

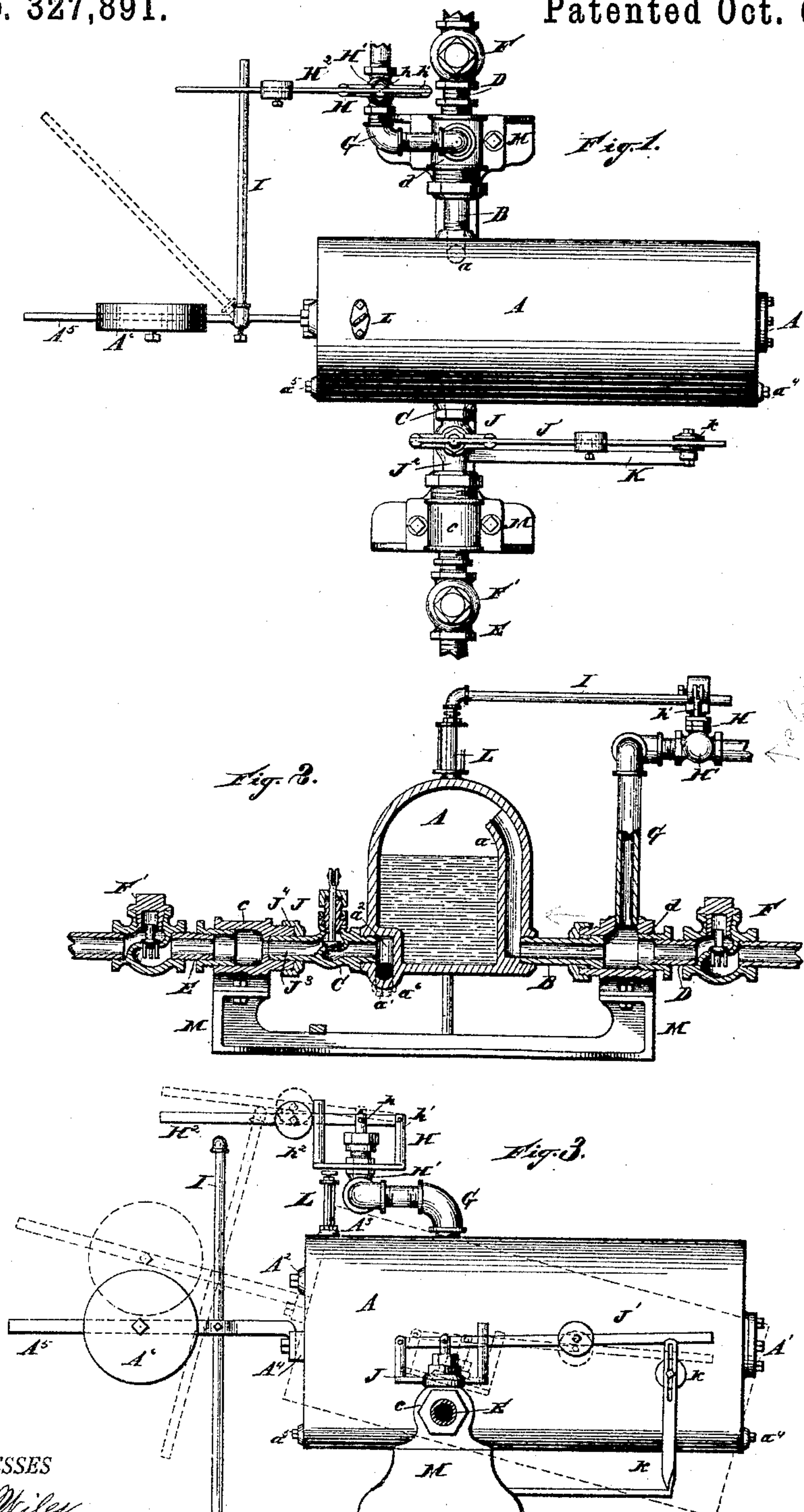
(No Model.)

J. MOREHEAD.

STEAM TRAP.

No. 327,891.

Patented Oct. 6, 1885



WITNESSES

Jno. C. Miles.
W. Wright.

INVENTOR

John Morehead
By W. W. Feggett
Attorney

UNITED STATES PATENT OFFICE.

JOHN MOREHEAD, OF DETROIT, MICHIGAN.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 327,891, dated October 6, 1885.

Application filed February 5, 1885. Serial No. 155,009. (No model.)

To all whom it may concern:

Be it known that I, JOHN MOREHEAD, of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Steam-Traps; and I 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 it, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to steam-traps for freeing steam-pipes of the water which condenses therein, and is designed more especially as an improvement upon Letters Patent issued to me September 5, 1882, No. 263,716, and July 31, 1883, No. 282,353.

The object of my present invention is, first, a novel combination and arrangement of devices adapted to return the condensed water either to a sewer or tank or to the boiler, and, second, a novel construction of the receiving-chamber.

My invention therefore consists in the novel combinations of devices and appliances, hereinafter more fully explained, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a plan view, Fig. 2 a cross-section, and Fig. 3 a side elevation, of the device embodying my invention.

I accomplish the objects of my invention as above by suspending a suitable receptacle or receiving-chamber upon one side of the center of gravity, said chamber being constructed with an arm having a suitable weight located thereon to permit the chamber being kept in a proper position to receive the condensed water until its weight counterbalances the weighted arm and causes the chamber to tilt, the tilting of the chamber opening one or more valves to accomplish the discharge of water from the chamber, when the weighted arm restores the normal position of the chamber, ready to receive again condensed water from the pipes. The tilting of the chamber and the operation of the valves thus being automatic, and the operation of the trap capable of continued observation, as the rocking of the chamber is evidence of its proper working.

As illustrated in the drawings, A represents a chamber for receiving the condensed water. This chamber is tapped to receive an inlet-

pipe, B, and an outlet-pipe, C, and is constructed with an upwardly-extended pipe, *a*, within the chamber, said pipe communicating with the inlet-pipe and adapted to carry steam above the condense water in the chamber. The chamber is also constructed or provided with a channel, *a'*, communicating with the interior of the chamber at one end, and with the outlet-pipe, as shown at *a''*.

While I do not limit myself to any precise method of constructing the chamber with its pipe *a* and channel *a'*, yet I prefer a novel construction, which I will proceed to describe, and which forms a feature of the present invention.

I have found, as a result of experience, that it is practical and desirable to construct the chamber of a single casting by the use of suitable cores. The pipe *a* and the channel *a'* may be cast integral with the chamber. The channel *a'* is preferably opened through at both ends to receive plugs *a¹* and *a²*, as this facilitates the cleansing of the pipe if necessary, or as it is difficult to suspend a core the full length, and consequently it is liable to be broken, it may be cast solid at the point where the channel is desired to communicate with the outlet-pipe, and be afterward bored out from beneath to afford communication of the channel with an outlet-pipe, as shown in dotted lines at *a³*. I prefer to construct the chamber with a hand-hole, to be covered by a separate cap, *A'*, removably connected therewith. *A²* is a core-print. I prefer, also, to construct the chamber with a vent-orifice at *A³*. It will be convenient also to construct it with a lug, *A⁴*, to which a weighted arm, *A⁵*, may be attached. *A⁶* is an adjustable weight located thereon. It is evident, however, that the channel *a'* might be constructed separately and be attached to the chamber with communications, as already described, or it may be located wholly within the chamber; but is preferably constructed as shown in the drawings. It is obvious that thus it will receive condensed water from the lowest point of the chamber, so as to relieve it completely of the water accumulated therein, if desired. The inlet-pipe B and the outlet-pipe C have an oscillatory connection, respectively, with the steam-pipe D and waste-pipe E in any suitable manner, to permit the tilting of the chamber—as, for

instance, *d* and *c* represent bearings in which the inlet-pipe and outlet-pipe, respectively, are pivotally connected.

F and F' represent any suitable check-valves located in the steam-pipe and waste-pipe, respectively.

When it is desired to return the condensed water to the boiler, the trap should be located above the water-level of the boiler. To accomplish this return to the boiler, a steam-pipe, G, is led from the steam-dome of the boiler, or otherwise properly connected with the steam-space, its opposite extremity communicating with the steam-pipe D between the check-valve F and the trap. This steam-pipe G is provided with a valve, H, constructed and arranged to open when the chamber is tilted and to close when it resumes its normal condition after emptying itself.

I do not confine myself to any specific kind of valve, but find the following very suitable: H' is the valve-case, provided with a valve-stem, *h*, and arm *h'*, supporting the weighted lever H², pivotally engaged thereon, and preferably with a guide-arm, *h'*, the construction being such that when the chamber tilts the valve will be opened, and when it is restored to its normal position, after emptying itself, the valve will be closed. To accomplish this result, as shown in the drawings, any suitable arm, I, may be provided to engage the lever H² and lift it so as to open the valve when the chamber is tilted. This arm I prefer to engage with the weighted arm of the chamber in such a manner that it may be adjusted vertically to give the desired throw to the lever H², and also so that it may be partially rotated, so as to be out of engagement with said lever when desired.

As thus constructed, it is evident that when the chamber tilts the valve *h* is opened by the arm I, and live steam from the boiler passes through the inlet-pipe into the interior of the chamber, overcoming the pressure in the waste or return pipe leading to the boiler, and consequently delivering the condensed water into the boiler, the live steam closing the check-valve F and opening the valve F'. It is obvious that when the chamber resumes its normal position the valve H is closed, and the check-valve F' is then closed by the steam-pressure from the boiler, while the check-valve F is opened by the force of steam in the pipes, the valves F and F' being arranged accordingly.

To return the water to a tank or sewer the outlet-pipe C is provided with a valve, J, of any suitable construction, located between the chamber and the slip-joint. A valve similar to the valve H I have found preferable. To lift the arm J', so as to open the valve when the chamber tilts, I provide a stationary bar, K, which may be provided with an arm or roller, *k*, to engage said lever and open the valve, said roller being adjustable. The arm I may be extended below the weighted arm of the chamber, so as to form a stop to prevent

the chamber from returning too far when relieved. So the opposite end of the chamber may be provided with a stop, if desired, to prevent its tilting too far in the opposite direction.

The device, as shown, is adapted to return water either to the boiler or to a tank or sewer; but in the latter case the valve H should be made inoperative, which may be accomplished by simply throwing the arm I out of engagement with the lever H².

The operation of the device in returning water to the tank or sewer will be readily understood. The water enters the chamber through the inlet-pipe, steam being admitted to the top of the chamber above the water. When the water has accumulated sufficiently to overbalance the weighted arm, the vessel tilts and the valve J is opened. The steam on the water within the chamber causes the water to pass through the outlet-pipe and the waste-pipe into the tank or sewer. In case the trap is only desired to return water to a tank or sewer, the steam-pipe G and valve H may be entirely omitted, and also the check-valves F and F', in order to cheapen the construction. On the other hand, should the trap be desired simply to return water to the boiler, the valve J may be dispensed with, a straight pipe taking the place of the valve-case.

L is an air-valve, of any suitable construction, located in the vent A³ on the chamber. This valve may be readily made automatic, so as to operate by the expansion and contraction of the metal.

It is obvious, as already explained in my former patents, that since the steam is carried above the water in the chamber it will not be liable to blow off with the water, for the reason that when the weight of the water is relieved the chamber tilts back to a state of equilibrium, closing the valve and preventing the escape of steam.

Any suitable form of standards M may be employed to support the bearings.

The weight on the arm of the chamber A may be adjusted so as to return the chamber to its normal position a little before all the water has been discharged, so as the more effectually to prevent the escape of steam.

If desired, a receiving-chamber may be located between the inlet-pipe and the steam-pipe. The inlet and outlet pipes may have an oscillatory connection with the adjacent pipes, either by means of stuffing-boxes or ground joints, as may be desired.

In my Patent No. 282,353, above referred to, the outer end of the valve-chamber J² was connected with the waste-pipe by means of a slip-joint secured to said chamber by means of a nut. Experience proves, however, that the expansion and contraction of the adjacent pipe tend to cause said pipe to bind in the slip-joint. I prefer, therefore, in my present device to reverse this method of connection, and to extend the valve-case so as to be sleeved into the journal-bearing, as at J³, the nut J⁴

being engaged upon said bearing and serving to hold any intervening packing, if desired. As thus constructed the tendency to bind is removed.

5 What I claim is—

1. A steam-trap consisting of a chamber provided with an inlet and outlet pipe at one side of the center of gravity, said inlet-pipe axially connected with a steam-pipe, and the
10 outlet-pipe axially connected with a discharge-pipe, a valve located in the outlet-pipe arranged to open when the vessel is tilted, and vice versa, said vessel having an upwardly-extended interior pipe to admit condensed wa-
15 ter, and a channel to carry the water from the chamber into the outlet-pipe, said chamber with said interior pipe and said channel all constructed in an integral casting, substan-
tially as described.

20 2. The combination, with a chamber communicating with an inlet-pipe and an outlet-pipe at one side the center of gravity, and constructed with an upwardly extended interior pipe to admit condensed water, a channel to
25 carry the water from the chamber to the outlet-pipe, of a pipe to return the condense water to the boiler, a steam-pipe, D, communicating with the inlet-pipe, check-valves located in the steam-pipe and the return-pipe, a steam-pipe,
30 G, connected with the steam-space of the boiler, and with the inlet-pipe between its check-valve and the chamber, said steam-pipe provided with a valve arranged to be closed when the chamber is in a horizontal position,
35 and vice versa, said chamber having an oscillatory connection with the steam-pipe D and the return-pipe, all arranged to operate substantially as and in the manner described.

3. In a steam-trap, a chamber constructed to
40 communicate with an inlet and an outlet pipe at one side the center of gravity, having an interior pipe to communicate with the inlet-pipe upwardly extended, said chamber provided with a channel to carry the water
45 from the chamber to the outlet-pipe, having end openings, and a hand-hole to facilitate cleansing the same, and a vent-orifice, all con-

structed of an integral casting, substantially as described.

4. The combination, with a tilting chamber, 50 of inlet and outlet pipes connected therewith at one side the center of gravity, said pipes axially connected with a steam-pipe and a waste-pipe, a valve located in the outlet-pipe arranged to open automatically when the
55 chamber is tilted, and vice versa, an automatic air-valve connected with said chamber, said chamber provided with an interior pipe to admit condensed water to the chamber and carry the steam above the surface of the wa-
60 ter, and a channel to carry the water from the lowest point of the chamber, when the same is tilted, to the discharge-pipe, substantially as described.

5. The combination, with a chamber having 65 an inlet and an outlet pipe communicating therewith at one side the center of gravity, of a valve located in or connected with said outlet-pipe, said valve and inlet-pipe having an oscillatory union with journal-bearings in the
70 manner specified, supports for said bearings, and a bar secured upon said support having an adjustable roller thereon for tripping the valve, substantially as described.

6. The combination, with a chamber having 75 an inlet and an outlet pipe communicating therewith at one side the center of gravity, of check-valves in said inlet and outlet pipes, a steam-pipe communicating with the inlet-pipe between the check-valve and trap, and with the
80 steam-space of the boiler, a valve located in said steam-pipe provided with an operating-lever, said chamber having connected therewith an arm provided with an adjustable weight, and an adjustable bar, I, to tilt said
85 lever as the chamber tilts, substantially as and for the purpose described.

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

JOHN MOREHEAD.

Witnesses:

N. S. WRIGHT,

M. B. O'DOHERTY.