

No. 749,942.

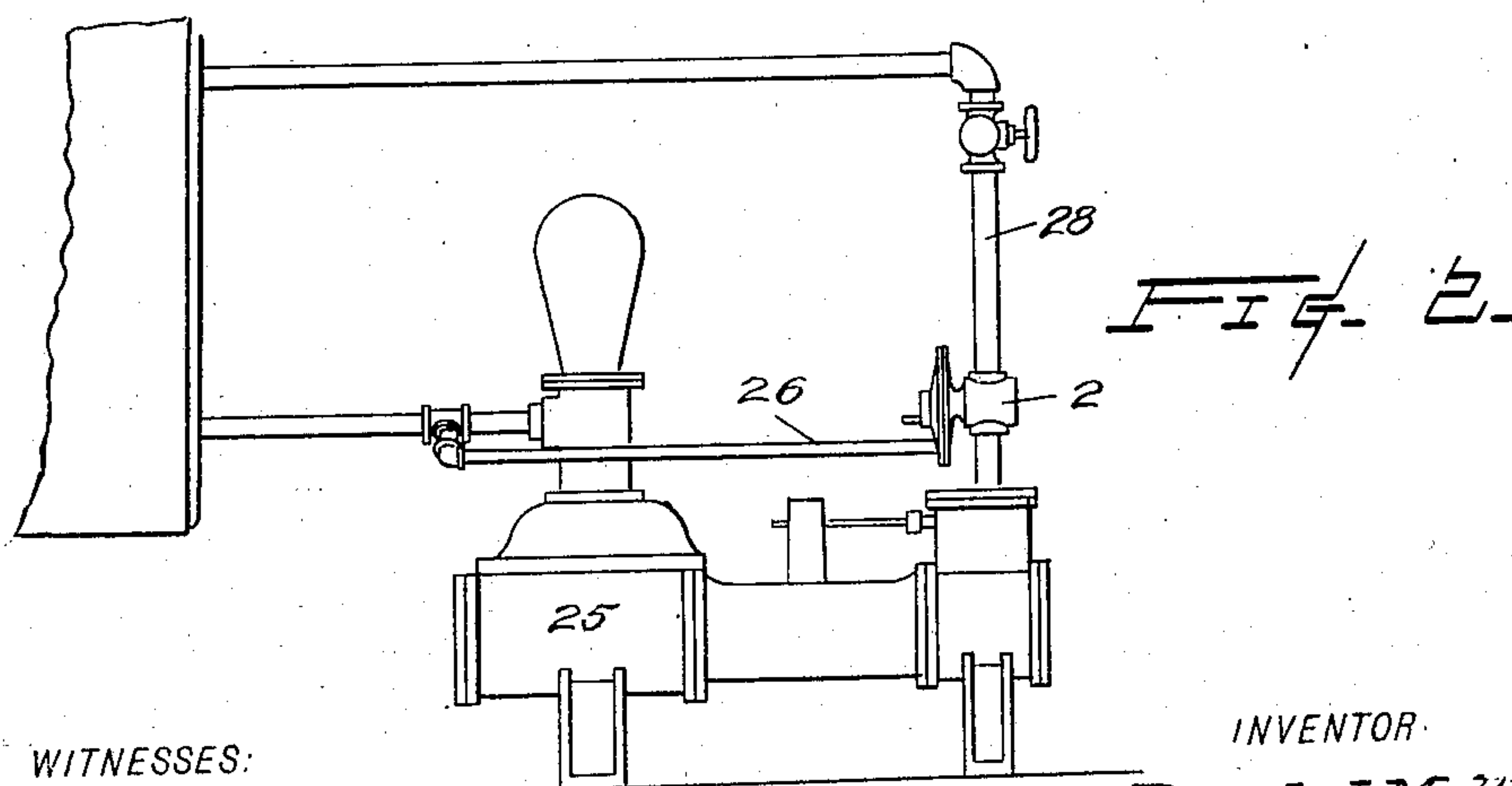
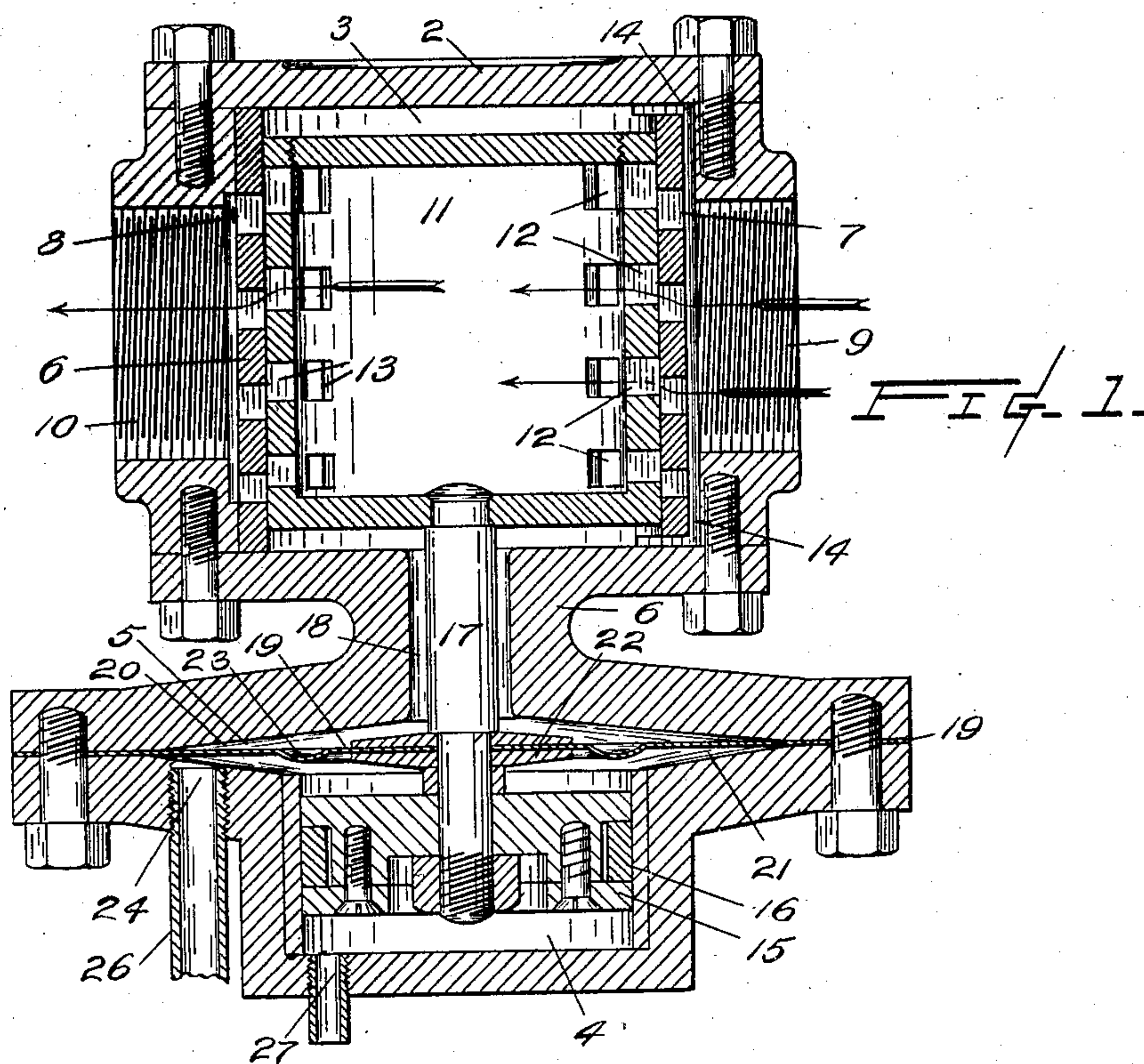
PATENTED JAN. 19, 1904.

R. J. MULLIN.

AUTOMATIC CONTROLLER FOR FEED PUMPS.

APPLICATION FILED OCT. 5, 1903.

NO MODEL.



WITNESSES:

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AUTOMATIC CONTROLLER FOR FEED-PUMPS.

SPECIFICATION forming part of Letters Patent No. 749,942, dated January 19, 1904.

Application filed October 5, 1903. Serial No. 175,812. (No model.)

To all whom it may concern:

Be it known that I, ROYAL J. MULLIN, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Automatic Controllers for Feed-Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of this invention is the provision of means to automatically control the supply of steam to a boiler-feed pump by the relative pressures of the steam and the water within the pump-delivery or feed-water pipe. I accomplish this by the apparatus hereinafter described, illustrated in the accompanying drawings, and finally set forth in the claims.

In the said drawings, Figure 1 is a longitudinal section of a device embodying my invention; and Fig. 2 is an elevation of a feed-pump and its water and feed connections with a boiler, showing the invention attached.

The reference-numeral 2 indicates a casing having at its opposite ends cylindrical chambers 3 and 4 and an intermediate circular chamber 5, which is communicatively connected directly with the chamber 4 and to the chamber 3 by a neck 6.

The cylinder 3 is provided with a bushing 6, having port-openings 7 and 8, arranged to be in line with steam inlet and outlet openings 9 and 10, respectively, of the casing, which are screw-threaded for making connection with a pipe 28, leading from a source of steam-supply to the pump. Positioned so as to be axially movable within the said bushing is a hollow drum or valve 11, provided with ports 12 and 13, which register with the respective ports of the bushing. Communication is made between the ends of the valve-cylinder and the steam-inlet opening 9 by channels 14, and consequently the drum is balanced, or nearly so, as to the end pressure exerted thereon by the steam. Seated within the cylinder-chamber 4 is a piston 15, provided with suitable packing-rings, such as 16, and integrally connected to the said drum by a stem 17, extending axially through the neck 6, but of less diameter than the inside of same, so as to leave an annular passage 18 around the stem.

19 is a diaphragm extending diametrically across and divides the chamber 5 into two compartments 20 and 21. The diaphragm is constructed, preferably, of thin metal, such as copper, and is fixedly connected at its periphery to the casing and at its center to the aforesaid stem by collars 22, and in order to make the diaphragm flexible for local movement with the rod I provide the same with one or more annular corrugations 23. Communication is made through an aperture 24 in the casing-wall between the compartment 21 and the water-delivery pipe of the pump 25 (see Fig. 2) by a pipe 26, while the compartment 4 is connected with the atmosphere through aperture 27.

The several aforescribed parts are of size suited to their respective services; but the area of the diaphragm acted upon by the water must exceed the area of the said piston, and ordinarily the device will act efficiently when the proportions of same are as four is to one, though this may be somewhat varied to suit a special requirement.

The operation of the invention is as follows: The valve being supposed to be in its half-opened position, as shown in Fig. 1, to admit steam sufficient to actuate the pump under ordinary conditions, and will remain in this its normal position until the pressure of the water within the compartment 21, which is connected with the boiler-feed pipe, acting upon the diaphragm exceeds or is less than the combined pressures of the water acting oppositely upon the piston 15 and the steam-pressure upon the diaphragm. When these pressures are unbalanced, then it is evident that the valve will be moved to open or close its ports and control the admission of steam to the pump, according as to whether the water-pressure is increased or diminished relatively of the steam-pressure. Furthermore, it is apparent with this device that when the valve in the feed-pipe is closed the steam is cut off from the pump by reason of the pressures of the restrained water soon overcoming the pressure of the steam acting upon the diaphragm, and, vice versa, when the feed-pipe valve is open the water-pressure is reduced and the unbalanced steam-pressure

overcoming the water-pressure opens the valve to operate the pump.

The invention is adapted for use with marine and other boilers, whether arranged singly or in series or battery.

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

1. In an apparatus of the class described, in combination, a casing having steam inlet and outlet openings and openings for the admission of water and air, a bushing in said casing provided with steam-ports, a valve-stem extending axially of and longitudinally movable in the casing and carrying at one end a valve for regulating opening of said bushing-ports, said valve, a piston mounted upon the opposite end of the valve-stem and intermediate the air and steam openings, a diaphragm mounted axially to the said valve-stem intermediate the water and steam openings and secured at its periphery to the casing, communicative connections between the said steam-inlet and the casing at each end of the valve and with the space within the casing at the adjacent side of the diaphragm, whereby the said valve will be moved longitudinally to regulate the opening of the said ports and control the passage of steam through the casing by reason of the differential pressures exerted upon one side of the diaphragm and the water upon the other side less the opposing action of the water upon the said piston.

2. In an apparatus of the class described, the combination with a balanced steam-valve and a suitable containing-case, of means to control the movement of said valve for the purpose of regulating the flow of steam to a boiler-feed pump relatively of the pressure within the water-delivery pipe of said pump, such means comprising a diaphragm and a piston integrally connected by a stem whereby pressure introduced therebetween will be balanced in the proportion as the area of the piston is to the diaphragm and which unbalanced pressure acting against the opposing pressure of steam acting against the diaphragm will oper-

erate the valve and maintain an excess of water-pressure above the steam-pressure sufficient to maintain a positive feed of water to the boiler.

3. In a device of the type set forth, a casing having steam inlet and outlet openings, a neck connected to the lower end of the casing with a cylindrical chamber secured to said neck, a valve operating in the casing and a piston in said cylindrical chamber, with a stem connecting the valve and piston and passing through said neck, and a diaphragm secured to said neck above the piston and secured between said neck and said chamber, with a chamber formed between the neck and the piston in which said diaphragm extends, and a connection between said last-named chamber and the water-delivery pipe of the pump.

4. A device of the type set forth presenting a casing having inlet and outlet openings with a valve therein, a neck upon the casing, and a cylindrical chamber on the neck, a piston operating in said chamber with a stem connecting the valve and piston, and passing through the neck, a diaphragm secured to the stem and a second chamber formed between said chamber and the neck in which said diaphragm extends, and a connection between the under side of the diaphragm and the water-delivery pipe of the pump.

5. A device of the type set forth consisting of a casing having inlet and outlet openings, a neck on the casing with a chamber bolted onto the neck, the casing having a valve therein and the chamber, a piston with a stem connecting the two and passing through the neck, a diaphragm on the stem having its ends secured between the neck and chamber, a chamber between the diaphragm and piston with a connection between said chamber and the water-delivery pipe of the pump.

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

ROYAL J. MULLIN.

Witnesses:

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