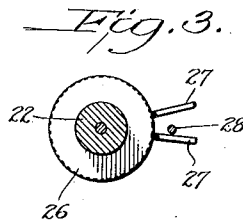
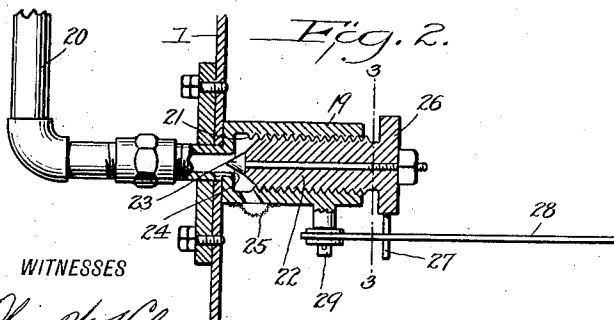
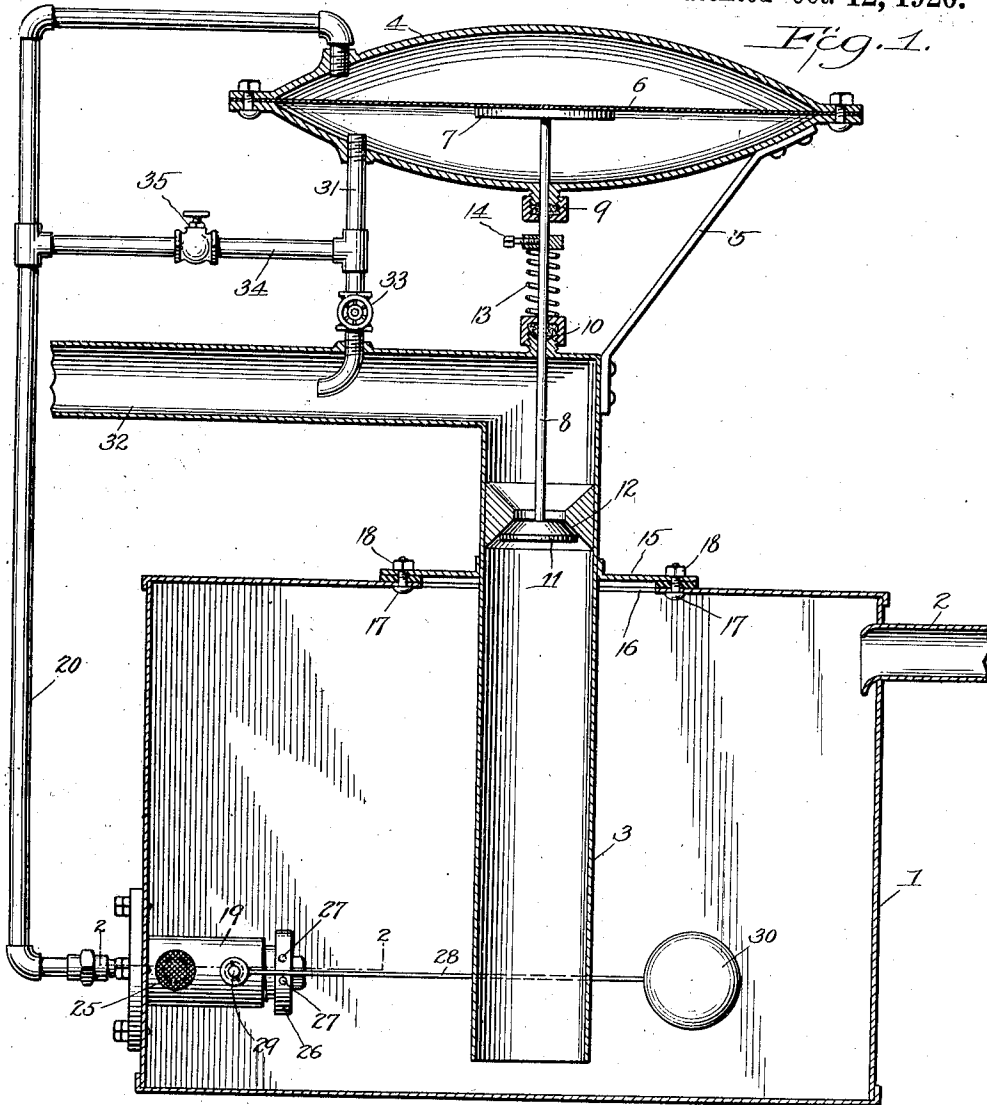


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TRAP.
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WITNESSES
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TRAP.

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To all whom it may concern:

Be it known that I, HENRY W. JUSTUS, a citizen of the United States, and a resident of Napanoch, in the county of Ulster and State of New York, have invented a new and Improved Trap, of which the following is a full, clear, and exact description.

This invention relates to improvements in traps, and more particularly to a trap for the water of condensation in any steam system, an object of the invention being to provide improved means for automatically discharging the water when it reaches a predetermined level, the operation being controlled by means of a diaphragm and the pressure of the water thereupon causing the opening of the valve in the main outlet and allows the water to be forced therethrough by the steam pressure and then automatically closes the said valve when the level of water falls to a predetermined point.

A further object is to provide a device of the character stated, which will be extremely simple in construction, which will be entirely automatic in its operation, and which will most efficiently perform the functions for which it is intended.

With these and other objects in view the invention consists in certain novel features of construction, and combinations and arrangements of parts, as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings—

Figure 1 is a view in vertical section illustrating my improvements;

Fig. 2 is an enlarged view in section on the line 2—2 of Fig. 1; and

Fig. 3 is a view in section on the line 3—3 of Fig. 2.

1 represents a tank having an inlet 2 through which the water of condensation from the system flows into the tank. 3 represents a main outlet which constitutes a vertical pipe extending into the tank and having its open inlet end located at a point slightly above the bottom of the tank. A diaphragm casing 4 is supported on the pipe 3 by means of a brace 5 and a diaphragm 6 in the casing 4 has a disk 7 secured thereto and a rod 8 secured to the disk and extends through stuffing boxes 9 and 10 on the casing 4 and pipe 3 respectively.

A valve 11 is secured to the lower end of the rod 8 and is adapted to engage a valve seat 12 in the pipe 3 to control the passage

therethrough. A coiled spring 13 is positioned around the rod 8 above the stuffing box 9 and exerts pressure on a collar 14 fixed to the rod 8 and operates to normally hold the valve in the closed position.

The pipe 3 is supported in tank 1 by means of a cover plate 15 which is secured over an opening 16 by means of bolts 17 and nuts 18 so as to permit ready access to the tank as occasion may require.

19 represents a cylindrical valve casing which is secured in the lower portion of tank 1 and communicates with a pipe 20, the latter at its upper end communicating with the upper portion of diaphragm casing 4. This valve casing 19 is internally screw threaded, as shown at 21, and a screw threaded valve plug 22 engages the threads 21 and is provided with a needle valve 23 adapted to engage the reduced end 24 of the valve casing and fully close the outlet.

The valve casing 19 has a screened inlet 25 through which the water from the tank passes in its passage into the pipe 20. The valve plug 22 is provided at its inner end with a head 26 having a pair of radially positioned pins 27 thereon which are adapted to be engaged by an arm 28. This arm 28 is pivotally connected to the casing 19, as shown at 29, and its free end carries a float 30.

A pipe 31 connects the lower portion of casing 4 with the horizontal discharge end 32 of outlet pipe 3 and a check valve 33 is provided in this pipe 31. A drain pipe 34 connects pipe 20 with pipe 31 and a needle valve 35 is located in pipe 34.

Fig. 1 illustrates the normal position of parts. As the water of condensation from inlet 2 accumulates in the bottom of tank 1, it will cause the float 30 to lift. This lifting action does not affect the valve 23 for some time because of the fact that there is a certain space between the pins 27, but as soon as the arm 28 engages the upper pin 27 it will cause the valve plug 22 to turn and in doing so will open the valve 23. When this valve is sufficiently opened, the steam pressure in tank 1 will force the water through the screened inlet 25 and up the pipe 20 into the upper portion of diaphragm casing 4 exerting a pressure on the diaphragm 6 to overcome the pressure of spring 13 and open valve 11. The water in the tank is then forced out through the pipe 3 until the level in the tank falls to a point

one inch above the bottom of pipe 3 and during this discharge of the water the float 30 will descend and gradually close the valve 23 tight.

5 The valve 35, having a permanent leak, soon relieves pipe 20 and diaphragm 4 of all pressure and allows the spring 13 to close valve 11 shutting off any further discharge from pipe 13. The trap is now ready
10 for another filling.

The pipe 31, as connected to the under portion of diaphragm casing 4, is utilized to insure an equilibrium of pressure on both sides of the diaphragm when float 30 is
15 down, and float valve 23 closed, so as to allow spring 13 to close valve 11 under all conditions.

I would have it understood that with my improved apparatus a free passage from
20 the top space of the diaphragm casing 4 to the discharge end 32 is maintained at all times by the adjustable needle valve 35 and the check valve 33. The flow of the water is as follows and is continuous as long as
25 there is water under the slightest pressure: from the space in the casing 4 above the diaphragm 6, through pipe 20 and pipe 34, past the needle valve 35 and through pipe 31, past the check valve 33 into the discharge end 32.
30

If, for any reason, a back pressure exists in pipe 32 which would not allow a free discharge as above described, the water would at once back up in pipe 31 and cause
35 a pressure in the lower space of the diaphragm casing 4 below the diaphragm 6. Pressure on both sides of the diaphragm then being equal, or nearly equal, the spring 13 will promptly close the trap valve 11.

40 The best results are had by opening the needle valve 35 just sufficiently to conduct away one-half of the water which the float valve 23 can supply when this valve is open. Naturally, the pressure builds up
45 in the pipe 20 in the top space of the diaphragm casing and continues to build up until the diaphragm is forced downwardly to open the valve 11.

Various slight changes may be made in
50 the general form and arrangement of parts described without departing from the invention, and hence I do not limit myself to the precise details set forth but consider myself at liberty to make such changes and
55 alterations as fairly fall within the spirit and scope of the appended claims.

I claim:

1. A trap of the character stated, comprising a tank having an inlet thereto, an
60 outlet pipe communicating with the lower portion of the tank, a diaphragm casing, a diaphragm in the casing, a valve in the outlet pipe, a rod connecting the diaphragm with said valve, a spring normally holding
65 the valve in closed position, and a float-con-

trolled valve in the tank controlling communication with the diaphragm casing.

2. A trap of the character stated, comprising a tank having an inlet thereto, an outlet pipe communicating with the lower
70 portion of the tank, a diaphragm casing, a diaphragm in the casing, a valve in the outlet pipe, a rod connecting the diaphragm with said valve, a spring normally holding the valve in closed position, a pipe connecting the lower portion of the tank with the upper portion of the diaphragm casing, and a float-operated valve controlling
75 communication between the tank and said last-mentioned pipe.

3. A trap of the character stated, comprising a tank having an inlet thereto, an outlet pipe communicating with the lower
80 portion of the tank, a diaphragm casing, a diaphragm in the casing, a valve in the outlet pipe, a rod connecting the diaphragm with said valve, a spring normally holding the valve in closed position, a pipe connecting the lower portion of the tank with the upper portion of the diaphragm casing, an
85 internally screw threaded valve casing communicating with the last-mentioned pipe, a screw threaded valve plug in said casing, a valve carried by the plug and adapted to control communication with said last-mentioned pipe, and a float controlling the position of the plug.
90

4. A trap of the character stated, comprising a tank having an inlet thereto, an outlet pipe communicating with the lower
100 portion of the tank, a diaphragm casing, a diaphragm in the casing, a valve in the outlet pipe, a rod connecting the diaphragm with said valve, a spring normally holding the valve in closed position, a pipe connecting the lower portion of the tank with the upper portion of the diaphragm casing, an
105 internally screw threaded valve casing communicating with the last-mentioned pipe, a screw threaded valve plug in said casing, a valve carried by the plug and adapted to control communication with said last-mentioned pipe, radially projecting pins carried by the plug, an arm pivotally connected to the valve casing and extending between the
110 pins, and a float on the free end of said arm.

5. A trap of the character stated, comprising a tank having an inlet thereto, an outlet pipe communicating with the lower
120 portion of the tank, a diaphragm casing, a diaphragm in the casing, a valve in the outlet pipe, a rod connecting the diaphragm with said valve, a spring normally holding the valve in closed position, a pipe connecting the lower portion of the tank with the
125 upper portion of the diaphragm casing, an internally screw threaded valve casing communicating with the last-mentioned pipe, a screw threaded valve plug in said casing, a valve carried by the plug and adapted to
130

control communication with said last-mentioned pipe, radially projecting pins carried by the plug, an arm pivotally connected to the valve casing and extending between the
5 pins, and a float on the free end of said arm, said valve casing having a screened inlet, and said last-mentioned valve fully controlling communication to the last-mentioned pipe.

10 6. A trap of the character stated, comprising a tank, a diaphragm casing, a dia-

phragm in the casing controlling the water outlet from the tank, a pressure pipe connecting the tank and casing, a drain pipe from the casing into the tank outlet, a
15 siphon nozzle on said pipe, a pipe connecting the pressure and drain pipes, and a valve in said last-mentioned pipe controlling the drain from the pressure pipe and equalizing the back pressure.

HENRY W. JUSTUS.