

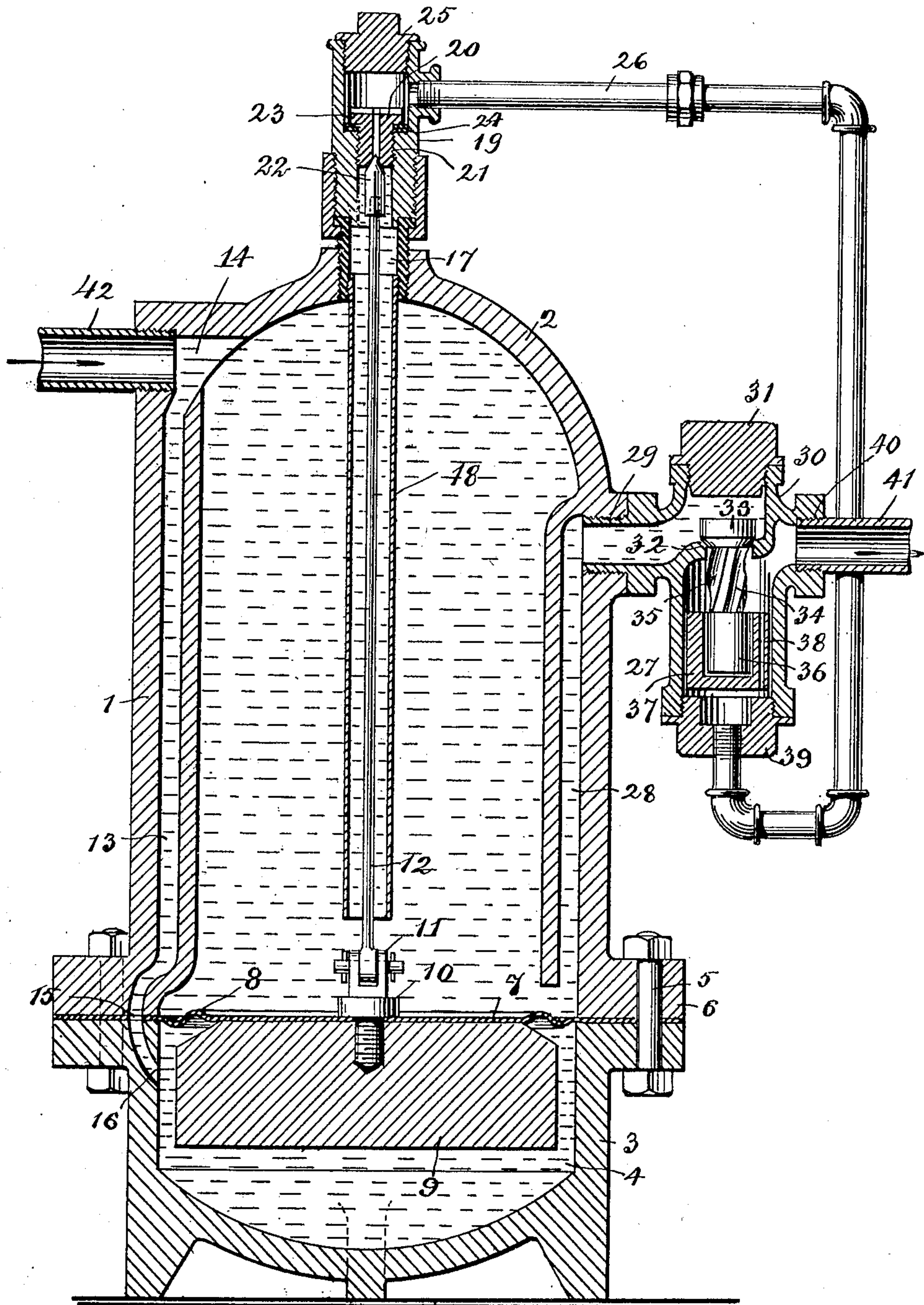
G. M. HILGER.

STEAM TRAP.

APPLICATION FILED JULY 18, 1908.

913,498.

Patented Feb. 23, 1909.



WITNESSES

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GEORGE MICHAEL HILGER, OF CHICAGO, ILLINOIS.

STEAM-TRAP.

No. 913,498.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed July 18, 1908. Serial No. 444,222.

To all whom it may concern:

Be it known that I, GEORGE MICHAEL HILGER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Steam-Trap, of which the following is a full, clear, and exact description.

This invention relates to steam traps.

10 An object of the invention is to produce a steam trap which shall be of simple construction and positive in its action.

A further object of the invention is to provide means whereby the main outlet valve will operate in daily use to maintain itself ground upon its seat, and to provide improved means for adjusting the seat of the pilot valve which controls the operation of the main valve.

20 The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawing forming a part of this specification, in which the figure is a vertical section through a steam trap constructed according to my invention.

Referring more particularly to the parts, 30 1 represents the body of the trap which is in the form of a cylindrical shell having a rounded upper end or dome 2. This body 1 is seated upon a base 3 having a chamber 4 therein. The parts 1 and 3 are attached together by means of bolts 5 passing through flanges 6 formed on the body and on the base, and between these flanges there is clamped rigidly a diaphragm 7 having circumferential corrugations 8, as shown. At 40 the central point of this diaphragm, a weight 9 is attached on the under side, and disposed within the chamber 4. This weight is attached by means of a bolt 10, the upper portion of which is formed into a knuckle 11 for the attachment of a valve stem 12 which 45 extends upwardly in the trap for a purpose which will appear hereinafter.

On its left side the shell is formed with a vertical duct 13 which leads downwardly 50 from an inlet opening 14, which opening 14 is disposed at the dome 2, as shown. This duct 13 communicates with an opening 15 formed in the clamped portion of the diaphragm, and also communicates with a duct 55 16 which leads from this point to the chamber 4. The dome 2 is provided on the cen-

tral axis of the shell 1 with a threaded nipple 17, at the lower end of which a suction tube 18 is provided. This tube extends downwardly within the trap and surrounds the 60 valve stem 12, as shown. To the nipple 17 a valve body 19 is attached, said valve body having a removable valve seat 20 in the form of a plug, which screws into the threaded bore 21 of the valve body, as indicated. The 65 lower end of this plug 20 is formed into a conical seat to receive the conical end of a needle or valve head 22 which is attached to the upper end of the stem 12. The upper end of the plug 20 is enlarged so as to form 70 a projecting head with an annular shoulder 23. Under this head a plurality of washers 24 are placed, and the number of these washers used determines the position of the conical seat for the valve head or needle 22. 75

The valve 19 is of cylindrical form and is closed at its upper end by a removable plug or cap 25. From the side of the valve body 19, a pipe 26 extends and this pipe leads to a main valve casing 27. The valve 33 within 80 this casing is operated through the medium of the valve 22 so that the valve 22 may be considered as a pilot valve. On the right side of the shell 1, a vertical duct 28 is formed in the wall of the body, and communicates 85 with the interior of the trap just above the diaphragm 7. In the upper portion of the casing 27 an outlet 29 is formed from this duct 28, and at this outlet, the valve casing 27 is attached. The valve 27 has a sub- 90 stantially cylindrical body 30, the upper end of which is closed by a removable cap 31. Near the middle portion of the body 30, a valve seat 32 is formed, upon which there is seated a valve 33. This valve extends 95 downwardly through the valve opening and is formed with a guide stem 34 which is provided with flutes 35 of helical form for a purpose which will appear hereinafter. The lower end of the stem 34 is formed into a 100 plain cylindrical neck 36 which seats in the bore in the piston 37, said piston being slidably mounted in the lower portion of the valve body, as indicated. This piston is provided with a vertically disposed vent 38 105 through which communication is made from the lower side to the upper side of the piston. The lower end of the valve 27 is closed by a removable cap head 39, and to this cap head the aforesaid pipe 26 is attached, as shown. 110 The valve body 30 is provided with an outlet 40 just below the valve 33 and to this outlet

the delivery pipe 41 is attached. To the inlet opening 14, a feed pipe 42 is attached which conducts the water of condensation to the trap.

5 The mode of operation of the steam trap will now be described: The water of condensation enters the trap by the pipe 42 and descends by the duct 13 into the chamber 4. In this connection it should be observed that
10 the pipe 42 does not project into the trap sufficiently to cover the upper end of this duct. The pressure of this water on the under side of the diaphragm 7 assists in maintaining the valve head 22 upon its seat.
15 After the duct 13 and the chamber 4 have become filled with water, the water commences to accumulate in the interior of the body 1 above the diaphragm. When the weight of this water above the diaphragm
20 becomes sufficient it will depress the diaphragm 7 and open the valve 19 by drawing the stem 12 downwardly. The water then passes upwardly through the plug 20 and through the pipe 26 to the under side of the
25 piston 37. This raises the piston, which raises the valve 33, and a flow of water then takes place from the body through the duct 28. After passing the valve 33 this water finds outlet through the delivery pipe 41.
30 In passing the valve 33 the helical form of the flutes 35 operates in such a way that the current of water will rotate the valve 33. In this way it will always come upon its seat by a rotary movement which tends to grind
35 the valve and keep it fitting nicely upon its seat. Whenever the position of the valve seat or plug 20 is to be changed or adjusted to suit the needle 22, it is only necessary to remove the cap 25 and place the proper
40 number of washers 24 under the head of the plug. The vent 38 has the effect of relieving the pressure upon the under side of the piston so that the pressure becomes unbalanced and the piston will seat itself again.
45 Also as soon as the weight of the water becomes removed from the upper side of the diaphragm 7, it will return to its normal position and the valve 19 will become closed. In connection with the operation of the
50 piston 37, attention is called to the fact that the area of this piston is greater than that of the upper end of the valve 33.

Having thus described my invention, I claim as new and desire to secure by Letters
55 Patent,—

1. A steam trap having a base, a body seated thereupon, a diaphragm disposed across said body and clamped between the same and said base so as to form a chamber
60 therebelow within said base, a pilot valve mounted in the upper end of said body, a suction tube extending down from said valve and into the interior of said body and pro-

jecting to a point near said diaphragm, a stem having a head adapted to close said
65 pilot valve extending downwardly in said suction tube and attached to said diaphragm, a main outlet valve from said body, a piston adapted to raise said main outlet valve, and
70 a pipe connection from said pilot valve to said main valve admitting water under said piston to raise said main valve.

2. A steam trap having a base, a body seated thereupon, a diaphragm disposed
75 across said body and clamped between the same and said base so as to form a chamber therebelow within said base, a pilot valve mounted in the upper end of said body, a suction tube extending down from said valve and into the interior of said body and pro-
80 jecting to a point near said diaphragm, a stem having a head adapted to close said pilot valve extending downwardly in said suction tube and attached to said diaphragm,
85 a main outlet valve from said body, a piston adapted to raise said main valve outlet, and a pipe connection from said pilot valve to said main valve admitting water under said
90 piston to raise said main valve, said main valve having a swivel connection with said piston and having a helically fluted stem adapted to be rotated by the current of
95 escaping water at said valve.

3. A steam trap having a base, a body mounted thereupon, a diaphragm between
95 said body and said base, a pilot valve adapted to be opened by the downward movement of said diaphragm, a main valve through which the water escapes from said body, said valve having a helically fluted
100 stem adapted to be rotated by the water in escaping, a piston having a swivel connection with said main valve, and means for admitting water to the underside of said piston from
105 said pilot valve.

4. A steam trap having a body, a diaphragm therein, a pilot valve actuated by
110 said diaphragm, a main valve past which the water from said body may flow, said main valve having a flute plug adapted to be rotated by the water in flowing past said
115 main valve, a piston receiving the lower end of said valve and of greater area than said valve, and a pipe connection leading to said piston and connecting with said pilot valve,
120 said piston having a vent leading there-through opening communication from the lower to the upper side thereof.

In testimony whereof I have signed my name to this specification in the presence of
two subscribing witnesses.

GEORGE MICHAEL HILGER.

Witnesses:

JAMES PETERSEN,
WM. J. HOLTON.