E. ENGEBRETSON.

STEAM TRAP.

APPLICATION FILED JUNE 12, 1909.

954,175. Patented Apr. 5, 1910.

Fig. 1.

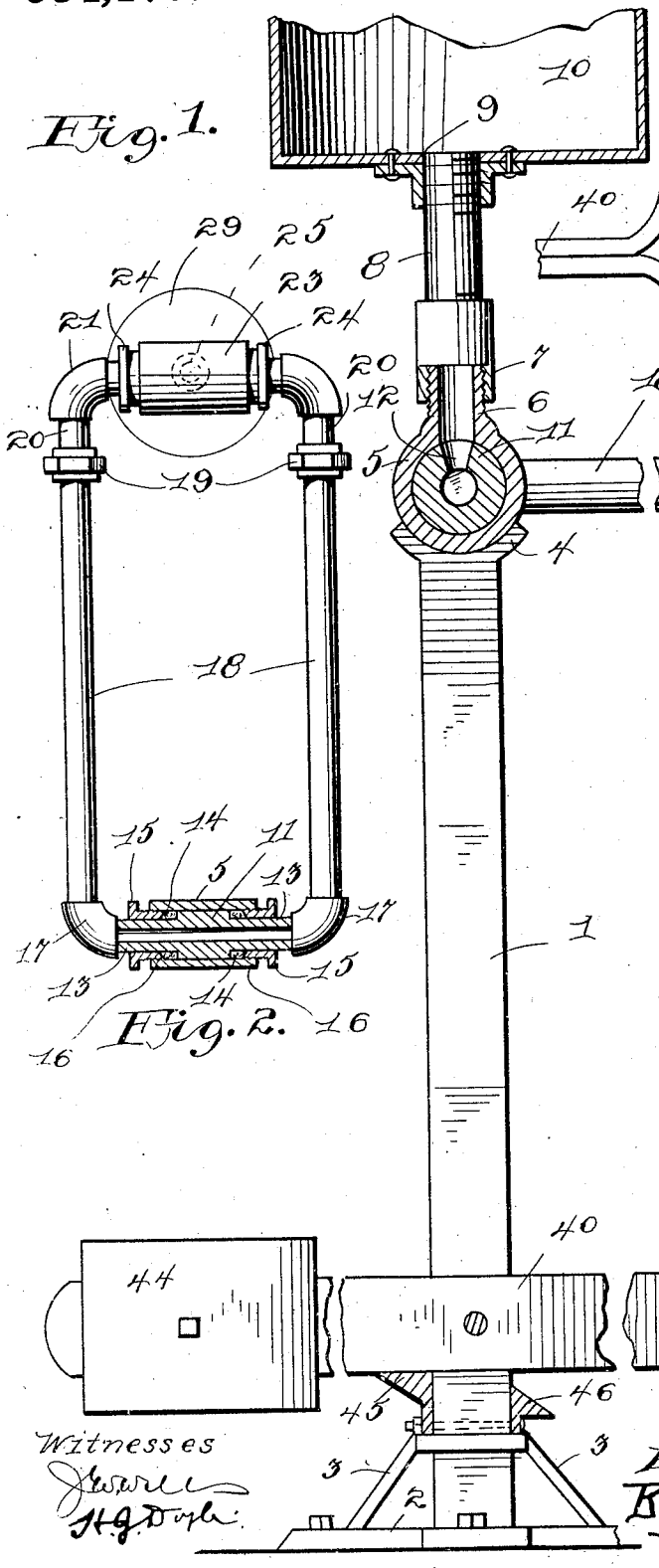
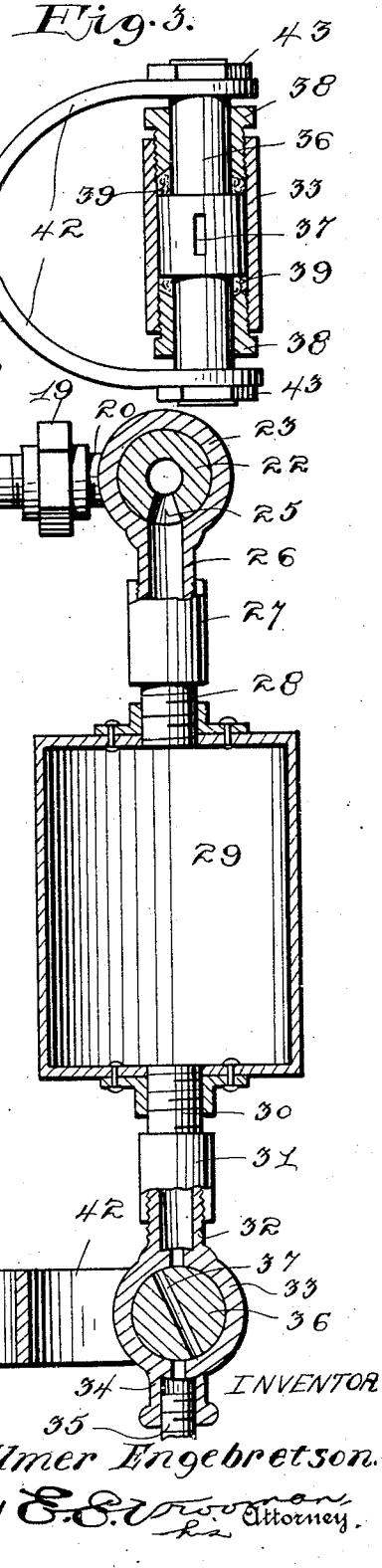


Fig. 2.

Fig. 3.



Witnesses

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STEAM-TRAP.

954,175. Specification of Letters Patent. **Patented Apr. 5, 1910.**

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To all whom it may concern:

Be it known that I, ELMER ENGEBRETSON, a citizen of the United States, residing at Devils Lake, in the county of Ramsey and State of North Dakota, have invented certain new and useful Improvements in Steam-Traps, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to balanced steam traps, and is especially adapted for use in removing water of condensation from compressed air and steam reservoirs, drying kilns, and the like.

The principal object of the invention is to provide a balanced trap which will automatically and periodically discharge the water of condensation received from reservoirs, the automatic operation of the device being obtained through the employment of a pair of vessels or receptacles which have swiveled valve controlled pipe connections and also a counterweight, the parts of the invention being so arranged that when they are in their normal receiving position, the valves between the two receptacles will be opened and the discharge from the lowermost receptacle closed, but when the weight of the water of condensation received into the said lowermost receptacle overcomes the weight of the counterweight, the position of said valves will be reversed, so that the discharge outlet will be opened and the inlet closed, which position is retained until the lowermost receptacle has been drained, whereupon the counterweight will overcome the weight of said receptacle and cause the valves to assume their former positions.

In carrying out the object of the invention generally stated above, it will, of course, be readily understood that the essential features of the same are susceptible of changes in details and structural arrangements, one preferred and practical embodiment thereof being shown in the accompanying drawings, wherein—

Figure 1 is a vertical sectional view of the improved automatically acting balanced trap. Fig. 2 is a plan view, partly in horizontal section, of the connection between the reservoir and the receiving receptacle. Fig. 3 is a detail horizontal sectional view showing the valve for controlling the discharge from the receiving receptacle.

Referring to said drawings by numerals, it will be observed that the improved trap is supported by a standard 1 having a flat widened base 2 which may be composed of a plurality of horizontally arranged radiating members, which carry brace bars 3 for engagement with the sides of said standard. The upper end of said standard is provided with a horizontally arranged concaved rest 4 for a valve casing 5. Said valve casing 5 is in the form of a tube from the upper surface of which a threaded nipple 6 projects and which is engaged by a coupling sleeve 7 which in turn connects with a short pipe length 8 coupled within an opening 9 formed in the bottom of and communicating with a reservoir 10.

The valve casing 5 has a turning plug mounted therein the enlarged central portion 11 of which has a snug fit within said casing and is provided with an inwardly tapering opening 12 which extends transversely through one surface of said enlarged central portion and is adapted to communicate with the nipple 6 when the parts of the invention are in the position shown in Fig. 1. The ends of said turning plug are reduced as indicated at 13 and project beyond the ends of said casing. Packing material 14 is interposed between the reduced portions of the turning plug and the casing, said packing being tightly compressed therein by means of packing nuts 15 which engage with threads formed on the interior surface of the ends of said casing. The inner end of each packing nut is beveled as indicated at 16 so as to effect a wedging pressure on said packing. The projecting ends of the turning plug each carry a coupling elbow 17 which connect with pipe lengths 18, each pipe length 18 at its outer end carrying a detachable coupling 19 which connects with a short pipe length 20. The pipes 20 in turn connect with elbow couplings 21 carried by the reduced ends of a turning plug 22, which is identical in construction with the plug described in connection with the casing 5, said plug being held within a casing 23 by means of packing nuts 24. The tapering opening 25 formed transversely through the plug 22 is adapted to communicate with a nipple extension 26 of the casing 23, said nipple having a sleeve coupling 27 with a pipe 28 projecting from and in communication with the top of a receiving receptacle 29 the bottom of which carries a discharge pipe 30 which has a sleeve coupling 31 with a nipple 32 projecting from a

valve or plug casing 33, the lower surface of which is provided with a discharge outlet 34 in communication with a discharge pipe 35.

A solid turning plug 36 is rotatably mounted in the casing 33, the central portion of said plug being provided with a transverse opening 37 adapted to communicate with the nipple 32 and also the discharge outlet 34. Said plug has its ends reduced and projecting beyond the casing and is held steam tight within said casing by means of the packing nuts 38 and interposed packing 39, the packing nuts being identical with the packing nuts used in connection with the casing 5.

An arm 40 is pivotally mounted on the lower portion of the standard 1, one end of said arm being bifurcated to provide the members 42 the free ends of which are mounted on the projected ends of the plug 36 and held thereon by means of the lock nuts 43. The other end of said arm 40 carries an adjustable counterweight 44. A bottom rest for the arm 40 is rigidly fastened on the standard 1, said rest projecting on opposite sides of the standard so as to provide a horizontal surface 45 for the counterweighted portion of said arm, and a downwardly inclined surface 46 for the bifurcated portion of said arm, by means of which the movements of said arm are limited.

As is shown in Fig. 1, the reservoir 10 is in communication with the receiving receptacle 29 through the hollow plugs or valves interposed therebetween, and the discharge outlet of the receiving receptacle is closed by means of the turning plug 36. This is the position the invention assumes when the counterweight 44 overcomes the weight of the water of condensation in the said receiving receptacle. It will therefore be seen that when the said receptacle with its water of condensation is of greater weight than the said counterweight, said receptacle will drop, thereby closing the two upper turning plugs, and opening the lower turning plug, so that the contents of the receptacle will be drained through the discharge pipe 35. As soon as this has occurred, the counterweight will restore the receiving receptacle to its former position, which movement closes the lower turning plug and opens the upper turning plugs.

It will be seen from the foregoing that the invention is entirely automatic in its action and will serve in a simple and effective manner to carry off the water of condensation and the like from the reservoir 10.

A prominent feature of the invention resides in the described standard used for supporting the improved trap. It will be seen that by use of the same the trap is securely and compactly supported, and by the use of the described rest thereon for the counterweighted arm, the movements of the trap are confined to either the opening or closing of the valves therein, so that there is no danger of the same moving or rocking to an inoperative position.

What I claim as my invention is:—

1. In a steam trap, the combination with a stationary reservoir, of a rotatable valve for the discharge thereof, an oscillatory receptacle, inlet and outlet valves for the said receptacle, and means for opening the outlet valve and closing the inlet and discharge valves on the descent of the oscillatory chamber and reversing the positions of said valves on the ascent of said receptacle.

2. In a steam trap, the combination with a stationary reservoir, of a discharge valve therefor, an oscillatory receptacle having a pipe connection with said discharge valve, an inlet valve carried by said receptacle and connected to said pipe connection, an outlet valve for said oscillatory receptacle, and means for opening the discharge and inlet valves and closing the outlet valve when the oscillatory receptacle ascends and reversing the positions of said valves when said receptacle descends.

3. A steam trap comprising an oscillatory receptacle, an inlet pipe therefor, valves controlling the inlet and discharge of said pipe, a discharge for said receptacle, a valve therefor, and means for closing the valves of said pipe and opening the outlet valve of said receptacle when said receptacle descends and reversing the position of said valves when said receptacle ascends.

4. A steam trap comprising an oscillatory receptacle, an inlet pipe therefor, valves controlling the admission to and discharge from said inlet pipe, a discharge pipe, a valve controlling said discharge pipe, and automatically acting means for closing the inlet pipe valves and opening the discharge valve when said receptacle descends, and reversing the positions of said valves when said receptacle ascends.

5. A steam trap comprising an oscillatory receptacle, an inlet pipe therefor, valves controlling the admission to and discharge from said inlet pipe, an outlet pipe for said receptacle, a valve controlling the same, and a counterweighted lever for operating the last mentioned valve as said receptacle moves.

6. A steam trap comprising a stationary reservoir, a movable receptacle, a pivotally mounted pipe connection between said reservoir and said receptacle, valves controlling the admission and discharge of connection for permitting an unobstructed passage from said reservoir to said receptacle when the latter is ascending, a discharge outlet for said receptacle, and a valve controlling said outlet and adapted to close when the first mentioned valves are opened, and open when the same are closed.

7. A steam trap comprising an oscillatory receptacle, an inlet pipe therefor, valves controlling the admission to and discharge from the said inlet pipe, means for automatically opening said valves on the ascent of the receptacle and closing the same on the receptacle's descent, a discharge valve for said chamber, and a counterweighted lever for opening said valve on the descent of said receptacle and closing the same as said chamber ascends.

8. In a steam trap, the combination with a reservoir provided with a discharge pipe, a valve for said pipe, an oscillatory receptacle, an inlet valve therefor, a pipe connection between said valves for closing the same on the descent of the said receptacle and opening the same on the ascent of the receptacle, a discharge valve for said chamber, and means for opening the same on the descent of said receptacle and closing the same when the receptacle ascends.

9. In a steam trap, the combination with a reservoir provided with a valve controlled discharge, of an oscillatory receptacle, an inlet valve therefor in communication with the discharge of said reservoir, a pipe connection between said valves for opening the same when the receptacle ascends and closing them when the receptacle descends, a valve controlled discharge for said receptacle, and a counterweighted lever for opening the last mentioned valve when the receptacle descends and closing the same when the receptacle ascends.

10. A steam trap comprising a supporting standard, a valve casing supported by the upper end thereof, a movable chamber having a pivotal connection with said casing, a discharge valve carried by said chamber, an arm pivoted to said standard and having one end connected to said discharge valve, a counterweight mounted on the other end of said arm, and a rest carried by said standard for limiting the movements of said arm.

11. A steam trap comprising a standard, a valve casing supported thereby, a movable chamber having a pivotal connection with said casing, a discharge valve carried by said chamber, an arm pivoted to said standard and having one end connected to said discharge valve, a counterweight on the other end of said arm, and a rest projecting from opposite sides of said standard, one portion of said rest having a horizontal surface for limiting the downward movement of the counterweighted end of said arm and the other portion having an inclined surface for limiting the downward movement of the other end portion of said arm.

12. A device of the character described comprising a stationary receptacle, a discharge pipe therefor, a hollow rotatable valve for the said pipe, an oscillatory reservoir, an inlet pipe therefor, a hollow rotatable valve carried by said pipe, pipe communications between the ends of said valves whereby said valves are closed on the descent of said oscillatory receptacle, a discharge for said oscillatory receptacle, a valve therefor, and means for opening the same when the first mentioned valves are closed and for closing the same when said valves are opened.

13. A device of the character described comprising a supporting standard, a rest carried by the upper end thereof, a valve casing supported by said rest, a rotatable valve in said casing, a stationary receptacle, a discharge pipe therefor communicating with said casing, an oscillating receptacle having a pipe communication with said valve whereby the same is opened by one movement of said receptacle and closed by an opposite movement thereof, a discharge valve for said oscillatory receptacle, and means for opening the same when the first mentioned valve is closed and closing it when said valve is open.

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

ELMER ENGEBRETSON.

Witnesses:
N. F. Crewe,
S. C. Haggen.