

No. 618,263.

Patented Jan. 24, 1899.

J. H. BLESSING.
AUTOMATIC STEAM TRAP.

(Application filed Aug. 20, 1898.)

(No Model.)

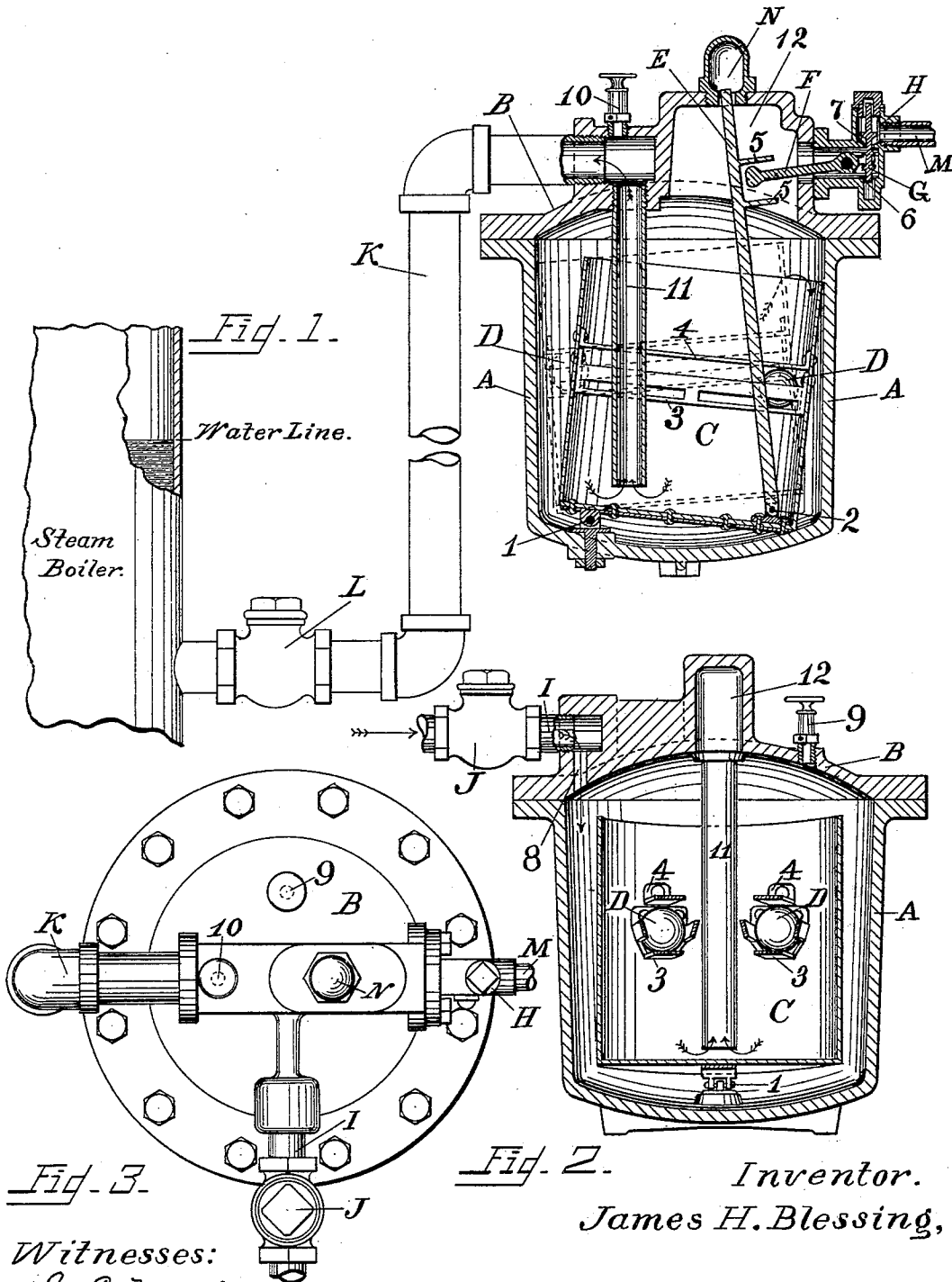


Fig. 3.

Fig. 2.

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AUTOMATIC STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 618,263, dated January 24, 1899.

Application filed August 20, 1898. Serial No. 689,110. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. BLESSING, of Albany, in the county of Albany and State of New York, have invented new and useful
5 Improvements in Automatic Steam-Traps, of which the following is a specification.

My invention relates to improvements in that class of steam-traps that are used for automatically returning the water of condensation to the steam-generator from the steam-pipes or other connected parts in which such
10 condensation will occur; and the objects of my invention are to simplify the construction of the apparatus, render its operation more positive and effective, and to reduce the cost
15 of manufacture. These objects I attain by the mechanism illustrated in the accompanying drawings, which are herein referred to and form part of this specification, and in which—
20 Figure 1 is a central vertical section of my improved steam-trap connected to the feed-water pipe of a steam-boiler, only a small portion of the latter being shown; Fig. 2, a central vertical section of said steam-trap, taken
25 at right angles to Fig. 1; and Fig. 3, a plan view of said steam-trap.

As represented in the drawings, A designates the outer casing of my improved steam-trap, which is usually made of cast metal and
30 consists of a vessel of approximately cylindrical form and provided with a close bottom; B, a removable bonnet which forms a closure for the upper end of the casing A and is secured to a circumferential flange formed
35 around the upper end of said casing by screw-bolts, as shown in Fig. 3; C, an open-top bucket which is inclosed in and arranged to tilt within the casing A. Said bucket is attached by means of a hinge-joint 1 to said
40 casing in such manner that it will be free to acquire tilting movements when occasion requires. Channeled guides 3 are arranged within said bucket, so as to be practically at right angles to the center-line of the pivot of
45 the hinge-joint 1, and in said guides spherical counterweights D are fitted to roll to complete a tilting movement of the bucket C by gravitating toward the depressed ends of the guides 3, the initial tilting movement of the
50 bucket C in either its rising or falling phase being effected by the fluctuations of the level of the water contained in casing A. Guard-bars 4 are arranged directly over the guides 3 for the purpose of preventing the counter-

weights D becoming displaced from their 55 proper positions.

A valve-operating rod E is connected by a joint 2 to the bucket C, and the upper end of said rod is fitted to move loosely in a chambered guide N, secured to the bonnet B, the
60 chamber of said guide allowing the upper end of the rod E to swing slightly to correspond to the swaying movements of said rod. The operating-rod E is provided with tappets
5, which project laterally therefrom and are
65 adapted to take against the inner end of a valve-lever F and impart required oscillations to the latter. The tappets 5 should be spaced sufficiently apart to afford a degree of lost motion between them and the corresponding
70 end of the valve-lever F, the movements of the latter only being effected when the bucket C has completed a prescribed portion of its rising and falling movements. The bonnet B is provided with a chamber 12, which
75 is formed in its under side and in which the inner end of the valve-lever F is free to move in a vertical plane.

G is a valve that is fitted to close upon a valve-seat 7, formed in a valve-casing H, secured to the bonnet B. The valve-lever F is
80 pivoted, as at 6, to said valve-casing in such manner that said lever can oscillate in a vertical plane. The outer end of the valve-lever F is bifurcated to span the stem of the valve
85 G in the usual manner.

I is an inlet water-pipe through which the water of condensation is conveyed into the steam-trap. Said inlet-pipe is provided with
90 a check-valve J, by which communication between the steam-trap and the system of steam-pipes will be controlled at proper times and in proper manner. The inlet water-pipe I communicates with an inlet-port 8, through
95 which the inflowing water will be discharged directly into the space between the inner side of the casing A and outer side of the bucket B.

K is an outlet water-pipe through which the outflowing water will be conducted from the steam-trap into the steam-boiler, and to
100 prevent a backflow of water from the boiler into the steam-trap the pipe K is provided with a check-valve L, of the usual form of such devices. The outlet water-pipe K is
105 connected to the bonnet B and communicates with a siphon-pipe 11, which extends downwardly into the bucket C and reaches nearly to the bottom of the inside of the latter, so

that when the steam-pressure is admitted into the steam-trap the water contained in said bucket will be forced to flow upwardly through said siphon-pipe and thence through the pipe K into the steam-boiler. A steam-pipe M forms a connection between the steam-boiler and valve-casing H for the purpose of supplying the steam-trap with the steam required to operate the steam-trap. Manually-operated air-valves 9 and 10 are inserted in the bonnet B to afford egress for any air that may be contained in the steam-trap before the latter is in condition to operate automatically. The first-named air-valve communicates directly with the interior of the casing A and the other communicates with the siphon-pipe 11 and outlet water-pipe K, and by its combined action of the two air-valves all the air contained in the steam-trap may be discharged to allow the steam-trap to perform its functions properly.

It should be understood that the steam-pipe M is provided with a stop-valve for preventing an inflow of steam into the steam-trap and that as a preliminary to starting the automatic operation of the trap said stop-valve must be closed and the air-valves 9 and 10 opened. Thereby the steam from the boiler will be prevented from entering the trap and the water of condensation from a system of steam-pipes will be permitted to flow into the trap and expel the air from the latter.

During the time the stop-valve in the steam-pipe M remains closed the air-valves 9 and 10 should be open, and the parts of the steam-trap will be in the positions shown by the full lines in Fig. 1. The water of condensation contained in the system of pipes will be impelled by the pressure of steam in said system to pass through the pipe I, check-valve J, and inlet-port 8 into the space between the inner side of the casing A and outer side of the bucket C. In filling said space the flotation of the water by acting on the outer side of the bucket will cause the latter to be tilted upward, and when the level of the water has nearly attained to the upper edge of the bucket the angular position of the channeled guides 3 will cause the weights D to roll to the opposite side of the bucket C into the position indicated by dotted lines in Fig. 1. A sudden impulse will thus be imparted to the upward tilting movement of the bucket C, and thereby the lower tappet 5 will be moved to take against the valve-lever F and cause the valve G to positively close the opening in the valve-seat 7. The stop-valve in the steam-pipe M should now be opened to admit steam from the boiler into the steam-trap and the air-valves 9 and 10 closed. The inflow of the water of condensation, which has been continued during the tilting movement of the bucket C, is kept up, and the water by flowing over the upper edge of said bucket will fill the bucket until the preponderance of weight causes the latter to tilt downward into the position shown by full lines in Fig. 1, and

in making such downward movement the upper tappet 5 will take against the valve-lever F, and thereby the valve G will be raised to admit steam from the boiler into the steam-trap, thereby equalizing the pressure in the latter, so that the water will then gravitate out of the inner side of the bucket C, passing through the siphon-pipe 11 into the pipe K and through the check-valve L into the steam-boiler. When the water has been nearly discharged from the interior of the bucket to within a short distance from the bottom of the latter, the bucket will begin to tilt upward, the movement being caused by the floating power of the water contained between the bucket and the casing, and when said bucket is tilted sufficiently the weights will shift to the side of the bucket that is adjacent to the hinge-joint 1, thereby producing a sudden impulse in the tilting movement just referred to and again closing the valve G upon its seat, and this operation will be continued automatically as long as the water and steam are admitted into the steam-trap in the manner described.

By arranging the shiftable counterweights D within the tilting bucket C, I am enabled to simplify the construction and reduce the cost of my steam-trap, increase the efficiency of its operation, avoid the liability of derangement due to friction of pivots projecting through stuffing-boxes to the outer side of the casing, and prevent the accidental or intentional derangement of the parts that would destroy the proper action of the apparatus.

Having described my invention and its operation, what I claim as new, and desire to secure by Letters Patent, is—

1. In a steam-trap, the combination of a close casing provided with an inlet steam-pipe and pipes for the admission and emission of water into and out of said trap, a tiltable bucket within said casing and having transverse guides in said bucket, a steam-valve operated by said bucket, counterweights fitted to move on said guides and adapted to shift their positions automatically to correspond to each change of the angularity of said guides, and means for preventing the displacement of said counterweights, as specified.

2. In a steam-trap, the combination of a close casing, a tiltable bucket located within and hinged to said casing, guides secured transversely in said bucket, automatically-shiftable counterweights adapted to move on said guides, a valve for controlling the steam admission, a valve-lever extending into said casing, a valve-operating rod attached to said bucket and provided with tappets that take against and impart motion to said valve-lever, as and for the purpose specified.

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