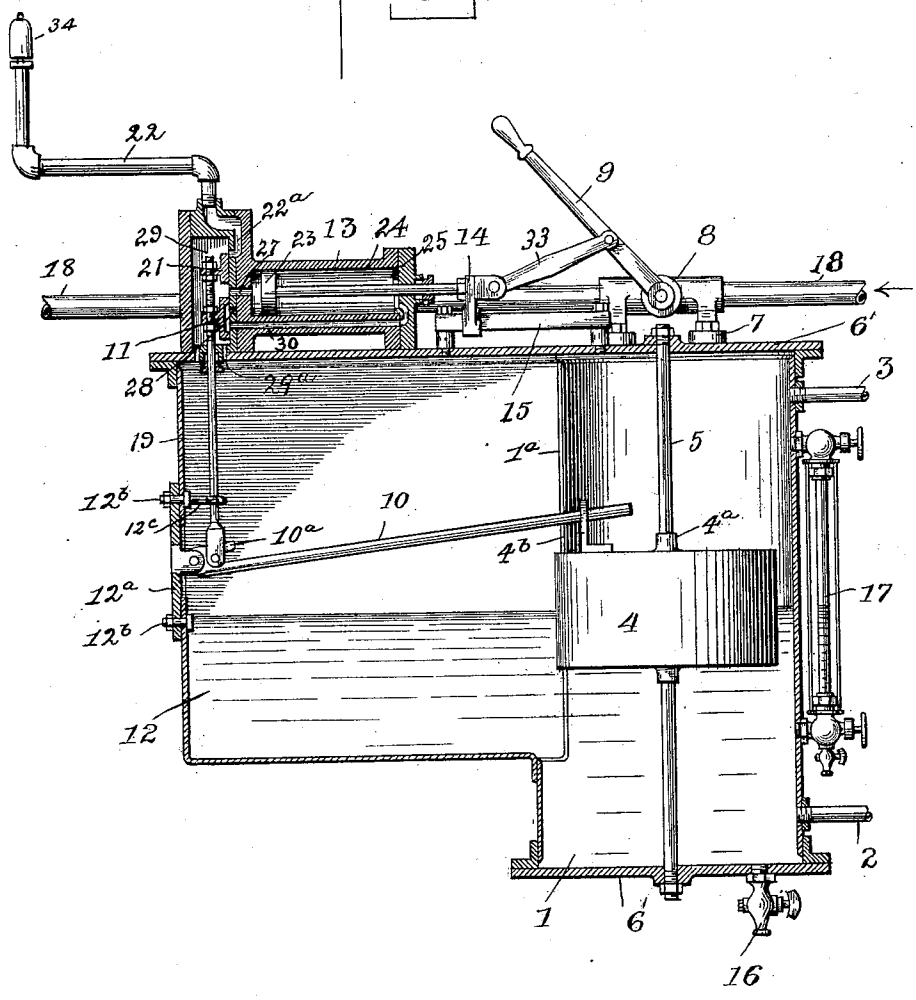
(No Model.) 2 Sheets—Sheet 1.

L. DERY.

FEED WATER REGULATOR.

No. 606,195. Patented June 28, 1898.

Fig. 1.



Witnesses
Harry W. Hahn
Victor J. Evans

Inventor
Louie Dery.
by John Wedderburn
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

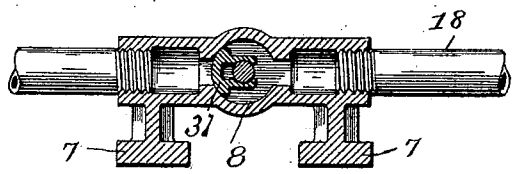
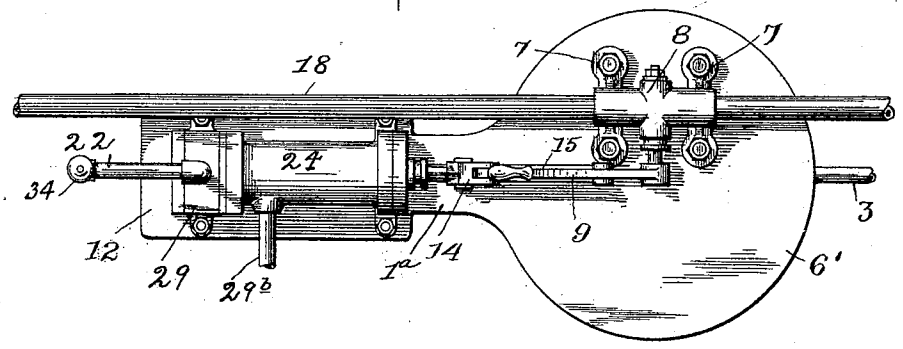


Fig. 3.



Witnesses
Harry W. Hahn
Victor J. Evans

Inventor
Louie Dery.
by John Wedderburn
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LOUIE DERY, OF MONTPELIER, NORTH DAKOTA, ASSIGNOR OF ONE-FOURTH TO PROSPER NAZE, OF SAME PLACE.

FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 606,195, dated June 28, 1898.

Application filed July 30, 1897. Serial No. 646,544. (No model.)

To all whom it may concern:

Be it known that I, LOUIE DERY, a citizen of the United States, and a resident of Montpelier, in the county of Stutsman and State of North Dakota, have invented certain new and useful Improvements in Feed-Water Regulators, of which the following is a specification.

My invention relates to an improved combined water-column alarm and apparatus for automatically throwing into and out of operation a water-feed pump or injector for boilers; and it consists of certain novel features of construction, combination, and arrangement of parts in an apparatus of this character, which will be hereinafter more fully described, and specifically set forth in the appended claims.

The objects of the invention are to provide, first, simple and effective means comprising a float and novel valve mechanism operated thereby for letting on and cutting off the supply of steam to the pump to maintain the water in the boiler at a predetermined height; second, to provide improved adjustable valve devices for controlling the supply of steam to the piston-cylinder; third, to provide an improved casing for the various operative parts of the apparatus, and, finally, to improve and simplify the construction and render more efficient the operation of this class of apparatus generally.

In the drawings hereto annexed and forming a part of this specification, Figure 1 is a central vertical section of a water-feed-pump-controlling apparatus embodying my invention. Fig. 2 is a detail sectional view of the throttle-valve in the steam-supply pipe of the pump. Fig. 3 is a top plan view of the complete apparatus shown in Fig. 1.

Referring now more particularly to the drawings, wherein like reference-numerals designate corresponding parts throughout the several views, 1 represents a cylindric barrel or float-casing which in practice is suitably supported adjacent to the boiler (not shown) and provided with water and steam supply pipes 2 3, respectively, leading thereto from the boiler. The barrel contains a float 4, having a tubular central sleeve 4^a, by which it is fitted to slide up and down on a vertical guide-rod 5, accordingly as the column of water rises and falls therein. This rod has its ends projecting through the end plates or heads 6 6′ of the barrel and threaded to receive nuts by which it is detachably secured in place. The tubular sleeve 4^a affords a comparatively long bearing on the rod for the float, which is thereby prevented from binding or wabbling.

On one side of the barrel or float chamber is a neck or extension 1^a, which is connected to one end of a rectangular chamber 12, forming in conjunction with said barrel a casing for the float and the valve mechanism operated thereby. This chamber is formed with bottom, side, and end walls, the top wall thereof being formed by the top plate or head 6′, which, as shown, covers both the barrel and chamber. In the outer end of the chamber is a hand-hole normally closed by a plate 12^a, secured by bolts 12^b, one of said bolts being provided with a guide 12^c, projecting from its head portion inside the chamber, for a purpose presently described.

Mounted on the plate 6′, above the barrel 1, is a valve-casing 8, supported by legs 7, bolted or otherwise secured to said plate, said casing being interposed in the continuity of a steam-supply pipe 18, leading from the boiler to the valve-chest of a water-feed pump or injector. (Not shown.) In this casing is an oscillatory valve 31, to the stem of which is connected a lever 9, formed at its free end with a handle by which it may be operated by hand to open or close the valve in the event that the automatic mechanism for operating the same, hereinafter described, should from any cause become temporarily inoperative.

Mounted on the top plate 6′, above the chamber 12, is a cylinder 24, in which slides a piston 23, having a rod or stem 13, connected at its outer end with a cross-head 14, fitted to slide on the usual guide 15. The cross-head is in turn connected through the medium of a pivoted rod or arm 33 to the lever 9, so that said lever will be operated to open or close the valve 8 when the piston 23 is impelled in one direction or the other.

On the outer end of the cylinder is a steam-

chest 29, which is in communication with the chamber 12 through openings 29^a in the top plate 6'. Live steam passing from the boiler through pipe 3 to the barrel 1 and chamber 12 enters the chest through the openings 29^a, and thus the chest is constantly supplied with steam. The steam-chest is in communication with the cylinder through a port 27 in the outer end of the cylinder, by which steam enters to impel the piston inwardly or to the right, as shown in Fig. 1. It is also in communication with the cylinder through a longitudinal passage 30, extending below the piston-chamber and opening thereinto at the inner end of the cylinder, by which steam enters the cylinder to impel the piston outwardly or to the left. When the piston is at the limit of its inward stroke at the inner end of its cylinder, it rests against a packing-ring 25, which prevents the steam from leaking around the piston-head into the said passage 30. It is to be understood that the piston on its inward stroke operates the lever 9 in one direction to open the valve 33 to permit the steam to pass to the water-feed pump and on its outward stroke operates the lever in the reverse direction to close the valve to cut off the supply of steam to the pump. Connected with the steam-chest is a pipe 22, which is in communication therewith through a port 22^a, and this pipe is provided with a suitable alarm device, preferably a steam-whistle 34.

The valve mechanism actuated by the float and controlling the inlet of steam from the steam-chest to the cylinder will now be described.

On the upper end of the float 4 is an angle-bracket 4^b, having an opening in which the inner end of an operating-rod 10 is loosely fitted. This rod is pivoted at its outer end to ears on the hand-hole plate 12^a and is provided with a hook 10^a, which engages a pin on the lower end of a vertical valve-rod 19. The said lower end of this rod is guided and maintained in engagement with the hook 10^a by the hook 12^c and the upper end thereof projects through an opening in the plate 6' into the chest 29 and is threaded, as shown. Adjustably secured thereon by nuts are slide-valves 11 21. The valve 11 controls the port 27 and passage 30 and the valve 21 the port 22^a.

The operation is as follows: When the water in the boiler falls below a predetermined level, the float 4, moving downwardly, will operate the rods 10 19 and cause the slide-valve 11 to uncover port 27. When this takes place, steam from the chest entering the cylinder through said port will move the piston inwardly, which will actuate lever 9 to open valve 8. The motive agent will then flow through pipe 18 to the feed-water pump, which will begin to force water into the boiler. If the water in the boiler should fall so low as to expose the tubes, the valves would be moved downwardly to a greater extent, so that the ports 22^a and 27 would both be uncovered, whereupon steam would be admitted simultaneously to the cylinder to open valve 31 and the pipe 22 to sound the alarm-whistle to notify the engineer. As soon as the water again rises to the normal level the valves will close ports 22^a 27. When the water rises above the predetermined level, the valves are moved upwardly to the limit of their stroke. When this occurs, port 30 is uncovered and the steam flows from the chest to the inner end of the cylinder, impelling the piston outwardly and causing the lever 9 to be operated to close the throttle-valve. Connected with the cylinder 24 is an exhaust-pipe 29^b and in communication with said pipe is an exhaust-passage 28. When the piston is impelled outwardly or to the right, as above described, the dead steam in the cylinder flows back through passage 30 and through the arch of valve 11 to the passage 28 and thence to the exhaust-pipe. The valves 11 21 may be adjusted by means of their nuts on rod 19 to vary their stroke, so that they may be set to maintain the water at a different height in the boiler whenever desired.

The barrel 1 is provided at its lower end with a draw-off cock 16, and may also be provided with an ordinary gage-tube 17 to indicate the level of water therein.

Access may be readily and conveniently had to the chamber 12 and barrel 1 through the opening closed by 12^a whenever it is desired to clean the same or repair or remove the float and its connections. If it should become necessary to remove the float, this may be readily and conveniently accomplished by first removing plate 12^a, disengaging the outer end of rod 10 from the valve-rod 19, withdrawing the inner end thereof from engagement with bracket 4^a, and then detaching the bottom head 6.

Changes in the form, proportion, and minors details of construction may be resorted to within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is—

1. In a boiler-feed-pump regulator, the combination of a barrel or float casing having water and steam pipe connections with a boiler, a chamber in open communication at one end with the barrel and provided at its opposite end with a hand-hole, a detachable plate closing said hand-hole, a vertical guide-rod in the barrel, a float fitted to slide thereon, an operating-rod projecting across the chamber and having one end detachably connected with the float and its opposite end pivoted to said hand-hole plate, a steam-supply pipe for a feed-water pump having a valve controlling the passage of steam therethrough, a cylinder having a steam-chest supplied with steam from the chamber, a piston therein operatively connected with said valve in the feed-pump pipe, a valve-rod detachably con-

nected at its lower end to the operating-rod and having its upper end projecting through the top of the chamber into the steam-chest of the cylinder, and valves carried thereby controlling the supply of steam to said cylinder, substantially as described.

2. In a boiler-feed-pump regulator, the combination of a barrel or float casing having water and steam supply pipe connections with a boiler; a water and steam chamber in open communication therewith; a float in the barrel; an operating-rod projecting across said chamber and pivoted at one end therein and detachably connected at its opposite end to the float; a steam-supply pipe for a feed-pump having a valve controlling the passage of steam therethrough; a lever connected with said valve; a cylinder supported on the chamber and having the following instrumentalities, viz: a piston-chamber, a steam-chest in communication with the water and steam chamber and supplied with steam therefrom and provided with a port for the escape of steam when the water in the float-casing falls to the danger-point, a pipe in communication with said port and carrying an alarm device, such as a whistle, a main port in the cylinder to admit steam from the chest to the adjacent end of said cylinder, and a passage in the cylinder to admit steam to the opposite end thereof; a piston in said cylinder operatively connected with the valve in the steam-pipe of the feed-pump; a valve-rod connected at its lower end to the pivoted operating-rod, and having its upper end projecting into the steam-chest; and a pair of slide-valves carried thereby, one controlling the alarm-port in the steam-chest and the other the said main port and passage in the cylinder, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LOUIE DERY.

Witnesses:
WM. WELLMAN,
HENRY J. DERY.