

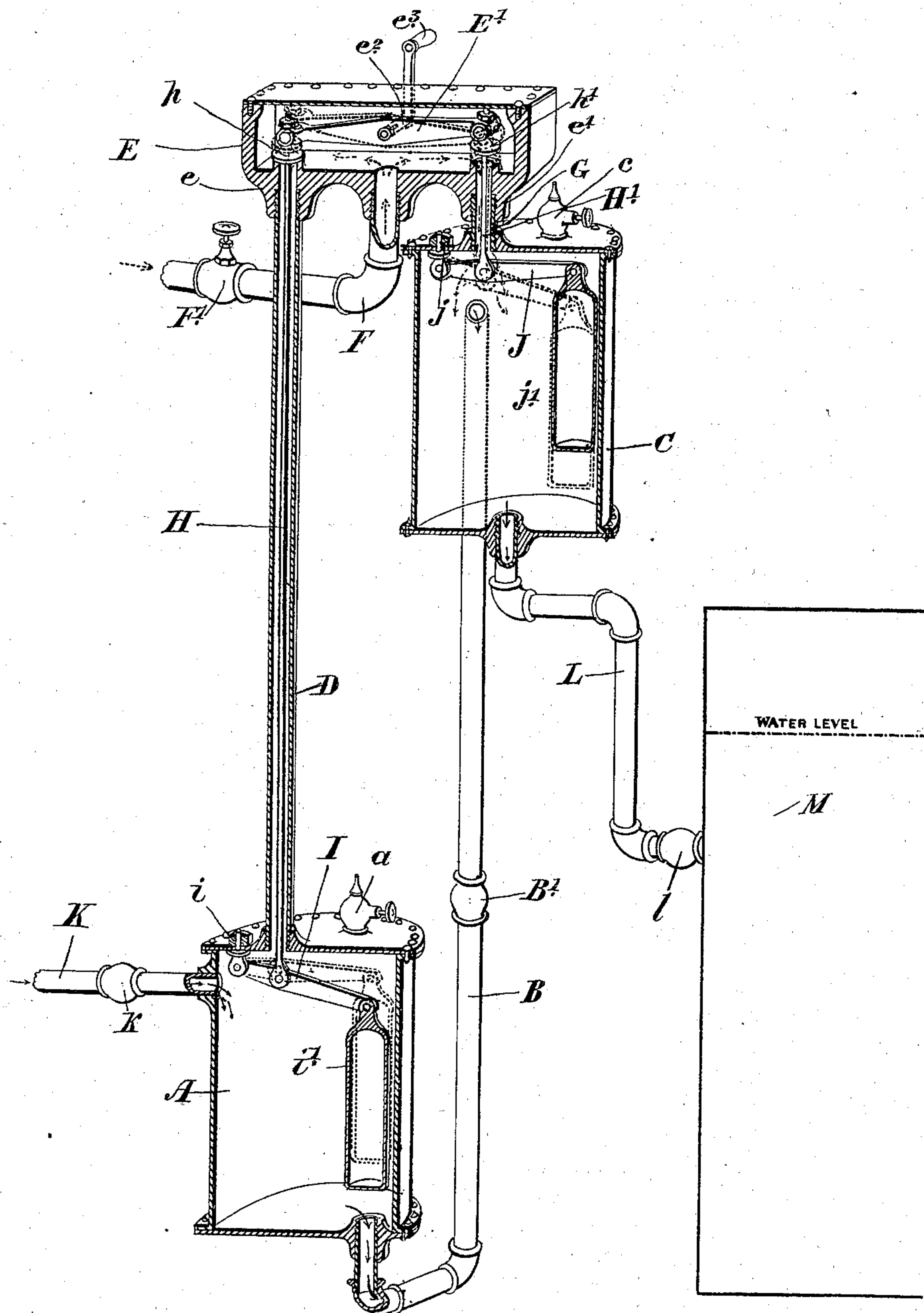
(No Model.)

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COMBINED RETURN WATER TRAP AND BOILER FEED.

No. 558,608.

Patented Apr. 21, 1896.



Witnesses.

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# UNITED STATES PATENT OFFICE.

WILLIAM NORRIS, OF TORONTO, CANADA.

## COMBINED RETURN WATER-TRAP AND BOILER-FEED.

SPECIFICATION forming part of Letters Patent No. 558,608, dated April 21, 1896.

Application filed August 1, 1895. Serial No. 557,890. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM NORRIS, steam-fitter, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Combined Return Water-Traps and Boiler-Feeds, of which the following is a specification.

My invention relates to an improved combined return water-trap and boiler-feed; and the object of the invention is to design a simple and perfect feed for boilers which will be entirely automatic and dispense with pumps, which are now commonly employed; and it consists, essentially, of an arrangement of water-cylinders connected together and connected to and operating valves in a steam-chest connected with the steam-pipe of the boiler, as hereinafter more particularly explained.

The drawing represents a sectional perspective view of my combined return water-trap and boiler-feed and its connection to a boiler.

A is the lower cylinder, which is constructed in a strong manner and is connected by a pipe B, provided with a check-valve B', to a cylinder C and near the top thereof. The cylinder C is situated above the level of the water in the boiler.

D is a pipe connecting the top of the cylinder A with the steam-chest E.

e is a boss formed in the bottom of the steam-chest at the upper end of the pipe D.

F is a steam-pipe leading into the center of the steam-chest E and provided with a turn-off valve F'.

G is a pipe connecting the top of the cylinder C with the steam-chest.

e' is a boss formed at the upper end of the pipe at the bottom of the steam-chest.

E' is a lever pivoted centrally upon the rod e<sup>2</sup>, extending across the steam-chest and having at the outer end a crank-handle e<sup>3</sup>, which is situated outside the steam-chest. This crank-handle is designed to adjust the valves to the proper relative position when starting the device.

h is a valve pivotally connected at one end of the lever E' and covering the opening at the top of the pipe D.

h' is a valve pivotally connected to the end

of the lever E' and covering the opening at the top of the pipe G.

H is a rod connecting the valve h to a lever I, which is pivoted on a bolt i, extending through the top of the cylinder A. The lever I is pivotally connected to the rod H and has a float i' of a suitable weight.

H' is a rod connecting the valve h' to a lever J, pivoted at the bottom end of the bolt j, extending through the top of the cylinder C. The rod H' is pivotally connected to the lever J, which is provided with a float j' at its opposite end of a suitable weight, as shown.

K is a pipe leading from the water supply into the top of the cylinder A. The pipe K is provided with a check-valve k and leads from a tank or return-pipes.

L is a pipe leading from the bottom of the cylinder C to the boiler M below the water-line. The end of the boiler is shown only in side elevation. The pipe L is provided with a check-valve l.

a is a let-off cock situated at the top of the cylinder A, and c is a let-off cock situated at the top of the cylinder C.

Having now described the principal parts involved in my invention, I shall briefly describe its operation.

In order to start my device, I open the cock and allow of the water from the pipe K to flow into the cylinder A, so as to fill it up and raise the float i', which opens the valve h. I then turn on the steam by the valve F', when the steam will pass down through the pipe D and force the water out of the cylinder A up through the pipe B into the cylinder C until it raises the float j'. As the steam increases in the cylinder A the float will fall and the water rising in the cylinder C will raise the float j', which will raise and bring up the valve h'. The steam then in the chest E will pass down through the pipe G and force the water in the cylinder C down by the pipe L into the boiler. The pipe F is of course connected to the boiler, and the operation above described will be repeated continuously, so that the boiler will be kept at the proper level automatically and without the use of pumps now commonly employed for this purpose, it of course being understood that the supply of water is kept up as required.



The distance that the valves move is very slight, and there is at the beginning of the operation a pressure of the steam upon the valve *h*, which the float in the cylinder A has to overcome. As soon as this pressure is overcome the weight of the float *J'* in the cylinder C will tilt the lever *E'*, so as to throw up the valve *h* and close the valve *h'*. At the same time the cylinder A will be discharging and filling the cylinder C, which will raise the lever *E* through its rod, and the weight of the float in the cylinder A will now draw down the valve *h*. This operation is repeated continuously.

What I claim as my invention is—

1. A combined return water-trap and boiler-feed comprising a cylinder connected to a water supply and to a corresponding cylinder above the water-level of the boiler and connected thereto, a steam-chest connected to the boiler, pipes leading from said cylinders to the steam-chest, valves arranged in said steam-chest for closing the upper ends of said pipes, and means connected to floats in said

cylinders for operating said valves, substantially as described.

2. The combination with the cylinder A pipes K and B provided with suitable valves, cylinder C, pipe L, of the steam-chest E connected by the pipes D and G to the cylinder A and C respectively, steam-pipe F leading to the steam-chest, pivoted lever *E'*, valves *l* and *h'*, rods H and H' connecting the valves *h* and *h'* to the pivoted levers I and J respectively to which suitable floats are secured as and for the purpose specified.

3. The combination with the cylinders A and C and the steam-chest connected therewith and the pipes leading from the cylinders to the boiler, of the lever *E'* provided with valves over the ends of the pipes D and G, and the crank-handle *e*<sup>3</sup> as and for the purpose specified.

WILLIAM NORRIS.

Witnesses:

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E. R. CASE.