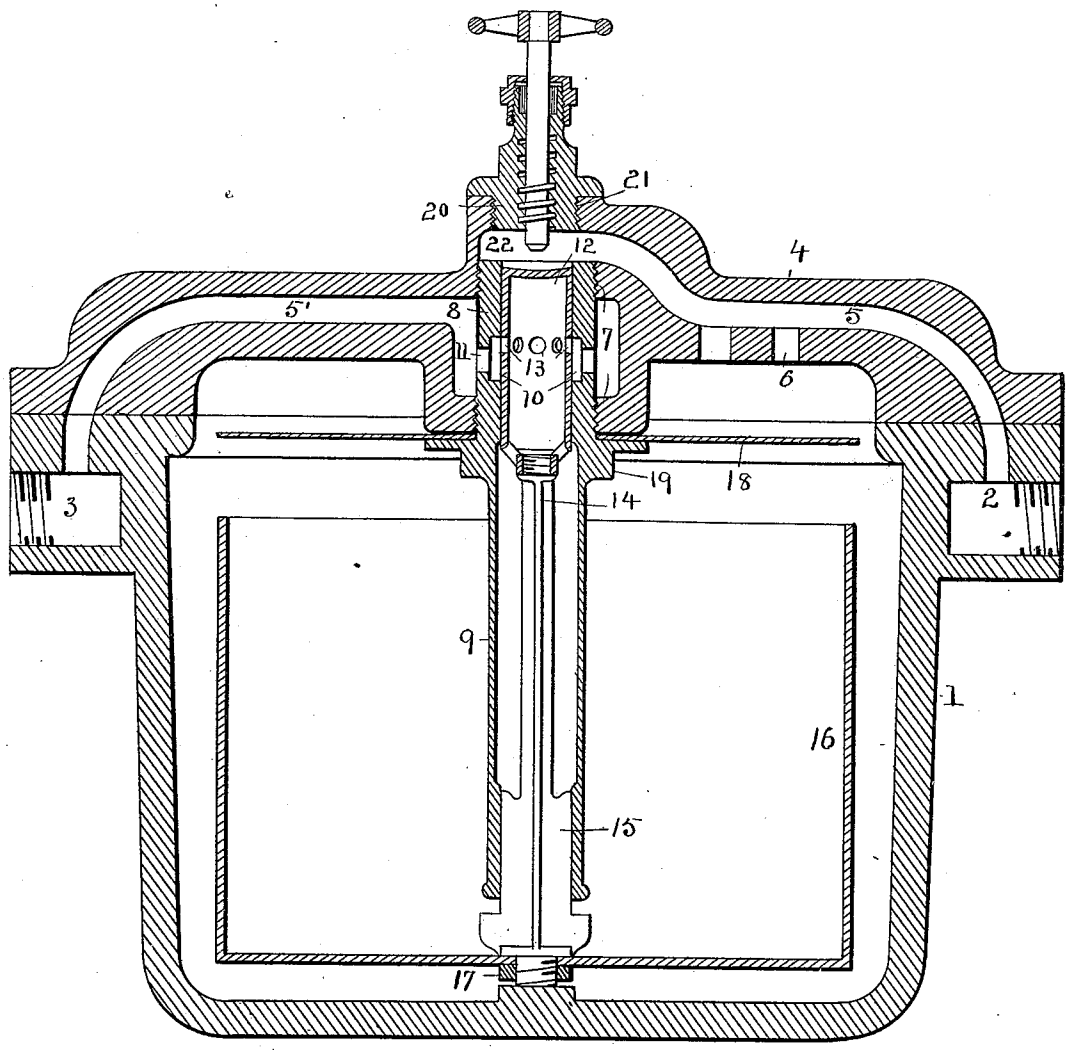
(No Model.)

R. R. LEITCH.

STEAM TRAP.

No. 508,727. Patented Nov. 14, 1893.

Fig. 1.



Witnesses
Norris A. Clark.
George B. Cook.

Inventor
R. R. Leitch.
By his Attorneys
Dyer & Seely.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT R. LEITCH, OF BALTIMORE, MARYLAND.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 508,727, dated November 14, 1893.

Application filed July 28, 1892. Serial No. 441,449. (No model.)

To all whom it may concern:

Be it known that I, ROBERT R. LEITCH, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented a certain new and useful Improvement in Steam-Traps, of which the following is a specification.

The present invention relates to steam traps designed to remove water of condensation from steam pipes. The invention constitutes an improvement on the well-known Nason trap, the main objects of the invention being to make it possible to use such traps in high pressure systems, and to improve the construction and operation of such traps.

In carrying my invention into effect I provide a trap which has a valve balanced by the pressure of steam only, and the opening and closing of the valve being controlled solely by the buoyancy of the float employed in the trap.

The drawing is a central section of the preferred form of the improved trap.

Referring to the drawing, 1 is a cup-shaped casting or body, having an inlet 2 and an outlet 3.

4 is a casting forming the cover for said cup, having a passage 5 communicating with the inlet and extending to the space above the valve, and having in its lower wall one or more openings 6, the cover having also a passage 5′ communicating with the outlet. At the center of the cover are screw-threaded openings 7, within which the body 8 is screwed, said body having a tube 9 extending nearly to the bottom of the float, a channel 10 and water outlets 11. Within the central bore of the body 8 is a cup-shaped piston valve 12, having ports 13 adapted to communicate with the channel 10 when in its open position, as shown. The upper end of this valve is closed so that there will always be direct pressure of steam thereon when the apparatus is in use. From the bottom of this valve extends the shank or stem 14, having at the lower end ribs 15 in contact with the inner surface of tube 9 and by means of which the valve stem is guided and caused to move in a straight line as it rises and falls. At the lower end of this stem is a float, preferably in the form of a pan or cup 16, secured to the valve stem by the nut 17, although it is evident that the particular form of the float is not material. Above the float is placed a spatter-plate 18 so located that water falling through the holes 6 cannot fall into the float but will pass into the outer vessel or chamber. This plate is preferably held between a shoulder 19 on the tube 9 and the cover. In the cover above the openings 7 is a screw-threaded opening 20, in which may be placed a screw 21 having a stop 22 above the valve.

When this trap is to be used, the inlet 2 is connected with the drain or exhaust pipe of the steam pipe or system from which it is desired to remove the water of condensation in order to keep the steam in the system dry and to maintain the full heating surface of the pipes or radiators of the system. The outlet 3 of the trap is connected to any suitable tank or waste-pipe. The operation will be as follows: Water of condensation will flow from the pipe connected to inlet 2, through the passage 5 and holes 6 into the outer chamber of the trap. Steam will also pass through said passage to the chamber above the valve, and through said holes to the space below the valve, thus balancing it. As the water rises in the outer chamber it will raise the float, closing the outlet ports 13. As the water continues to rise it will overflow and begin to fill the float, and this will continue until the weight of water in the float is sufficient to overcome friction of the valve and the buoyancy of the water, when it will move downward, opening the outlet ports and allowing the steam pressure in the steam chamber above the water to force water from the float up through the tube 9, out through the ports 13 to the tank or waste-pipe, and all or enough of the water is forced out of the float to allow it to rise to its normal position, closing the valve. Thus it will be seen that no additional means such as springs need be employed to assist in closing or opening the valve. By balancing the valve controlling the water outlet by the steam employed to force out the water in the manner described, the operation thereof is made much more delicate than in devices with unbalanced valve, and I find that the trap can be used effectively in systems employing high steam pressure, while this is

not the case with the Nason trap, since with the valve employed therein the weight of water in the float would be insufficient to open the valve against the steam pressure in the chamber if such high pressure existed.

With my improved arrangement the pressure of steam which can be employed in connection with the trap is only limited by the strength of materials of which it is made. Moreover, the size of the float and trap can be reduced and still be as effective as larger traps of the old form, since less weight of water is required to move the valve; and, further, the size of the outlet ports and passages can be largely increased, so that the time consumed in blowing out the water is reduced.

By making the improved trap of the same size as old traps a larger area of pipe can be drained. If at any time it should be desirable to hold the valve open so as to be able to blow steam directly through the trap, it can be done by screwing down the plug 21, so that the stop 22 reaches the plane occupied by the top of the valve in Fig. 1.

What I claim is—

1. The combination in a steam trap, of an inclosing casing having an inlet and an outlet, a float within said casing, a valve operated solely by the buoyancy of said float and a chamber above said valve communicating directly with the inlet, but closed against communication with the outlet by the valve whereby the valve is balanced by direct pressure of steam, substantially as set forth.

2. The combination in a steam trap, of an inclosing casing having an inlet and an outlet, a float within said casing, a valve within said casing controlling the outlet passage, a rigid connection between said valve and float, a space above said valve communicating directly with said inlet, but closed against communication with the outlet by the valve, whereby the steam pressure will act on both the valve and float to balance said valve, said valve being operated solely by the buoyancy of the float, to open and close the outlet, substantially as set forth.

3. The combination in a steam trap, of an inclosing casing 1, cover 4, an inlet and an outlet to said casing, a tubular body 8 secured within said cover, said body 8 having a tubular extension 9, outlet ports 11 in said body 8, a valve 12 working within said body 8, a stem 14 passing through tube 9 and rigidly connecting said valve with a float 16 within said casing, passages 5 leading to a space above said valve 12 and into the casing 1, whereby the pressure of the stem acts on both the valve and float to balance said valve, said valve being operated solely by the buoyancy of said float to open and close outlet ports 11, substantially as set forth.

This specification signed and witnessed this 25th day of July, 1892.

ROBERT R. LEITCH.

Witnesses:
CHARLES M. CATLIN,
GEORGE B. BUCHANAN.