No. 630,308. Patented Aug. 1, 1899.

A. J. BAYLEY.

STEAM TRAP.

(Application filed Oct. 21, 1898.)

(No Model.)

Fig. 1.

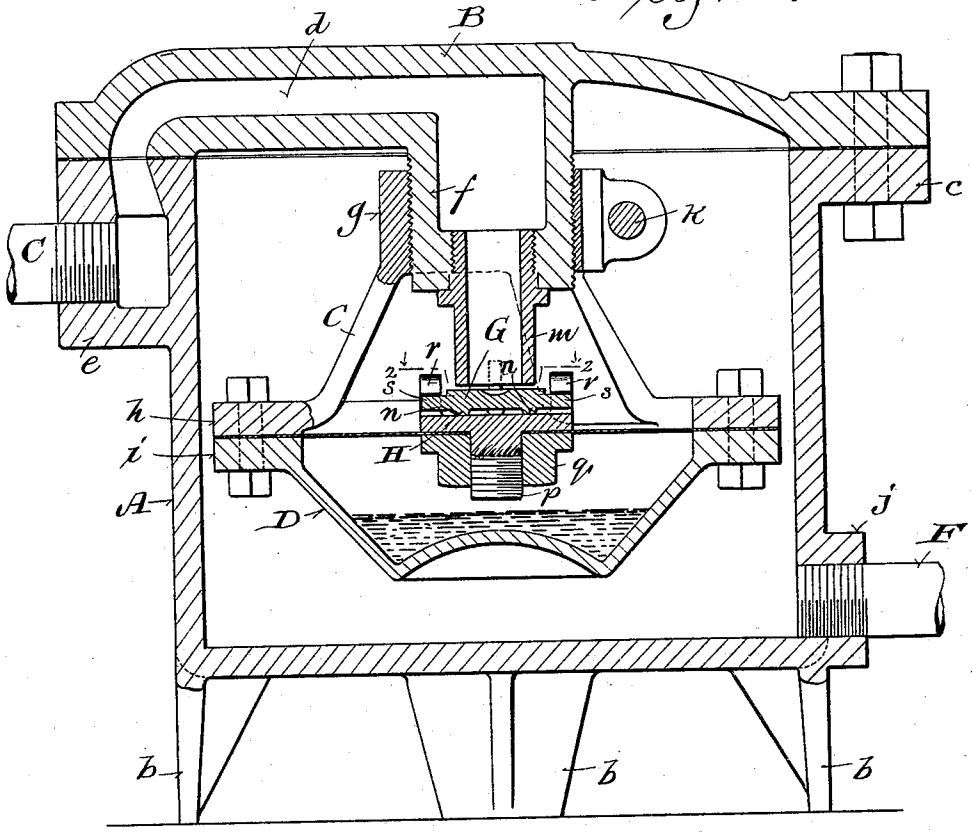


Fig. 2.

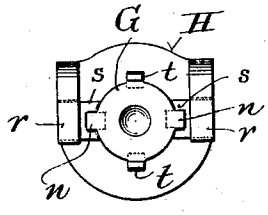
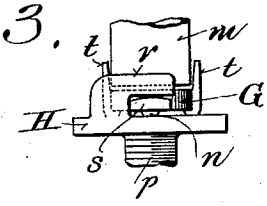


Fig. 3.



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UNITED STATES PATENT OFFICE.

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STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 630,308, dated August 1, 1899.

Application filed October 21, 1898. Serial No. 694,158. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR J. BAYLEY, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Steam-Traps; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its object to provide simple, economical, and sensitive steam-traps. Therefore it consists in certain peculiarities of construction and combination of parts hereinafter particularly set forth with reference to the accompanying drawings and subsequently claimed.

Figure 1 of the drawings represents a sectional view of a steam-trap constructed according to my invention; Fig. 2, a detail plan view of a valve and a holder for the same, constituting parts of the trap, the view being indicated by line 2 2 in the preceding figure; and Fig. 3, a detail side elevation of said valve and holder.

Referring by letter to the drawings, A represents a cylindrical pot having legs *b* and an upper annular flange *c*, the latter constituting a support for a cover B in detachable steam-tight connection therewith. The cover B is provided with a passage *d*, communicating with a hollow outside protuberance or chamber *e* of the pot-wall, and a pipe C is shown in screw-thread connection with said protuberance. The aforesaid passage is open to a hollow cylindrical boss *f*, depending from the center of cover B, and in adjustable screw-thread connection with the exterior of this boss is the preferably split neck *g* of a skeleton frame C, having a horizontal ring portion *h* thereof bolted to an annular flange *i* of a cup D against an interposed expansible diaphragm E, the proportions of said frame and cup being such that the latter is suspended in the aforesaid pot above a port-boss *j* at the bottom thereof, with which a pipe F is shown connected. By tightening a bolt *k*, engaging ears (only one being shown) extending laterally from neck *g* of frame C, the latter is made fast in adjusted position.

The bottom of cup D is preferably dome-shaped, as herein shown, and contained in said cup is a liquid, the latter being preferably one that has greater expansion than water at a known temperature, although water or water mixed with other liquid may be utilized, according to the pressure it is desirable to exert upon diaphragm E from within the aforesaid cup at a predetermined temperature.

In screw-thread union with the lower end of depending hollow boss *f* of pot-cover B is a nipple *m*, that constitutes an extension of said boss, and a flat valve G, controlling the nipple, is shown provided with stilts *n* at rest on a disk H, having a screw-threaded shank *p*, extended through a corresponding aperture in diaphragm E and engaged by a clamp-nut *q*, the upper face of said disk being provided with hook-arms *r*, overhanging lateral lugs *s* of the valve, the hook-opposing faces of these lugs being preferably convex to facilitate seating of said valve. By means of prongs *t* rising from its face the valve is centered with respect to the nipple *m* aforesaid.

The preferred construction of the cup D, as herein shown, renders the liquid therein as sensitive as possible and also makes it possible to use but a small quantity of said liquid to obtain satisfactory results, while at the same time provision is had for rapid condensation of the aforesaid liquid owing to the amount of surface exposed to external influences.

Either the pot protuberance *e* or pot-boss *j* may be the inlet of the trap and the other the outlet; but I deem it preferable to have said protuberance as the inlet and said boss as the outlet.

Assuming the pipe C to be a part of heating-coils or other steam-using apparatus, water of condensation from said pipe will flow through the pot-cover passage *d*, find its way out of the open lower end of nipple *m*, and finally escape through pipe F; but upon entrance of steam into the pot the liquid in cup D will boil and thereby generate a pressure against diaphragm E sufficient to seat the valve G against said nipple, the latter remaining in this position until said liquid again condenses. Therefore it follows that there are seating and unseating of said valve at such intervals that flow of water from the trap is practically continuous without loss of steam.

Should the pipe F be a part of a steam-using apparatus, the steam that follows the water of condensation into pot A of the trap

will cause expansion of the liquid in cup D to thereby effect seating of valve G to cut off nipple *m* and prevent loss of steam from said trap. Now if the water of condensation accumulates in the pot until the latter is partially filled the temperature of this water and exposed surface of cup D will cause condensation of the cup contents, thus reducing the pressure below diaphragm E to a less degree than that above the same. Consequently the valve G will be brought away from nipple *m* to permit escape of said water through said nipple, pot-cover passage *d*, pot protuberance *e*, and the pipe C aforesaid.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A steam-trap comprising a pot having an upper apertured chamber and lower orifice for connection with pipes, a steam-tight pot-cover provided with a passage in communication with said chamber, a hollow boss depending from the pot-cover open to said passage, a skeleton frame hung from the boss, a liquid-cup in connection with the frame, an expansible diaphragm arranged to constitute a cup-cover, and a valve arranged in connection with the diaphragm to constitute a cut-off for the aforesaid boss.

2. A steam-trap comprising a pot having an upper apertured chamber and lower orifice for connection with pipes, a steam-tight pot-cover provided with a passage in communication with said chamber, a hollow boss depending from the pot-cover open to said passage, a skeleton frame in vertically-adjustable connection with the boss, a liquid-cup in connection with the frame, an expansible diaphragm arranged to constitute a cup-cover, and a valve arranged in connection with the diaphragm to constitute a cut-off for the aforesaid boss.

3. A steam-trap comprising a pot having an upper apertured chamber and lower orifice for connection with pipes, a steam-tight pot-cover provided with a passage in communication with said chamber, a hollow boss depending from the pot-cover open to said passage, a skeleton frame having a split neck in screw-thread connection with the boss and provided with ears engaged by a clamp-bolt, a liquid-cup in connection with the frame, an expansible diaphragm arranged to constitute a cup-cover, and a valve arranged in connection with the diaphragm to constitute a cut-off for the aforesaid boss.

4. A steam-trap comprising a pot having an upper chamber and lower orifice for connection with pipes, a steam-tight pot-cover provided with a passage in communication with said chamber, a hollow boss depending from the pot-cover open to said passage, a depending nipple in screw-thread connection with the boss to constitute an extension of same, a liquid-cup suspended from the boss, an expansible diaphragm arranged to constitute a cup-cover, and a valve in connection with the diaphragm opposite the nipple extension of the aforesaid boss.

5. A steam-trap having a flat valve provided with stilts, centering-prongs and lateral lugs; a valve-holder comprising a disk having hook-arms engaged by the valve-lugs, and suitable means for seating and unseating the valve.

6. A steam-trap having a flat valve provided with stilts, centering-prongs and lateral lugs; a valve-holder comprising a disk having hook-arms engaged by the valve-lugs, and an expansible diaphragm in connection with a shank of the valve-holder.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

ARTHUR J. BAYLEY.

Witnesses:
N. E. OLIPHANT,
B. C. ROLOFF.