G. W. NISTLE.

STEAM TRAP.

APPLICATION FILED MAY 4, 1911.

1,025,293.

Patented May 7, 1912.

Fig. 1.

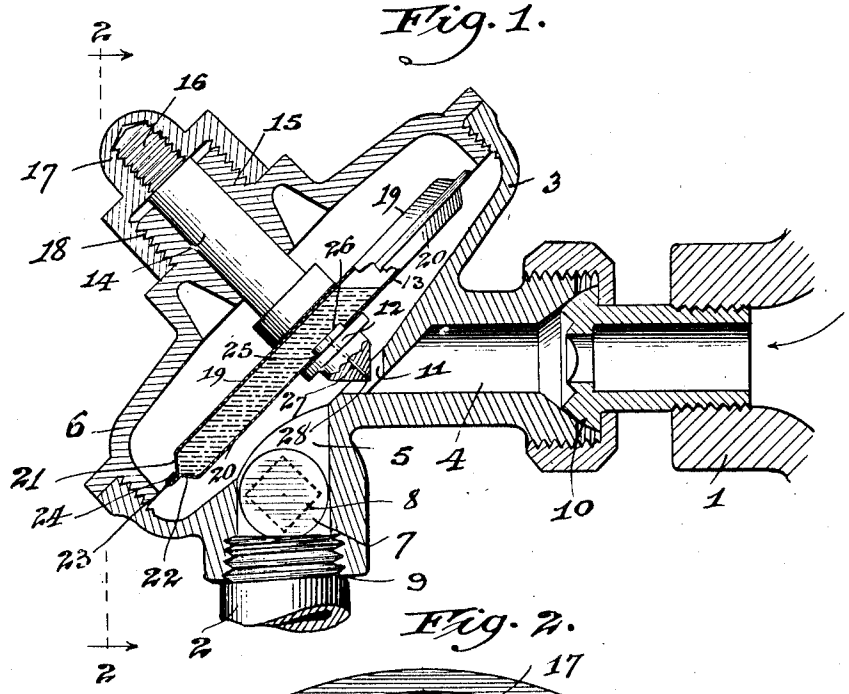


Fig. 2.

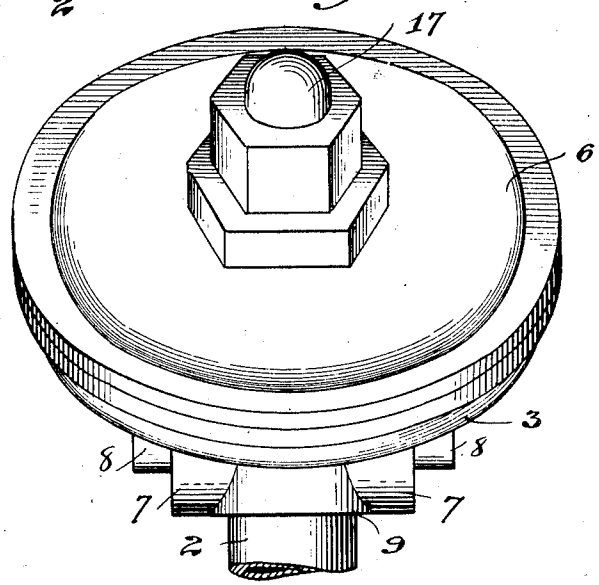
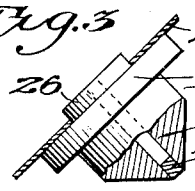


Fig. 3



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UNITED STATES PATENT OFFICE.

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STEAM-TRAP.

1,025,293. Specification of Letters Patent. Patented May 7, 1912.

Application filed May 4, 1911. Serial No. 625,042.

To all whom it may concern:

Be it known that I, GEORGE W. NISTLE, a citizen of the United States, residing at the city of Muskegon, county of Muskegon, and State of Michigan, have invented certain new and useful Improvements in Steam-Traps, of which the following is a specification.

This invention relates to improvements in steam traps and refers more particularly to that type of traps commonly known as thermostatic traps, which are principally used on radiators.

Among the salient objects of the invention are to provide a construction in which the thermostat is inclined at an angle to the inlet and discharge passages of the trap; to provide in a construction of this general character an improved form of thermostat; to provide an improvement in the manner of expanding the thermostat; to provide a novel manner of filling the thermostat and attaching a fitting thereto which also serves as a closure for the filling orifice of the thermostat; to provide a construction in which the trap may be blown out and cleaned while under steam pressure without opening the trap; to provide an improved construction in which the vertical distance between the center of the inlet and the face of the bottom outlet of the trap is reduced to a minimum; to provide a construction in which the trap is provided with a plurality of outlet orifices whereby the trap may be used in rights or lefts and connected either to a horizontal or a vertical return pipe; to provide a device which is characterized by its simplicity and economy of construction and reliability of operation; and in general to provide an improved construction of the character referred to.

The invention consists of the matters hereinafter described and more particularly pointed out in the appended claims.

In the drawings—Figure 1 is a vertical sectional view of the device shown as connected to the outlet of a radiator return pipe. Fig. 2 is a front elevation looking toward the radiator taken on line 2—2 of Fig. 1 and looking in the direction of the arrows. Fig. 3 is a sectional detailed view of a portion of the valve member.

Referring to the drawings, 1 represents the outlet hub of a steam radiator and 2 the return pipe. The top of the trap consists generally of a diaphragm casing 3, inlet passage 4, and outlet passage 5. The diaphragm casing 3 is provided with a removable cover 6. As a special feature of improvement the diaphragm casing 3 is inclined at an angle to the inlet and discharge passages thereby materially shortening the distance between the inlet and outlet passages. The construction is such as to materially reduce the vertical distance between the inlet passage and the bottom of the discharge outlet whereby the trap may be placed closer to the floor when it is connected to the radiator.

In some steam systems the return pipe is horizontal instead of vertical. In order that my trap may be more readily connected to such horizontal return pipe I provide a pair of horizontal discharge outlet passages 7, 7 which may be closed as 8 when not required. If the outlet passage of the trap is connected to one of the horizontal outlets 7 the vertical outlet 9 may be similarly plugged. In the present instance I have shown the vertical outlet 9 as connected to the return pipe 2. The wall of the inlet passage 4 is screwed to the radiator by means of a ball-joint union designated as a whole 10. The diaphragm casing 3 communicates with this inlet passage 4 through means of a small orifice or port 11, which also forms a valve seat for the valve member 12. The valve member 12 is carried by the diaphragm 13, hereinafter more particularly described. To the opposite side of the diaphragm 13 is rigidly fixed a stem 14 which extends through the annular extension 15 of the cover and is provided at its outer end with a reduced screw-threaded extension 16. This extension 16 is screwed into a cap 17, which is in turn screwed onto the annular extension 15, as shown at 18. The relative position of the valve 12 to the port 11 is such as to materially restrict the latter when the valve is in normal position, thus leaving a relative small opening from between the inlet passage 4 and the diaphragm casing. In practice port 11 sometimes becomes more or less clogged with dirt and it is necessary to clean out this port or orifice in order that the trap may be restored to its normal efficiency. In the present construction this orifice may be cleaned or blown out without removing the cover of the trap by simply unscrewing the cap 17 and thus retracting

the diaphragm and valve 12. The orifice 11 will then be blown out by the steam pressure when the cap will be screwed up and the valve returned to its normal position.

As a special feature of this invention I have provided a novel construction of the thermostat. Heretofore difficulty has been experienced in preventing the two plates forming the thermostat from pulling apart at the joint, under the ordinary pressure of operation. Difficulty has also been experienced in getting sufficient expansion of the thermostat without unduly increasing the size of it or deforming it by corrugation. This corrugating of the thermostat has a tendency to unduly weaken the plates.

The present device obviates the above difficulty in a simple manner. The thermostat 13 is formed of two parallel flat plates 19 and 20 which are not corrugated or deformed in any way. Near their edges the plates are bent toward each other as shown at 21, 22, to form in effect the side walls of the diaphragm, and the edge 21 is provided with a flange 23 which has locking engagement with a hook-shaped extension 24 of the opposite plate 20. When the two plates are united in the manner shown in the drawing the interlocking flanges 23 and 24 form in effect a strengthening rib. The construction is such as to form a rigid and particularly strong joint. The side walls 21 and 22 are so formed as to substantially eliminate any expansive strains on the joint. It is to be understood of course that the joint between the plates 19 and 20 is soldered after the inter-locking parts are crimped together. The plate 20 is centrally apertured as shown at 25 to receive the end 26 of the valve 12. After the diaphragm is filled with the volatile liquid the valve 12 is soldered in place. Before the diaphragm is filled the edge of the opening 25 is tinned. The opposing face of the valve is similarly tinned, then the diaphragm filled and the valve heated and soldered in place. During the soldering of the valve in place some of the liquid is of necessity volatilized and in order that it may escape the valve is provided with a small duct 27 through which this gas escapes. The thermostat is then cooled and the external orifice of the duct 27 is closed by soldering as shown at 28. It is to be understood that the duct 27 is minute and is not to be used for the purpose of filling the thermostat. It is also to be understood that when the thermostat 19 is mounted in the trap it is sealed against communication with the trap chamber or inlet passage. In operation the valve is so arranged relative to the inlet passage as to leave a restricted opening for the passage of the condensate into the trap. The port 11 however, being relatively small is apt to become clogged. When this occurs the retraction of the valve by adjusting the stem 14 will fully open the port 11 and permit it to be blown out clean. The valve will then be restored to its normal position as heretofore described.

I claim as my invention:

1. In a thermostatic trap, the combination with a thermostat casing, of a thermostatic member seated therein and comprising a pair of spaced apart plates bent toward each other at their edges to form side walls, one of said side walls terminating in an outstanding flange, and the other of said side walls terminating in a hook shaped flange crimped around and having interlocking engagement with said first flange, one of said plates having an aperture through which the thermostatic member may be filled with a volatile liquid, a fitting for said aperture and soldered to the plate, said fitting having a gas vent to permit the escape of gas developed in soldering and adapted to be closed after soldering is completed, and a fitting secured to the opposite plate.

2. In a thermostatic trap, the combination with a casing having inlet and outlet ports, of a valve for said inlet port, a thermostat seated in said casing and provided with an aperture through which the thermostat may be filled with a volatile liquid, said valve fitting within said aperture and soldered thereto, and said valve having a gas vent to permit the escape of gas developed in soldering and adapted to be closed after said soldering is completed.

3. In a thermostatic trap, the combination with a casing having an inlet and a discharge passage, a valve controlling said inlet passage, a thermostat seated in said casing and connected at one side to said valve, a fitting secured to the opposite side of said thermostat, and means for retracting said fitting to carry the valve away from the inlet port whereby the inlet passage may be cleaned out by radiator pressure.

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