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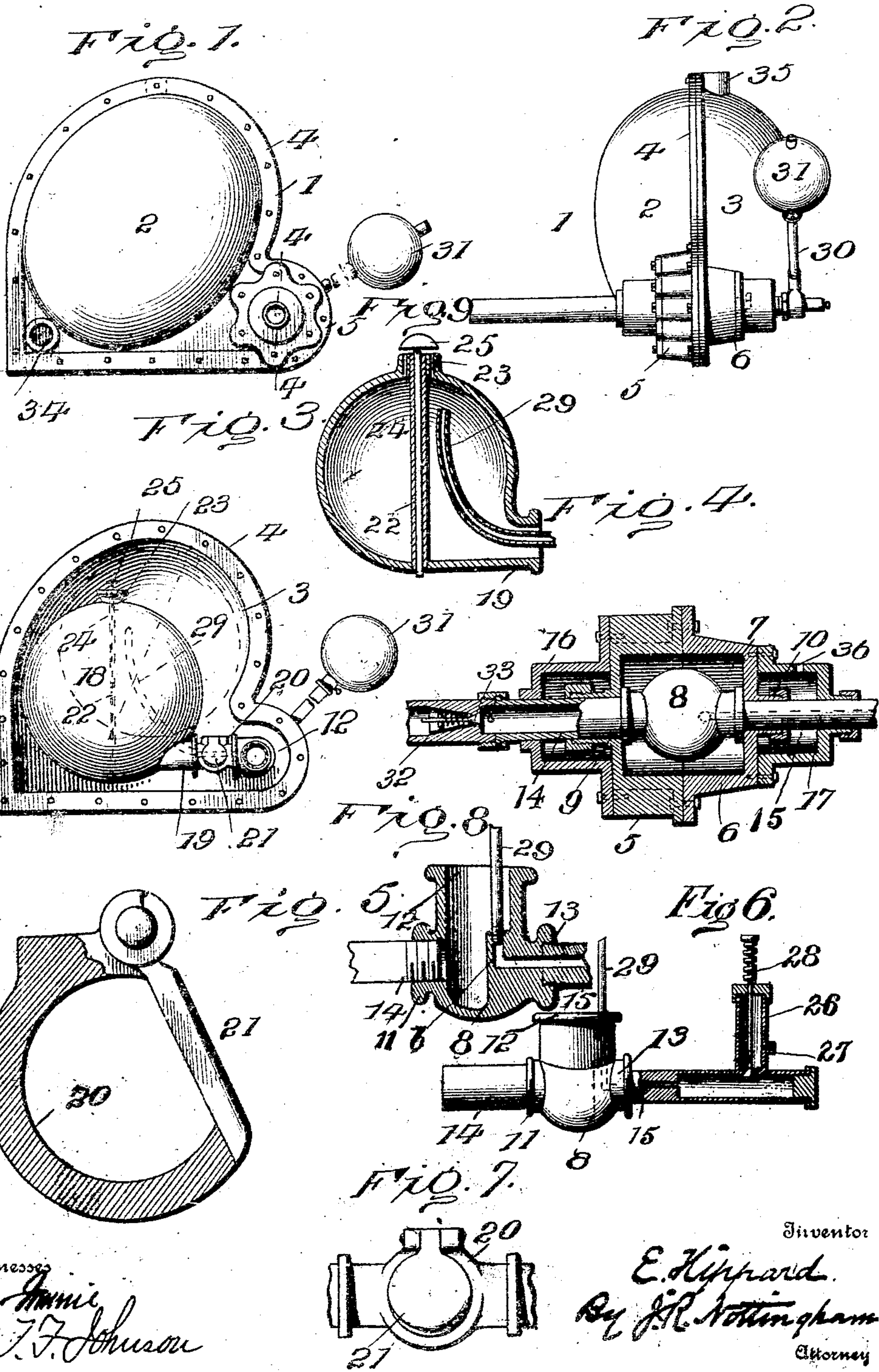
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E. HIPPARD.

STEAM TRAP.

Application filed June 17, 1899.,

(No Model.)



Witnesses

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# UNITED STATES PATENT OFFICE.

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## STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 638,581, dated December 5, 1899.

Application filed June 17, 1899. Serial No. 720,943. (No model.)

*To all whom it may concern:*

Be it known that I, EMANUEL HIPPARD, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Steam-Traps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to steam-traps; and it consists, primarily, of the novel and peculiar construction and arrangement of an oscillating receiver whereby the water-inlet valve is operated by the rise and fall of said receiver.

The invention further consists of the general arrangement and combination of the several parts of the device as a whole, as will be hereinafter more fully described, and particularly set forth in the claims.

The general object of the invention is to produce a steam-trap wherein the water is caused to flow from the shell or casing of the trap to the boiler without the intervention of the usual valves.

Another object of the invention is to provide means for delivering steam into the oscillating receiver to force the water out into the shell, from whence it is forced through a suitable connection into the boiler, and also to provide means for the escape of the steam from said receiver after the water has been forced therefrom.

Other objects of the invention will become apparent upon further description thereof.

In the accompanying drawings, Figure 1 is a side elevation of my improved steam-trap; Fig. 2, a front elevation of the same; Fig. 3, an interior view of the device, one-half of the shell or casing being removed; Fig. 4, a vertical longitudinal section on line 4 4 of Fig. 1, some of the parts being in full lines; Fig. 5, a transverse section of the valve-casing, showing the valve in full lines; Fig. 6, a top plan view of the three-way or union coupling and connections disconnected from the oscillating receiver and removed from the shell or casing; Fig. 7, a detail of the flap-valve and casing; Fig. 8, a horizontal section through the union-coupling, and Fig. 9 a vertical section through the oscillating receiver.

Referring to the several views, the numeral

1 indicates a suitable steam and water tight shell or casing composed of two parts 2 and 3, each part being formed at its edge with an outwardly-extending flange 4, by means of which the said parts are firmly bolted together, as shown. At the lower front edge the part 2 is formed with an extension 5, having a fluted outer surface, and the part 3 with a similar extension 6, but having a smooth outer surface. When the two parts are bolted together, these extensions form a chamber 7, in which is located a rockable union connection 8, as will be hereinafter more fully described. The side wall of the extension 5 is provided with a flanged opening 9, and the side wall of the extension 6 is provided with a similar opening 10, but of less diameter than the opening 9. These flanged openings serve as bearings for the rockable union connection, which is provided with three internally-screw-threaded openings 11, 12, and 13, respectively. In the opening 11 is screwed a short tubular arm 14, which forms one of the journals of the union-coupling, the same being journaled in the bearing 9, and in the opening 13 is screwed an arm 15, which forms the other journal of the union-coupling, being journaled in the bearing 10. Suitable stuffing-boxes are provided for the journals, and incasing caps 16 and 17, bolted to the outer sides of the extensions, may be employed to protect the parts.

The numeral 18 indicates an oscillating receiver, preferably made of aluminium, having a projecting neck 19, into which is screwed one end of a valve-casing 20, the other end of said valve-casing being screwed into the opening 12 of the union connection. The valve-casing at one side is provided with a suitable check-valve 21, which in the present instance consists of the flap or swing style.

The oscillating receiver is provided with a central tube 22, (shown in Fig. 9 and by dotted lines in Fig. 3,) passing entirely through it, and the upper end of the tube is provided with a collar or nut 23, having a circular row of perforations. Movably fitted in said tube is a valve-rod 24, provided with a valve-head 25, the latter being of sufficient diameter to cover the circular row of perforations.

The arm 15 is provided with a central bore, which is connected to a hollow extension 26,



near the inner end of which is an outlet-port 27, which is controlled by an ordinary spring-actuated valve-rod 28, fitted in the extension 26. The solid wall *b* of the union-coupling 5 is bored to intersect the bore of the arm 15, and in the outer end of the bore of the coupling is screwed a vent-pipe 29, which extends well up into the oscillating receiver, as shown by dotted lines in Fig. 3.

To the outer end of the arm 15 is secured an arm 30, on which is adjustably secured a counterbalancing-weights 31, by means of which the oscillating receiver is returned to normal position (shown by dotted lines in 15 Fig. 3) after each discharge of the water from said receiver.

To the outer end of the tubular arm 14 there is connected by a suitable coupling one end of a pipe 32, which leads to a proper water-tank. (Not shown.) This pipe is provided with a suitable check-valve 33, by means of which the flow of water to the oscillating receiver may be automatically cut off. The casing 1 is provided at one side with a water-outlet 34, to which may be connected the 25 pipe leading to the boiler to be fed, and at the top with an inlet 35 for the introduction of steam, which may be taken from the steam-dome of the boiler.

30 In operation the flow of the water through the pipe 32 exerts a force sufficient to open the check-valve 33 and permit the water to enter the oscillating receiver, the pressure of steam in the casing serving to maintain the valve 21 in closed position during the 35 filling operation. When the receiver is filled, the counterbalance is overcome, allowing the receiver to fall, and just before reaching the limit of its movement the end of the valve-rod 24 comes in contact with the bottom of 40 the casing and is forced upward to uncover the circular row of perforations, so that the steam may enter the receiver. The steam entering the receiver overcomes the pressure of the inflowing water and causes the valve 33 to close, thus shutting off the supply of water. At the instant the flow of 45 water is stopped the water in the receiver exerts a pressure against the inner face of the valve 21, and this pressure, reinforced by the pressure of the steam entering the receiver, is sufficient to overcome the pressure of the steam in the casing against the outer face of the valve 21 and cause it to open 50 to permit the water in the receiver to be discharged into the casing, from whence it flows unobstructed into the boiler. As soon as the receiver is emptied of its contents it is caused to rise by the counterbalance, and the valve-head coming into contact with the top of the casing it is pushed down and the flow of steam into the receiver is cut off, the steam and air escaping through the vent-pipe 29 55 out into the chamber of the cap 17 and thence into the open air through an outlet 36 in said cap when used. When the receiver has

reached its normal position, the pressure of the water on the valve 33 opens it, and the operation is repeated.

Various modifications and changes may be 70 made in the structure of my device without changing the principle or sacrificing the spirit of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by 75 Letters Patent, is—

1. In a steam-trap, the combination with a suitable casing provided with a steam-inlet and a water-outlet, of a counterbalanced, oscillating receiver, provided with a steam-inlet 80 valve and a water-outlet valve, and a valve situated between the receiver and the water-supply, substantially as specified.

2. In a steam-trap, the combination with a suitable casing provided with a steam-inlet 85 and a water-outlet, of an oscillating receiver provided with a steam-inlet valve, a union-coupling, journaled in the casing, connected with the receiver by a valve-casing, provided with an outlet-valve, a water-inlet, controlled 90 by a suitable valve, through one of the journals of the coupling, and an adjustable counterbalance secured on the other journal of said coupling.

3. In a steam-trap, the combination with a 95 suitable casing provided with a steam-inlet and a water-outlet, of a counterbalanced, oscillating receiver, provided with steam-inlet and water-outlet valves, a valve situated between the receiver and water-supply, and 100 means for exhausting the receiver of steam and air.

4. The combination, with the casing having a steam-inlet and a water-outlet, of an oscillating receiver provided with a steam-inlet 105 valve, a union-coupling journaled in the casing, a casing, connecting the coupling with the receiver, provided with a valve, a valve-controlled water-supply inlet through one of the journals of the coupling and a valve-controlled outlet in the other journal, and an adjustable counterbalance secured on said journal. 110

5. The combination, with the casing having a steam-inlet and a water-inlet, of an oscillating receiver provided with a steam-inlet 115 valve, a union-coupling journaled in the casing and connected with the receiver by a casing provided with an outlet-valve, a water-controlled passage through one of the journals, an exhaust-passage through the other journal, a vent-pipe secured in said exhaust-passage and leading into the receiver, and an adjustable counterbalance secured on one 120 of the journals.

In testimony whereof I affix my signature 125 in the presence of two witnesses.

EMANUEL IMPPARD.

Witnesses:

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