

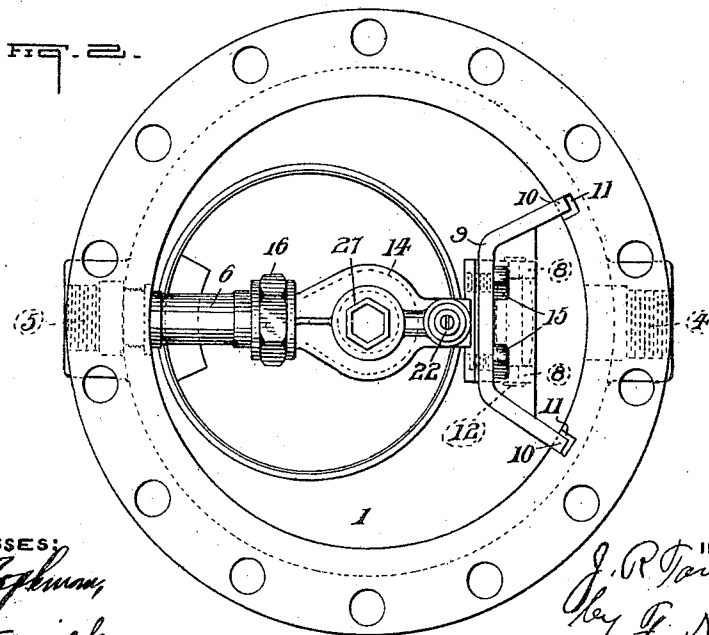
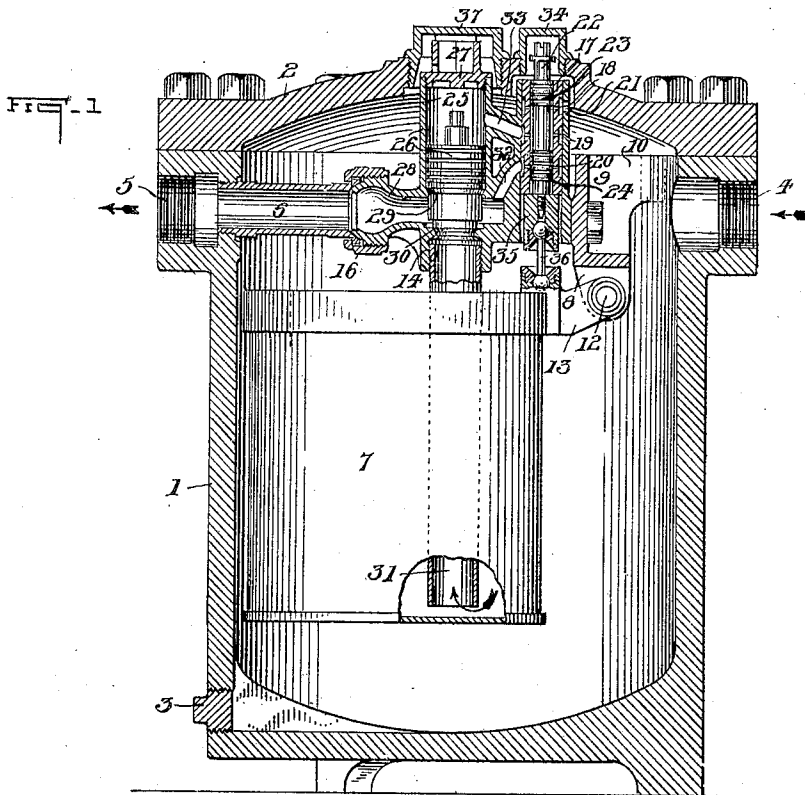
J. R. TANNER.

STEAM TRAP.

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971,801.

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WITNESSES:

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STEAM-TRAP.

971,801.

Specification of Letters Patent.

Patented Oct. 4, 1910.

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To all whom it may concern:

Be it known that I, JULIUS R. TANNER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Steam-Traps, of which the following is a specification.

My invention relates to steam traps and has for its object the provision of an automatic balanced valve to govern the operation of an automatic unbalanced valve for opening and closing the waste pipe for the water accumulated in the trap.

Another object is to provide means for permitting the valves to be removed without breaking a joint in the body of the trap or the cap thereof or in the pipe connections.

Another object is to make all the working elements and their supports independent of the cap and readily removable from the body so that the body may be more easily made and all the working parts may be out of the body when the cap and the working parts are removed to make repairs or clean the trap.

On the accompanying drawing, Figure 1 shows in vertical section a steam trap embodying my invention, and Fig. 2, a plan of the trap with the cap removed.

Referring to the said drawing, 1 designates the body of the trap. It has a cylindrical or analogous cross-section, the bottom being closed and the cap covered by the removable cap 2.

3 is a removable plug which may be removed when it is desired to blow-off or drain the water from the body 1. 4 is the inlet to the trap and 5, the outlet thereto, the latter being provided with the pipe 6 which is screwed into the said outlet and projects radially into the said body 1.

7 is a float or bucket pivoted at one side of its upper end to ears 8 on the under side of the support or fork 9, the arms 10 of the support or fork being seated in the notches 11 in the upper edge of the body 1. These notches are preferably open at the upper edge of the body 1, the cap 2, when in place on the said edge, covering the notches and preventing any accidental movement of the arms from the notches. The pin 12 pivotally connects the ears 8 to the arm 13 attached to the

bucket 7. The fork 9 is located in front of the inlet 4 and serves as a deflector for the water, preventing the water from falling directly into the float.

I provide the valve casing 14 which has one end secured by the screws 15 to the central portion of the fork 9, the opposite end of the casing 14 being tubular and secured by the union 16 to the inner end of the pipe 6. The casing 14 contains a vertical opening for the vertical lining 17 having three annular passages communicating respectively with the three annular series of ports 18, 19, and 20, which extend through the wall of the lining. The upper series of ports 18 are supplied with steam by means of the port 21 in the casing 14. Within the lining 17 is the piston valve 22 having the heads 23 and 24 and a reduced portion between said heads to provide a steam passage between successive series of ports 18, 19, and 20. The heads 23 and 24 are so spaced that, while one head closes one of the end series of ports 18 or 20, the steam may pass through the central ports 19 and the remaining one of the end series of ports. The casing 14 contains a second vertical opening 25, constituting a cylinder or casing for the discharge-valve 26. The cylinder 25 is closed at the top by the screw plug 27. The valve 26 has its lower end extending through the discharge passage 28, which is that end of the casing 14 which is connected by the union 16 to the pipe 6. The valve 26 has two seats one, 29, at the bottom of the cylinder 25 and just above the passage 28, and the other, 30, just below the passage 28. A pipe 31 extending nearly to the bottom of the bucket 7 has its upper end screwed into the casing 14 and conducts the water in the bucket during discharge to the seat 30. The discharge passage 28 is in communication with the series of ports 19 by means of the passage 32 in the casing 14; and, when the valve 26 is in its lower position, in which it sits on both its said seats, the space in the cylinder above the valve is in communication with the series of ports 18 by means of the passage 33.

The cap 2 is provided with the screw cap 34 above the lining 17 and the piston valve 22 so that, after the screw cap has been removed, the said lining and piston valve may be removed without disturbing any of the

other parts. The top of the piston valve is provided with a slot for a screw driver so that the valve may be unscrewed from the block 35 to which the back is connected by the link 36. The block may be prevented from turning in various ways while the piston valve is being unscrewed therefrom, as by making the same square in horizontal cross-section.

The cap 2 is provided with the screw-cap 37, which, when removed, permits access to the screw plug 27. When the plug 27 has been removed the valve 26 may be removed without disturbing any part of the apparatus or breaking any joints.

The upper end of the piston valve is in constant communication with the steam from the passage 33 which has a greater area than the lower end thereof exposed to the upward pressure of the water in the pipe 31.

Assuming that the bucket contains water above the lower end of the pipe 31 and that the water in the body 1 is high enough to float the bucket and hold it at the position shown on Fig. 1, the steam will pass through the port 21, the series of ports 18, along the reduced portion of the piston valve 22, and through the passage 33 into the cylinder 25 above the valve 26. The steam above the valve will hold the same on its seats 29 and 30, because the upward pressure of the water in the pipe 31 on the lower end of the valve is less than that of the steam on its upper end. The series of ports 20 are closed by the head 24. When the water in the trap rises above the top of the bucket and fills the same to a predetermined level, the weight of the water in the bucket will cause it to sink. This movement of the bucket through the block 35 and the link 36 pulls the piston valve 21 to its lower position, in which the ports 18 are closed and the ports 20 are placed in communication with the ports 19. Thereupon the steam above the valve 26 is exhausted through the passage 33, the ports 19 and 20, and the passage 32 into the discharge passage 28. The pressure on the top of the valve 26 being removed, the pressure of the water in the tube 31 at once pushes the valve 26 up and the water in the bucket escapes up the tube 31 and through the seat 30 into the discharge passage 28, whence it passes along the pipe 6 and through the outlet 5. When the water in the bucket has reached a predetermined level, which will be above the inlet end of the pipe 31, the bucket will again be floated, causing the piston valve to be lifted to the position shown on Fig. 1 and permitting steam to enter the space above the valve 26 and force the said valve down to the position shown on Fig. 1, where it will remain until the bucket is again swung down as above described.

It is seen that I have mounted my valve casing 4 so as to be entirely free from the

cap 2 and so as to enable me to readily remove the same when the cap has been removed, and that I am also enabled to remove the valves without disturbing any of the other parts of the trap and without breaking any joint in the body or the cap or in any of the steam passages or pipe connections.

I do not limit myself to the precise means shown and described.

I claim—

1. In a steam trap, a hollow body, a float within the said body, a cap for the said body, a valve casing supported by the body and having therein valve chambers, a balanced valve in one chamber, an unbalanced valve arranged to control the discharge of water from the trap and controlled by the said balanced valve, means for causing the float to control the position of the last named valve, and removable closures supported by said cap and arranged over the said valves, whereby the latter may be removed from the trap without removing the said cap.

2. In a steam trap, a hollow body having an inlet and discharge openings, and a unit in the said body consisting of a valve casing, a float, valve mechanism coöperating with the float to control the discharge of water from the body, a discharge member removably connected to the discharge opening in the hollow body, a deflector located in front of the inlet to the hollow body and constituting a support for the said casing.

3. In a steam trap, a hollow body, a valve casing therein, a deflector opposite the inlet to the hollow body and supporting the said casing, and a float also supported by said deflector.

4. In a steam trap, a hollow body, a valve-casing therein, a support therefor having arms seated in openings in the said body, and a cap for said body, said cap covering the said openings.

5. In a steam trap, a differential valve to control the discharge of water therefrom, a valve supporting member having therein a discharge passage across which said valve extends, a valve seat at each side of the discharge passage, said valve adapted to rest on both seats simultaneously, and a discharge pipe arranged to lead the water from the trap to the smaller seat of the valve.

6. In a steam trap, an unbalanced valve to control the discharge of water, said valve extending through the discharge passage for the water, means for leading steam to the larger end of the valve and the water to the smaller end of the valve, and a seat for said valve between the discharge passage and the larger end of the valve.

7. In a steam trap, an unbalanced valve to control the discharge of water, said valve extending through the discharge passage for the water, means for leading steam to the

larger end of the valve and the water to the
smaller end of the valve, a seat for said
valve between the discharge passage and the
larger end of the valve, a balanced valve to
5 control the unbalanced valve, and removable
caps over the valves, whereby, when the caps
are removed, the valves may be taken out.

Signed at Pittsburg, Pa., this 26th day of
April, A. D. 1909.

JULIUS R. TANNER.

Witnesses:

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