(No Model.) 2 Sheets—Sheet 1.

J. MOREHEAD.

STEAM BOILER FEEDER.

No. 507,716. Patented Oct. 31, 1893.

Fig. 1.

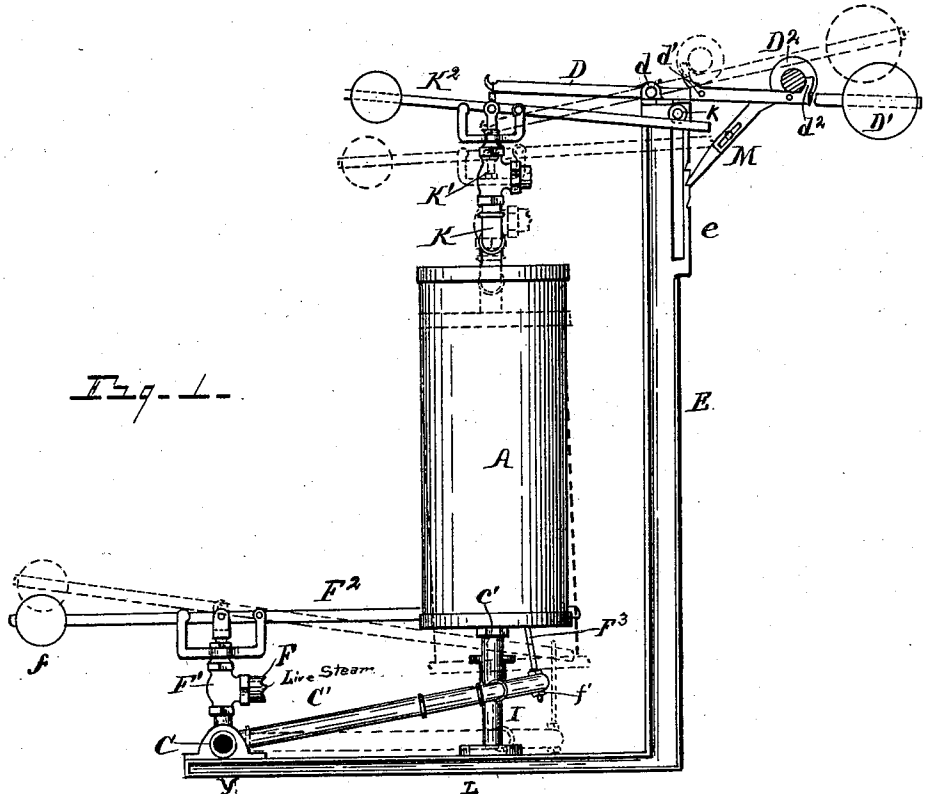
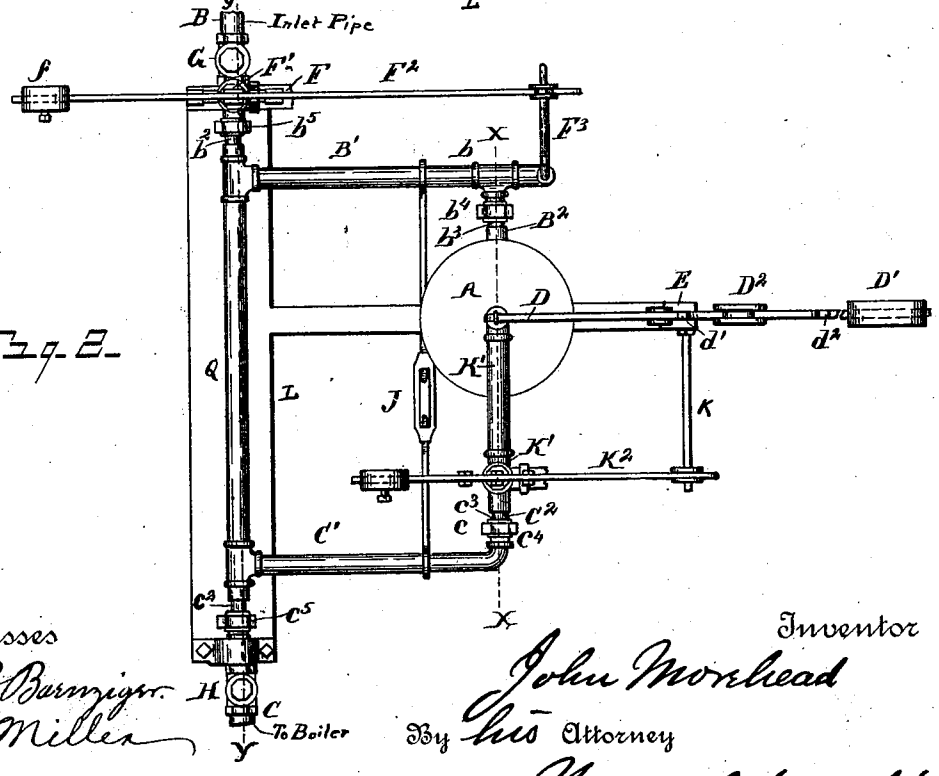


Fig. 2.



Witnesses
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J. F. Miller

Inventor
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By his Attorney
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(No Model.) 2 Sheets—Sheet 2.

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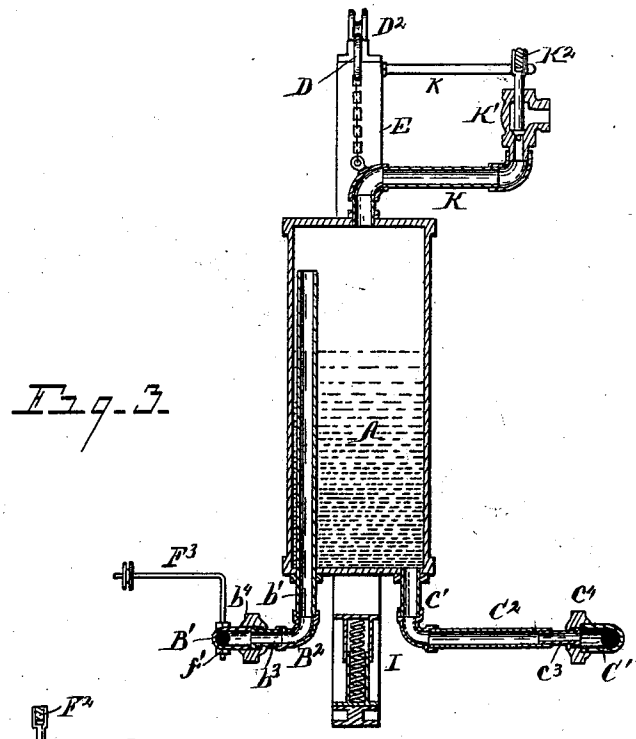

Fig. 3.

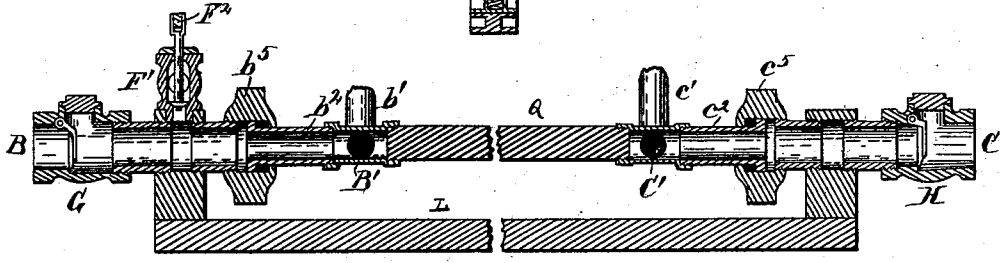

Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN MOREHEAD, OF DETROIT, MICHIGAN.

STEAM-BOILER FEEDER.

SPECIFICATION forming part of Letters Patent No. 507,716, dated October 31, 1893.

Application filed March 20, 1893. Serial No. 466,844. (No model.)

To all whom it may concern:

Be it known that I, JOHN MOREHEAD, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Steam-Boiler Feeders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain new and useful improvements in steam-boiler feeders; and it consists of the construction, combination and arrangement of devices and appliances hereinafter specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is plan view. Fig. 3 is a vertical section, through the receiving chamber on the line *x—x* Fig. 2. Fig. 4 is a vertical section on the line *y—y* Fig. 2.

In the drawings A represents a vertically reciprocatory receiving chamber or tank, to receive the condensed water.

B denotes an inlet pipe through which the water of condensation is carried into the receiving chamber, the same being provided with a tubular supporting arm B′, communicating with the interior of the receiving chamber.

C denotes an outlet pipe, preferably a return pipe, to conduct the water from the receiving chamber back into the boiler.

The outlet pipe C is provided with a tubular supporting arm C′, communicating with the chamber A.

The receiving chamber, it will be observed, is located at one side of the inlet and outlet pipes. The arm B′ leads into the chamber or tank A by means of an angle arm B^2, united to the arm B′ at its outer end, as shown at "*b*," the inner end of the arm B^2 being turned upward, as shown at "*b′*," and led into the tank and carried upward therein, so as to carry the steam above the water of condensation, which may collect therein. So also the arm C′ leads into the chamber or tank A by means of an angle arm C^2, united to the arm C′ at its outer end, as shown at "*c*," the inner end of the arm C^2 being turned upward, as shown at "*c′*," and led into the tank. It will be observed that the tank A is, thus, supported upon the tubular arms B′ and C′, with their angular arms B^2 and C^2. To provide for the vertical reciprocation of the receiving chamber, the arms B′ and C′ are axially connected with the pipes B and C respectively, as by arms B^2 and C^2 are also axially connected means of suitable slip-joints "b^2" "c^2." The with the arms B′ and C′, as by suitable slip-joints "b^3" and "c^3." This construction necessitates the location of stuffing boxes "b^4" and "c^4" in the outer ends of the arms B′ and C′. Additional stuffing boxes will also be required in the pipes B and C, as shown at "b^5" and "c^5." As so constructed the tank or chamber A is made to rise and fall, the arms B′ and C′ occupying the position shown in dotted lines, Fig. 1, when the chamber A is in its downward position.

D denotes a lever arm connected with the top of the chamber A, and provided with a counterbalance weight, as shown, for example, at D′. The lever arm is shown fulcrumed upon a standard E, as shown at "*d*." The weighted lever arm counterbalances the weight of the tank A and lifts the tank into its upper or normal position when the water of condensation has been discharged therefrom.

F denotes a live steam pipe, which I prefer shall lead from the steam dome of the boiler, not shown, or from any other portion of the boiler from which the boiler pressure may be reached, into the pipe B, a valve F′ controlling its communication therewith.

F^2 is a lever arm, provided with a weight "*f*," engaged to open the valve F′ when the tank A descends, and vice versa. The steam pipe F is thus communicable through the pipe B, arms B′ and B^2, with the interior of the receiving chamber, above the water line therein.

G is the check valve located in the pipe B outside the entrance of the live steam pipe F to prevent the live steam from passing in the direction opposite the arm B′, said valve closing when the valve F′ is open.

H is an additional check valve located in the outlet pipe C, to prevent any backward

action of boiler pressure in said pipe, the said valve closing when the tank is restored to normal position.

F^3 is an arm engaged with the forward end of the pipe B′ to strike the lever arm F^2 when the tank A descends to open the valve F′, or the arm F^3 might be connected with the tank itself. By connecting the said arm with the pipe arm B′, it may readily be made adjustable, as by means of a nut "*f*′" having a threaded engagement therewith.

A cushion I may be located beneath the the tank, preferably, a spring cushion, to prevent noise and jar, and to help in restoring the tank to normal position when the water has been discharged therefrom.

J denotes a tie rod engaging the two pipe arms B′ and C′, to prevent their spreading.

K denotes an air vent tube, leading from the top of the tank A, and provided with a controlling valve K′, arranged to open when the tank is in normal position, and to close when the tank descends. Thus the air valve may be provided with a weighted lever arm K^2, which will strike against a stop "*k*" on the standard E when the tank rises into normal position, said stop being adjustable, as in an elongated slot "*e*" in said standard.

The operation of the trap will now be understood, and is as follows: The trap is to be located a suitable distance above the water line of the boiler, in order that when the tank descends or tilts, there shall be the boiler pressure in the inlet pipe plus the water pressure or weight of water in the chamber A to overcome the pressure in the outlet or return pipe. The pipe B, it is understood, connects with the drip pipes of the system with which the trap is connected, and when the tank A is in normal position, the condensed water flows freely into the tank through the arms B′ and B^2, until the weight of water in said tank overcomes the counterbalance weight on the weighted arm D. The tank will then tilt downward, opening the valve F′, allowing steam at boiler pressure to be admitted upon the top of the water within the tank. The combined boiler pressure, and that of the weight of the water in the tank, will open the check valve H, and the water will be returned to the boiler. When the valve F′ is opened the closing of the check valve G not only prevents the back pressure of the steam, but also prevents the condensed water passing therethrough while the trap is discharging. Thus the device is automatically operative.

A blank pipe or rod Q may connect the adjacent ends of the pipes B and C to prevent any direct communication of said pipes.

L is a supporting bed. Upon the weighted arm D, I prefer to locate a movable weight D^2, which may run back and forth upon the arm D, to help the movement of the chamber A and make it operate more quickly. When the chamber A begins to tilt the weight D^2 will run forward toward the tank or forward of the center of gravity. When the tank rises the said weight will roll in the opposite direction, or on the other side of the center of gravity. The arm D may be provided with adjustable stops "*d*′," "d^2" on either side of the weight D^2, to limit its movement. M denotes a stop beneath the arm D to limit its movement and prevent the tank from rising more than is necessary when discharged. This stop may be made adjustable.

What I claim as my invention is—

1. In a steam boiler feeder, the combination of an inlet and an outlet pipe, a reciprocatory receiving chamber or tank supported at one side of the inlet and outlet pipes and axially connected therewith, a steam pipe communicating with the inlet pipe and with the interior of said tank above the water line therein, an automatically operated valve to control said communication, check valves in the inlet and outlet pipes, means to restore the tank to normal position, and an automatically valve controlled air vent connected with said chamber, substantially as described.

2. In a steam boiler feeder, the combination of a vertically reciprocatory receiving chamber or tank, an inlet pipe, an outlet pipe, a pipe arm having a jointed connection with the inlet pipe and communicating with said tank above the water line therein, a second pipe arm having a jointed connection with the outlet pipe and communicating with said tank, a steam pipe F communicating with the inlet pipe, a valve to control the communication of the steam pipe therewith, check valves in the outlet and inlet pipes, and means to automatically restore the tank to normal position, substantially as described.

3. In a steam boiler feeder, a reciprocatory or tilting receiving chamber or tank, an inlet pipe B, a pipe B′ having an axial connection therewith, a pipe B^2 connected with the pipe B′ and communicating with the interior of the tank, an outlet pipe C, a pipe C′ axially connected therewith, a pipe C^2 connected with the pipe C′ and communicating with the interior of the tank, the pipes B, B′, B^2 provided with stuffing boxes "b^4," "b^5," and the pipes C, C′, C^2 provided with stuffing boxes "c^4," "c^5," substantially as described.

4. In a steam boiler feeder, the combination of an inlet pipe B, and an outlet pipe C connected by a blank pipe or rod Q, and provided each with a laterally extended tubular arm axially engaged therewith, respectively, a reciprocatory receiving chamber connected upon the opposite extremities of said arms and communicating therewith, a steam pipe communicating with the inlet pipe, a valve to control said communication, means to automatically operate said valve as the receiving chamber rises and falls, check valves located in the pipes B, C, an air vent connected with said chamber, a valve controlling the vent, means to automatically operate the valve when the chamber rises and falls, and a weight-

ed counterbalance arm to restore the chamber to normal position, substantially as described.

5. In a steam boiler feeder, the combination of an inlet pipe B, and an outlet pipe C connected by a blank pipe or rod Q, and provided each with a laterally extended tubular arm axially engaged therewith, respectively, a reciprocatory receiving chamber connected upon the opposite extremities of said arms and communicating therewith, a steam pipe communicating with the inlet pipe, a valve to control said communication, means to automatically operate said valve as the receiving chamber rises and falls, check valves located in the pipes B, C, an air vent connected with said chamber, a valve controlling the vent, means to automatically operate the valve when the chamber rises and falls, and a weighted counterbalance arm to restore the chamber to normal position, a tie rod J uniting said tubular arms, and a movable weight upon the counterbalance arm, substantially as described.

6. In a steam boiler feeder, the combination of an inlet and an outlet pipe, a reciprocatory receiving chamber or tank supported at one side of the inlet and outlet pipes and axially connected therewith, a steam pipe communicating with the inlet pipe and with the interior of said tank above the water line therein, an automatically operated valve to control said communication, check valves in the inlet and outlet pipes, means to restore the tank to normal position, and an automatically valve controlled air vent connected with said chamber, a base, and a spring cushion below the receiving chamber, substantially as described.

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

JOHN MOREHEAD.

Witnesses:
N. S. WRIGHT,
JOHN F. MILLER.