

No. 819,497.

PATENTED MAY 1, 1906.

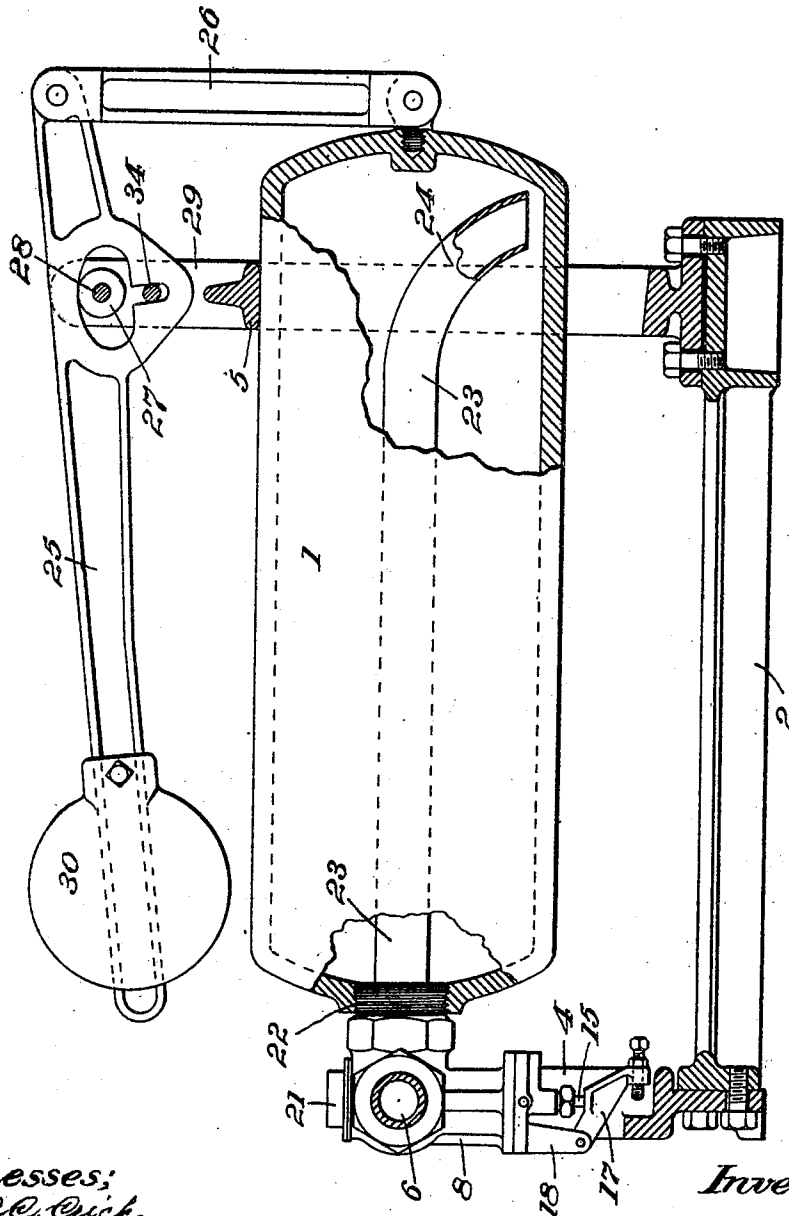
E. V. ANDERSON.

STEAM TRAP.

APPLICATION FILED JUNE 8, 1905.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses;
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O. D. Thompson

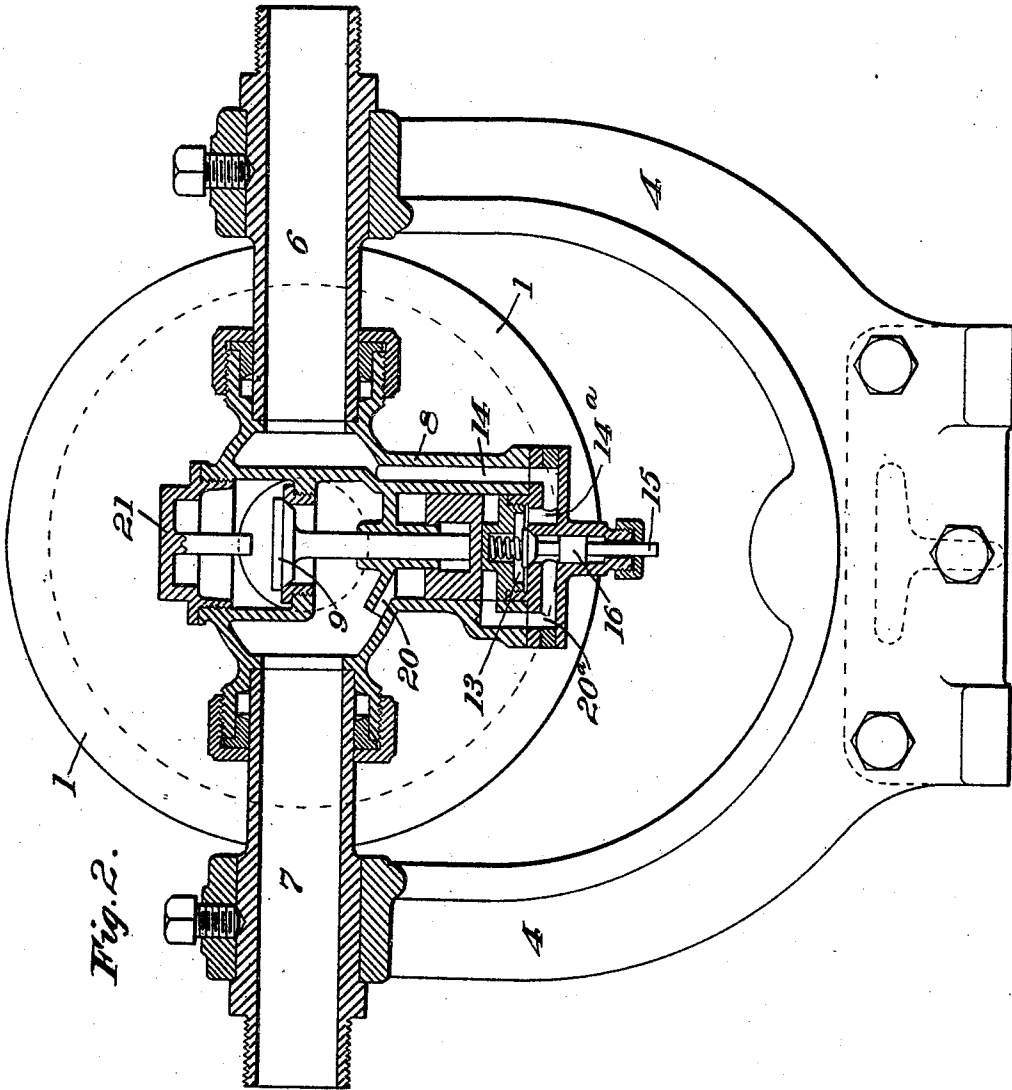
Inventor
per Edward V. Anderson
W. G. Doolittle
Att'y.

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4 SHEETS—SHEET 2.



Witnesses;
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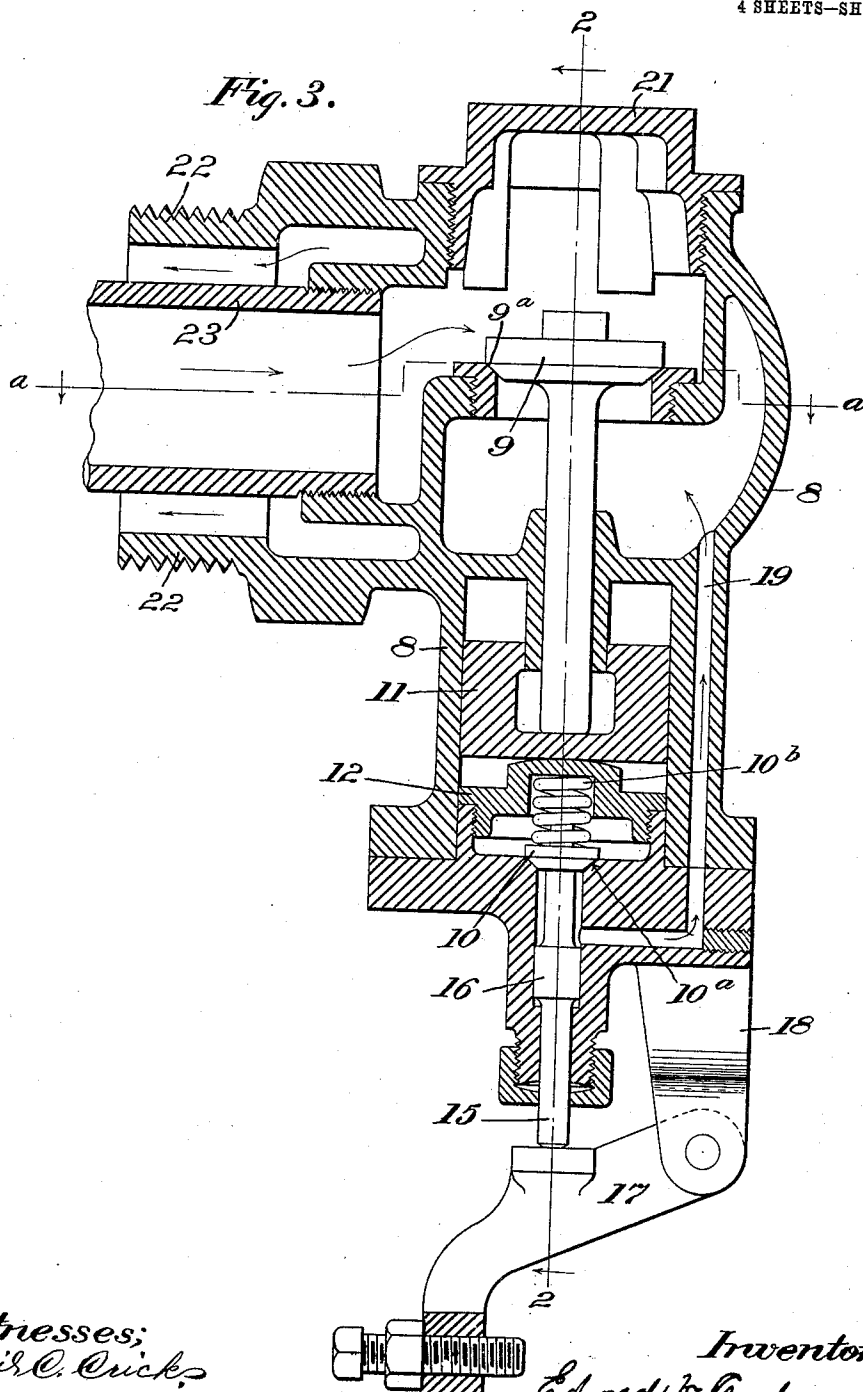
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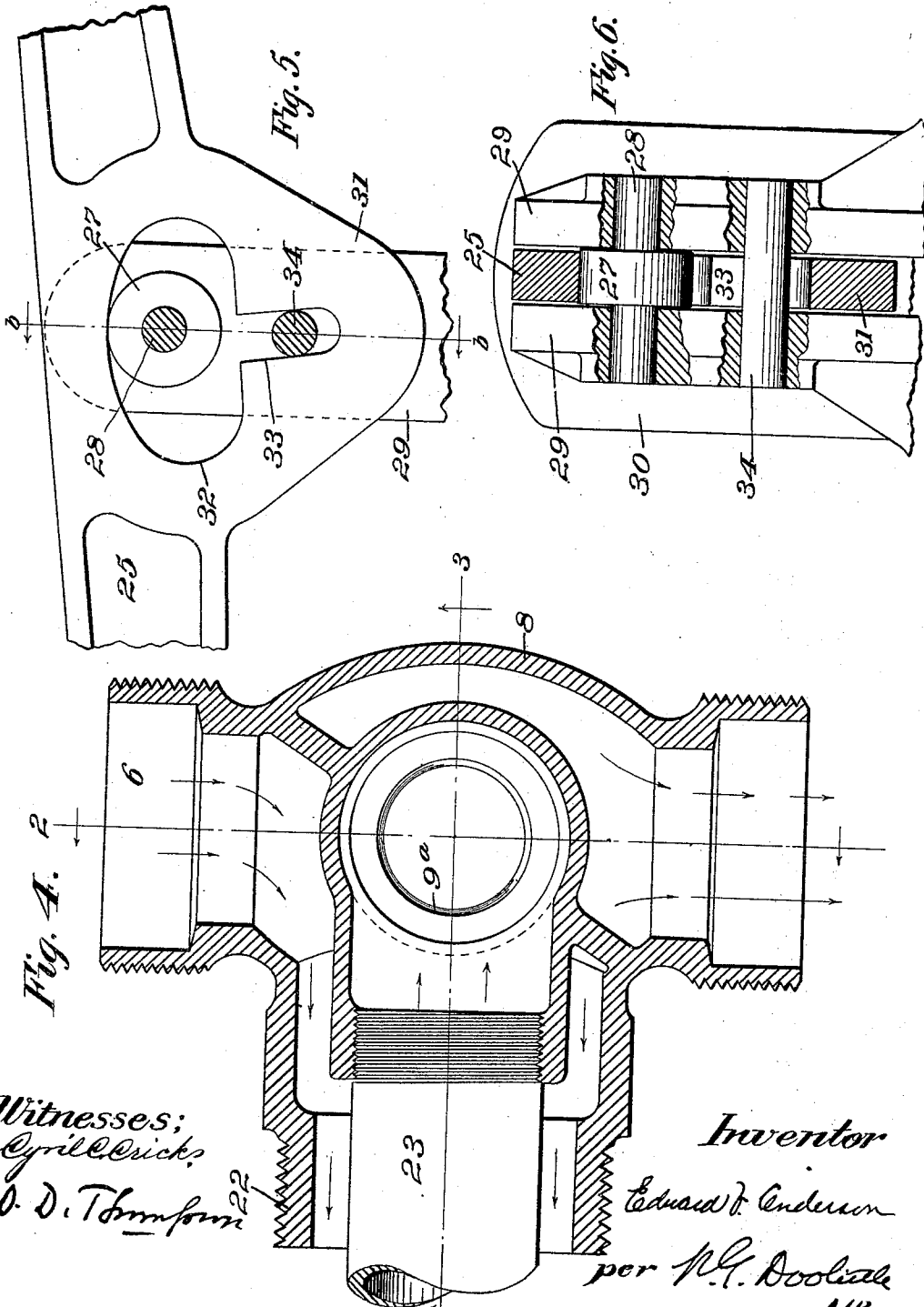
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4 SHEETS—SHEET 4.



Witnesses;
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UNITED STATES PATENT OFFICE.

EDWARD V. ANDERSON, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF
TWO-THIRDS TO CHARLES E. GOLDEN, OF CRAFTON, PENNSYLVANIA.

STEAM-TRAP.

No. 819,497.

Specification of Letters Patent.

Patented May 1, 1906.

Application filed June 8, 1905. Serial No. 264,315.

To all whom it may concern:

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

The object of my invention is to provide a new and improved steam-trap; and to this end the present invention consists of a new and improved steam-trap, in new constructive features, and in the combination and arrangement of parts, all as fully hereinafter described and claimed.

In the accompanying drawings, which illustrate an application of my invention, Figure 1 is a part side elevational view and a part sectional view of a trap embodying my invention; Fig. 2, a part end view and a part sectional view; Fig. 3, a detailed vertical sectional view, particularly showing the valve mechanism; Fig. 4, a horizontal sectional view on line *a a* of Fig. 3; Fig. 5, a detail view of a portion of counterbalancing-lever and its fulcrum, and Fig. 6 a detail sectional view taken on line *b b* of Fig. 5.

Referring to the drawings, 1 designates a movable or tilting receiver arranged to collect the water of condensation and to discharge the same therefrom, and 2 a suitable bed-plate having attached thereto at one end a yoke 4 and at or near its other end an annular plate or ring 5. Yoke 4 is provided with bearings for trunnions 6 and 7. 6 represents the supply trunnion, and 7 the waste.

The valve mechanism is contained within a single casing 8, and this casing, as well as one end of the receiver 1, is supported by the trunnions. This construction forms a characteristic and important feature of my invention.

The valve mechanism as illustrated comprises main valve 9, auxiliary valve 10, and intermediate said valves is a piston 11. Both valves in their normal positions are respectively seated on valve-seats 9^a and 10^a, and 10^b represents a coiled spring located in a chambered plug 12 and exerting a downward pressure on the auxiliary valve. Chamber 13 is in communication with trunnion 6 by means of passages 14 and 14^a, thus permitting high-pressure steam or water to pass into said chamber and to press upon the auxiliary valve. Auxiliary valve has a valve-stem 15 extending downwardly therefrom

and is provided with a collar 16. This stem is arranged to make contact with an arm 17, having one end adapted to come in contact with the yoke and the other end pivoted to a forked hanger 18.

19 designates a relief-port in low-pressure side of valve-casing, and 20 a relief-port for piston, also on the low-pressure side. The function of relief-port 19 is to take pressure off the under side of piston when the same is closing; and the purpose of port 20 is to permit the fluid which may leak by the piston to escape to the waste-passage.

20^a designates a passage for the high-pressure fluid which passes the auxiliary valve. This passage leads to the under side of the piston.

The upper end of the casing is provided with a screw-threaded cap 21, and attention is particularly called to this construction, as it enables a ready access to the main valve and the interior of the casing.

The receiving-chamber is connected up with the valve-casing by means of a nozzle 22, which nozzle in the form illustrated is made integral with said casing. Attached to the casing and projecting through the nozzle 22 is a horizontally-disposed pipe 23, having a curved downwardly-extending end portion 24. Pipe 23 extends nearly the length of the receiver and moves therewith as the receiver is tilted. The opposite end of the receiver is connected with and supported by a counterbalancing-lever 25. Link 26 connects the lever and receiver. Lever 25 is fulcrumed on a roller 27, supported on rod 28, having its bearings in the forked portion 29 of annular plate 5.

30 designates an adjustable counterweight mounted on lever 25.

The manner of supporting lever 25 forms an important and characteristic feature of my invention, and I have particularly illustrated a preferred construction of this part of my invention by Figs. 5 and 6. As shown, the lever is provided with an enlarged portion 31, having an elliptical opening 32 and a vertically-disposed slot 33. The wall of opening 32 rests upon the roller 27, and 34 designates a pin passing through slot 33 and having its bearings in the forked portion 29.

The purpose of the above-described construction is to vary the leverage on both sides of the fulcrum, so that when the receiver tilts, caused by the weight of the water therein

overcoming the counterweight and a certain quantity of water is displaced from the receiver, the receiver will not be brought back to its normal position before further water is displaced. In other words, when the tilting takes place the counterweight is shifted onto a shorter lever-arm and the receiver onto a slightly longer one. The desired quantity of water in the receiver is then displaced through pipe 23 by the pressure of the steam. The amount of water displaced is controlled by the position of counterweight on the lever and also by the distance between the roller and pin 34. These should be so placed as to always leave a sufficient quantity of water in the receiver to form a seal to prevent the escape of steam from the receiver.

In the drawings I have shown the receiver in a horizontal position with the valves closed ready to receive steam and water through the feed-trunnion 6. When sufficient water has been collected in the receiver to overcome the weight of the counterweight, the receiver and valve-casing are tilted. This tilting movement of receiver and valve-casing causes auxiliary valve-stem 15 to make contact with arm 17, thereby raising auxiliary valve 10 and permitting high-pressure fluid to pass through passage 20^a to the lower side of piston 11, thereby raising the piston and the main valve. While the receiver is discharging through pipe 23 and waste-trunnion 7 to a connected pipe, (not shown,) collar 16 covers port 14 and prevents the escape of high-pressure fluid. When sufficient water has been displaced from the receiver, it is caused to assume its normal or horizontal position by the counterweight, and during this movement both valves are seated.

While I have shown and described my invention in the form of a steam-trap, my trap may be employed in connection with other fluids.

What I claim is—

1. In a trap of the character described, the combination with a fluid-receiver, of a valve-casing, valve mechanism in said casing, a supply-trunnion, a waste-trunnion, said receiver connected with the valve-casing, and said casing supported on the trunnions.

2. In a trap of the character described, the combination, with a tilting receiver, of a valve mechanism, a counterbalancing-lever having an elliptically-formed fulcrum-bearing and a vertically-disposed slot, a fulcrum-roller, having fixed bearings, said lever-bearing mounted

on the roller-fulcrum, and a pin located in the said slot.

3. In a trap of the character described the combination with a receiver, of a valve-casing, a valve mechanism in the casing, trunnions on which the valve-casing is mounted and arranged to turn, one end of the receiver attached to the valve-casing and adapted to move therewith, a fluid-discharge pipe in the receiver and in communication with the valve mechanism, and a lever provided with a counterweight connected to one end of the receiver.

4. In a trap of the character described the combination with a tilting receiver having a fluid-discharge pipe, of a valve mechanism comprising a main valve, an auxiliary valve, a piston, means for moving the auxiliary valve to admit fluid to one side of the piston for the purpose of moving the piston to open the main valve as the receiver tilts.

5. In a trap of the character described, the combination with supporting-trunnions, a valve mechanism having its casing mounted on the trunnions, a tilting receiver attached to the valve-casing and arranged to move therewith, a main valve controlling the fluid-discharge from the receiver, a piston, and an auxiliary valve actuated by tilting the receiver whereby fluid is admitted to one side of the piston for the purpose of moving the main valve.

6. In a trap of the character described the combination with supporting-trunnions, a valve mechanism having its casing mounted on the trunnions, a tilting receiver attached at one end to the casing, a counterbalancing-lever connected with the opposite end of the receiver, said lever having an elliptically-formed fulcrum-bearing and a vertically-disposed slot, a fulcrum-roller having fixed bearings, said lever-bearing mounted on the roller-fulcrum, and a pin located in the said slot.

7. In a trap of the character described, the combination with a fluid-receiver of a valve mechanism comprising a main valve and an auxiliary valve, a counterbalancing-lever having an elliptically-formed bearing, a roller-fulcrum, said lever-bearing mounted on the roller and arranged to be shifted thereon.

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

EDWARD V. ANDERSON.

Witnesses:

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MARGARET HUGHES.