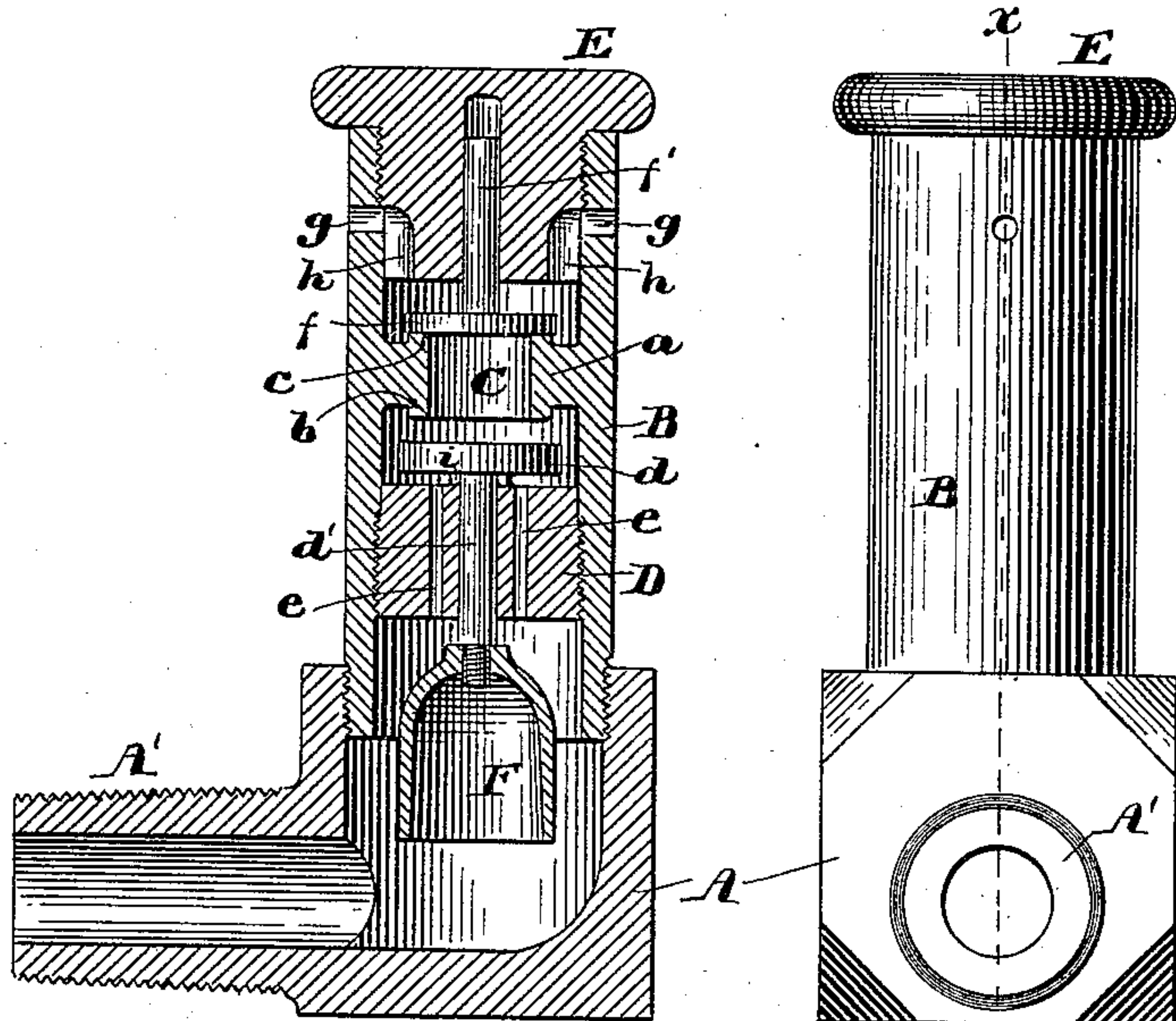


Fig. 2.

Fig. 1.
x

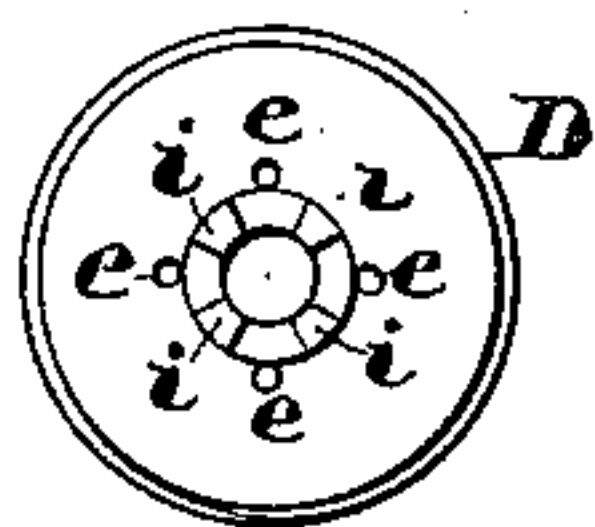


Fig. 3.

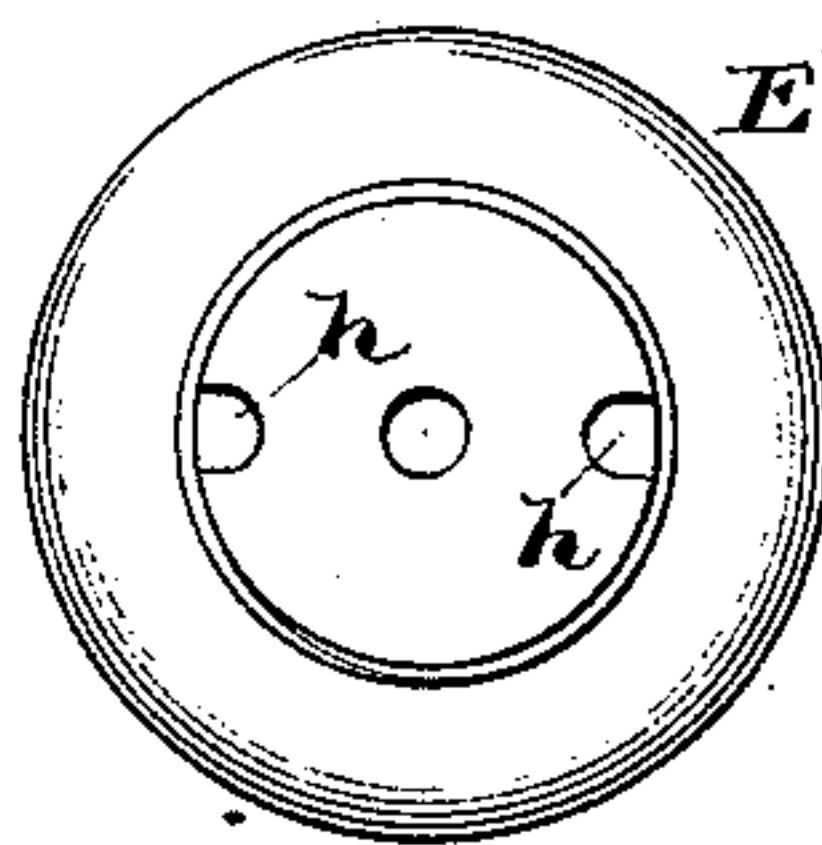


Fig. 4.

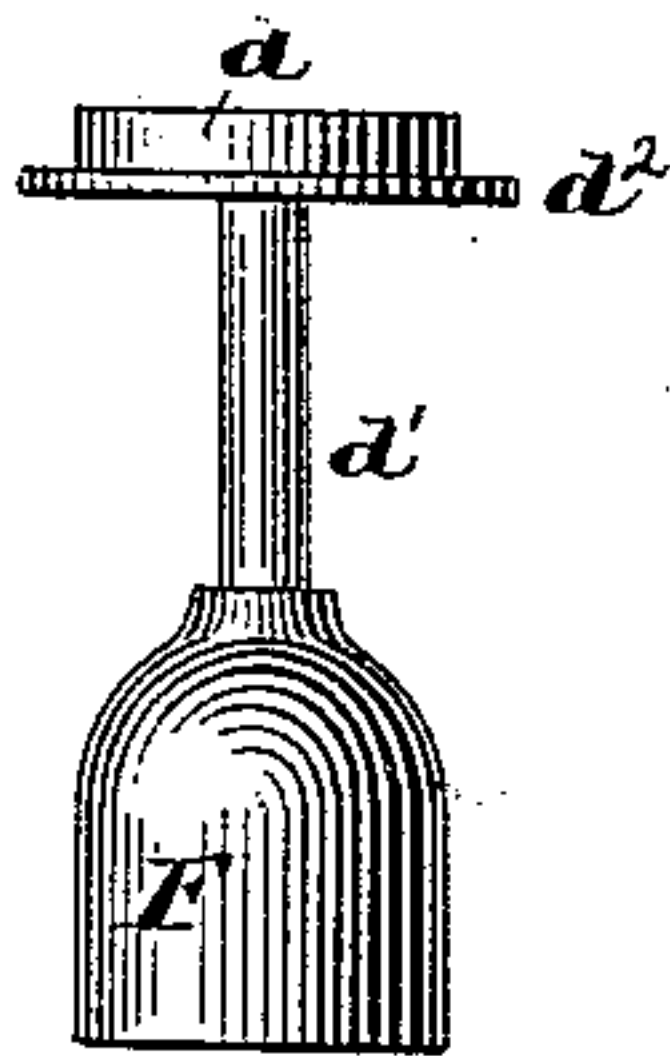


Fig. 5.

Witnesses:
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UNITED STATES PATENT OFFICE.

SYLVANUS SAWYER, OF FITCHBURG, MASSACHUSETTS.

AUTOMATIC AIR AND VACUUM VALVE.

SPECIFICATION forming part of Letters Patent No. 540,760, dated June 11, 1895.

Application filed March 2, 1895. Serial No. 540,323. (No model.)

To all whom it may concern:

Be it known that I, SYLVANUS SAWYER, of Fitchburg, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Automatic Air and Vacuum Valves, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to automatic air and vacuum valves for steam radiators, and other similar heating apparatus and has for its object the production of a radiator valve that will permit the gradual escape of the air from the radiator, pipes, &c., and then be automatically closed by the pressure of the steam when said pressure is sufficiently above the pressure of the atmosphere to give the required temperature, and that will also be automatically closed by the water of condensation should it appear in sufficient quantities in the valve chamber to float the valve or with sufficient force to move said valve by impact, and keep it closed until the water subsides, and it consists in certain novel features of construction, arrangement and combination of parts which will be readily understood by reference to the description of the accompanying drawings and to the claims hereto appended and in which my invention is clearly pointed out.

Figure 1 of the drawings is an elevation of a valve embodying my invention, viewed as looking directly at the end of the screw-shank which is screwed into the radiator. Fig. 2 is a vertical section of same on line *x x* on Fig. 1. Fig. 3 is a plan of the perforated plug which forms a bearing for the stem of the air-valves. Fig. 4 is an inverted plan of the cap for the valve-casing; and Fig. 5 is an elevation of the air-valve and the float, with a supplementary disk applied to said stem to increase the area of the valve. All the views of the drawings are drawn to an enlarged scale.

In the drawings A is the stock or base provided with the threaded shank A' to screw into the radiator.

B is the cylindrical body of the valve casing, provided near the middle of its length with the inwardly projecting annular rib *a* having formed upon its under side the annular seat *b* and upon its upper side the annular seat *c*, both surrounding the passage C as shown in Fig. 2.

The cylinder B has formed upon the exterior of its lower end a male screw thread by which it is screwed into the stock A, and within its interior a female thread to receive the perforated plug D having a central perforation to receive and guide the stem *d'* of the air valve *d* and a plurality of small perforations *e e* through which the air escaping from the radiator and pipes passes to the chamber containing said air valve, and thence through the passage C and lifting the vacuum valve *f* escapes to the open air.

The upper end of the cylinder B has formed therein two escape orifices *g, g*, and above said orifices is provided with a female screw thread to which is fitted the screw plug or cap E which projects some distance below said orifices and is fitted from the upper side of said orifices to its lower end, closely to the interior of the cylinder with a smooth fit and has formed therein two channels or passages *h, h*, to coincide with the passages *g, g*, as shown in Fig. 2.

The cap E has formed in the center thereof a bearing to receive the stem *f'* of the vacuum valve *f* and has the edge of its flange milled so it can be screwed in or out by hand and by turning about its axis the discharge orifices *g, g*, may be closed or opened at the will of the operator.

The stem *d'* of the air valve *d* has secured to its lower end the inverted cup F which serves both as a weight to hold the valve *d* off its seat until the pressure of steam rises to the desired height, and as a float to cause said valve to close upon its seat when the water of condensation enters the valve chamber in considerable quantity.

The plug or partition D has formed upon its upper surface a plurality of upwardly projecting points, or small lugs *i, i*, upon which the valve *d* rests when it is dropped from its seat. The area and weight of the valve *d* together with the area of the passages *e, e*, determines the pressure at which the valve *d* will close after the water of condensation has subsided, and therefore I increase or diminish the area of the valve or its weight, or the area of the steam passages through the grid D to vary the pressure and consequently the temperature at which the air valve will close.

If it is desired to increase the area of the

valve d exposed to the pressure of the steam, it can be done by applying to its stem beneath said valve a supplementary disk d^2 as shown in Fig. 5, or by substituting for the valve itself a valve of greater area.

In the operation of my invention when it is desired to heat the room and the steam cock is opened to let the steam into the radiator the cap E is turned so that the passages h, h , therein will register with the orifices g, g , in the casing B, when the steam will force the air in the radiator into the valve casing and it will pass through the passages e, e , in the plug or partition D around the valve d through the passage C, lift the valve f and will escape through the passages h, h and orifices g, g . When the air has escaped and the steam in the valve chamber has reached the pressure required to give the desired temperature the valve d will be closed upon its seat by said pressure and immediately the valve f will close upon its seat and both valves will remain closed until the pressure falls below the required point when the valve d will open while the valve f remains closed. If water has accumulated by the condensation of the steam, and is forced into the valve chamber in considerable quantity the water will close the valve d through the medium of the float F and said valve will remain closed until the water subsides when it will open and the steam forcing the air before it will operate to expel the air and then close the valve d as before described.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an air and vacuum valve for steam radiators and other purposes the combination of a casing or body provided with a discharge passage near its upper end and with two opposing valve seats surrounding a common passage; a perforated plug located below said seats and passage; an air valve located between said plug and lower seat, and provided with a stem extending through said plug and adapted to be moved upward to close the passage through its seat; and a vacuum valve located above, and adapted to engage with the upper of said seats.

2. The combination of a casing or body provided with a discharge passage near its upper end and with two opposing valve seats surrounding a common passage; a perforated

partition or plug located below said seats and passage; an air valve located between said plug and the lower seat and provided with a stem extending through said plug and adapted to be moved upward to close the passage through said seat; a float carried by said stem; a second valve located above and adapted to close upon the upper seat.

3. The combination in a radiator valve of a casing or body provided with means for connecting it to the radiator and with a discharge passage near its upper end and with two opposing valve seats surrounding a common passage; a valve constructed and arranged to close upon the lower of said seats; a perforated plug having contracted passages for throttling the escaping steam; a valve located above and adapted to close upon the upper of said seats; and a screw cap to said casing having passages to connect with said discharge passages in the casing and adapted to serve as a cock to close or open said discharge passages.

4. The combination in a radiator valve of a casing or body having an inwardly projecting annular rib provided with a valve seat upon its under side; a perforated plug or partition located below said seat; a flat disk like valve located between said plug and valve seat and provided with a stem fitted to and guided by a bearing in said plug; and means for arresting the downward movement of said valve at a point a short distance above the upper surface of said plug.

5. The combination in a radiator valve of a casing or body having an inwardly projecting annular rib provided with a valve seat upon its under side; a perforated plug or partition located below said seat a flat disk like valve located between said plug and seat and provided with a stem fitted to and guided by a bearing in said plug; and a removable disk mounted on said stem below said valve substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 28th day of February, A. D. 1895.

SYLVANUS SAWYER.

Witnesses:

N. C. LOMBARD,

H. THEODORE FLETCHER.