(No Model.)

R. NEWTON.
Steam Trap.

No. 233,004. Patented Oct. 5, 1880.

Fig. 1.

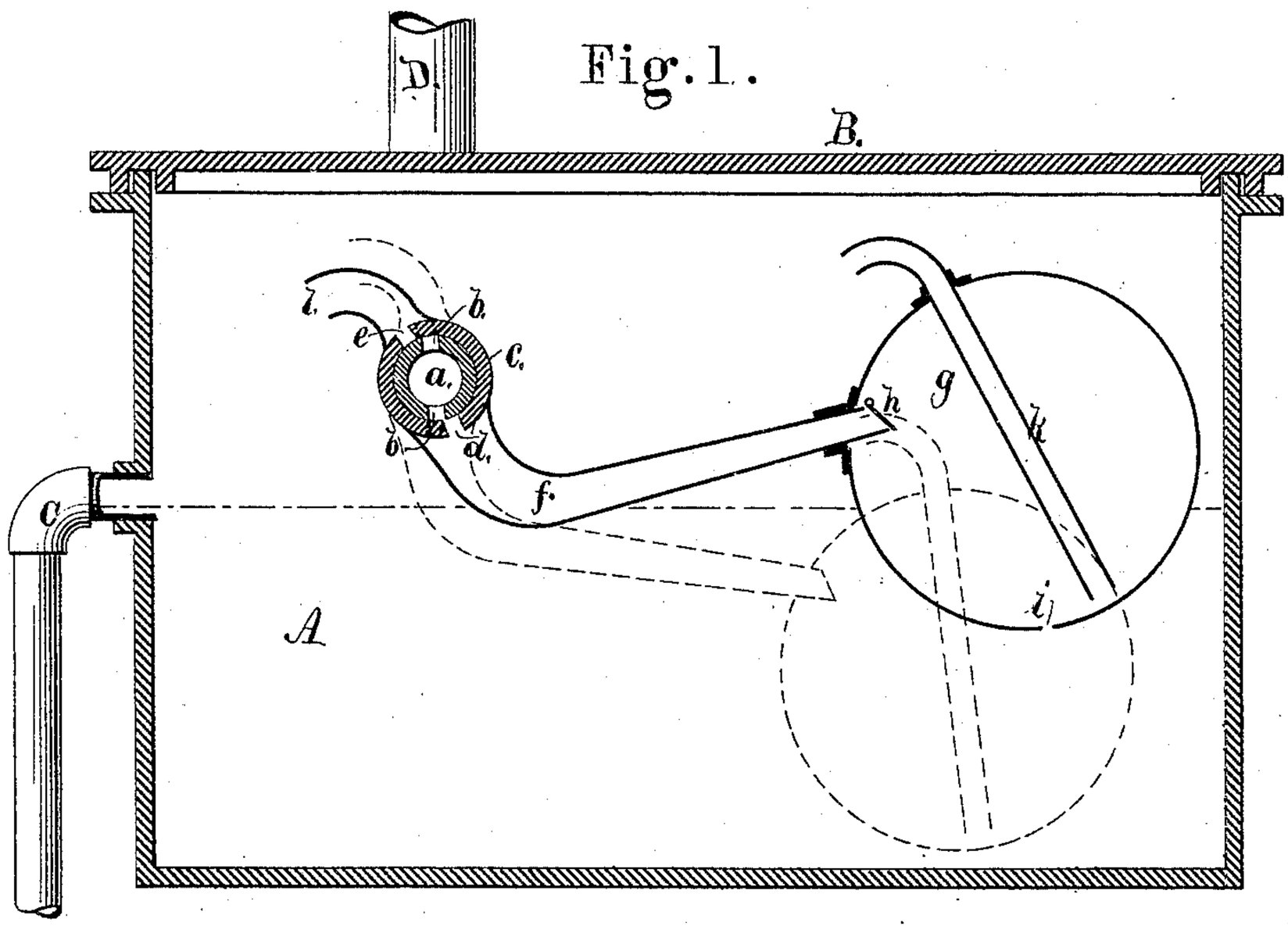


Fig. 2.

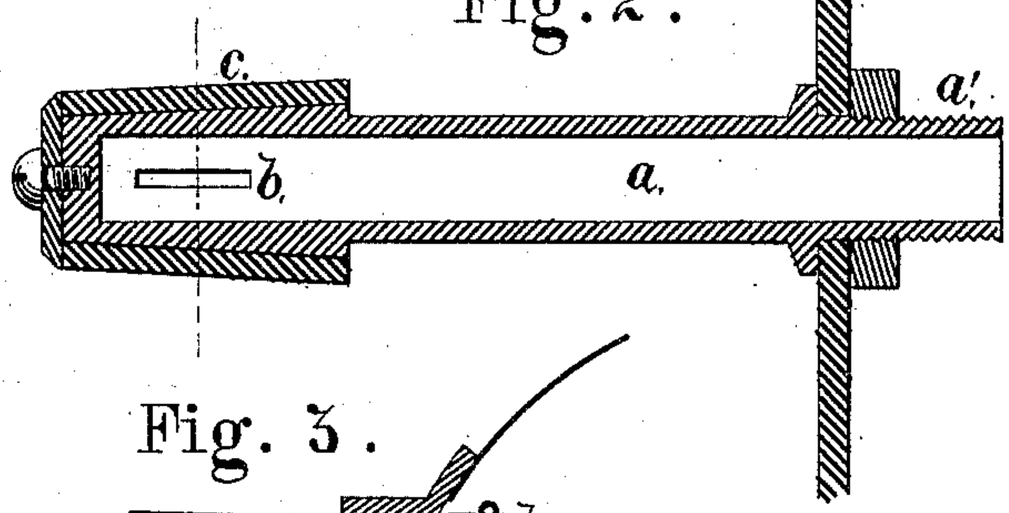


Fig. 3.

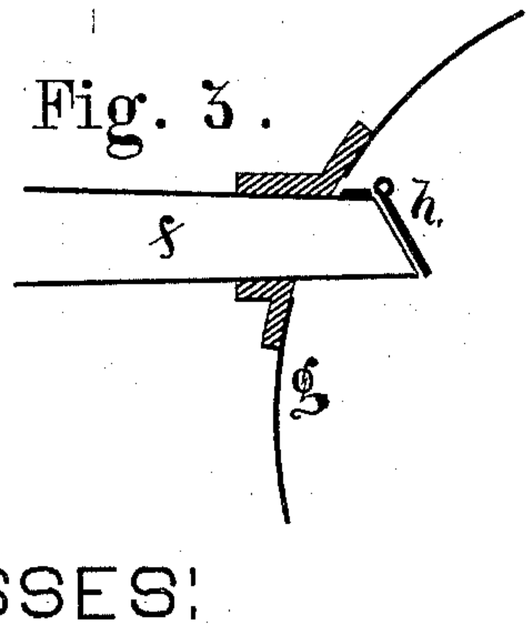
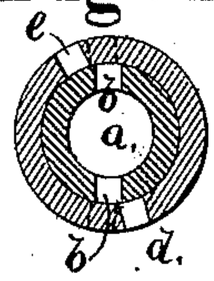


Fig. 4.



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UNITED STATES PATENT OFFICE.

ROBERT NEWTON, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO BARNARD COLLINGHAM, OF SAME PLACE.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 233,004, dated October 5, 1880.

Application filed May 12, 1880. (No model.)

To all whom it may concern:

Be it known that I, ROBERT NEWTON, of the city and county of Providence, and State of Rhode Island, have invented a new and useful Improvement in Steam-Traps; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improvement in a steam trap or device used to withdraw the water from steam-pipes without the loss of steam.

The object of this invention is to expel the water of condensation from steam-pipes without loss of steam automatically and prevent the entrance of water into the pipes from the steam-trap.

The invention relates more particularly to that class of steam-traps in which the pipe to be drained is connected with a hollow valvular spindle arranged in a box and supporting a tubular discharging device operated by a perforated float to open and close the valve or ports in said spindle; and the improvement herein claimed consists in a flap or gate valve connected to said hollow or tubular discharging device within the float and operating automatically to prevent siphoning of the box or trap.

Figure 1 is a sectional view of my improved steam-trap, showing the float in the position occupied when the outlet is closed in solid lines, and also the position when open in broken lines. Fig. 2 is a sectional view of the hollow spindle through which the water is discharged, showing the ports and the bearing of the float and discharge-pipe. Fig. 3 is an enlarged sectional view of the outlet within the float, showing the valve to prevent the entrance of water. Fig. 4 is a cross-section of the spindle, showing the ports in the spindle, and also the ports connecting with the hollow arm of the float.

In the drawings, A represents a box or case into which the water of condensation is to be discharged. B is the cover of the box A, and C is the discharge-pipe, by which the water is withdrawn at such a height as will maintain a fixed water-level within the box A.

a represents a hollow spindle, one end of which is closed, and near the closed end two ports, *b b*, are fixed for the discharge of water.

The spindle *a* is firmly secured to one side of the box and projects horizontally, so as to form a bearing for the discharge-pipe and float. The hollow spindle also projects outside of the box A, and is provided with a screw-thread at *a'*, by which the same is connected with the steam-pipe to be controlled.

c is a sleeve surrounding the end of the hollow spindle *a*. It is provided with two ports, *d* and *e*, and these ports are so situated that the port *d* will come first opposite to the lower one of the two ports *b b* in the spindle *a*, and the port *e* will be opposite the upper port, *b*, when the port *d* is nearly or quite open.

The object of this arrangement of giving a certain amount of lap to the port *e* is to discharge the water from the port *d*, but allow of the discharge of any air in the pipes after the water has been discharged.

f is a curved hollow arm, into which the water from the port *d* flows. It is connected with or forms part of the sleeve *c*.

The other end of the arm *f* is secured to the spherical float, and within the float is provided with the self-closing valve *h*, preferably a hinged gate-valve; but any other valve that will open and close readily can be used.

At the lower portion of the spherical float a small hole, *i*, is made, so that a limited quantity of water can enter the float and allow the same to sink gradually.

k is a pipe inserted into the spherical float, so that its lower open end will nearly reach the surface of the float. The upper end is bent so as to direct the discharged water and prevent it from striking the cover.

l is the curved air-discharge pipe, connected with the sleeve *c* and forming an outlet from the port *e*.

The operation of the device is as follows: When the whole is connected with the steam-pipe to be drained, and water is placed in the box A up to the discharge-pipe or overflow, the float will be at first in the position shown in solid lines in Fig. 1, or rather a little above this position. A small quantity of water will enter the float by the hole *i*, and the

float will sink very slowly until the port *d* will connect with the lower port, *b*. The steam from the pipe or pipes will now enter the arm *f* and pass into the spherical float, (taking for granted that no water has been condensed,) and this steam, by its pressure, will expel the water in the sphere by the small hole *i* and the pipe *k*. The sphere being relieved of the weight of water will rise, shut off the steam by closing the lower port, and will commence to sink again by the water entering the sphere through the hole *i*.

Considering that water has now been condensed in the pipe or pipes to be drained, when the sphere *g* has again descended enough to open the port the water will rush into the spherical float and the float will sink rapidly, and when filled with water the pressure of steam following the water will discharge the same through the pipe *k* and the hole *i;* and when all the water has been discharged the steam will empty the spherical float, it will rise and close the outlets, as before, and this device will so continue automatically to discharge the water from the pipes into the box A, from whence it flows through the pipe C.

It will be seen that the small hole *i* performs a most important function in the certain and gradual opening of the outlet-port.

In steam-traps of this construction, when the steam is shut off from the pipes which are used at night the condensation in the pipes is liable to produce a sufficient vacuum to draw the water from the box A into the pipes. To prevent this I place the valve *h* on the end of the discharge-pipe and provide the port *e* and outlet *l*. When, now, the float is sunk to or near the bottom no water can enter the arm *f*, while water can run from the same, and any air in the pipes can freely escape by the pipe *l*.

This steam-trap requires no adjustment, is not liable to derangement, and the movement of the sleeve *c* on the spindle *a* is so slight that it is not liable to wear. There is no pressure in the case A, as all the air or steam can freely escape by the pipe D in the cover, or, if preferred, in the side of the box A near the cover, in which case the cover can at any time be removed and the working observed.

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

In a steam-trap having a vessel, A, a float, *g*, provided with an opening, *i*, and discharge-tube *k*, and the hollow arm *f*, connected with and vibrating upon a ported or valvular hollow spindle, *a*, the valve *h*, arranged within the float upon the mouth of the arm *f*, all constructed and arranged substantially as and for the purpose described.

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