May 1, 1928. 1,667,935

F. LE C. HUTCHINSON

STEAM TRAP

Original Filed March 14, 1925

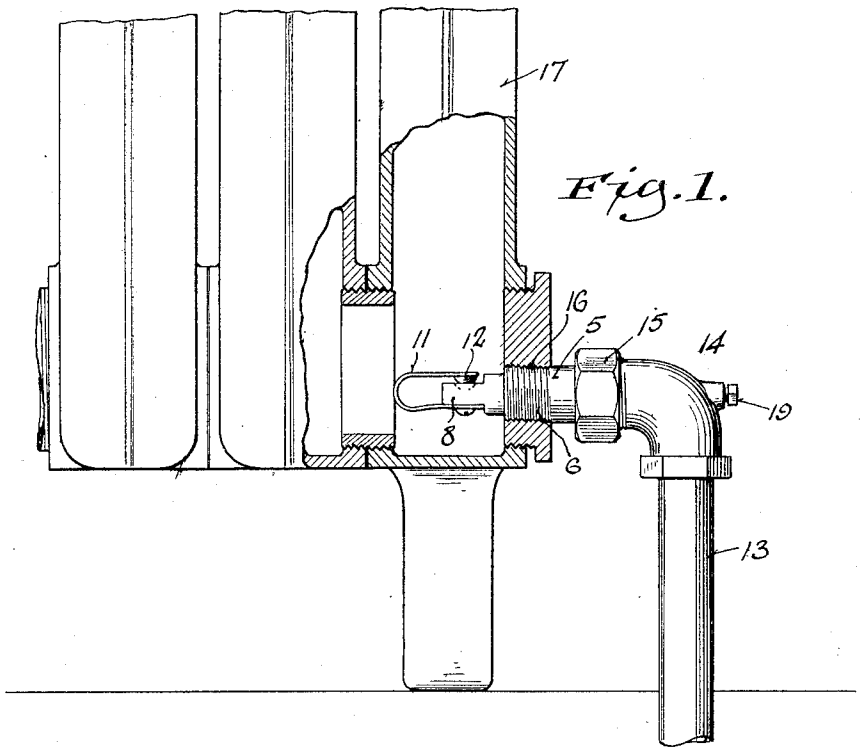


Fig. 1.

Fig. 2.

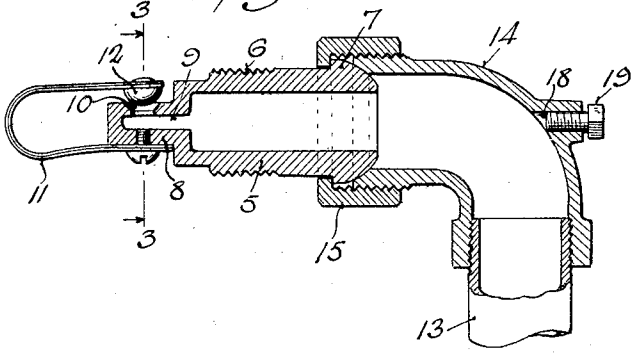
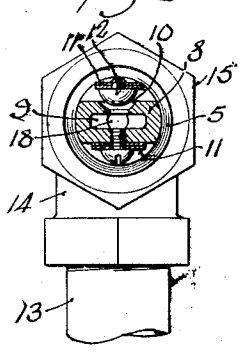


Fig. 3.



INVENTOR.

Frank LeClair Hutchinson.

BY

Morsell, Keeney & Morsell

ATTORNEYS

Patented May 1, 1928. 1,667,935

UNITED STATES PATENT OFFICE.

FRANK LE CLAIR HUTCHINSON, OF WAUWATOSA, WISCONSIN, ASSIGNOR TO CONSOLIDATED STEAM SPECIALTY COMPANY, A CORPORATION OF DELAWARE.

STEAM TRAP.

Application filed March 14, 1925, Serial No. 15,668. Renewed November 23, 1927.

This invention relates to improvements in steam traps, and more particularly to a steam trap adapted to be connected to the return pipe in a steam or vapor heating system.

In heating systems employed in buildings, utilizing steam under pressure, it is customary to control the admission of steam to the radiator and to provide an outlet pipe to return water of condensation back to the boiler. In order to make the system conducive of the best results and to provide for its maximum efficiency, it is necessary to prevent the passage of any of the live steam back through the return pipe with the water of condensation. It is also necessary in systems of this character to provide means whereby air which may be trapped in the radiator can escape, so that the air will not act to prevent the entrance of steam into the radiator.

Hence, it is the principal object of the present invention to provide a device adapted to be connected to the return pipe and constructed to permit the passage of water of condensation therethrough and also any air trapped in the radiator.

A further object of the invention is to provide a thermally controlled steam trap constructed so that the radiator itself is utilized as a chamber for the thermal or expansion member.

A further object of the invention is to provide a steam trap which is readily attached to a steam radiator by being threaded into the discharge end thereof.

A further object of the invention is to provide a steam trap which is of very simple construction, is inexpensive to manufacture and install, is strong and durable, is efficient in operation, and is well adapted for the purposes described.

With the above and other objects in view, the invention consists of the improved steam trap, and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a fragmentary view of the drain end portion of a radiator having the improved steam trap installed therein, part being broken away and shown in section;

Fig. 2 is a longitudinal sectional view of the steam trap on a larger scale; and

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2.

Referring now more particularly to the drawing it will be seen that the numeral 5 indicates a tubular nipple member threaded as at 6 and having a shouldered outer end portion 7. The inner end portion of the member 5 is reduced as at 8 and is formed with an opening or channel 9 communicating with the interior of said member. A transverse opening or valve seat 10 leads to the channel 9.

A bi-metallic strip 11 of U-formation is secured at one end portion to the reduced end portion 8 of the tubular nipple member and the free end portion of said strip carries a rounded valve member 12, said valve member 12 being in juxta-position to the valve opening or seat 10. The bi-metal strip or thermostatic member 11 is formed preferably of an outer strip of brass or copper and an inner strip of steel or a similar metal, having a different co-efficient of expansion, and hence the free end portion of said thermostatic member will be urged inwardly or outwardly by the expansion or contraction of the metals constituting the same.

The numeral 13 indicates a radiator drain pipe with which the device is in communication and said pipe is threaded into the usual elbow member 14 which in turn is threaded to a union nut 15. The union nut engages the shouldered end portion 7 of the nipple member 5 and thereby connects the same to the elbow member. The threaded end portion 6 of the member 5 is screwed into the internally threaded bore 16 at the discharge end of a radiator 17 so that the reduced end portion 8 and the thermostatic strip 11 are entirely within the confines of the radiator.

It will be observed that the elbow member 14 is formed with a bushed portion 18 provided with a bore in alinement with the interior of the nipple member, the bore being normally closed by a threaded plug 19. By removing the plug the device and openings can be cleared of dirt and sediment, if necessary.

The operation of the steam trap is as follows: When the radiator is filled with live steam the heat therefrom will influence

the thermostatic strip to the extent that it will be bent so that the valve member will tightly seat in the valve opening 10 and close the same, thus preventing the escape of the live steam. However, as soon as an appreciable amount of water of condensation has collected within the radiator its cooling effect will be felt by the thermostatic member with the result that the outer end will automatically flex outwardly to lift the valve member 12 from its seat and open the passage-way 9. The water can then drain out of the radiator through the elbow member and drain pipe. The result is the same when air collects in the radiator. The temperature thereof will cause a movement of the strip 11 to open the valve and allow the escape of the air. As soon as sufficient live steam again enters the radiator, the valve will be automatically closed to prevent the escape thereof.

It will thus be seen that in the improved steam trap the necessity of a separate chamber for the valve and valve operating mechanism is eliminated as said mechanism and valve utilize the interior of the radiator for a chamber. This materially increases the simplicity of the device as to manufacture and installation and permits the provision of an inexpensive and efficient steam trap. Also, from the foregoing description it will be seen that the improved steam trap is of very simple and novel construction, and is well adapted for the purpose set forth.

What I claim as my invention is:

1. The combination with a radiator and a drain pipe, of a tubular member connected to the drain pipe and extending into the radiator, and a thermally controlled valve integral with said tubular member and within the radiator for closing the opening of said tubular member.

2. The combination with a fluid heated chamber having a drain member, of a tubular member in connection with said drain member and extending into the heating chamber, and thermally controlled means carried by said tubular member and confined only within said heating chamber for opening or closing the inner opening of said tubular member.

3. The combination with a fluid heated chamber having a drain member, of a tubular member in connection with said drain member and extending into said heating chamber, said tubular member having an inner valve opening, and a bi-metallic strip carried by the inner end portion of the tubular member within the chamber and formed with a valve portion for seating in said valve opening.

4. A steam trap for a heating chamber provided with a discharge opening, comprising a tubular member insertable in said discharge opening and having an inner opening, and a thermally controlled valve member associated with said tubular member and confined within said heating chamber for controlling said inner opening.

5. A steam trap for a heating chamber provided with a discharge opening, comprising a tubular member arranged to be threaded into said discharge opening and having an inner opening, and a thermally controlled valve member carried by the inner end portion of the tubular member and confined within said heating chamber for controlling said inner opening.

6. A steam trap for connection with a radiator and a radiator drain pipe, comprising an elbow member, a tubular member, a union nut revolubly connecting the tubular member to the elbow member, and a bi-metallic member carried by the free end portion of the tubular member, said bi-metallic member carrying a valve member to control the inner opening of the tubular member.

7. In combination, a fluid heated radiator having an internally threaded discharge opening, a tubular member having one end portion threaded into said discharge opening, a U-shaped bi-metallic strip secured at one end to the inner end portion of said tubular member and entirely within the radiator, a valve member carried by the free end portion of said strip for controlling the inner opening of said tubular member, a discharge pipe, and means for connecting the outer end portion of the tubular member to the discharge pipe.

In testimony whereof, I affix my signature.

FRANK LE CLAIR HUTCHINSON.