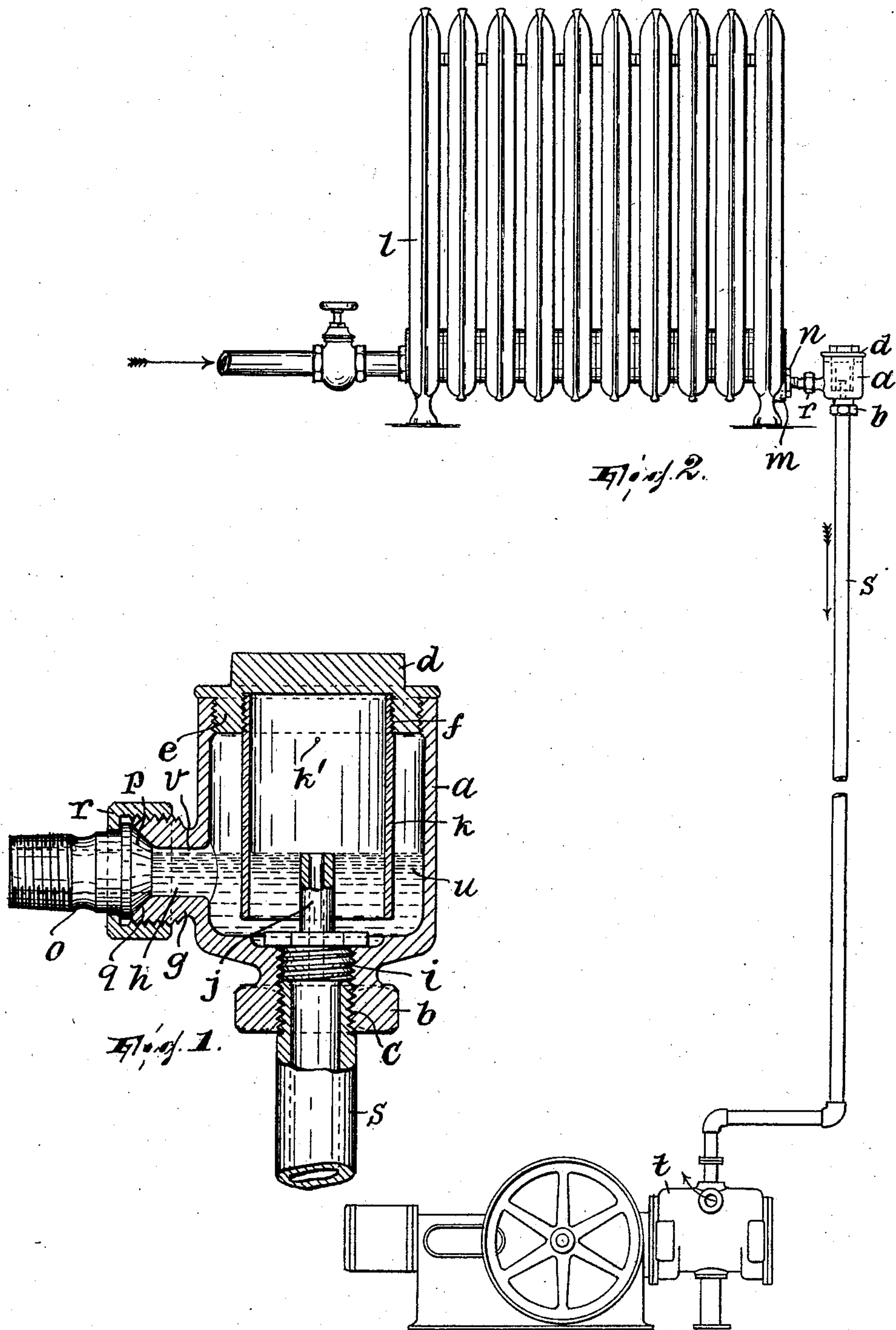


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 AUTOMATIC RELIEF VALVE FOR STEAM HEATING SYSTEMS.
 APPLICATION FILED APR. 28, 1909.

933,777.

Patented Sept. 14, 1909.



WITNESSES

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UNITED STATES PATENT OFFICE.

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AUTOMATIC RELIEF-VALVE FOR STEAM-HEATING SYSTEMS.

933,777.

Specification of Letters Patent.

Patented Sept. 14, 1909.

Application filed April 28, 1909. Serial No. 492,712.

To all whom it may concern:

Be it known that I, AUGUSTUS MOWELL, a citizen of the United States, residing in Paterson, Passaic county, New Jersey, have invented a certain new and useful Improvement in Automatic Relief-Valves for Steam-Heating Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to automatic relief valves for steam-heating systems, and particularly to that class of such valves which are designed to take care of the relief of the water of condensation as well to control the relief of the steam and air. In these devices the uniform purpose is to provide an adequate outlet for the air and steam which shall be so limited as not to allow a wasteful escape of the latter. This has heretofore been accomplished by trapping the water of condensation and using it to buoy up or move a float or the like which, during the steam- and air-flowing periods allows limited escape of air and steam, and during the water-flowing periods opens an adequate escape for the water, which escape is closed when the water-flow has ceased and the conditions are normal. Such devices, working in pulsating fashion, require moving parts, and this it is one of the principal objects of my invention to avoid.

Other objects will appear herein or be apparent to those skilled in the art.

The invention consists, broadly, in providing a chamber, having a laterally entering inlet from the radiator for air, water of condensation and steam, with means affording an outlet for the air, water and steam, for maintaining a water level in said chamber in a horizontal plane cutting the inlet in proximity to the highest point thereof, whereby to form a limited passage for the admission of air and steam to the chamber.

The invention further consists in employing, in connection with an inlet and an outlet, a controlling means having for its function to allow the air admitted to said chamber to escape, but automatically to stop the escape of such steam as is admitted to the chamber substantially completely.

Figure 1 is a vertical central sectional view of the improved device; and, Fig. 2 shows it assembled with a steam heating system.

a is a shell or chamber having a polygonal or faceted projection *b* at the bottom, where it has a vertically extending threaded opening *c*, and a cap *d* which is screwed into the top of the shell or chamber, the entrant portion *e* of such cap being formed with an internally threaded recess *f*. The said shell or chamber also has a laterally extending and externally threaded boss *g* formed with a port *h*. The port *h* affords the inlet from the radiator for the water of condensation, air and steam. Into the threaded opening *c* is screwed the threaded portion *i* of a nipple *j*, the top of which lies in a horizontal plane which cuts the port *h* and approximates the highest point thereof. On the admission of water from the radiator it will be apparent that before it can escape it must accumulate until its level is coincident with the top of the nipple. Into the internally threaded entrant portion *e* of the cap is screwed the cylinder *k*, the same depending from the cap and preferably extending downwardly to a level below the port *h*. This has a small vent *k'* preferably in the upper portion thereof, said vent being small enough so that, while it will freely allow the passage of air, it will prohibit the passage of steam, owing to condensation forming and acting to clog it.

The radiator *l* to which the device is attached has its last coil extended lower than the remaining coils, as indicated at *m*, and into the portion *m* is screwed a bushing *n* into which in turn is screwed the nipple *o* whose cone *p* bears against the conical seat *q* of the boss *g*, *r* being a coupling screwed on the boss and engaging the cone of the nipple after the manner of an ordinary union.

s is a pipe screwed into the opening c of shell a and connected with a suitable vacuum pump t .

The operation is as follows: On the admission of steam to the system, water of condensation first enters the radiator and is forced through the chamber a by the pressure behind it, aided by the vacuum pump. The flow of water is followed by air, and since a body of water u has been left in the chamber a whose level coincides with the top of the nipple j , and consequently above the lower end of the cylinder k , the formation of a water-seal prevents the air from flowing down under the cylinder k in the effort to escape from the chamber a by the nipple j . Hence, it escapes by way of the vent k' . Ultimately the flow of air is followed by steam, which also, on account of the formation of the water-seal, seeks to escape by vent k' ; said vent being, however, restricted, it soon becomes clogged by a globule of condensed steam, so that further escape of the steam automatically ceases, or at least is materially reduced. Such condensation of the steam at the vent k' is of course augmented by the cooling influence of shell a , which is directly subject to the cooling influence of the atmosphere. The level of the water u in Fig. 1 is that which would be maintained in chamber a during idle periods; during working periods, the level outside of cylinder k would at least tend to be slightly lower than that inside of the same, due to greater pressure outside of than within the cylinder, but since the pull of the pump and the pressure in the heating system are comparatively low and condensation is constantly replenishing the body of liquid in chamber a more or less, the difference in levels outside of and within cylinder k is practically so little as to be inappreciable.

In view of the foregoing it will be apparent that the nipple j in effect forms a barrier between the inlet to and the outlet from the chamber a which maintains the water level in a plane cutting the inlet and preferably approximating its highest point. Thus, without regard to the parts k and k' , a limited passage for the escape of air and steam is produced at v , while the water of condensation is free to escape at all times unobstructed. By providing the parts k and k' , a means is afforded which allows the escape of the air but stops the escape of steam immediately such escape begins. If solid substances should tend to clog the vent k' access to it is readily had by removing the cap and the cylinder attached to it.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A relief means for heating systems consisting of a chamber having a laterally en-

tering inlet and means, affording an outlet from the chamber, for maintaining the level of the water of condensation in said chamber in a horizontal plane cutting the inlet and in relatively close proximity to the highest point of the inlet, substantially as described.

2. A relief means for heating systems consisting of a chamber having a barrier extending upwardly from a relatively underlying portion of said chamber, a constantly open outlet on one side of said barrier and a laterally entering inlet on the other side of said barrier, the top of the barrier lying in a horizontal plane cutting the inlet in relatively close proximity to the highest point of the inlet, substantially as described.

3. A relief means for heating systems consisting of a chamber having an inlet and an outlet, in combination with a water-seal-forming means, disposed relatively between the inlet and the outlet, for controlling the passage of air and steam to the outlet, said outlet being constantly open and disposed at a level approximating the highest point of the inlet, substantially as described.

4. A relief means for heating systems consisting of a chamber having an inlet and an outlet, in combination with a water-seal forming means, disposed relatively between the inlet and outlet, for controlling the passage of air and steam to the outlet, said outlet being constantly open and disposed at a level approximating the highest point of the inlet and said water-seal forming means having a restricted opening above said level, substantially as described.

5. A relief means for heating systems consisting of a closed chamber having an inlet and an outlet, said outlet being disposed at a level approximating the highest point of the inlet, in combination with a cylinder carried by and depending from the top of said chamber and having its lower end projecting below the entrance to the outlet and thereby adapted to form a water-seal, said cylinder having a restricted opening above the horizontal plane occupied by the entrance to the outlet, substantially as described.

6. A relief means for heating systems consisting of a closed chamber having an inlet and an outlet, in combination with a cylinder vertically arranged within said chamber and having its lower end projecting below the entrance to the outlet and thereby adapted to form a water-seal, said cylinder having a restricted opening above the horizontal plane occupied by the entrance to the outlet and said outlet being constantly open and disposed at a level approximating the highest point of the inlet, substantially as described.

7. A relief means for heating systems comprising, in combination, a closed cham-

ber having a removable cap forming its top
portion and also having a lateral inlet, a
nipple forming the outlet from said chamber
and projecting upwardly into said chamber
5 from an underlying portion thereof and hav-
ing the entrance to the outlet formed thereby
disposed at a level approximating the high-
est point of the inlet, and a cylinder depend-
ing from said cap and having its lower end
10 surrounding, and extending below the hori-
zontal plane of, the entrance to said outlet,

said cylinder having a restricted opening
above the horizontal plane occupied by said
entrance, substantially as described.

In testimony, that I claim the foregoing I 15
have hereunto set my hand this 26th day of
April, 1909.

AUGUSTUS MOWELL.

Witnesses:

JOHN W. STEWARD,
WALTER R. HUDSON.