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J. MULLEN ET AL

HEATING SYSTEM

Filed May 19, 1924

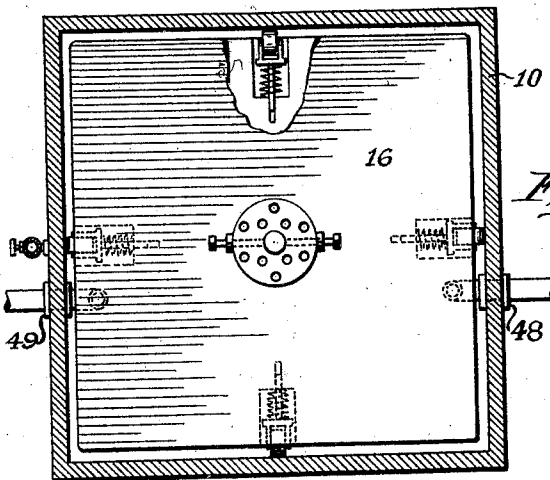
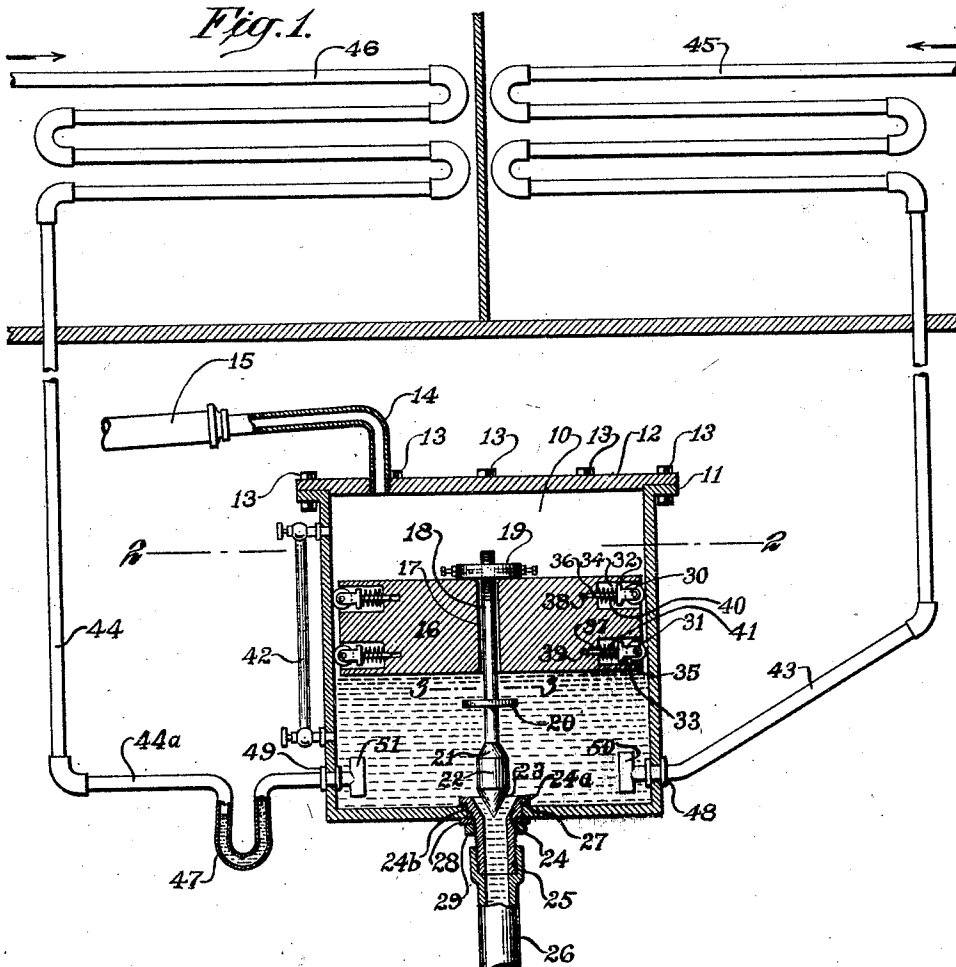
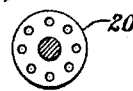


Fig. 3.



INVENTOR
JAMES MULLEN
LEAMAN B. HARVEY
BY
H. G. Manning
ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES MULLEN AND LEAMAN S. HARVEY, OF WATERBURY, CONNECTICUT.

HEATING SYSTEM.

Application filed May 19, 1924. Serial No. 714,269.

To all whom it may concern:

Be it known that we, JAMES MULLEN and LEAMAN S. HARVEY, citizens of the United States, and residents of Waterbury, county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Heating Systems, of which the following is a specification.

This invention relates to heating systems, and more particularly to an improved form of steam trap adapted to operate automatically without the use of thermostats or other heat-sensitive mechanisms.

One object of this invention is to provide a steam trap of the above nature which will remove condensed steam and air from a relatively large number of heating units of a heating system.

A further object of the invention is to provide a steam trap having a float for intermittently discharging the condensed steam when the level of the water in the trap has risen to a predetermined point.

A further object is to provide a device of the above nature which will be simple, inexpensive to manufacture, easy to install and manipulate, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawings one form in which the invention may be conveniently embodied in practice.

Fig. 1 represents a sectional view of the steam trap and the heating system to which it is connected.

Fig. 2 is a sectional view of the trap, taken along the plane 2—2 of Fig. 1, looking downwardly and showing the construction of the float.

Fig. 3 is a sectional view of the valve stem, taken along the plane 3—3 of Fig. 1, looking downwardly.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the steam trap includes a hollow casing or tank 10, preferably formed in the shape of a cube and provided with a flanged top portion 11, upon which a flat square cover 12 is secured by means of bolts 13.

The cover 12 is provided near one side edge with an upwardly extending vent pipe 14 having a downwardly inclined portion 15 open to the air and adapted to pass outside of the building. This vent pipe is employed to reduce the strains in the pipes, and to

eliminate banging noises and the starting of leaks. The downwardly inclined portion 15 of the vent pipe serves as a condenser in which any steam which may pass through the trap will be air-cooled and condensed before it reaches the outer atmosphere.

Located within the casing 10 is a float 16 preferably constructed of wood and having a hollow vertical central passage 17, said float fitting loosely within the interior of the casing. A valve stem 18 is slidably fitted within the passage 17, and is provided with a cylindrical adjustable flat collar 19 fitted upon its upper end and secured in position in any suitable manner, as by two set screws engaging in threads. Below the float, the stem 18 has a perforated fixed circular disc 20. The collar 19 is adapted to be lifted when the float has risen to a predetermined point, and thus raises the valve stem 18 which is provided on its lower end with a valve head 21. The valve head 21 has a cylindrical intermediate section 22 and a conical base 23 which is adapted to seat in a conical outlet bushing 24 located in the bottom of the casing 10. The bushing 24 has a pair of shoulders 24^a and 24^b and is provided with a downwardly extending section 25, upon which is screwed an outlet pipe 26. If desired, the condensed steam may be pumped back into the steam boiler, not shown.

In order to form a water-tight joint between the outlet bushing 24 and the bottom of the tank, washers 27 and 28 are provided above and below the base of the tank respectively, said washers being held tightly in position against the shoulders 24^a and 24^b and the base of the casing, by means of a nut 29 screwed on the outside of the bushing 24 and engaging said washer 28.

In order to permit the float 16 to rise and fall within the cubical casing 10 with the minimum of friction, the float is provided on each of its four vertical faces with a pair of vertically spaced roller bearings 30 and 31, said roller bearings being mounted in brackets 32 and 33 adapted to slide within horizontal recesses 34 and 35 respectively, extending into said float. The brackets 32 and 33 have stems 36 and 37 extending inwardly and loosely fitting within horizontal sockets 38 and 39 located at the rear of the recesses 34 and 35.

The four sets of roller bearings 30 and 31 are adapted to be resiliently pressed out-

wardly against the four walls of the cubical casing 10 by means of spiral springs 40 and 41 located on said stems 36 and 37 between the bases of the recesses 34 and 35 and the brackets 32 and 33 respectively. A gauge glass 42 is provided on one side of the casing to indicate the level of the water therein.

The casing 10 is adapted to receive the drip or condensed steam from the heating units of a heating system through a pair of drain pipes 43 and 44. The drain pipe 43 is directly connected to a set of low-pressure steam heating units, such as the pipes 45, while the pipe 44 is connected to a set of high-pressure steam heating units, such as pipes 46. The drain pipe 44 is provided with a horizontal portion 44^a between the ends of which is a U-shaped depending pipe 47 which serves as an auxiliary trap and which forms a liquid seal when the system is idle.

The drain pipes 43 and 44 pass through opposite walls of the casing near the bottom thereof, and the joints are made watertight by means of bushings 48 and 49 respectively. The pipes 43 and 44 are provided on their inner ends within the casing, with vertical T-members 50 and 51 adapted to form baffles to prevent the inflowing hot water, steam, or vapor from directly impinging upon the valve head 22.

In operation, condensed steam from the heating pipes 45 and 46 will pass down through the pipes 43 and 44 and enter the trap from both sides through the bushings 48 and 49. The level of the water in the trap will then rise until the float has been lifted to a predetermined point, at which time it will strike the adjustable collar 19. The stem 18 will then be lifted together with the head 42. The water will then be permitted to flow out by gravity through the

pipe 26 until the level has fallen to such a point that the valve head has closed under its own weight, or until the perforated collar 20 on the stem 18 has been forced down by the weight of the float. While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claim.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

In a steam trap for a steam heating system, a casing having an inlet at the bottom for receiving condensed steam from the heating system, an outlet in the bottom of said casing, a float in said casing, a vertical valve rod passing loosely through said float, said valve rod having a valve head for normally closing said outlet, said rod having a collar above said float, whereby the valve head will be lifted by said float to permit water to escape when the level in the casing rises to a predetermined point, and a combined air outlet pipe and excess steam condenser leading from the top of said casing, said condenser having a downwardly inclined enlarged section adapted to be cooled by the surrounding air to condense any excess steam which may pass through the casing.

In testimony whereof, we have affixed our signatures to this specification.

JAMES MULLEN.
LEAMAN S. HARVEY.