

G. C. ELLERTON.  
STEAM TRAP.  
APPLICATION FILED NOV. 6, 1908.

951,063.

Patented Mar. 1, 1910.

Fig. 1.

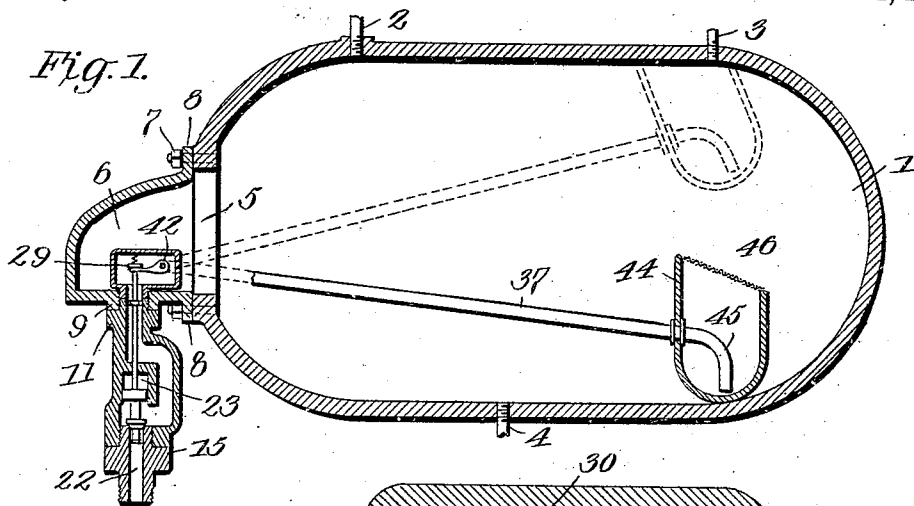
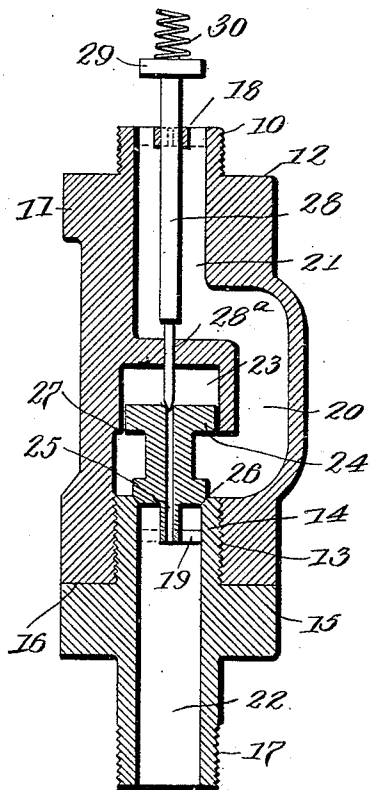


Fig. 2.



WITNESSES

Samuel O. Wade  
R. H. Stanley

Fig. 3.

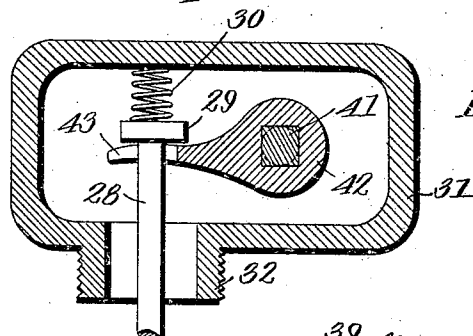
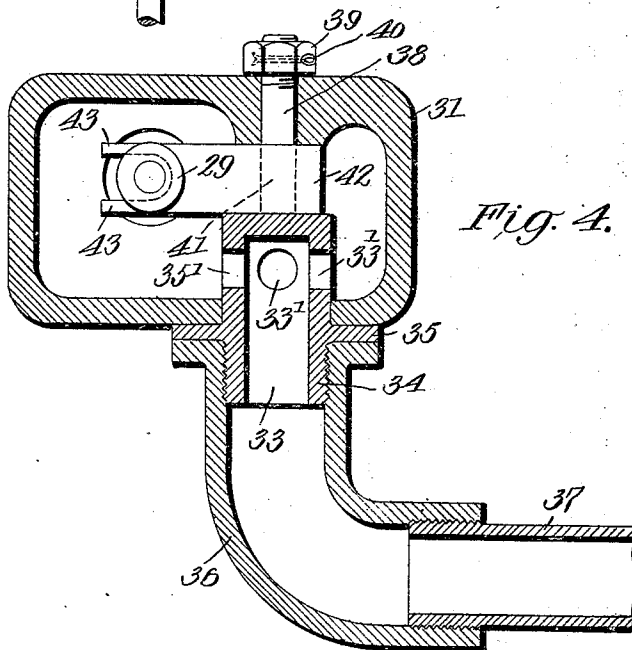


Fig. 4.



INVENTOR  
GEORGE C. ELLERTON.

BY Munn & Co.

ATTORNEYS

# UNITED STATES PATENT OFFICE.

GEORGE C. ELLERTON, OF PORTSMOUTH, VIRGINIA.

## STEAM-TRAP.

951.063.

Specification of Letters Patent.

Patented Mar. 1, 1910.

Application filed November 6, 1908. Serial No. 461,262.

*To all whom it may concern:*

Be it known that I, GEORGE C. ELLERTON, a citizen of the United States, and a resident of Portsmouth, in the county of Norfolk and State of Virginia, have made certain new and useful Improvements in Steam-Traps, of which the following is a specification.

My invention relates to improvements in automatic steam traps for the discharge of the accumulated water of condensation and it consists in the arrangements, constructions and combinations hereinafter described and claimed.

An object of my invention is to provide a device in which the accumulated water can be discharged as fast as it enters the trap without the necessity of providing a by-pass.

A further object of my invention is to provide a trap having a reservoir of spherical shape which is self supporting and needs no strengthening ribs or webs cast integral with it, which tends to increase the weight correspondingly.

A further object of my invention is to provide a simple valve mechanism which is positive in operation and easily overhauled without opening the reservoir.

A further object of my invention is to provide an inclosed valve mechanism without packed stems or trunnions, said valve mechanism being attached externally to the reservoir.

Other objects and advantages will appear in the following specification and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a view showing a central vertical section through the device. Fig. 2 is an enlarged detail section of the valve mechanism. Fig. 3 is a detail view of a section of the upper part of the valve casing, and Fig. 4 is a horizontal section through the casing and movable pipe.

Referring now to Fig. 1 I have shown therein a reservoir 1 provided with an inlet pipe 2 and an air pipe 3 on the upper side thereof and a drain pipe 4 at the bottom. In order to make the reservoir as strong as possible and do away with the necessity of providing strengthening ribs, I construct the reservoir in a shape approximating an oblate spheroid. At one end of the reservoir there is an opening 5 which

communicates with a bonnet 6 which is secured to the end of the reservoir by means of the bolts 7, which pass through the outwardly turned flanges 8 as clearly shown in Fig. 1.

The lower portion of the bonnet 6 has a downwardly extending portion 9 integral therewith which is threaded internally to receive the upwardly projecting portion 10 of the valve casing 11. The latter has a shoulder 12 which fits up against the end of the extended portion 9, thereby rendering these parts steam-tight. The valve casing 11 has a cored out portion 13 at its bottom which is provided with threads arranged to receive the threaded end 14 of the nipple 15, the latter being provided with a shoulder 16 to limit its upward movement and to make it steam tight and having a lower threaded end 17 to which the union coupling of a discharge pipe may be attached. The upper extension 10 of the valve casing has a web 18, which is provided with a central perforation and serves as a guide for the stem 28.

The valve casing 11 has a hollow portion 20 with upper and lower passages 21 and 22 leading therefrom. Located within the central portion of the valve casing 11 is the cylinder 23, this part being formed integral with the valve casing and adapted to receive the piston 24. This piston is connected with the valve 25 as seen in Fig. 2, and is normally against its valve seat 26 at the top of the nipple 15. The piston 24 fits loosely within the cylinder 23. The valve 25 is guided in its movement by the guides 19, which are secured to the bottom of the valve and contact with the walls of the passage 22.

The valve 25 as well as the piston 24 is provided with a central opening 27. The end of the valve stem 28 is arranged to seat in the upper end of this opening, the reduced portion 28<sup>a</sup> of the valve stem passing loosely through the web forming the upper end of the cylinder 23. The upper end of the valve rod 28 is provided with a head 29 upon which a spring 30 rests.

Within the bonnet 6 of the casing is secured the casing 31, the lower extended threaded portion 32 of the latter being screwed into the upper half of the opening in the extension 9. Passing through the side of the casing is the hollow trunnions 33, which is provided with a threaded end 34 and a radial flange 35 against which the elbow 36 at the end of the pipe 37 may

be secured. The trunnion 33 has an extended portion 38 which has a bearing in the opposite side of the tripper casing and which is held in place by means of a nut 39 and the cotter pin 40. The extension 38 has a squared portion 41 arranged to carry the arm 42. This member is provided with the two arms 43 between which the valve stem 28 is adapted to pass, the arms 43 being normally in engagement with the under side of the head 29, as shown in Fig. 3. The holes 33' in the hollow trunnion 33 permit communication between the interior of the latter and the interior of the casing 31. The casing 31 is so formed internally, that the arm 42 is held between shoulder of trunnion 35 and casing 31 without other fastenings to prevent a lateral movement of arm 42, as shown in Fig. 4. The opposite end of the pipe 37 is passed through the walls of a bucket 44 and is turned downwardly at 45, as shown in Fig. 1. The upper part of the bucket is provided with a screen 46 in order to prevent the admission of dirt or foreign matter.

From the foregoing description of the various parts of the device the operation thereof will be readily understood. Enough water is put in the reservoir so that the hollow bucket 44 is floated until the pipe 37 is in a horizontal position. The valve in the inlet pipe 2 is now opened and the steam and condensed water is permitted to fill the reservoir, the bucket 2 in the meantime rising until it reaches the top of the reservoir as indicated by the dotted lines in Fig. 1. At this point there is no further rising of the bucket but the water continues to rise until it overflows into the bucket, which, when filled sinks to the position shown by the full lines in Fig. 1. As the bucket goes down the pipe 37 turns the trunnion 33, together with the arm 42, the latter engaging the under side of the head of the valve stem and raising it against the tension of the spring 30 which bears against the top of the casing 31. When the valve stem is lifted the point of the stem 28' allows the water filling the cylinder 23 (which has leaked past the stem 28 and the piston 24, both of which are loosely fitted as described) to escape through the channel 27 and thence through the passage 22 to the discharge pipe. The escape of the water from the cylinder 23 now leaves the cylinder above the piston 24 at only atmospheric pressure, while the lower side of the piston 24 is under a greater pressure. The piston being larger in area than the valve 25, is lifted by the excess pressure and unseats the valve 25, thereby permitting the water in the reservoir to discharge through the bucket 46, pipe 37, trunnion 33, casing 31 and through the passages 21, 20 and 22.

The water in the reservoir continues to

lower until it reaches the rim of the bucket, while the water in the bucket is forced out by the steam pressure. The bucket now rises and as it rises it permits the lowering of the valve stem due to the reaction of the spring 30 and also the pressure of the steam. The point 28' of the valve stem is reseated, thereby preventing the escape of water from the cylinder 23, which then fills with water leaking past piston 24 and stem 28' and valve 25 seats as fast as the pressure is restored above piston 24. As the water continues to come into the reservoir the float 44 continues to rise and the cycle of operations is again repeated.

It will thus be seen that I have provided a steam trap which is automatic in its nature and which has relatively few parts.

I am aware that other forms of the device based upon the same general idea might be made, but I consider as my own and desire to claim all such modifications as fairly fall within the spirit and scope of the invention.

I claim—

1. In a steam trap, a reservoir provided with an opening at one end, a detachable bonnet secured to said reservoir and communicating with the latter through said opening, a valve casing secured to said bonnet, one portion of said valve casing projecting within the bonnet and the other portion being outside of the bonnet, a float disposed within said reservoir comprising a bucket, a hollow pipe communicating with the interior of said bucket at one end, the other end of said pipe being arranged to project through the opening between the bonnet and the reservoir, hollow trunnions disposed in the upper end of said valve casing and adapted to establish communication between said pipe and the interior of said valve casing, a valve within said valve casing and an arm carried by said hollow trunnions for actuating said valve.

2. In a steam trap, a reservoir provided with an opening at one end, a detachable bonnet secured to said reservoir and communicating with the latter through said opening, a valve casing secured to said bonnet, one portion of said valve casing projecting within the bonnet and the other portion being outside of the bonnet, a float disposed within said reservoir comprising a bucket, a hollow pipe communicating with the interior of said bucket at one end, the other end of said pipe being journaled in the upper end of said valve casing and arranged to establish communication therewith, a valve within said casing, and means, connected with said hollow pipe for operating said valve.

3. In a steam trap, an oblong reservoir provided with an opening at one end, a detachable bonnet secured to said reservoir and communicating with the latter through said

opening, a valve casing secured to said bonnet, one portion of said valve casing projecting within the bonnet and the other portion being outside of the bonnet, and separable from the part within the bonnet, a float disposed within said reservoir comprising a bucket, a hollow pipe communicating with the interior of said bucket at one end, a valve disposed in the detachable part of said valve casing, and having a valve stem arranged to project into the portion of the casing within said bonnet, one end of said hollow pipe being journaled in the part of the valve casing within the bonnet, and adapted to establish communication between said reservoir and said casing.

4. In a steam trap, a reservoir provided with an opening at one end, a detachable bonnet secured to said reservoir and communicating with the latter through said opening, a valve casing secured to said bonnet, one portion of said valve casing projecting within the bonnet, and the other portion being outside of the bonnet and separable from the part within the bonnet, a valve disposed in the detachable part of said casing, a float disposed within said reservoir comprising a bucket with an open top, and a hollow pipe connected with said valve

and arranged to operate the latter, and to serve as a conduit for the water passing through the valve casing.

5. In a steam trap, a reservoir provided with an opening at one end, a detachable bonnet secured to said reservoir and communicating with the latter through said opening, a valve casing secured to said bonnet, one portion of said valve casing being secured in an opening in the wall of the bonnet, the other portion of the valve casing being outside the bonnet and being provided with a part adapted to enter the opening in the bonnet in which the other part of the casing is held, a float disposed within said reservoir comprising a bucket, a hollow pipe communicating with the interior of the bucket at one end, the other end of said pipe pivoted in the part of the valve casing within the bonnet, and a valve disposed in the part of the valve casing outside of the bonnet having a valve stem adapted to be operated by the pivoted end of said pipe.

GEORGE C. ELLERTON.

Witnesses:

WM. HEIDELBERG,  
T. W. KINKAID.