

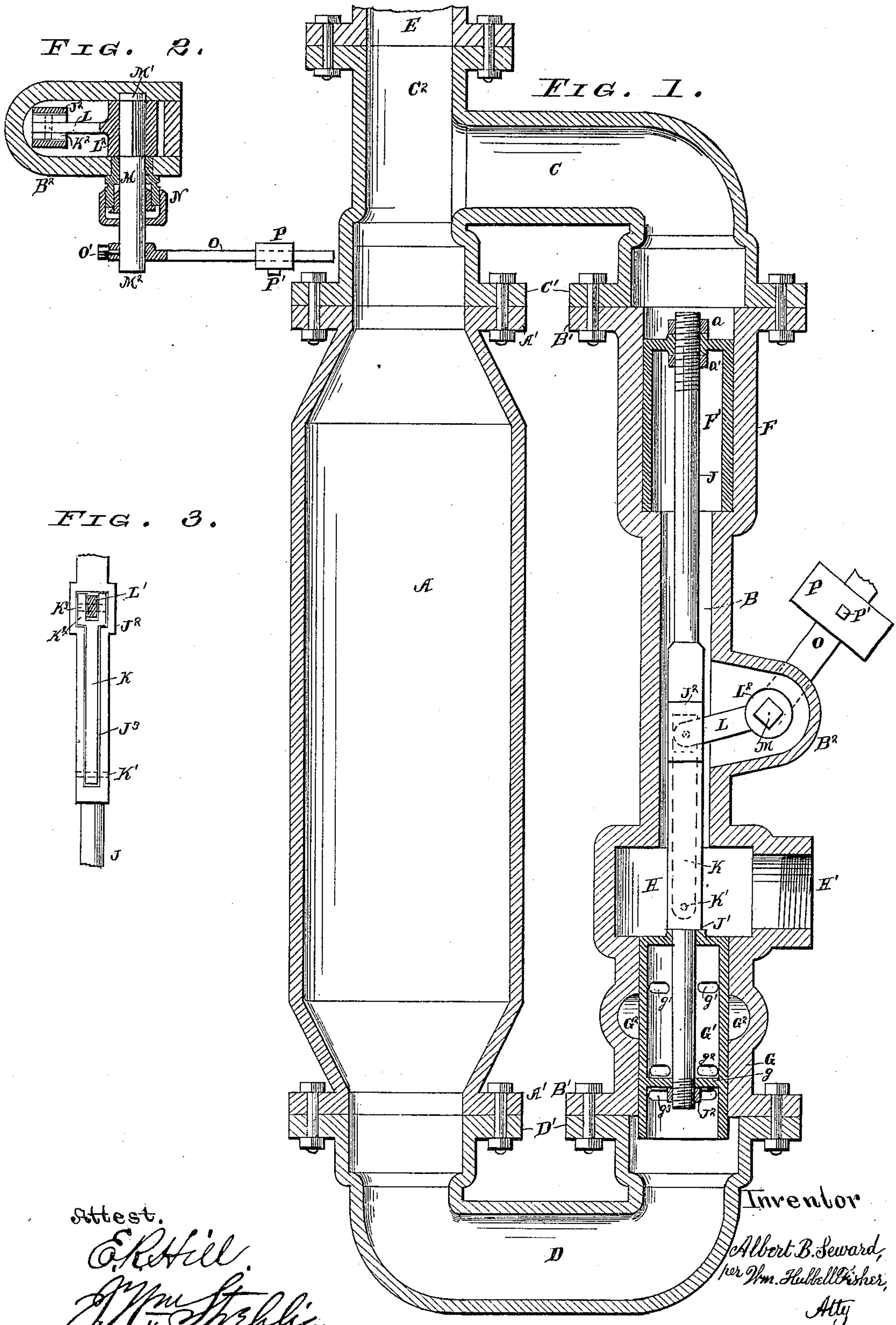
(No Model.)

A. B. SEWARD.

DRAINAGE APPARATUS FOR STEAM PIPES.

No. 258,816.

Patented May 30, 1882.





# UNITED STATES PATENT OFFICE.

ALBERT B. SEWARD, OF CINCINNATI, OHIO.

## DRAINAGE APPARATUS FOR STEAM-PIPES.

SPECIFICATION forming part of Letters Patent No. 258,816, dated May 30, 1882.

Application filed January 28, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT B. SEWARD, of the city of Cincinnati, Hamilton county, and State of Ohio, have invented certain new and useful Improvements in Drainage Apparatus for Steam-Pipes, of which the following is a specification.

My invention consists in a certain novel construction and arrangement of parts by which any water condensing in the steam-pipes shall be automatically withdrawn without permitting any of the steam to escape; and the object of my invention is to prevent the pounding in the pipe consequent upon water remaining in the pipes.

Referring to the drawings forming part of this specification, Figure 1 is a sectional elevation. Fig. 2 is a cross-section of a portion of the valve, and Fig. 3 is a longitudinal section of another part.

The attachment consists of the two vertical elongated chambers A and B, which are open at both ends, and are connected one with the other by means of the hollow castings C D, the flanges C' D' of which are bolted securely to the flange A' B' of the chambers A B, so as to form tight joints. These castings D C form a means of communication between the chambers A B, and the casting C has a cylindrical opening, C<sup>2</sup>, immediately opposite the connection of the chamber A with flange C', by which the entire attachment may be secured firmly to the outlet or drainage pipe E of any system of steam-pipes. The chamber B, which is of a cylindrical shape, has two enlargements, F G, one at each end, preferably of the same length and diameter and accurately bored, and entirely similar one to the other, except the one marked G, situated at the lower end of the chamber, is itself enlarged somewhat half-way between each end by the annular groove G<sup>2</sup>, preferably semicircular in cross-section. Immediately above the enlargement G the chamber B is again enlarged into the annular space H, which has an outlet, H', on the side of the chamber which is opposite to that next the chamber A. Also, midway between the ends of this chamber B, and on the side which is opposite to that next the chamber A, is the semicircular housing B<sup>2</sup>. Fitting respectively in the enlargements F G are the elongated hol-

low pistons F' G', connected with each other by the piston-rod J. The piston F' consists of a cylinder closed at its upper end, a hole being drilled in its closed end of a sufficient size to allow the piston-rod J to pass through it, the piston being then secured to the end of the rod by the nuts *a a'*, by which this position may be also adjusted. The piston G' consists also of cylinder closed at its upper end, and has also a cross-partition, *g*, about two-thirds the distance to its lower end. Both the upper end and this partition have holes bored of a sufficient size to permit the piston-rod J to pass through. The piston G' has bored in its cylindrical sides the holes *g'*, *g*<sup>2</sup>, and *g*<sup>3</sup>, so situated that when the holes *g'* are in communication with the enlargement H the holes *g*<sup>2</sup> and *g*<sup>3</sup> are in the same relation to the annular enlargement G<sup>2</sup>, the holes *g*<sup>2</sup> and *g*<sup>3</sup> being situated on opposite sides of the partition *g*.

The rod J is reduced somewhat in size at a distance from its lower end equal to the length that is surrounded by the piston G', thus forming a shoulder at J', which fits snugly against the outer face of the top of the piston, and the lower end of this rod J passes through the partition *g*, and is fastened by the nut J<sup>2</sup>, butting against the lower face of said partition *g*. From a point somewhat above the housing B<sup>2</sup> to a point near the upper end of the piston G' the rod J is somewhat enlarged, and is preferably of a square or rectangular shape, and in this enlarged portion is formed the slot J<sup>3</sup>, the upper end of said slot being opposite to the housing B<sup>2</sup>, as shown in Fig. 1. At the upper end of the slot the piston-rod is enlarged still more, as shown at J<sup>2</sup> in Fig. 3, which permits of a still further and corresponding enlargement of the slot J<sup>3</sup>. The pitman K lies loosely in the slot J<sup>3</sup>, being connected to piston-rod J at its lower extremity by the pin K'. Its upper end, K<sup>2</sup>, is enlarged somewhat, and fits loosely in the enlargement J<sup>2</sup> of the slot J<sup>3</sup>. This end K<sup>2</sup> of the pitman K is forked, as shown in Fig. 3, so as to receive the outer end, L', of the crank-lever L, to which it is pivoted by the pin K<sup>3</sup>. The hub L<sup>2</sup> of the crank-lever L is rigidly secured to the rock-shaft M, one end, M', of which is turned slightly smaller, and is journaled in one side of the housing B<sup>2</sup>, as shown in Fig. 2. The other end, M<sup>2</sup>,



passes entirely through the other side of the housing B<sup>2</sup>, and also the stuffing-box N, which is attached to this side of the housing. On this end M<sup>2</sup> of the rock-shaft M is fastened, by means of the set-screw O', the lever-arm O, which may be fastened in any desired position on the end of the rock-shaft M by means of said set-screw O'. A counterbalance-weight, P, is slipped over this lever O, and may be secured to it at any desired point by the set-screw P'. The rock-shaft M is prevented from moving laterally by the hub L<sup>2</sup> of the crank-lever L, which surrounds the shaft for the whole width of the interior of the housing, the sides of the hub fitting closely against the inner faces of the sides of the housing.

The weight P and lever O being relatively so adjusted as to hold the pistons F' G' in the position shown in Fig. 1, when the pressure is equal upon the outer ends of each, any communication between the drainage-pipe E and the outlet is effectually prevented, so that as long as steam is pressing upon both pistons they remain closed. The moment, however, that water begins to collect in any appreciable quantity in the lower end of the chamber A the combined pressure of said water and the steam on top of it, acting against the piston G', overbalances the steam-pressure only, which is being exerted in an opposite direction against the piston F', and consequently forces the piston G' upward until the holes g' come into communication with the enlargement H, and the holes g<sup>2</sup> and g<sup>3</sup> connect with the annular enlargement G<sup>2</sup>, when the water is forced through the holes g<sup>3</sup> into the enlargement G<sup>2</sup>, thence out of the same by way of the holes g<sup>2</sup> into the interior of the piston G', and out of it through the holes g' into enlargement H, from whence it runs out by means of the outlet-pipe H'. The moment, however, that the pressure again becomes equal on each piston they resume their normal positions.

While the construction above described is the preferable form, it may be somewhat altered in some minor points without materially interfering with the utility of my invention. For instance, the pistons F' G' need not necessarily be of exactly the same size, as the additional pressure of steam upon the larger one may be counterbalanced by adjusting the weight P. This counterbalance-weight and its connections may, if desired, be entirely omitted, it being necessary in this event to lengthen or enlarge the chamber A to contain a larger amount of water, the pressure of this additional amount being required to lift the pistons at the proper time.

The precise manner of connecting the counterbalance-weight to the pistons may be varied at will; but that which I have shown is the preferred form of connection.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. A steam-trap for draining steam-pipes, pro-

vided with a double piston and means for allowing the steam to press on both ends of said piston, the trap being provided with means for automatically permitting the escape of water condensing in the pipes when the pressure of said water causes the piston to rise, substantially as described.

2. A steam-trap provided with the chambers A and B, connected by the passages C D, the chamber B being provided with a double piston and means for permitting the escape of water when the piston is raised by the pressure of said water, substantially as described.

3. The combination of the chambers A and B, connected by the passages C D, the chamber B being provided with the pistons F' and G', connected by the rod J, the piston G' preventing the escape of steam or water when at its lowest point, but provided with openings for permitting the escape of water when the piston is raised, substantially as and for the purpose specified.

4. The chamber A, having inlet C<sup>2</sup>, in combination with the chamber B, having outlet H' and annular passage G<sup>2</sup>, said chambers being connected by passages C D, the chamber B being provided with the pistons F' G', connected by the rod J, the piston G' having openings to permit water to escape when the piston is raised through the passage G<sup>2</sup>, and outlet H', substantially as described.

5. The chamber B, connected at top and bottom with the steam-pipes by the passages C D, and having an outlet-chamber, H, and annular passage G<sup>2</sup>, said chamber B being provided with the pistons F' G', suitably connected, the latter being provided with openings g' g<sup>2</sup> g<sup>3</sup>, substantially as and for the purposes specified.

6. The chamber B, connected at top and bottom with the steam-pipes, and having the supplemental chambers H G<sup>2</sup> and outlet H', the chamber B being provided with the pistons F' G', connected by the rod J, the piston G' being provided with openings g' g<sup>2</sup> g<sup>3</sup>, so placed that when the piston is lifted by the pressure of the water the openings g' will be in the chamber H, and the openings g<sup>2</sup> and g<sup>3</sup> will coincide with the chamber G<sup>2</sup>, substantially as and for the purposes specified.

7. The piston-valve G', having an interior partition, g, the sides of said valve being provided with the openings g' g<sup>2</sup> g<sup>3</sup>, the openings g<sup>3</sup> being on one side of the partition and the openings g' g<sup>2</sup> on the opposite side of the partition, all in combination with the chambers G<sup>2</sup> and H, substantially as and for the purposes specified.

8. The pistons F' G', connected by the rod J, said rod being provided with slot J<sup>3</sup>, and the pitman K, located in said slot, one end of said pitman being pivoted at the lower end of the slot, the other end of the pitman being pivoted to the arm L, attached to the rock-shaft M, to which is also attached the counter-

balance-arm O, substantially as and for the purposes specified.

9. The combination of the rod J, connecting the pistons F' G', and the pitman K', arm L, rock-shaft M, arm O, and counterbalance-weight P, substantially as and for the purposes specified.

10. The combination of the chamber B, connected at the top and bottom with the steam-

pipes, and provided with supplemental chambers H and G<sup>2</sup>, and the pistons F' G', and the adjustable counter-balance P, and connecting mechanism, substantially as and for the purposes specified.

ALBERT B. SEWARD.

Witnesses:

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E. R. HILL.