

E. WILLIAMS.  
STEAM TRAP.  
APPLICATION FILED MAR. 21, 1914.

1,176,010.

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Fig.1

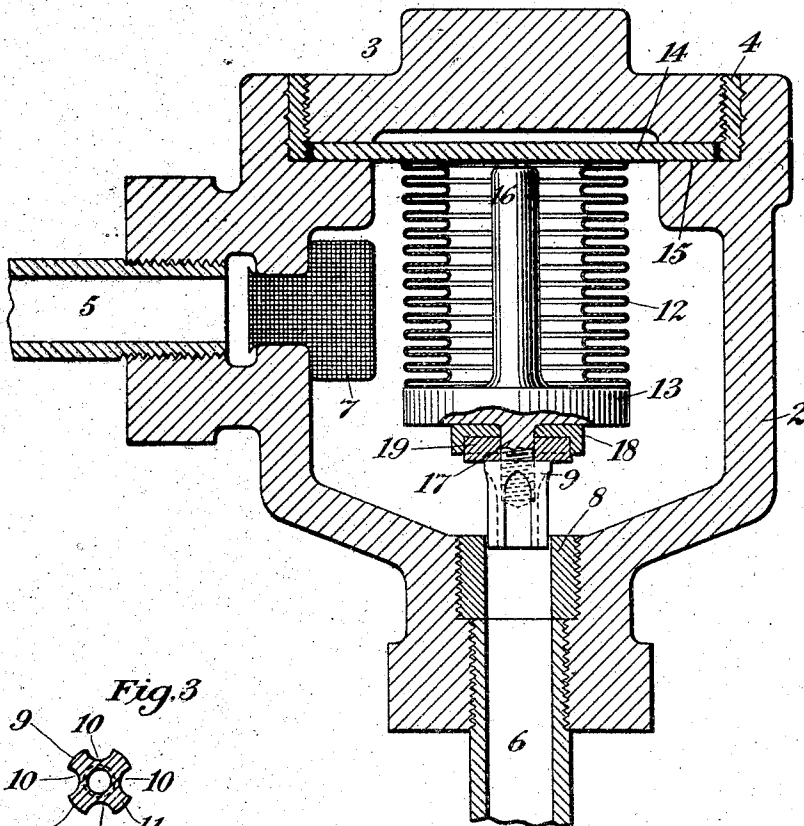


Fig.3

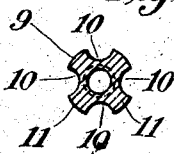
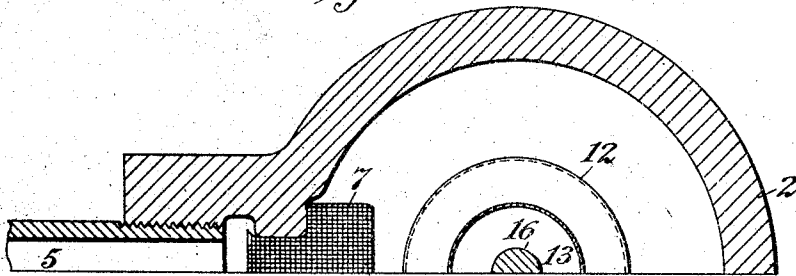


Fig.2



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# UNITED STATES PATENT OFFICE.

ERNEST WILLIAMS, OF NEW YORK, N. Y.

## STEAM-TRAP.

1,176,010.

Specification of Letters Patent.

Patented Mar. 21, 1916.

Application filed March 21, 1914. Serial No. 826,200.

*To all whom it may concern:*

Be it known that I, ERNEST WILLIAMS, a citizen of the United States, and a resident of Bronx, in the county of Bronx and State of New York, have invented certain new and useful Improvements in Steam-Traps, of which the following is a specification.

This invention relates to steam-traps, and the main object of the invention is to produce a simple type of trap of this general class, with few wearing parts, positive in its action and having improved means for governing the operation of the controlling valve of the trap.

This improved means for controlling the operation of the trap comprises as its main element a chamber containing an expansible fluid, preferably a volatile liquid, and made substantially in bellows form to expand and contract lengthwise in accordance with the expansion or contraction of the controlling fluid contained therein.

Other features of the invention not hereinbefore referred to will be hereinafter described and claimed and are illustrated in the accompanying drawings, in which—

Figure 1 is a substantially central, vertical section of a trap embodying my present invention; Fig. 2 is a substantially central, horizontal half section of the same, and Fig. 3 is a detail of a portion of the controlling valve and stem.

Similar characters designate like parts in all the figures of the drawings.

The steam-trap illustrated embodies a suitable main element or casing member, 2, substantially of usual construction, having two openings, one at the side and one at the bottom, for pipe connections, and a larger opening at the top to receive a suitable cover, such as 3. This cover is usually of the same material as the casing member 2, that is, of iron, and in the construction illustrated is threaded into a ring, such as 4, which may be of brass, securely fastened in place in the large upper opening of the main casing member 2. By means of this construction a non-corrosive and very tight joint is assured between the cover 3 and the body of the casing.

At the other openings in the main casing member 2 pipe connections are shown at 5 and 6, these being the usual inlet and outlet pipes, preferably screw-threaded into the main member 2 of the trap-chamber and

forming with said openings at the side and bottom of the chamber the ports of the trap. The port 5 may be provided with a screen of suitable material and mesh, such as that shown at 7, to prevent the passage of foreign particles of rust, dirt, etc. The other port is intended to be governed by a controlling valve responsive to changes in temperature of a sensitive controlling medium, such as the aforesaid expansible fluid. The valve used may be of any type suitable for the purpose, but is here illustrated as a sliding valve cooperating with a suitable seat in the trap-chamber. Preferably this seat is formed in a movable part of the trap, the construction shown being one in which the seat is in a brass plug or nipple screw-threaded into the opening at the bottom of the trap, this opening being shown as of somewhat larger diameter at the point where the plug is inserted in place than lower down where the pipe 6 is screwed into the main member 2 of the trap. This threaded brass plug is designated here by 8 and has the double function of providing a seat for the valve and of also forming a tight joint at the lower port of the trap, there being a very close contact between the screw-threads of the brass plug and those of the iron casing member 2, as will be understood.

The controlling valve employed may be of any type suitable for the purpose, but is preferably of the type illustrated. Its movements will be derived from the hereinbefore described controlling member embodying an expansible fluid sensitive to changes in temperature; and the controlling member containing said sensitive fluid may be any suitable container movable in one direction with a substantially bellows-like action.

Here the controlling member proper is illustrated as a sheet-metal chamber corrugated in such a manner as to form a series of bellows folds and be capable of expansion or contraction under the influence of a sensitive fluid contained therein, and readily expansible by heat. This controlling bellows-chamber is indicated at 12 and is closed at its lower end in this instance by a lower head or cross-piece, 13, to which it is securely fastened in such a manner as to form a hermetically sealed chamber, the upper end of the controlling bellows-chamber being fastened to a suitable fixed point in the trap, as, for example, to an upper head

in the form of a disk or ring, 14, interposed between the cap or cover 3 and the annular seat, 15, in the upper end of the main casing member 2 of the trap. In this case the cross-piece 13 also has a central vertical projection, 16, constituting a center-guide and serving to determine the normal position of the controlling bellows-chamber, that is, its position when contracted. The valve used in this case comprises two separate parts and is intended to be connected, and to move, with the cross-piece 13 of the controlling bellows-chamber. This connection may be made in any suitable manner, as, for example, by fastening the stem portion 9 of the valve on the end of an externally threaded post or stud, 17, depending from the cross-piece 13 and securing the main portion of the valve in place between the stem 9 and said cross-piece. This main portion of the valve is intended to assure the positive sealing of the trap when closed and may be of any construction suitable for accomplishing this result. In that illustrated the main portion of the valve is carried by a collar, 18, preferably of hard metal, interposed between the stem portion 9 of the valve and the cross-piece 13. This collar 18 as illustrated has an annular opening or counter-sink in its under side and in this opening is placed the main portion of the valve. Here this main member of the valve is a disk or ring, 19, of smaller diameter than the collar 18 but thick enough to project below the under side of said collar when in place. This metal disk or washer 19, which may be of any suitable composition, serves to seal the discharge opening of the trap when in its closed position by impinging on the valve-seat at the upper side of the plug 8. It will of course be obvious that the disks or collars 18 and 19 constitute spacing means for properly locating the stem portion of the valve relatively to the main member 19, the stem portion 9 serving in turn to lock both of the disks 18 and 19 securely in place. As shown in the drawings, this stem portion is a substantially cylindrical member having a plurality of longitudinal channels, 10, in its periphery intermediate of which are guide-surfaces, 11, which are in constant contact with the corresponding vertical cylindrical seating surface of the plug 8. This construction of the stem portion serves the double function of permitting the discharge of the water of condensation and of positively guiding the movements of the entire controlling means. The casing is of course so constructed as to provide suffi-

cient storage space for the water of condensation to permit intermittent discharge.

It will be obvious that by renewing the metal washer 19 and the brass plug or nipple 8 from time to time the trap may be kept in perfect adjustment for a long period of time.

It will also be clear that not only are the parts of the trap few in number, but that practically all of the main parts are removable as a unit from the casing, owing to the fact that they are connected to the upper head or disk 14; so that removal and replacement of parts can be quickly and easily effected.

The manner in which the controlling bellows-chamber operates upon the valve to determine the action of the trap will be clear from the foregoing, as it will be obvious that the position of the valve, that is, whether it is open or closed, will depend upon whether the bellows-chamber 12 is contracted or expanded, which in turn will depend upon whether the sensitive expansible fluid within said bellows-chamber is contracted, or has been expanded, as the result of the in-rush of a sufficient volume of steam at high temperature.

What I claim is:

1. A steam-trap, comprising a chamber having inlet and outlet ports and an opening for obtaining access to the parts which opening is surrounded by an internal annular supporting ring, a circular head resting on said supporting ring, a controlling bellows-chamber secured to said head and containing an expansible fluid, and a valve at the outlet-port operated by the expansion and contraction of said bellows-chamber.

2. A steam-trap, comprising a chamber having inlet and outlet ports and an opening for obtaining access to the parts which opening is surrounded by an internal annular supporting ring, a circular head resting on said supporting ring, a cover for closing said opening and holding said head in place, a controlling bellows-chamber secured to said head and containing an expansible fluid, and a valve at the outlet port operated by the expansion and contraction of said bellows-chamber.

Signed at New York, in the county of Bronx and State of New York this 5th day of March, A. D. 1914.

ERNEST WILLIAMS.

Witnesses:

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ELMER E. DAUGHERTY.