

No. 813,332.

PATENTED FEB. 20, 1906.

J. H. TAYLOR.

STEAM TRAP.

APPLICATION FILED AUG. 6, 1905.

2 SHEETS—SHEET 1.

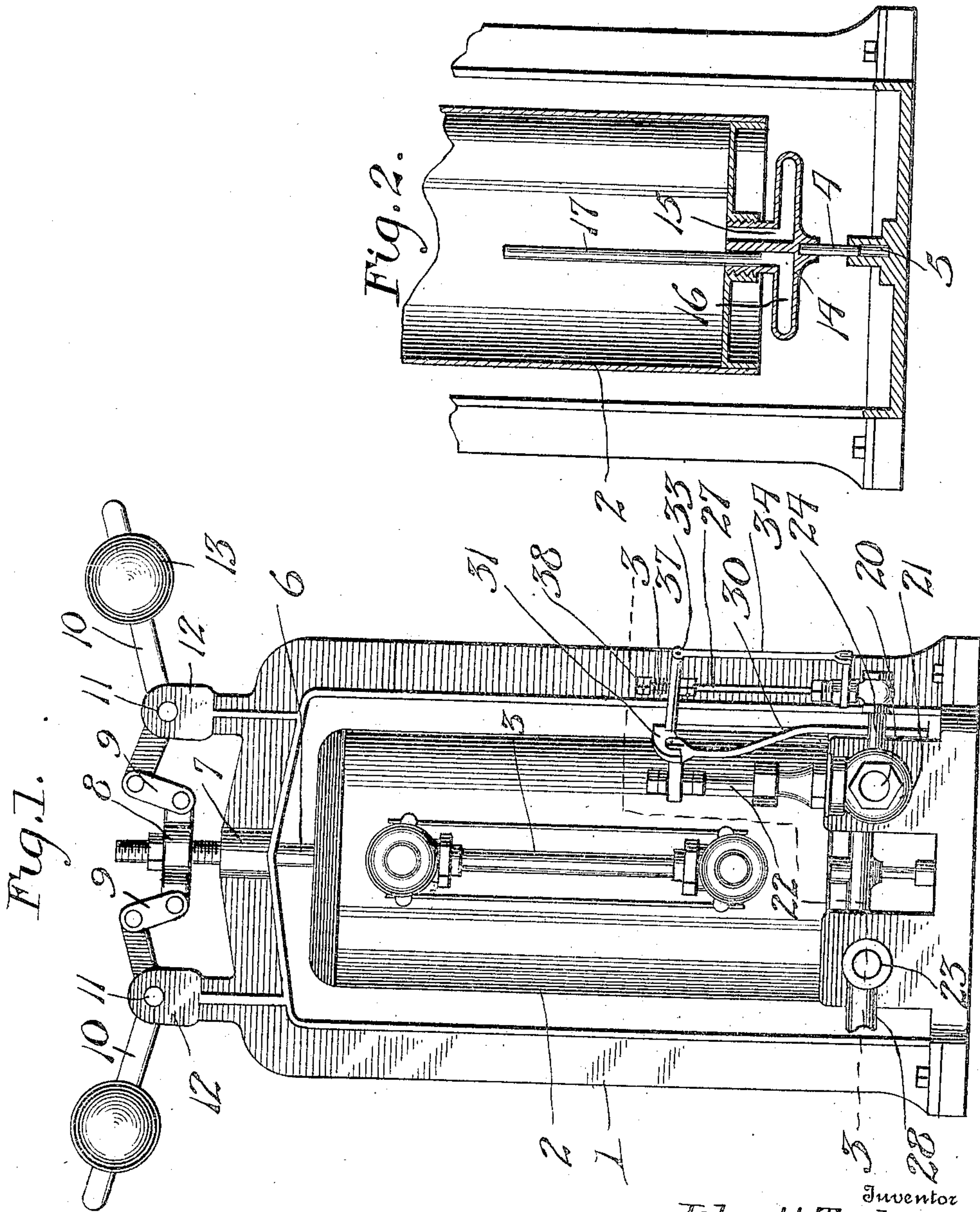


Fig. 1.

Fig. 2.

Witnesses  
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2 SHEETS—SHEET 2.

*Fig. 3*

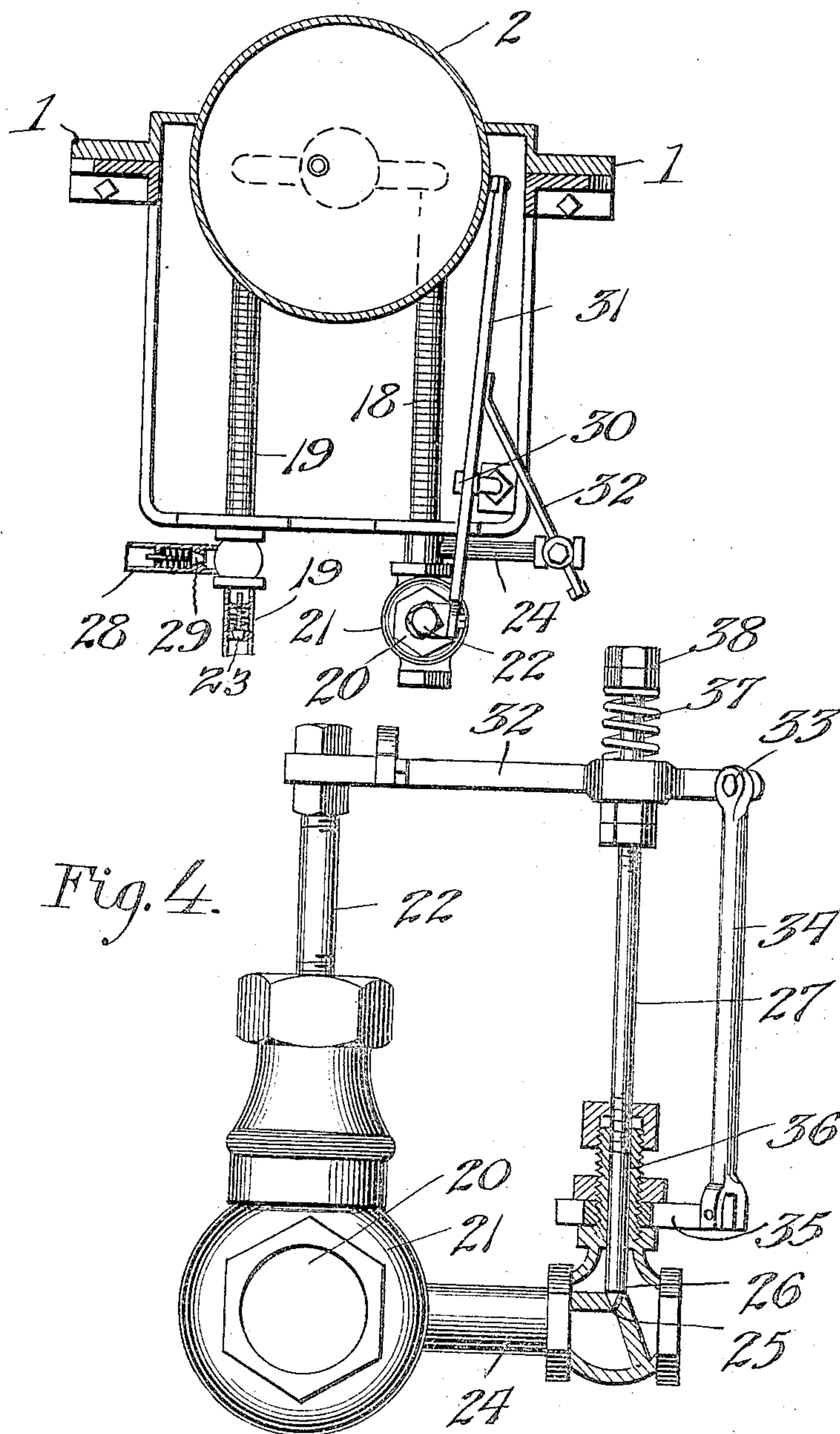


Fig. 4.

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# UNITED STATES PATENT OFFICE.

JOHN H. TAYLOR, OF BATTLE CREEK, MICHIGAN.

## STEAM-TRAP.

No. 813,332.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed August 5, 1905. Serial No. 272,896.

*To all whom it may concern:*

Be it known that I, JOHN H. TAYLOR, a citizen of the United States, residing at Battle Creek, in the county of Calhoun and State of Michigan, have invented new and useful Improvements in Steam-Traps, of which the following is a specification.

This invention relates to steam-traps for use in connection with engine-boilers, and particularly to that type of devices disclosed in Letters Patent No. 783,910, granted to me February 28, 1905, and has for its objects to produce a comparatively simple inexpensive device of this character in which the pressure within the trap or vessel will be automatically controlled, one wherein the parts will at predetermined intervals be automatically operated for returning the accumulated water of condensation from the vessel to the boiler, one wherein the pressure and vent valves will be controlled through the medium of a common lever actuated by the movements of the vessel, and one which generally improves and simplifies the construction disclosed in my prior patent.

With these and other objects in view the invention comprises the novel features of construction and combination of parts more fully hereinafter described.

In the accompanying drawings, Figure 1 is a front elevation of a device embodying the invention. Fig. 2 is a detail view, partly in vertical longitudinal section, the section being taken centrally through the vessel. Fig. 3 is a horizontal section taken on the line 3-3 of Fig. 1 and viewed in the direction of the arrow. Fig. 4 is an enlarged detail view, partly in section, of the pressure and vent valves, together with their adjacent operating mechanism.

Referring to the drawings, 1 designates an open substantially rectangular frame, in which is arranged for vertical movement a trap or vessel 2, equipped with a water-gage 3 and having at its lower end a vertical guide member or stem 4, arranged for movement in a socket or guide 5, provided on the lower portion of the frame 1, and at its upper end with a guide member or stem 6, slidable in a bearing or guide 7, formed in the upper portion of the frame, there being threaded onto the upper portion of the stem 6 an adjustable head or collar 8, connected by links 9 with a pair of actuating members or levers 10, fulcrumed at 11 in bearings 12 on the frame 1 and equipped

at their outer free ends with weights 13, for a purpose which will hereinafter appear.

Tapped into the bottom of the tank 2 and movable therewith is a pipe-coupling 14, having a pair of passages or ports 15 and 16, there being tapped into the port 16 the lower end of a vertical stand-pipe or duct 17, terminating at a point suitably above the bottom of the vessel, and through which the passage 16 communicates with the latter, while the passage 15 communicates directly with the vessel through its bottom.

Connected to the coupling 14 and for communication, respectively, with the passages 15 and 16 is a pair of flexible pipes or ducts 18, 19, having bearing at their outer ends in the frame 1 and adapted to permit free movement of the vessel, the pipe 18 being adapted to be opened or closed by means of a suitable cut-off valve 20, arranged in a casing 21 and equipped with a vertically-movable valve-stem 22, while the pipe 19 has disposed therein an inwardly-opening check-valve 23. Connected with the pipe 18 in advance of valve 20 is a vent-pipe 24, containing a valve-seat 25, on which closed a vent-valve 26, carried at the lower end of a vertically-movable stem 27, while communicating with the pipe 19 at a point in advance of the check-valve 23 is a return pipe or duct 28, leading to the boiler and containing an outwardly opening check-valve 29.

Arising from the base of frame 1 is a vertical support or standard 30, to the upper end of which is pivoted or fulcrumed a main operating-lever 31, connected at its outer end with the stem 22 of the pressure-valve and pivoted at its inner end to the tank 2 for operation through the movements of the latter, there being fixed to the lever 31 at a point in rear of its fulcrum 30 a branch arm or portion 32, loosely engaged between its ends with the upper end of stem 27 and pivoted at its outer end, as at 33, to the upper end of a rigid element or link 34, in turn connected at its lower end with a fixed arm or bearing 35 on the stuffing-box 36 of stem 27, there being disposed upon the upper end of the latter a pressure-spring 37, bearing at its lower end on the arm or lever 32 and at its upper end beneath a head or nut 38, tapped for adjustment onto the stem 27, it being mentioned in this connection that the valve 20 remains normally closed, while the valve 26 normally stands in open position.



In practice the exhaust-steam and water of condensation flows from the engine-exhaust into the tank 2 through the duct 19, while pressure in the tank is relieved through the medium of the normally open vent-valve 26 to permit ready entrance of the incoming condensation, back pressure through the pipe 19 being prevented through the medium of check-valve 23 and the tank being normally maintained in its upward or suspended position through the medium of the weight-levers 10 for acting on the main controlling-lever 31 and its branch 32 to maintain the valve 20 closed and valve 26 open. Upon accumulation in the tank 2 of sufficient water of condensation to overcome the force of weights 13, the tank 2 will descend, thereby rocking the lever 31 on its fulcrum for opening valve 20 and simultaneously closing valve 26, which latter action is due to the fact that the branch 32 is connected with the main lever at a point in rear of its fulcrum and at its outer end to the element 34. As soon as valve 20 opens live steam is admitted to the tank through the pipe 18, thereby creating a pressure for forcing the water of condensation from the tank through the duct 19 and return-pipe 28 to the boiler, it being understood that the check-valve 29 will under the increased pressure open to permit this return of the water, but will remain normally closed under the influence of the lower pressure exerted by the exhaust in coming to the tank. As soon as sufficient water has been discharged from the tank the same is raised by the weights 13, thus again closing valve 20 and opening valve 26, the function of which latter is to lower the pressure in the tank 2 sufficiently to permit the low-pressure exhaust to enter freely, it being obvious that without this vent the pressure in the tank would correspond to that in the boiler, and that consequently the exhaust, which is of lower pressure, could not enter the tank. It is to be observed in this connection that the collar 8 may be adjusted onto the stem 6 for regulating the lifting power of weights 13 upon the tank 2, and further, that the head 38 may be adjusted for regulating the tension of spring 37 to in turn control the pressure exerted thereby upon valve 26.

From the foregoing it is apparent that I produce a comparatively simple inexpensive device of this character admirably adapted for the attainment of the ends in view, it being understood that minor changes in the details herein set forth may be resorted to without departing from the spirit of the invention.

Having thus described my invention, what I claim is—

1. In a device of the class described, a vertically-movable vessel, means for moving the same in one direction, said vessel being mov-

able in the other direction under the weight of its contents, pressure-inlet and exhaust-inlet ducts communicating with the vessel, the latter having a vent-port, a pressure-controlling valve for closing the pressure-inlet duct, a vent-valve for closing the port, means controlled by movements of the vessel for moving the valves in relatively reverse directions, an inwardly-opening valve for closing the exhaust-inlet duct against back pressure, a return-duct leading from the vessel, and an outwardly-opening valve normally closing said return-duct.

2. In a device of the class described, a vertically-movable vessel, means for moving the same in one direction, said vessel being movable in the other direction by the weight of its contents, a pressure-inlet duct communicating with the vessel, the latter having a vent-port, a pressure-controlling valve for closing the duct, a vent-valve for closing the port, said valves being adapted for relatively reverse movement, and an operating-lever having connection with the vessel for operation thereby, and connected with and for actuating both valves.

3. In a device of the class described, a vertically-movable vessel, means for moving the same in one direction, said vessel being movable in the other direction through the weight of its contents, pressure-inlet and exhaust-inlet ducts communicating with the vessel, the latter having a vent-port, a pressure-controlling valve for closing the pressure-inlet duct, a vent-valve for closing the port, an operating-lever connected with and for moving the valves in relatively reverse directions, and operative connections between the lever and tank.

4. In a device of the class described, a vertically-movable tank, means for moving the same in one direction, said tank being movable in the other direction by the weight of its contents, a coupling member connected with the tank and having a pair of passages communicating therewith, a pair of flexible ducts coupled to the member and communicating with the tank through the respective passages, a check-valve arranged in one of the ducts, a pressure-controlling valve for closing the outer duct, said tank having a vent-port, a vent-valve for closing said port, and an operating-lever connected with the valves for moving them in relatively reverse directions, said lever being operatively connected with the tank for automatic operation thereby.

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

JOHN H. TAYLOR.

Witnesses:

WILLIAM L. CODLING,  
HOWARD H. BALDORFF.