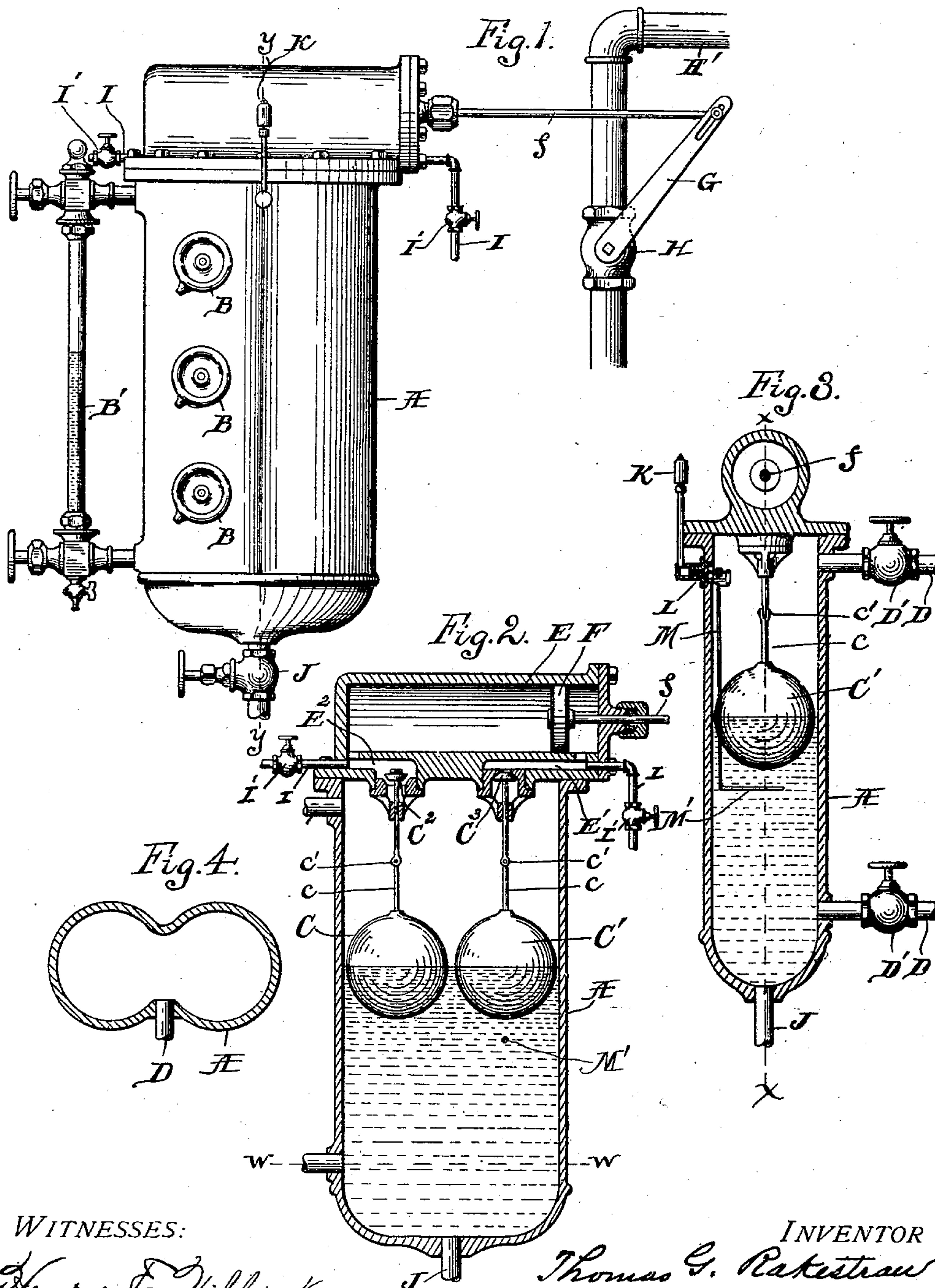


No. 870,046.

PATENTED NOV. 5, 1907.

T. G. RAKESTRAW.
WATER FEED REGULATOR.
APPLICATION FILED NOV. 5, 1906.



WITNESSES:

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WATER-FEED REGULATOR.

No. 870,046.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, THOMAS G. RAKESTRAW, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Water-Feed Regulators, and 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 the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in water columns for steam boilers, in which means are provided for regulating the supply of water to the boiler and for maintaining the level therein, as shown in the accompanying drawings, and more particularly set forth in the following specification and claims.

In the drawings:—Figure 1 is an elevation of my improved water column for a steam boiler, showing the connection made with the valve governing the steam supply to the pump or the water to the boiler, as the case may be. Fig. 2 is a central vertical sectional view through the water column on line $x-x$ of Fig. 3. Fig. 3 is a cross-sectional view through the column on line $y-y$ of Fig. 1. Fig. 4 is a horizontal sectional view through the column on line $w-w$ of Fig. 2.

The object of my invention is to provide an apparatus capable of automatically governing the opening and closing of the valve controlling the delivery of water to the boiler, or the passage of steam through the pipes to operate the feed pump, the construction being such that its action is not dependent upon the expansion or contraction of metal tubes, rods or like devices, but is positive and sure under all conditions and temperatures. It also provides means whereby a low water alarm will be automatically sounded in case the water level in the boiler should become dangerously low through an accident to the pumping apparatus or source of supply.

Referring to the letters of reference shown in the drawings, A is a water column of a steam boiler provided with the usual gage-cocks B and gage-glass B'. The shape of the water column is that shown in cross-section in Fig. 4, this construction providing practically separate chambers for the ball-floats C and C' housed therein.

D, D are the pipe connections leading from the top and bottom of the column to the boiler, the connection being under the control of the valves D', D'.

c, c are rods rising from the top of the ball-floats, to which are secured the valves C² and C³, controlling the delivery of steam into the cylinder E on top of the water column. The rods of the ball-floats are jointed, as shown at c' , to provide for any lateral movement of the floats. E' and E² are the inlet ports of the cylinder E.

F is a piston in the cylinder E, its rod f engaging the

slotted crank arm G, of the valve H controlling the passage of water through the pipe H' to the boiler or steam to the feed pump.

I, I are pipes leading from the exhaust port of the cylinder E, and I', I' are valves located thereon for reducing the exhaust opening.

J is a draw-off valve at the bottom of the auxiliary water column B.

K is a low water alarm or whistle controlled by the valve L, and operated through the rod M by the weight of the ball float C' on the bent portion M'.

Having indicated the several parts, the operation of the apparatus will be readily understood. When the water in the boiler falls below its predetermined level, as indicated in the drawings, the float C' will lower and open the valve C³, admitting steam through the port E' into the cylinder E, forcing the piston F to the limit of its stroke, thereby opening the valve H, admitting water to the boiler or steam to the feed pump, as the case may be. When the water in the boiler again reaches its predetermined level, the water in the column rising will force the valve C³ to its seat by means of its controlling float and open the valve C² by its float, thereby admitting steam through the port E² to the opposite side of the piston F, forcing it to the position shown in the drawing, and thereby cutting off the supply of water to the boiler or steam to the feed pump,—the steam on the opposite side of the piston passing out through the exhaust I, previously referred to. If through an accident to the supply, the water in the boiler should become dangerously low, the weight of the ball-float C' resting on the bent portion M' of the rod M will depress the latter, opening the valve L and thereby sound the low water whistle or alarm K.

Having thus described my invention, what I claim is:—

1. In a water feed regulator for boilers, a water column having communication with the boiler, a steam cylinder communicating with the water column through a pair of passages, the column being contracted longitudinally intermediate its sides, a piston in the cylinder, float valves arranged within the column for reciprocation to open and close the passages between the cylinder and column, alternately, to operate said piston, the float valves being arranged upon opposite sides of said longitudinal contraction, and a shut-off valve in the feed pipe to the boiler controlled by the piston.

2. In a water feed regulator for boilers, a water column having communication with the boiler, a steam cylinder communicating with the water column through a pair of passages, the column being contracted longitudinally intermediate its sides, a piston in the cylinder, float valves arranged within the column for reciprocation to open and close the passages between the cylinder and column, alternately, to operate said piston, the float valves being arranged upon opposite sides of said longitudinal contraction, a shut-off valve in the feed pipe to the boiler controlled by the piston, a low water alarm, and means for sounding said low water alarm by one of the float valves.

3. In a water feed regulator for boilers, a water column
having communication with the boiler, a steam cylinder
communicating with the column through a pair of pas-
sages, a piston in the cylinder, a pair of float valves ar-
5 ranged within the column for reciprocation to open and
close the passages between the cylinder and column, alter-
nately, to operate the piston, the float valves being ar-
ranged upon opposite sides of the column, and a shut-off
valve in the feed pipe to the boiler controlled by the
10 piston.

4. In a water feed regulator for boilers, a water column
having communication with the boiler, a steam cylinder
communicating with the column through a pair of pas-
sages, a piston in the cylinder, a pair of valves for co-

operation with said passages, a float connected with the 15
stem of each of said valves, whereby upon reciprocation
of the floats the valves will be moved into and out of
engagement with said passages, alternately, to operate
the piston, the stem of each valve being composed of
alining jointed sections, and a shut-off valve in the feed 20
pipe to the boiler controlled by the piston.

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

THOMAS G. RAKESTRAW.

Witnesses:

S. E. THOMAS,

HENRY E. VILLEROT.