

L. M. COOPER.
RELIEF VALVE.
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1,163,974.

Patented Dec. 14, 1915.

Fig. 1.

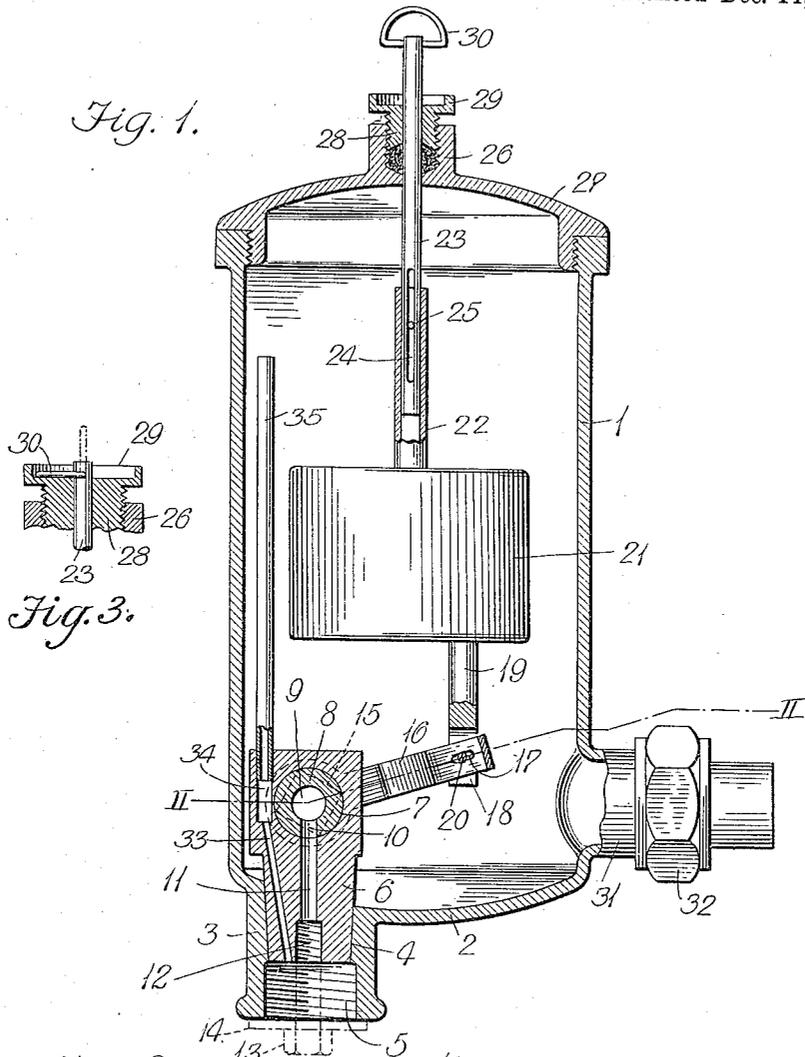


Fig. 3.

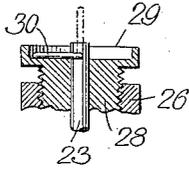
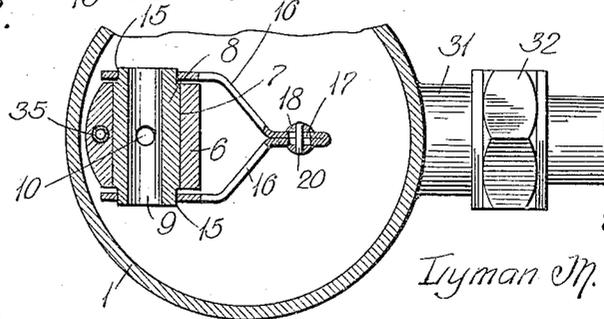


Fig. 2.



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UNITED STATES PATENT OFFICE.

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RELIEF-VALVE.

1,163,974.

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To all whom it may concern:

Be it known that I, LYMAN M. COOPER, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Relief-Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to steam traps especially adapted for removing the water of condensation from radiators, steam coils and other parts of steam heating systems in which a low pressure or partial vacuum is maintained.

This invention relates to that type of trap wherein a float is employed to automatically control a discharge of water and prevent the waste of steam, and the primary object of this invention is to furnish a trap of the above type with a novel valvular member and vent that insures a positive operation of the trap under normal conditions, the trap having provision whereby the valvular member can be manually operated should it have a tendency to stick in its seat or otherwise become impaired.

A further object of this invention is to provide a float actuated valve for traps that has a novel adjustable stop for limiting the action of the valve and consequently the withdrawal of water from a heating system.

The above and other results are attained by a mechanical construction that will be hereinafter specifically described and then claimed, and reference will now be had to the drawing wherein—

Figure 1 is a vertical sectional view of a trap in accordance with this invention, showing the valve thereof in open position; Fig. 2 is a horizontal sectional view taken on line II—II of Fig. 1 with the casing of the trap partially broken away; and Fig. 3 is a transverse sectional view of a portion of the trap, illustrating a stuffing box gland.

In the drawing 1 denotes a cylindrical trap casing having a convexo-concave bottom 2 provided with an eccentrically disposed and depending drain connection 3. The connection 3 has a seat 4 in the upper end thereof and the lower end interiorly screwthreaded, as at 5, to receive a suitable drain pipe. Mounted in the seat 4 of the connection 3 is the lower end of a tapering

plug 6 and the upper end of said plug has a transverse bore 7 to accommodate a valvular member 8. The member 8 has a longitudinal bore 9 and a radially disposed port 10 adapted to communicate with a longitudinal port 11 in the plug 6. The lower end of the port 11 is enlarged and the walls thereof screwthreaded, as at 12, whereby a bolt 13 can be placed in engagement with the plug 6 to facilitate mounting the plug in the seat 4 of the connection 3. For instance, an apertured plate 14 can be placed against the lower end of the connection 3 to receive the bolt 13 prior to securing the same in the plug. As the bolt is rotated and screwed into the plug, the plug is seated and becomes a permanent fixture of the trap casing. The bolt 13 and the plate 14 can then be removed and the pipe or other conduit secured into the connection 3.

The ends of the valvular member 8 terminate in rectangular shanks or studs 15 and sprung over the ends of said member are the side arms 15 of a stirrup 16. This stirrup, as a matter of good construction, is made of a metallic strap possessing sufficient resiliency to be bent upon itself and the ends thereof sprung into engagement with the ends of the valvular member, although any suitable connection can be made between said member and the stirrup as to insure the latter being fixed relative to the former. The two-ply end of the stirrup is slotted, as at 17, and extends into the bifurcation 18 of a depending float rod 19. A pin 20 is arranged transversely of the bifurcation 18 and extends through the slot 20 to loosely articulate said rod and stirrup. The rod 19 depends from the bottom of a cylindrical float 21 and the top of said float has a concentric vertical tube or upright 22 to receive a stem 23. The inner or lower end of the stem is longitudinally slotted, as at 24, and extending through said slot is a stop pin 25, carried by the tube or upright 22.

The upper or outer end of the stem 23 extends through a stuffing box 26 concentric with a cap or cover 27 detachably mounted, preferably by screw threads, upon the open end of the casing 1. The stuffing box 26 includes a gland 28 and the top or outer end of the gland has a recess or concavity 29 to receive a link 30 pivotally connected to the upper end of the stem 23.

A side wall of the trap casing 1, contiguous the bottom 2 thereof, has a connection 31

provided with a union for a coupling 32 whereby the trap can be connected to the pipes of the heating system.

The port 11 is concentrically of the plug 5 6 and to one side of the port 11 and the bore 7 is an angularly disposed port 33 communicating with a socket 34 in the top of the plug. Mounted in the socket 34 is the lower end of a vertically disposed vent tube 35 10 that extends a sufficient height in the trap casing to always establish an air connection between the trap and the connection 3.

The weight of the float 21 is sufficient to retain the valvular member 8 normally 15 closed and water that accumulates in the bottom of the trap casing will enter the tubular valve member and also eventually raise the float, whereby the port 10 of the valvular member 8 will be placed in communication 20 or registration with the port 11 of the plug 6 and thus allow water to drain from the trap.

The stem 23 is frictionally held by the stuffing box and by raising and lowering 25 said stem the movement of the float 23 can be regulated whereby prescribed quantities of water can accumulate in the trap casing before the valve is actuated to liberate the same. Should for any reason the valvular 30 member stick in the bore 7 or articulated members of the device become stiff and impaired, the link 30 can be gripped and the stem 23 reciprocated in the stuffing box to manually move the valvular member and its 35 connections. The link 30 also facilitates shifting the stem 23 to regulate the action of the float.

One embodiment of my invention has been illustrated, but it is to be understood that 40 the structural elements are susceptible to

such variations and modifications as fall within the scope of the appended claim.

What I claim is:—

A steam trap comprising a casing having a lateral inlet connection and a vertical out- 45 let connection, a tapering plug seated in the inner end of said outlet connection and provided with a transverse bore having the ends thereof open, said plug having a longitudinal port establishing communication be- 50 tween the bore of said plug and the lower end thereof, said longitudinal port having the walls thereof for a portion of its length threaded to receive a device adapted to be 55 placed against the outlet connection to forcibly seat said plug in said connection, a valvular member in the bore of said plug and having a longitudinal bore with the ends opening into said casing, said valvular mem- 60 ber also having a radial port intermediate the ends thereof adapted to communicate with the threaded port of said plug, said plug having a port therein, a vent tube in communication with the port of said plug, 65 an adjustable stem supported by the top of said casing, a float guided by said stem, said valvular member having the ends thereof terminating in rectangular shanks, a stirrup 70 connected to said float and having side arms sprung over the shanks of said valvular member to move in synchronism therewith, and means in connection with said stem to limit the action of said float.

In testimony whereof I affix my signature in presence of two witnesses.

LYMAN M. COOPER.

Witnesses:

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ANNA M. DORR.