June 24, 1930. C. E. WALSH 1,766,966

STEAM TRAP

Filed May 2, 1927

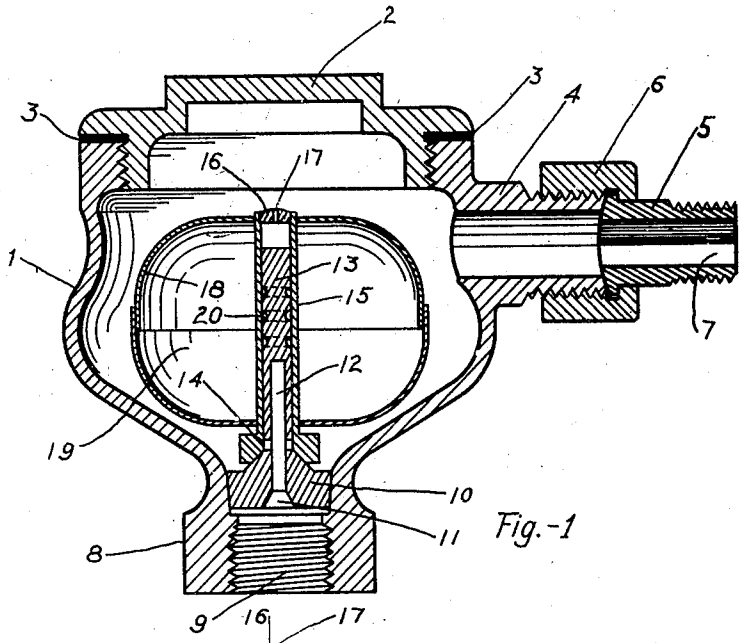


Fig.-1

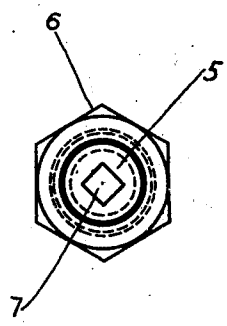


Fig.-4

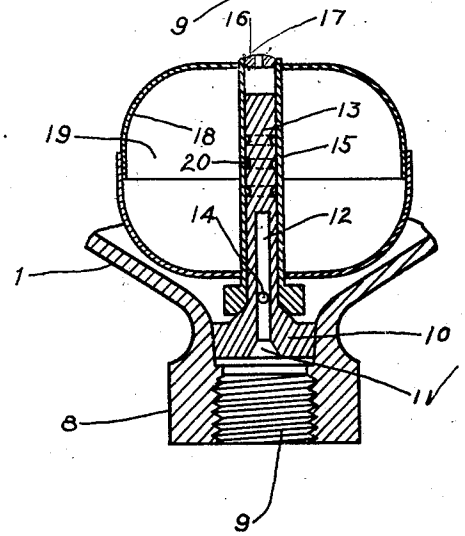


Fig.-2

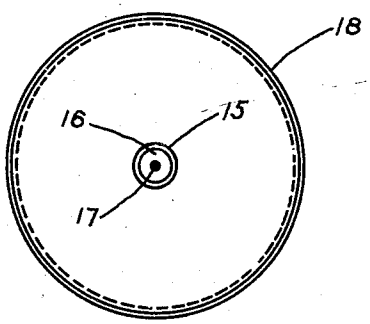


Fig.-3

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UNITED STATES PATENT OFFICE

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STEAM TRAP

Application filed May 2, 1927. Serial No. 188,353.

My invention relates to steam traps and particularly to traps employed in pressure heating systems wherein steam is employed and water of condensation develops. The primary object of my invention is to provide a trap more simple, easier to construct, and more reliable than any steam trap now in use.

More specifically my invention consists in regulating the quantity of water of condensation which accumulates within the trap by means of a float sliding on a valve-seat which serves not only as a guide for the float but also as a means of conveying away such accumulated water of condensation. Access of water to the discharge opening of the casing is had solely by means of perforations in the surface of the tubular valve-seat.

Further objects of my invention include the creation of a steam-trap which is easy to manufacture and, if necessary, to repair and whose operation is certain and not subject to be disturbed by dirt and scale which sometimes accumulate in heating systems.

While in the annexed drawings and following description only one particular form and use of my invention is described and illustrated the mechanical equivalents and methods by which the same results are obtained are within the contemplation of my invention.

In said annexed drawings:

Fig. 1, is a vertical section through the improved steam trap, showing all of the parts and their relation to one another;

Fig. 2, is a fragmentary central sectional view of the trap, along a different axis, showing more fully the improved valve-stem and seat;

Fig. 3, shows a plan view of the float separate from the valve-seat and forming one of the component parts of the improved steam trap; and

Fig. 4, is an end view of the tail-piece used in connection with the trap.

Referring to the same or similar elements by the same ordinals throughout the several views, I designate a metal casing by the ordinal 1, having three openings, one at the top, one at the side, and one at the bottom. For the opening at the top a cover member 2 is provided and threaded to engage the casing 1, being effectively sealed therewith by interposing the sealing gasket 3 between the cover 2 and the casing 1 as indicated in Fig. 1.

The casing 1 at the side opening is extended outward to form the tubular member 4 which is threaded for engagement with the coupling 6 to hold the tail-piece 5 whose bore is preferably square as shown in Fig. 4. By means of the tail-piece 5 a connection is made with a radiator outlet, not shown in the accompanying drawings, by which air and steam enter the casing.

The opening at the bottom of the casing 1 is similarly formed into a tubular member 8 whose inner surface is threaded for engagement with the return line pipe 9 of the pressure heating system, as shown in Figures 1 and 2. A cylindrical rod 13 with an enlarged end section 10 whose bevelled edge makes it fit snugly with the tubular opening 8 of the casing is then prepared to be fitted into the neck of this opening. The lower portion of the cylindrical rod 13 is hollowed to form the cylindrical section 12 with the enlarged end opening 11 and the cylindrical rod is drilled to form holes 14 by which access to the return line pipe 9 is made for such water of condensation as is allowed by the float 19 to pass through. The upper portion of the post 13 has several peripheral grooves 20 which form with the valve stem 15 pockets into which steam may condense and form water seals.

The float 19 consists of a nearly spherical metal ball, through the center of which is fitted a tubular stem 15 so as to make a sliding fit with the cylindrical valve-guide 13. One end of the stem 15 is fitted with a closure 16 with a small hole 17 to serve as an air vent in case of an air cushion being formed between the valve stem and guide, which would disturb the proper functioning of the float. The lower portion of the stem is enlarged and bevelled so as to form a smooth and firm fit with the enlarged portion of the valve-seat 10.

In operation air and steam enter the cas-

ing through the connection 5 and, as water of condensation develops and accumulates in the bottom of the casing, the float rises and lifts the valve stem upward until the water reaches the hole 14, when it flows through and down the inside of the stem-seat and guide and is carried off by the return pipe of the pressure system. In the event that it is desired to carry off the water faster more holes are made in the stem guide 13, such holes being spaced and diametrically disposed in a manner which will not seriously lessen the strength of the valve-guide.

To prevent steam from going through the opening 17 and escaping through the space between the valve-stem 15 and post 13 to the holes 14 the grooves 20 are used to cause whatever steam finds its way down to condense into water which effectively checks the further passing of steam. The water seals also act as a lubricant for the valve-stem.

By allowing the water of condensation to be carried off through the stem-guide, the structure of the steam trap is simplified and its functioning becomes easier. The disposal of the water of condensation through the valve-seat and guide in the manner illustrated, the formation of the valve-stem and float with the air vent at its close end and the water seals formed by the grooves between the stem and post make the steam trap illustrated and described an improved device.

What I claim is:

1. In a steam trap the combination of a casing with a removable cap at the top thereof, said casing having an inlet connection detachably arranged with the supply, and provided with a discharge opening in the bottom; a tubular valve-seat having one or more lateral apertures, one end closed, and an enlarged bevelled section adjacent said discharge opening and fitted therein whereby bottom discharge may occur only through the apertures of said valve-seat; lateral peripheral grooves in said valve seat; and a valve comprising a tubular stem having a float attached thereto, one end of said stem being closed but for a small aperture and the other end enlarged and internally bevelled, operative on said seat.

2. In a steam trap the combination of a casing with a removable cap at the top thereof, said casing having an inlet opening detachably connected with the supply means, and provided with a discharge opening in the bottom; a tubular valve-seat having one or more lateral apertures and an enlarged bevelled section adjacent to said bottom discharge opening and being fitted therein whereby discharge may occur only through the apertures of said valve-seat; lateral peripheral grooves in said valve seat; and a valve, comprising a tubular stem through the center of a spherical float, one end of said stem being closed but for a small aperture and the other end enlarged and internally bevelled, operative on said seat, whereby the apertures in said valve-seat are opened and closed, and water seals formed in said grooves.

3. In a steam trap the combination of a casing with a removable cap at the top thereof, said casing having an inlet opening detachably connected with supply means, and provided with a discharge opening in the bottom; a tubular valve-seat having one or more lateral apertures and being fitted vertically in said discharge opening whereby bottom discharge may occur through said opening only by means of said valve-seat apertures; lateral peripheral grooves in said valve-seat; and a valve comprising a tubular stem through the center of a spherical float, one end of said stem being closed but for a small aperture whereby gases accumulating between the stem and valve-seat are released, sliding on said seat whereby the apertures in said valve-seat are opened and closed, and water seals are formed in said peripheral grooves substantially as described.

Signed by me this 27th day of April, 1927.

CHARLES E. WALSH.