(No Model.)

F. LAMPLOUGH.

STEAM TRAP.

No. 590,895. Patented Sept. 28, 1897.

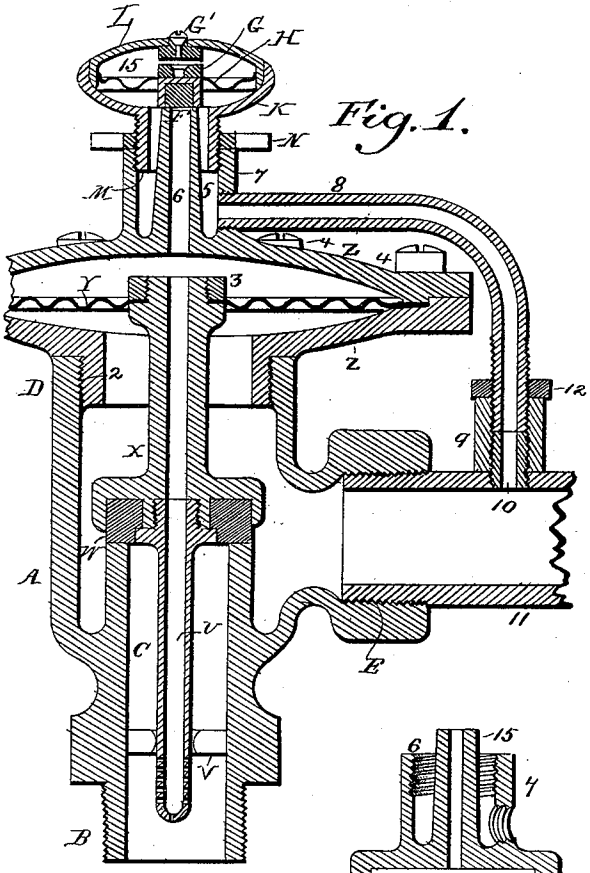


Fig. 1.

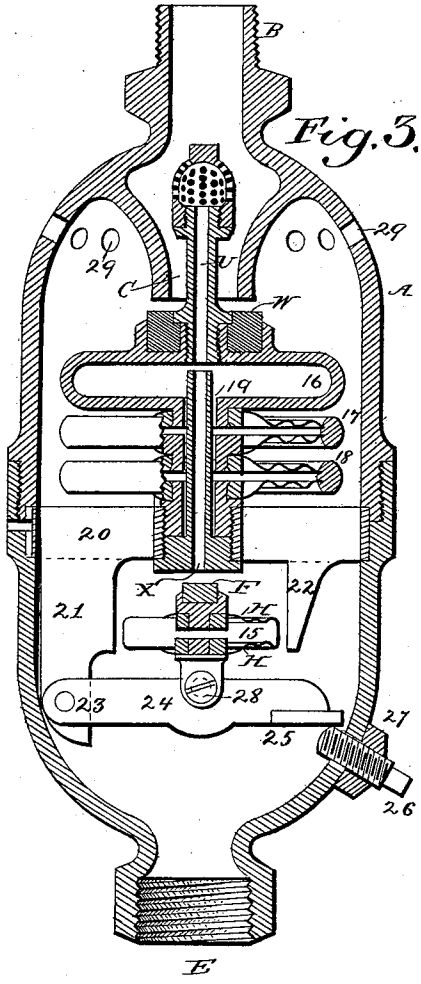


Fig. 3.

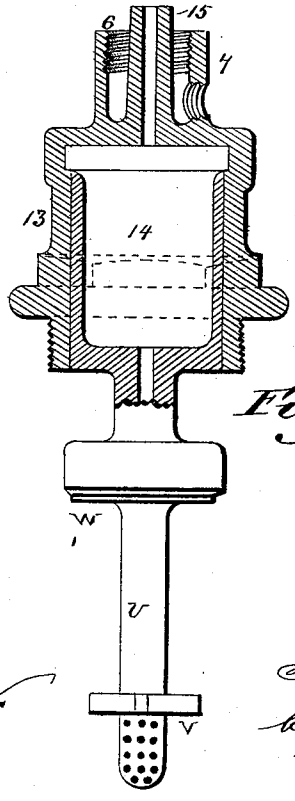


Fig. 2.

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UNITED STATES PATENT OFFICE.

FREDERICK LAMPLOUGH, OF GLEN RIDGE, NEW JERSEY.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 590,895, dated September 28, 1897.

Application filed September 25, 1895. Renewed August 13, 1897. Serial No. 648,160. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK LAMPLOUGH, a citizen of the United States, residing at Glen Ridge, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Steam-Traps; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to that class of traps employed where it is desirable to permit the escape of liquids, such as water of condensation, and prevent the escape of vapor or gas, such as steam.

My improved trap depends in its operation upon the principle of the movement caused by expansion and contraction under changes of temperature, a closed chamber containing alcohol or other suitable substance being the means employed.

My invention consists in the novel construction, combination, and arrangement of parts hereinafter described and claimed.

Referring to the accompanying drawings, Figure 1 is a vertical transverse sectional view of my improved trap. Fig. 2 is a view, partly in section, of a modified form of the pressure-chamber; and Fig. 3 is a vertical transverse sectional view of another modification.

Referring to Fig. 1, the body of the trap is preferably formed, as at A, with a screwed inlet at B, a central passage at C, and a screwed outlet E. Upon the part of the body D is secured a chamber composed of two parts Z Z. The parts Z Z are preferably held together with screws 4, which also bind the periphery of a diaphragm Y between said parts Z Z. The center of the diaphragm Y is fixed to a valve W by means of a screw connection 3, and the extension of said valve U X may be hollow. One part Z is provided with a tubular piece 5, with a passage 6 therethrough, and the extension U of the valve W projects into the passage C and passes through a guide V therein and has a perforated end, as shown. An outlet-pipe 11 is screwed into the screwed portion E of the chamber A, and a by-pass pipe 8 is arranged between the extension 7 of chamber Z Z and the outlet-pipe 11, a suitable nipple 10, coupling 9, and locknut 12 being provided to connect the by-pass pipe 8 with the outlet 11. The chamber Z Z is provided with an extension 7, into which is screwed an extension M on the case K, which, together with a cap L, provided with a screw G′ in its center, forms a closed chamber 15, which is provided with a flexible diaphragm H. The center of this diaphragm is connected to a suitable valve F by a screw G, while the periphery of the said diaphragm is fixed to the case K and the cap or cover L. The space between the diaphragm H and cover L is partly filled with alcohol as preference, and the extension M of the case K can be adjusted and locked by the nut N, so as to give proper regulation to the movement of the valve F, which seats itself upon the annular extension 5, projecting from the case Z within the extension 7.

The operation of the trap is as follows: The valve F, having been properly adjusted by means of the screwed extension M and locknut N and the steam-pipe connected to the inlet B, the heat of the steam passing through the passage V^6 will volatilize the alcohol in the chamber 15, which in expanding will distend the said diaphragm, so that the valve F will close the orifice 6. When the passage 6 is closed by said valve F, pressure accumulates at the back of the diaphragm Y, forcing said diaphragm, together with the valve W, against the end of passage C, and so closing the passage. When the chamber 15 cools, the valve F opens the passage 6, which is the same size as the passage in the extensions U X of the valve W. The steam is therefore liberated from behind the diaphragm Y and through the by-pass 8 as quickly as it passes through the passage through the extensions of the valve W. The said diaphragm therefore assumes its original position and opens the valve W. The discharge of the water of condensation then takes place and continues until the diaphragm H again comes into operation.

Fig. 2 shows a modification of Fig. 1, wherein a piston 14 is formed on the extension X of the valve W, said piston working in a cylinder 13, with a screwed extension 7, with

tubular part 5, and passage 6, as hereinbefore described. It will be readily understood that the action is the same as described with reference to the diaphragm Y.

Fig. 3 is another modification of the steam-trap, in which the alcohol-chamber is situated at 15 and is preferably formed with an elastic case, so as to act as if it were composed of two diaphragms H, joined at their peripheries. The body of the trap is A, with an inlet B, outlet E, and passage C. The body of the trap A is preferably made in two parts, as shown, for the purpose of fixing the ring 20, as hereinafter described. The second valve W has hollow extensions U, a rigid chamber 16, and two flexible chambers 17 and 18, formed similarly to chamber 15. The valve W and its adjuncts, as well as the valve F, are carried by the ring 20, as shown. A passage 19 makes connection between the chambers 16, 17, and 18, while the central passage X opens out against the valve F. The chamber 15 is carried by a pin 28 on the lever 24 and is guided by the projections 21 and 22, and at the other end has a plate 25 in contact with an adjusting-screw 26, which is fitted with a suitable lock-nut 27, for the purpose hereinbefore described.

It will be readily understood that the action of this trap is similar to that described with reference to Fig. 1, except that the condensation of the alcohol is accelerated by the current of air induced through the outlet E and the holes 29 in the case A. The chamber 16 will form a condenser and so keep the flexible chambers 17 and 18 charged with water, which will pass down the passage 19 thereto. The life of the diaphragm is thus much lengthened. One chamber 17 may be employed, or more than the two, as shown, according to the sensitiveness desired.

It will be obvious that any other suitable expansive medium may be employed besides alcohol, whether solids or hermetically-sealed liquids.

The chamber 15, as described with reference to Fig. 1, can be arranged for using it and the valve F as a stop-valve, when required.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a steam-trap, the combination with the body A, having the internal passage C, of the casing Z, mounted on the body A and formed with a central tubular extension 7, having an internal nozzle 5, an expansion-chamber 15, mounted on said tubular extension, a diaphragm H, fitted within said chamber 15, and carrying a valve F, to close and open the end of nozzle 5, a diaphragm Y, fitted to the chamber or casing Z, and a tubular stem U X carried by said diaphragm, and provided with a valve to close and open communication between passage C and trap-outlet E, and a by-pass pipe 8, leading from the extension 7, to the outlet E, substantially as described.

2. In a steam-trap, the combination with an expansion-chamber having a diaphragm and an attached valve adapted under expansion to close an outlet for water of condensation, of a second chamber containing a diaphragm so arranged as to be acted upon by accumulation of steam-pressure and connecting with a valve which is also adapted and arranged to close a similar outlet, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 27th day of August, 1895.

F. LAMPLOUGH.

Witnesses:
F. H. E. SHIPTON,
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