

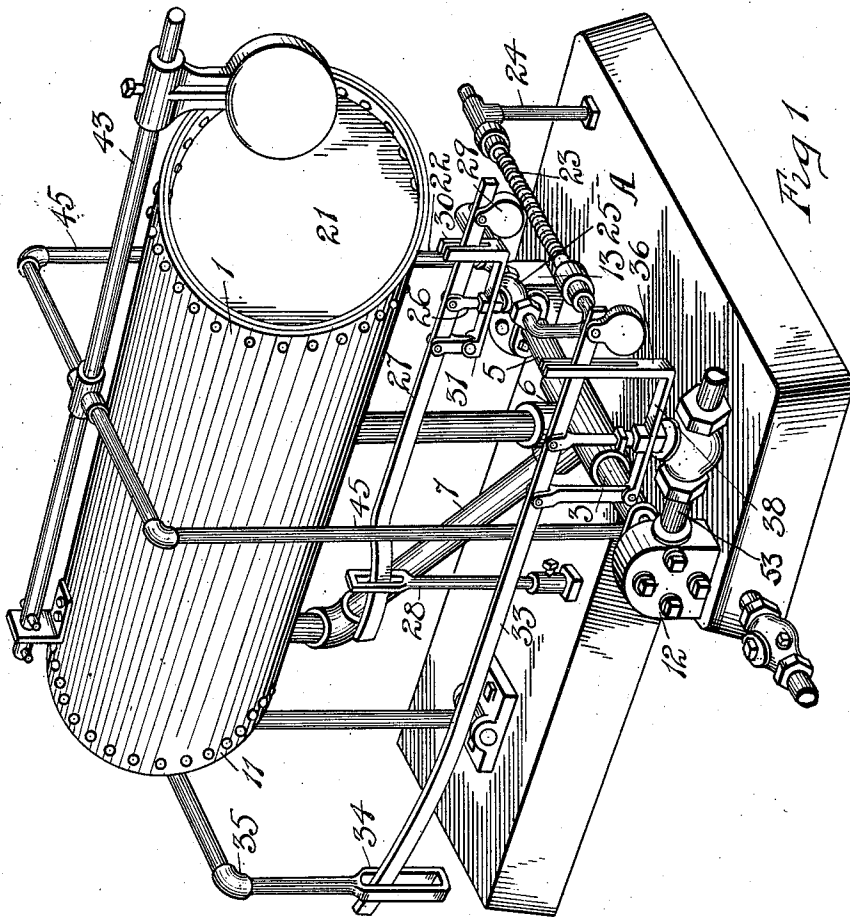
J. E. PURSER.
STEAM TRAP.

APPLICATION FILED AUG. 6, 1908.

1,000,344.

Patented Aug. 8, 1911.

4 SHEETS—SHEET 1.



Witnesses

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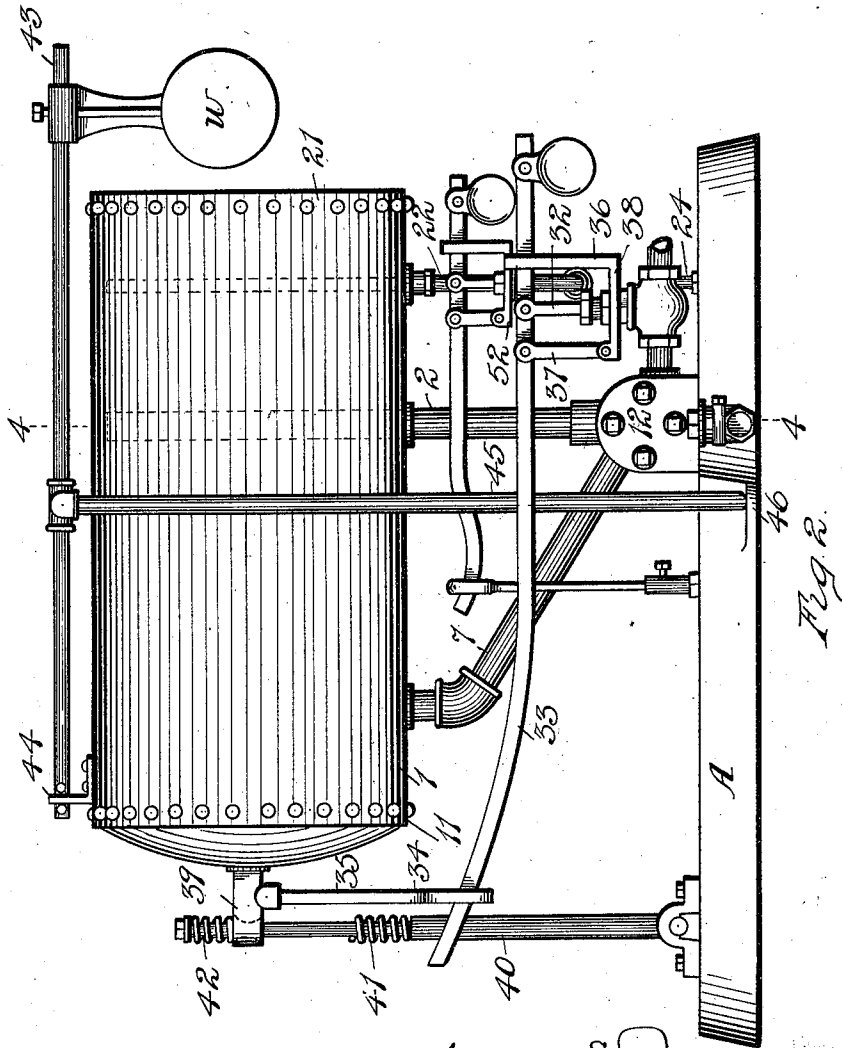
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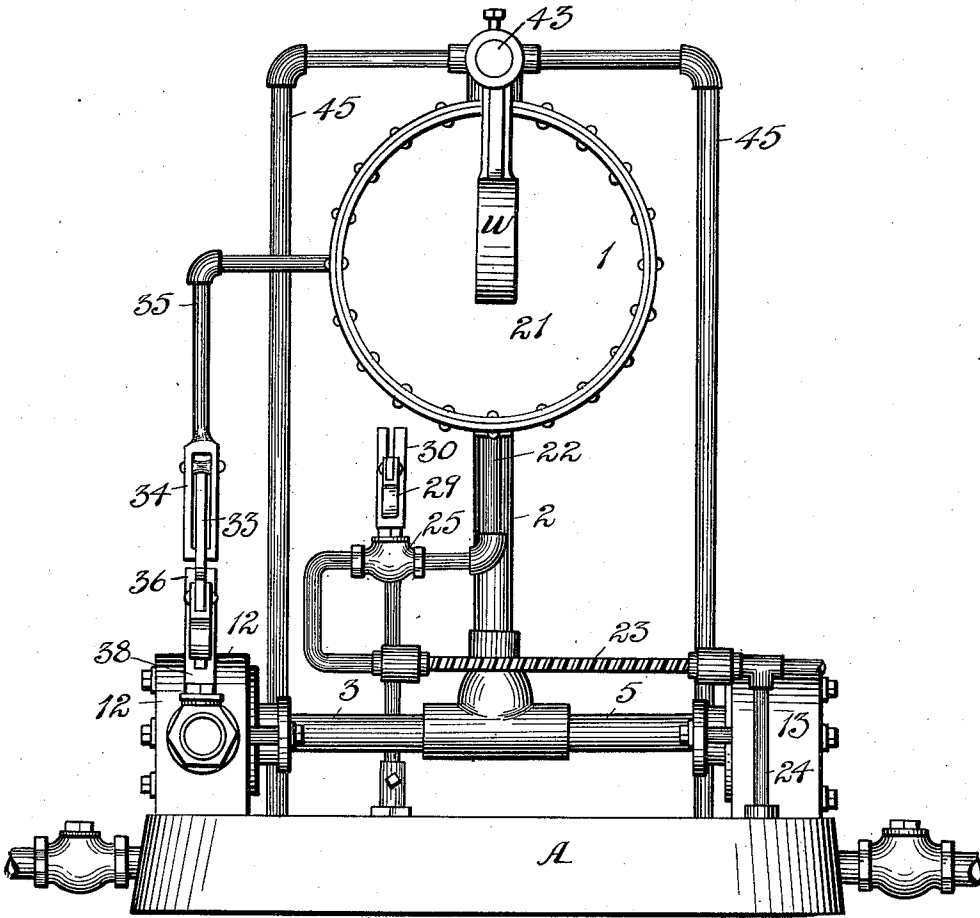


Fig 3.

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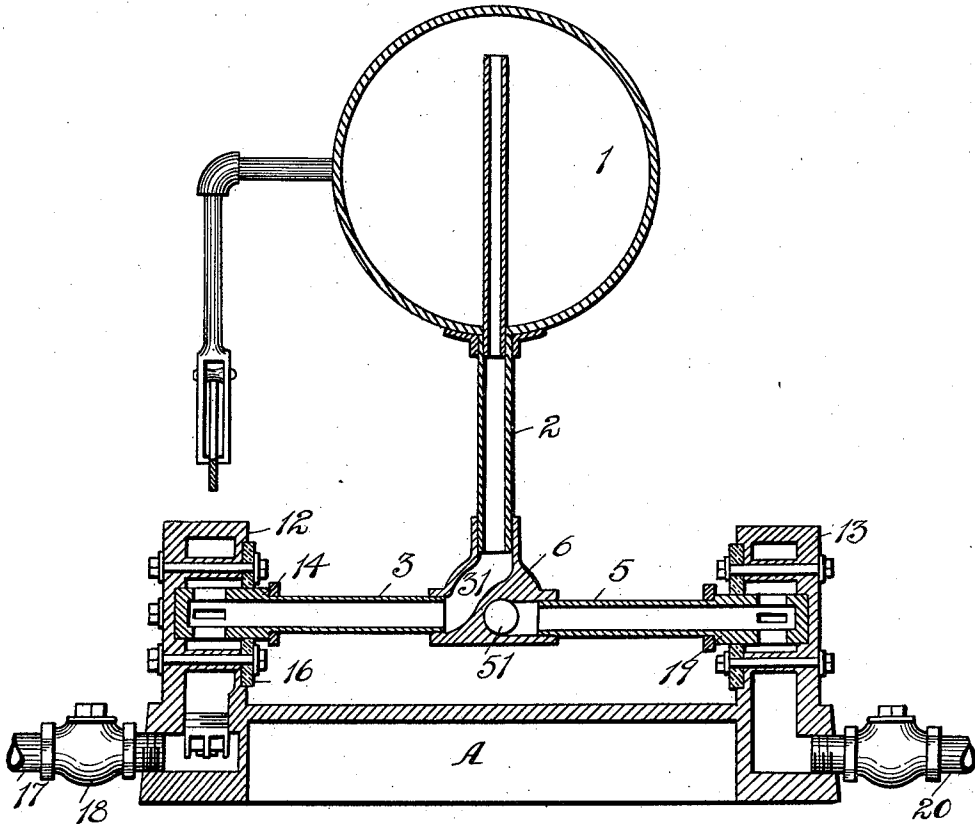


Fig 4.

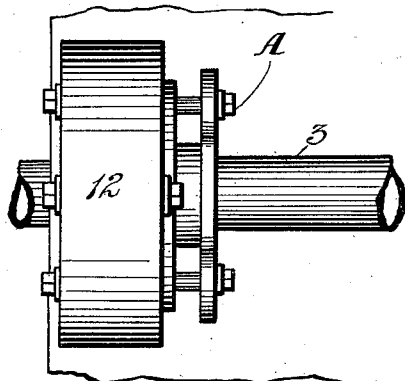


Fig 5

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UNITED STATES PATENT OFFICE.

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STEAM-TRAP.

1,000,344.

Specification of Letters Patent.

Patented Aug. 8, 1911.

Application filed August 6, 1908. Serial No. 447,270.

To all whom it may concern:

Be it known that I, JAMES E. PURSER, a subject of the King of Great Britain, residing in Windsor, county of Essex, Province of Ontario, Dominion of Canada, have invented a certain new and useful Improvement in Steam-Traps, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to separators for condensed water and has for its object an improved trap adapted to separate condensed water from the steam of a steam circulating system and return the water to the boiler for reheating.

In the drawings: Figure 1, is a perspective. Fig. 2, is a side elevation. Fig. 3, is an end elevation. Fig. 4, is a cross section at the line 4, 4, Fig. 2. Fig. 5, is a plan view of the trunnion bearing, upon which the main tank rocks.

The trap consists essentially of a tank 1, into which the water condensed from the steam passes from the circulating system and from which it is periodically delivered into the boiler by gravity through valve-controlled passages of which the valves are actuated by the weight of the water in the tank and by counter weights.

The tank 1, is mounted on the upper end of a vertical pipe 2, which rises from the cross member 3, 5; of this cross member the end 3, is an inlet pipe for water which connects through a by-pass 31, with the pipe 2, and this by-pass is connected through a casing 6, that forms a coupling between the pipes 2, 3, 5. The part 5, of the cross member is a pipe which connects with the casing coupling 6, and by means of a by-pass 51, connects through the casing with pipe 7, that enters the tank 1, near the terminal of its heavy end 11. The pipe 2, extends nearly to the top of the tank. The pipe 7, leads out from the bottom of the tank 1; the pipes 2, 7 both rock with the cross member in bearings 12, 13. The bearing 12, is a chambered bearing into which the cross member 3, projects through a stuffing box 14. For purposes of easy construction the stuffing box is inserted through a plate 16, which is itself bolted over an opening in the

face of the chambered bearing 12. The return water from the circulating system enters the chambered bearing 12, through a pipe 17, passes the check valve in the valve casing 18, enters the chamber within the bearing and thence passes into the pipe 3, of the cross member and thence into the tank 1, where it is delivered into the tank near the top thereof.

The water discharged from the tank passes out through pipe 7, into the tube 5, of the cross member, thence into a chambered bearing 13, into which the tube 5, is inserted through a stuffing box or packing member 19, which packing member is held to the chambered bearing in the way already described with reference to the connection between the packing 14, and the chambered bearing 12. The discharge water passes from the chambered head in the discharge pipe 20, and thence to the boiler.

The actuation of the tank on its trunnions is effected by the weight of the water in the tank 1, and in order that the result may be accomplished the tank is mounted on the oscillatory standard 2, nearer the end 21, of the tank than it is to the end 11, of the tank. As the tank rocks the lighter end, 21, carries with it and lifts the end of an air exhaust pipe 22, which is connected by flexible pipe section 23, with a standard pipe 24, on the base A, which supports the entire structure. In the pipe connection between the flexible section 23, and the vertical section 22, is a valve casing 25, within which is seated a valve with a stem 26, to which is connected a lever 27. One end of the lever 27 engages through a looped end of standard 28, the other end is weighted by weight 29, engages between standard guides 30, and is linked to a cross bar 52, which rests on or is secured to the casing of the valve 25. The depression of the valve casing which takes place when the end 11, of the tank rises actuates the lever and this in turn actuates the valve, opens it and furnishes an exhaust passage through the standard pipe 24, through the flexible connection 23, and through the standard 22. The tilting motion of the tank 1, when the end 11 falls, actuates a second valve in the pipe 53. The stem 32, of the second valve is pivotally connected to lever 33, the end of which engages through the looped terminal 34, of a hanger 35, that hangs from the end

of the tank or from a projection extending from the end of the tank 1.

When the heavy end 11, of the tank 1, falls it drops the hanger 35, and the looped end 34, thereof engages the lever 33, and actuates the valve stem 32, which is pivotally connected to the lever 33. The lever 33 engages through standard guides 36, and is connected by link 37, to cross bar 38, secured to the casing of the valve; this valve is a steam controlling valve through which steam enters the tank and brings the water in the tank between steam forces that are balanced as to pressure, and the water then runs into the boiler.

A projection 39, on the end of the tank engages a guide 40, pivotally connected to the base A, and provided below the projection 39, with a buffer spring 41 and above with buffer spring 42. The standard 40, is pivotally connected to the base A, and may oscillate slightly with respect thereto, to compensate for the radial travel of the projection 39, as that projection oscillates with the tank. The engagement between the projection 39, and the standards 40, is mechanically effected by passing the standard 40, through a slot-like opening in the projection 39, which permits the oscillation of the two on their independent centers as described.

The tank 1, is counter-weighted by a weight W, adjustably connected with the bar 43, that extends over the tank 1. One end of the bar 43, is held to the tank by bracket 44, and intermediate its ends it is held rigidly to rocking standards 45, which rest on steps 46, on the base. The standards 45, support the bar 43, but do not prevent its oscillating motion and themselves partake in the oscillating motion to a degree.

The tank 1, rocks on its trunnion bearings, the bar 43, rocks on the ends of the standards 45; the bar 43, and the tank 1, do not maintain an exactly parallel relation throughout this rocking movement, but remain nearly parallel throughout. As the water accumulates in the tank 1, it gradually overbalances the weight W, and the end 11 sinks because of the unbalanced condition that occurs when the tank fills. The amount of water that is necessary to start the sinking or oscillating movement is determined by the location of the weight W, on the rod 43. As the heavy end of the tank sinks it opens the valve to the steam inlet pipe allowing the admission of steam to the tank above the water which thus becomes equalized as to pressure and flows by gravity out of the tank.

What I claim is:

1. A steam trap, having in combination a tank adapted to tilt when the water accumulates therein, a water inlet passage, a steam inlet passage, a water outlet passage,

an exhaust air passage independent of the said other passages, a steam valve opened upon the tilting of said tank from normal and an exhaust air valve closed by such tilting and opened when the tank returns to normal, substantially as described.

2. A steam trap, having in combination a tank adapted to tilt when the water accumulates therein, a passage into said tank for both the water of condensation and the steam, a water outlet passage, an exhaust air passage independent of said other passage; a steam valve opened by the tilting of the tank from the normal, and an exhaust air valve closed by such tilting and opened when the tank returns to normal, substantially as described.

3. A steam trap, having in combination a tank, trunnions upon which the same is supported and adapted to tilt, a water inlet passage and steam inlet passage through one of said trunnions, and a water outlet passage through the other trunnion, an exhaust air passage independent of the trunnions and the other passages, a steam valve opened by the tilting of the tank from normal and an exhaust air valve closed by such tilting and opened when the tank returns to normal, substantially as described.

4. A steam trap, having in combination a base, a tank mounted thereon and adapted to tilt from the normal when water accumulates therein, a water inlet passage, a steam inlet passage, a water outlet passage, an exhaust air pipe leading from one end of said tank, a valve seat therein, a valve connected to said base and adapted to be opened when the tank is in normal position by the withdrawal of the valve seat from the valve, a steam valve and means for opening the same when the tank is tilted from the normal, substantially as described.

5. A steam trap, having in combination a base, a tank mounted thereon and adapted to tilt from the normal when water accumulates therein, a water inlet passage, a steam inlet passage, a water outlet passage, an exhaust air pipe leading from one end of said tank and having a flexible pipe connection with said base, a valve seat therein, a valve connected to said base and adapted to be opened when the tank is in normal position by the withdrawal of the valve seat from the valve, a steam valve and means for opening the same when the tank is tilted from the normal, substantially as described.

6. A steam trap, having in combination a base, a tank mounted thereon and adapted to tilt from the normal when water accumulates therein, a water inlet passage, a steam inlet passage, a water outlet passage, an exhaust air pipe leading from one end of said tank, a valve seat therein, a valve engaging on said seat, a yoke attached to said exhaust air pipe, a standard attached

to said base and having a looped end, a lever pivoted to said yoke and engaging through said looped end of the standard and attached to said valve whereby the tilting
 5 of said tank from the normal causes said air exhaust and valve seat to approach the valve which is held in place by said lever and thereby close said air exhaust valve, a steam valve, and means for opening the same when
 10 the tank is tilted from the normal, substantially as described.

7. A steam trap, having in combination a tank adapted to tilt when water accumulates therein, a combined steam and water
 15 inlet passage discharging near the top of said tank, a water outlet passage discharging from the end of said tank which tilts from the normal, and a steam valve adapted to open when said tank tilts from the normal,
 20 substantially as described.

8. A steam pipe, having in combination a cylindrical tank, a base, trunnions attached to said base, a cross member adapted to turn in said trunnions, a pipe forming
 25 with said cross member a combination water inlet and steam inlet passage, and discharging near the top of said tank, a second pipe disposed at an angle to said first-mentioned

pipe and adapted to form a water discharge passage from the tilting end of said tank, 30 an air exhaust pipe leading from the opposite end of said tank, a valve for the same adapted to close upon the tilting of said tank from the normal and a steam valve adapted to open upon the tilting of said
 35 tank from the normal, substantially as described.

9. A steam trap, having in combination a base provided with steps on either side, a steam inlet passage, a water inlet passage, 40 and a water discharge passage and a valve controlling said steam inlet passage, the said tank being so positioned that the accumulation of water therein causes the same to
 45 tip, a bar supported above said tank, a counter-weight adjustable on said bar, rocking standards freely supported in said steps on the base and supporting said bar and counter-weight, substantially as described.

In testimony whereof, I sign this specification in the presence of two witnesses. 50

JAMES E. PURSER.

Witnesses:

CHARLES F. BURTON,
 VIRGINIA C. SPRATT.