

G. E. HULSE.
STEAM TRAP.
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959,541.

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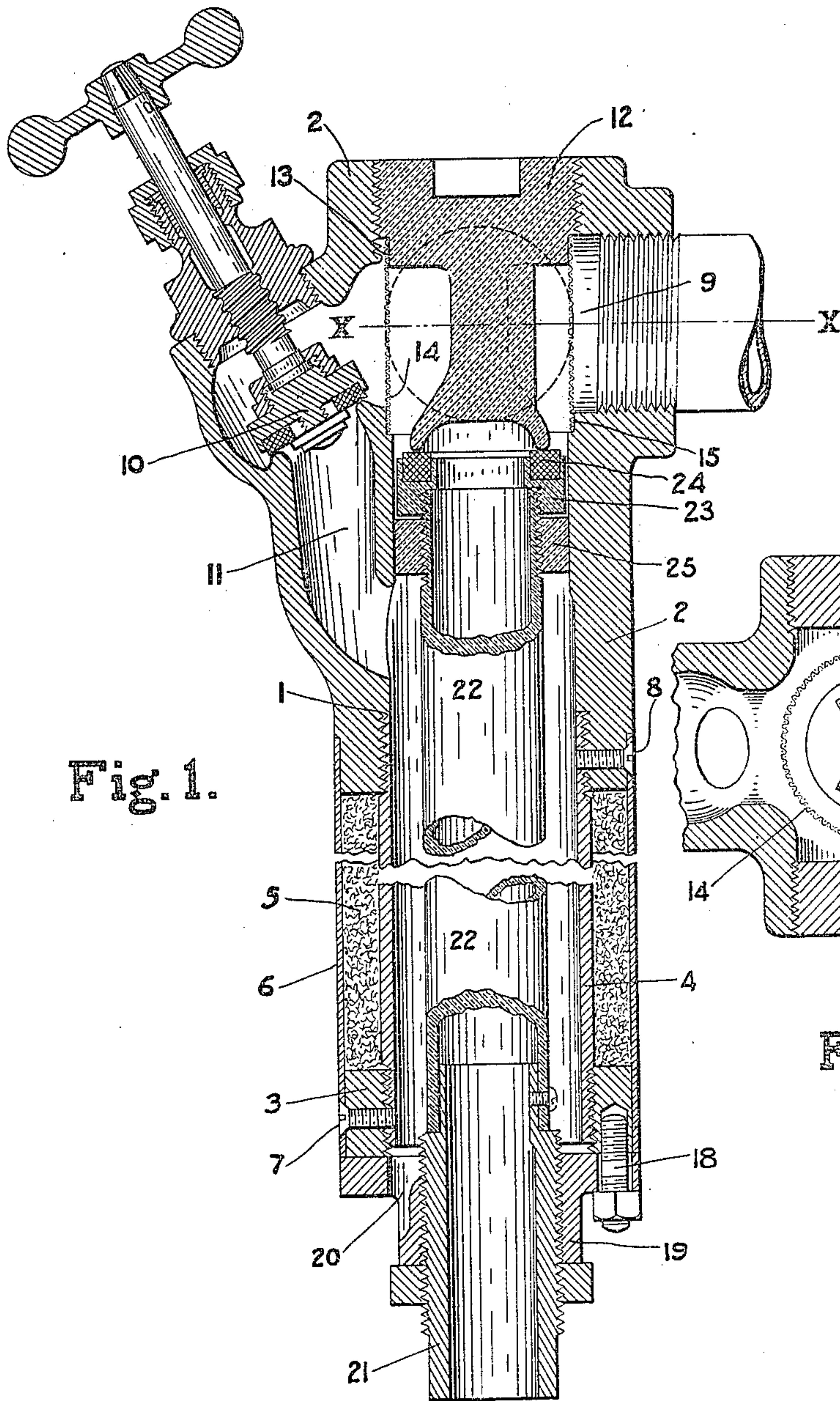


Fig. 1.

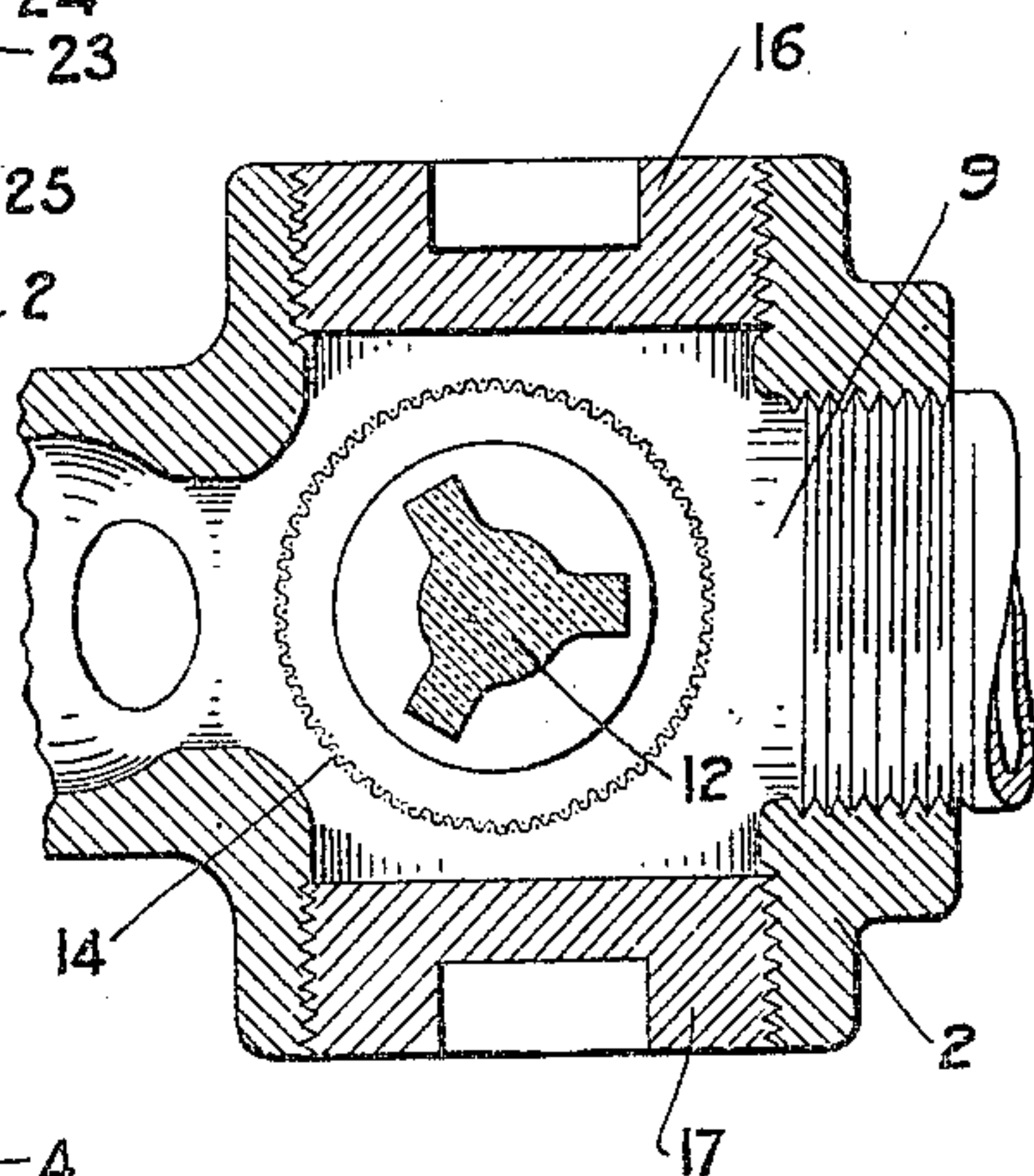


Fig. 2.

WITNESSES:

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STEAM-TRAP.

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To all whom it may concern:

Be it known that I, GEORGE E. HULSE, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Steam-Traps, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to traps.

One of the objects thereof is to provide an efficient steam trap, all parts of which shall be readily accessible.

Another object is to provide a durable device of the above nature which shall be of sensitive and yet reliable and uniform action.

Another object is to provide a trap, the parts of which are readily adjustable and yet remain as adjusted under all conditions of use.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the device hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings wherein is shown one of the various possible embodiments of my invention, Figure 1 is a sectional elevation of the same. Fig. 2 is a cross section taken substantially on the line $x-x$ of Fig. 1.

Similar reference characters refer to similar parts throughout both views of the drawing.

In order to render better understood certain of the features of my invention, it may here be noted that I have found, in connection with devices of the nature of those with which this invention deals, that, as these devices are often installed in positions in which they are handled with difficulty, it is highly desirable that all parts be readily accessible as for purposes of repair, cleansing or adjustment. Also, I have found it highly important in connection with devices of the above nature that the parts maintain their precise adjustment and uniform action under all conditions of use. In cases where a large number of traps are employed, as, for example, in car heating, in which re-

lation the hereinafter described device is peculiarly adapted for use, if the parts cannot be depended upon to maintain their adjustment, a considerable amount of labor is required to maintain the apparatus in efficient working condition.

The above and other advantages are attained in constructions of the nature of that hereinafter described.

Referring now to Fig. 1 of the accompanying drawings, there is shown at 1 what may be termed a "casing," the same comprising a casting 2 and an annular ring 3 connected therewith as by piping 4 and suitable heat-insulating material 5 held in position by an outer sheath 6, which is secured to the ring and the casting as by screws 7 and 8. The upper portion of this casing is provided with an inlet 9, opposite to which is positioned an inclined hand valve 10 controlling the passage through a by-pass 11 which leads into the lower portion of the casing. As this valve is of well known construction and, of itself, forms no part of the present invention, a detailed description of the same is unnecessary. Between the valve 10 and the inlet 9 is positioned a plug 12 tapped within the casting 2, as shown in the drawings. About a shoulder 13 formed upon this plug is secured a cylindrical sieve or screen 14 adapted to fit within a recess 15 formed in the casting. As this screen is of smaller diameter than the opening in which the plug 12 is threaded, it will readily be seen that the same may be removed therethrough if desired. There are also provided plugs 16 and 17 respectively, positioned at each side of the screen 14, as shown in Fig. 2 of the drawings, thus rendering the screen yet more readily accessible for purposes of inspection or cleansing. The openings, moreover, in which the last-mentioned plugs are positioned, may, if desired, form additional inlets by connecting the corresponding portions of the casing with suitable piping. Secured to the ring 3 as by bolts 18 is a collar 19 having formed therein openings 20 for the purpose hereinafter described. Within this collar is threaded an outlet nozzle 21 having fixed upon the upper end thereof a discharge conduit 22, which terminates adjacent the lower end of the plug 12. Upon the conduit or tube 22 is threaded a collar 23, which, together with a gasket 24 secured thereon, is adapted to co-act with the cup-shaped lower

end of the plug 12 and thus form a valve controlling the passage from the inlet 9 through discharge tube 22. The collar 23 fits loosely within the walls of the casting 2, but positioned below the same and likewise threaded upon the tube or conduit 22 is a collar 25 having a sliding fit within these parts, and, if desired, locking collar 23 in position.

The operation of the above described embodiment of my invention is substantially as follows: Assuming the parts to be in the position shown, with the hand-valve 10 resting against its co-acting seat and the gasket 24 firmly pressed against the lower end of the plug 12, let it be supposed that the inlet 9 is connected with the steam piping which it is desired to drain. The water of condensation will gradually accumulate within that portion of casting 2 above collar 23, which may be termed the "upper chamber" thereof, and, on account of the reduced temperature of the plug 12 and tube 22, these parts being made of some material having a relatively high coefficient of expansion, as brass, a contraction thereof will ensue and the gasket 24 will be drawn from the co-acting valve seat upon plug 12. The water which has accumulated above this valve is then forced through the conduit 22 and outlet 21; and, upon the upper chamber being emptied and live steam being blown past the plug 12 and through the conduit 22, these parts will expand so as to again close the automatic valve. This operation is automatically repeated as often as the parts have attained a sufficiently low temperature to open the valve, and the temperature at which such action takes place is, to a large extent, governed by the pressure with which the valve is closed. This pressure, of course, may be adjusted either by means of turning the collar 23 upon the tube 22 or the outlet nozzle 21 within the collar 19. In the event of the lower portion of the trap becoming frozen, valve 10 is opened, thus blowing live steam through the by-pass 11 and the jacket formed about the discharge conduit 22 by the walls of the casing 1. This steam is blown out through the openings 20 and, by reason of heating the several parts, quickly melts any ice which may have formed therein.

It may here be noted that the terms "lateral" and "longitudinal" are used throughout this description and the following claims in a broad sense to denote relative directions only.

It will thus be seen that I have provided apparatus well adapted to accomplish the several objects of my invention. The parts are readily adjusted as above described and yet, by reason of the fact that the collar 23 is free from the walls of the casing, its movement therein does not tend to throw the same out of adjustment. All parts of

the device, moreover, are readily accessible, it being necessary merely to remove plug 12 in order to attain access to the screen 14 and the automatic valve, or by removing the collar 19, the entire conduit 22 with associated parts may be withdrawn through the lower end of the trap. The device, moreover, is of the most uniform action, as the expansion of the metal only is involved, thus doing away with all chance of deterioration or change in the expanding medium, such as often arises in the cases wherein the expansion of a volatile fluid is depended upon. The action, moreover, is sensitive, as, on account of the fact that two expansible members coact one with another, a smaller contraction of either will open the automatic valve to a predetermined point than would be the case if only one contracted. Also, on account of positioning one of the expansible members in the upper portion of the trap and in contact at all times with the water of condensation, a higher degree of sensitiveness is attained. The entire device is of the simplest and most inexpensive construction and is positive and reliable in action to a high degree.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention could be made without departing from the scope thereof, I intend that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. I desire it also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween. Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a device of the class described, in combination, a casing, an inlet leading thereinto, an automatic valve, a cylindrical screen interposed between said valve and said inlet, said casing being provided with an opening adjacent said screen and independent of said inlet, and a removable shouldered member tapped within said opening and having said screen secured to said shoulder.

2. In a device of the class described, in combination, a casing, an inlet leading thereinto, a discharge conduit secured to and spaced from said casing, a hand valve controlling the passage from said inlet between said discharge conduit and said casing, an automatic valve controlling the passage through said discharge conduit, a cylindrical screen interposed between said inlet and said outlet valve, and a removable shouldered member threaded in the walls of said

casing and having said screen secured to said shoulder.

3. In a device of the class described, in combination, a casing, an inlet leading there-
5 into, an outlet leading from said casing, an
expansible discharge conduit having one end
in fixed relation to said outlet, relatively ex-
pansible means having one end in fixed rela-
10 tion to said inlet, said expansible means and
said conduit extending toward one another
and controlling the passage from said inlet
to said outlet.

4. In a device of the class described, in
15 combination, a casing, an inlet leading there-
into, a discharge conduit, a relatively expan-
sible member positioned within said casing
adjacent said inlet and having one end there-
of in fixed relation thereto adapted to co-act
20 with said conduit and control the passage
therethrough from said inlet.

5. In a device of the class described, in
combination, a casing, an inlet leading there-
into, an expansible discharge conduit within
25 said casing, a valve upon the said discharge
conduit, and a removable relatively expansi-
ble member positioned within said casing
adjacent said inlet adapted to co-act with
said valve in controlling the discharge from
said inlet through said conduit.

6. In a device of the class described, in
30 combination, a casing, an inlet leading there-
into, an expansible discharge conduit within
said casing, a valve upon the said discharge
conduit, and a relatively expansible member
35 positioned within said casing adjacent said
inlet adapted to co-act with said valve in
controlling the discharge from said inlet
through said conduit.

7. In a device of the class described, in
40 combination, a casing, an inlet leading there-
into, an outlet from said casing, an expansi-
ble discharge conduit within said casing and
spaced therefrom having one end in fixed re-
lation to said outlet, a hand valve controlling
45 the discharge from said inlet between said
conduit and said casing, a valve threaded
upon said discharge conduit adapted to con-
trol the passage from said inlet through
said discharge conduit, said second valve be-
50 ing free from contact with said casing, and
a collar threaded upon said conduit inde-
pendently of said valve adapted to engage
said casing and guide said expansible mem-
ber.

8. In a device of the class described, in com-
55 bination, a casing, an inlet leading thereinto,
an outlet, an expansible discharge conduit
leading to said outlet, a valve mounted upon
said conduit, a removable expansible member
60 having a valve seat adapted to co-act with
said valve, and a cylindrical screen secured
to said removable member and interposed
between said inlet and said valve.

9. In a device of the class described, in
65 combination, a casing, an inlet leading there-

into, a discharge conduit, an automatic valve
within said casing controlling the passage
from said inlet through said discharge con-
duit, a removable expansible member posi-
70 tioned within said casing interposed between
said inlet and said valve and adapted to
actuate said valve, and a cylindrical screen
interposed between said valve and said inlet
and secured to said removable member.

10. In a device of the class described, in
75 combination, a casing, an inlet leading there-
into, an outlet, an expansible discharge con-
duit leading to said outlet, a valve threaded
upon said conduit and free from contact with
said casing, removable means within said
80 casing adjacent said inlet adapted to co-act
with said valve and control the passage from
said inlet through said discharge conduit,
and a cylindrical screen mounted upon said
removable means and interposed between
85 said inlet and said valve.

11. In a device of the class described, in
combination, a casing, an inlet leading there-
into, an outlet, an expansible discharge con-
90 duit leading to said outlet and spaced from
said casing, a valve threaded upon said con-
duit and free from contact with said casing,
removable means within said casing adja-
cent said inlet adapted to co-act with said
valve and control the passage from said in-
95 let through said discharge conduit, a cylin-
drical screen mounted upon said removable
means and interposed between said inlet and
said valve, and a hand valve controlling the
passage from said inlet between said conduit
100 and said casing.

12. In a device of the class described, in
combination, a casing, an inlet leading there-
into, an expansible discharge conduit within
105 said casing, a valve upon said discharge con-
duit, and a plug threaded into said casing
adjacent said inlet carrying an expansible
member provided with a valve seat adapted
to coact with said valve in controlling the
110 discharge from said inlet through said con-
duit.

13. In a device of the class described, in
combination, an inlet fitting, an adjustable
plug secured therein, having formed integral
115 therewith a valve member, an expansion tube
supported on bearings in said fitting at one
end, and axially aligned with said plug, a
second fitting for holding said expansion
tube stationary at one end and means for
120 connecting said first-mentioned fitting to the
pipe of a steam appliance.

14. In a device of the class described, in
combination, a casing and inlet leading
thereto, an outlet leading from said casing,
125 an expansible discharge conduit having one
end in fixed relation to said outlet, means
screw-threaded at one end into said casing
in fixed relation to said inlet and having
formed integral therewith a valve member,
130 said valve member and said conduit extend-

ing toward one another and controlling the passage from said inlet to said outlet.

15 15. In a device of the class described, in combination, an inlet fitting having a lateral inlet opening, an outlet fitting spaced therefrom and connected thereto by a tube, an expansible outlet conduit fixed at one end to said outlet fitting and having a bearing in said inlet fitting, a plug threaded into
10 said inlet fitting and extending in axial alignment toward said outlet conduit, said plug and said outlet conduit being formed and adapted to coact to control the passage from
15 said inlet to said outlet.

16. In a device of the class described, in

combination, a casing, an inlet leading thereinto, an outlet leading from said casing, an expansible conduit having one end in fixed relation to said outlet, a valve detachably secured to the other end of said conduit and
20 means having one end in fixed relation to said inlet, said means and said conduit extending toward one another and controlling the passage from said inlet to said outlet.

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

GEORGE E. HULSE.

Witnesses:

A. C. MOORE,

GEO. T. MERWIN.