

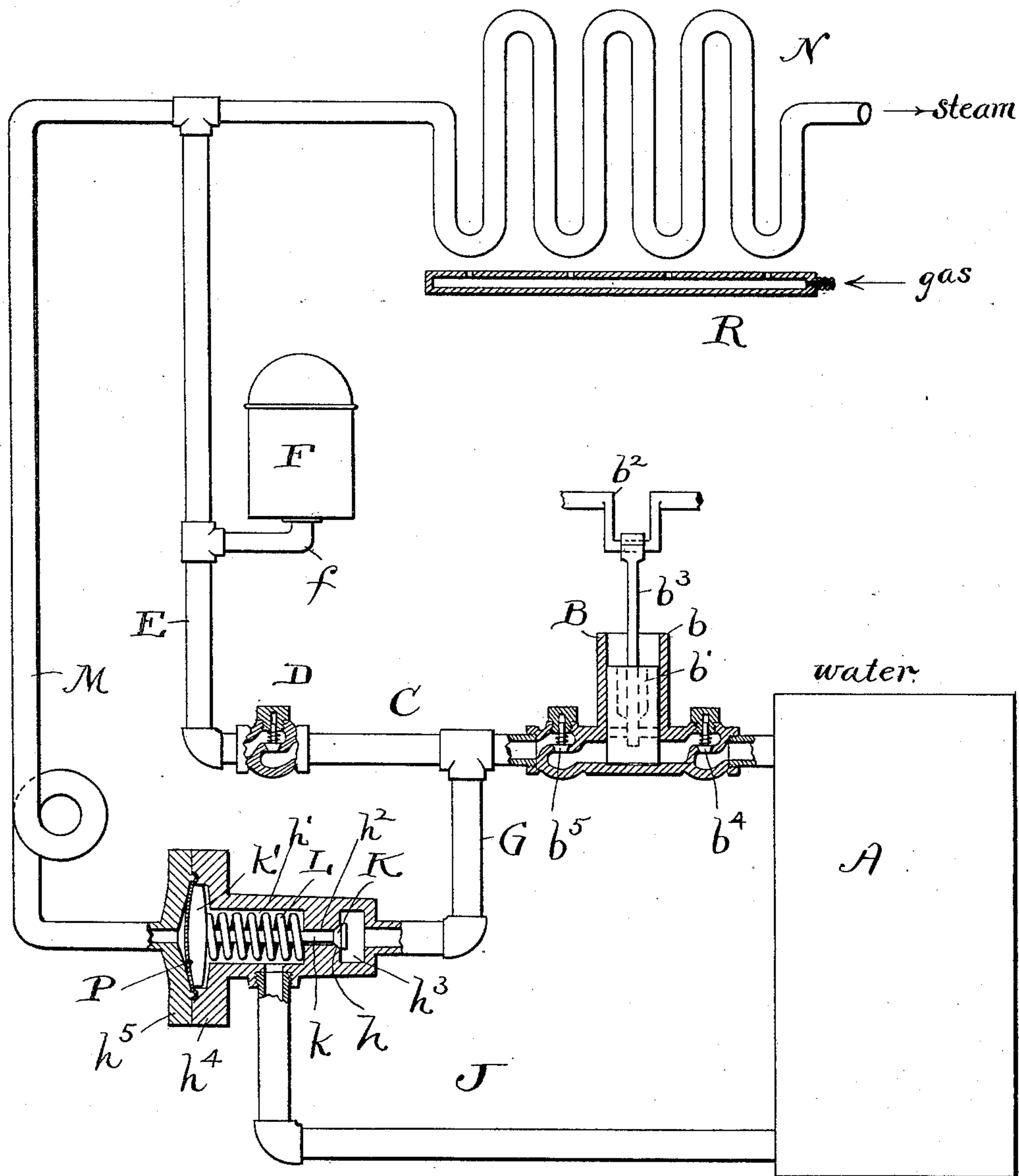
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R. H. WHITE.
FEEDING MECHANISM FOR BOILERS.

(Application filed Jan. 3, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 703,220, dated June 24, 1902.

Application filed January 3, 1900. Serial No. 223. (No model.)

To all whom it may concern:

Be it known that I, ROLLIN H. WHITE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Feeding Mechanisms for Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing.

My invention is particularly designed for use in connection with a "flash-boiler"—that is, a boiler in which no particular water-line has to be maintained, as where water is fed in a small stream as the steam is released and is vaporized while passing through the boiler by the high heat of the surface with which it contacts.

The object of the invention is to provide this character of steam-boiler with a feeding mechanism controlled by the steam-pressure, and more particularly to supply simple and efficient means for enabling the feeding-pump to work continuously and the water to simply circulate idly whenever the steam-pressure reaches a predetermined maximum.

To the above end the invention consists, broadly, of the combination, with a flash-boiler, of a water-feeding mechanism and means for governing it by the steam-pressure generated. More specifically, the invention consists of the combination of pumping mechanism, a feed-pipe leading therefrom, a by-pass from the pumping mechanism, and a valve normally closing such by-pass, but adapted to be opened by the pressure generated in the boiler when the same reaches a predetermined amount, and still more specifically in the embodiment of the invention hereinafter shown and described.

The invention therefore may be best summarized as consisting of the combination of parts described herein and set out in the claim.

The drawing is a side elevation of the feeding mechanism complete, together with the boiler and heater, the parts being represented somewhat diagrammatically.

Referring to the parts by letters, A represents a supply-tank adapted to contain the

feed-water, and B represents the pumping mechanism, which may be any approved form of forcing or injecting apparatus, the form shown being a single-acting plunger-pump, which consists of the cylinder b , the piston b' , which may be of the trunk type shown, the mechanism for reciprocating the piston, (shown as consisting of the double crank b^2 and the connecting-rod b^3), the admission-valve b^4 , and the exit-valve b^5 , each operating in the same direction. The result of this construction is that as the piston is reciprocated the feed-water is drawn in from the tank A through the valve b^4 and forced through the valve b^5 into the pipe C.

A check-valve D, opening in the same direction as the two pump-valves, is placed in the pipe C, and beyond this check-valve is the main feed-pipe E, leading to the flash-boiler N. This boiler is heated by the gas-burner R, and steam is generated as fast as the water is supplied. An air-chamber F is connected by the pipe f with this main pipe E and by the compression of the air therein not only continuously regulates the flow but also starts it instantaneously when the operation begins and before sufficient steam is generated to operate the pump.

A by-pass leads from the pipe C between the pump and the check-valve D back to the tank A. This by-pass consists of the pipe G, the valve-casing H, and the return-pipe J. In the valve-casing is a seat h , normally closed by the valve K. A shank k extends from the valve K and has at its other end a head k' . Surrounding the shank k is a coiled spring L, occupying a recess h' in the casing and bearing at one end against the base of the recess and at the other against the head. The pipe J leads out of the recess h' , while the opening h^2 from the valve-seat h into that recess is larger than the cross-section of the shank k of the valve. From this it results that when the valve is seated the by-pass is closed; but whenever the head k is forced inward the valve K is shoved away from its seat into the recess h^3 in the casing provided for its movement and an open passage is provided from the pipe G to the pipe J, whereby the pump

may simply cause the water to circulate through this by-pass and the tank A without feeding to the boiler.

The valve K is forced from its seat, as above explained, by the steam-pressure in the boiler by the following mechanism: Between the head h^4 of the valve-casing H referred to and a cap h^5 secured thereto is a diaphragm P, which bears against the head k of the valve. 10 Opposite this diaphragm is an opening through the plate h^5 , which communicates via the pipe M with the boiler, the communication in the installation shown being via the same pipe that feeds the water. Now 15 when the steam-pressure reaches a predetermined maximum this gives a downward pressure to the steam or water in the pipe M of the same amount, which, acting against the diaphragm P, forces the same inward and 20 overcoming the force of the spring L and the water-pressure on the smaller area of the valve K moves the valve K away from the seat, thus opening the by-pass from the pump to the tank. This relieves the water-pressure 25 on the valve K, and thereafter the pump continues its operation idly, circulating the water, as described, until the steam-pressure decreases sufficiently to cease overcoming the spring L, when the valve closes. Thereupon 30 the parts resume their normal operation, the

valve K remaining closed until the steam-pressure again reaches the maximum. The air-chamber in addition to its operation on the boiler evens the pressure in the pipe M, when the latter is connected, as shown, to the water end of the boiler and prevents the pulsation of the pump from irregularizing the valve. 35

Having described my invention, I claim—

In a feeding mechanism, in combination, a 40 supply-tank, a main feed-pipe, a boiler connected therewith, pumping mechanism adapted to force water from the tank into the feed-pipe, an air-chamber communicating with the feed-pipe between the pumping mechanism 45 and boiler, a by-pass leading from between the feed-pipe and pumping mechanism back to the supply-tank, a valve normally closing said by-pass but adapted by pressure to open it, a pipe for communicating pressure to the 50 valve, which pipe is connected with the fluid on the opposite side of the air-chamber to that at which the pumping mechanism is connected, substantially as described.

In testimony whereof I hereunto affix my 55 signature in the presence of two witnesses.

ROLLIN H. WHITE.

Witnesses:

ALBERT H. BATES,
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