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R. J. MULLIN.

AUTOMATIC CONTROLLER FOR FEED PUMPS.

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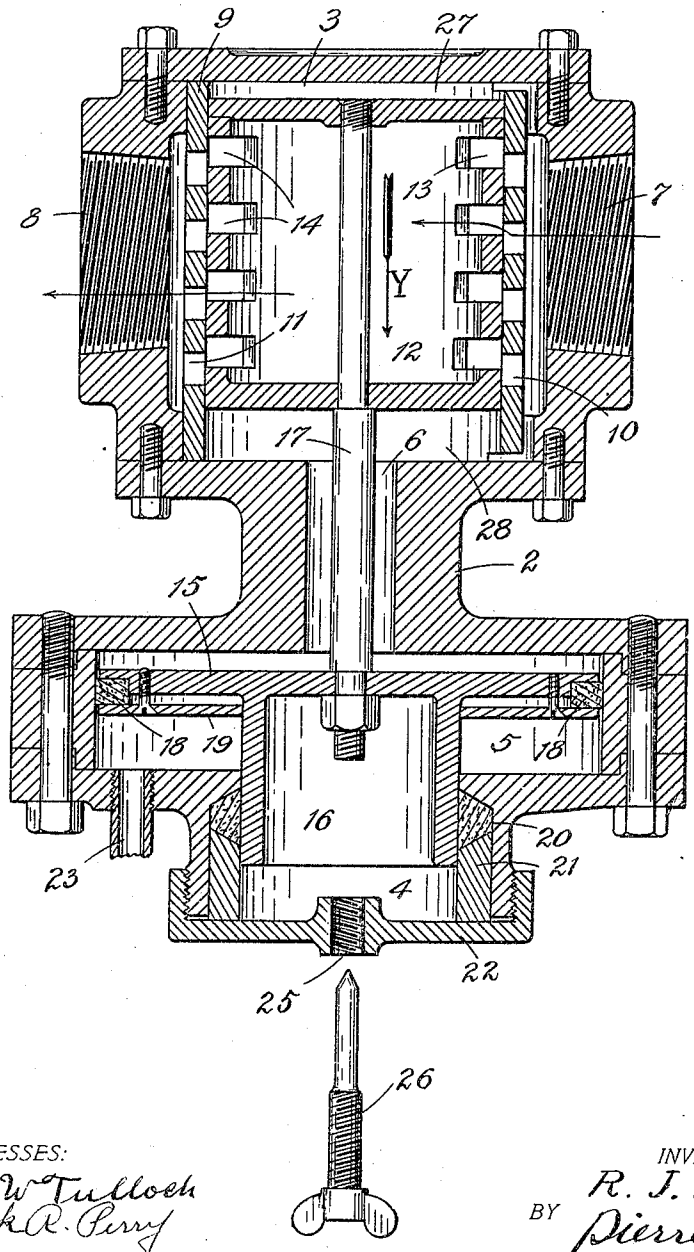
NO MODEL.



WITNESSES:

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No. 770,866. Patented September 27, 1904.

UNITED STATES PATENT OFFICE.

ROYAL J. MULLIN, OF SEATTLE, WASHINGTON.

AUTOMATIC CONTROLLER FOR FEED-PUMPS.

SPECIFICATION forming part of Letters Patent No. 770,866, dated September 27, 1904.

Application filed March 17, 1904. Serial No. 198,581. (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 drawing.

This invention relates to feed-pump controllers, and more especially to improvements in the controller shown and described in my Patent No. 749,942, issued January 19, 1904; and the object of the present invention is to provide improved means whereby the device is capable of quicker and more positive action than in the said patent by utilizing to the fullest extent the power of the controlling steam and water agents.

The invention or improvements consist in certain novel features of construction and combination of parts, which will hereinafter be described and claimed.

The accompanying drawing represents a longitudinal section of apparatus embodying my improvements.

The reference-numeral 2 indicates the casing, provided at one end with a valve-chamber 3 and at its opposite end with a cylinder 4 and having an intermediate cylinder 5 contiguous with the cylinder 4 and connected by a steam-passage 6 with the said valve-chamber. As in the aforementioned patent, the valve-chamber is provided with inlet and outlet steam-openings 7 and 8, respectively, and also with a bushing 9, provided with port-openings 10 and 11, respectively positioned upon its diametrically opposite sides. A cylindrical balanced valve 12 is also included in the present invention and is provided with port-openings 13 and 14, located so as to register with the ports 10 and 11, respectively, at one position of the valve.

Fitted within the cylinder 5 is a piston 15, formed or provided with a cylindrical hub or extension 16, which projects into the chamber 4. A stem or rod 17 of less diameter than the steam-passage 6 extends axially therethrough and is rigidly connected to both the valve and the piston in order that they will move as one piece. A packing-ring 18, which is retained in position by a follower 19, is provided for the piston 15 to prevent any leakage about the peripheral edge thereof, and for a like purpose a stuffing-box, such as 20, having a gland 21 and a screw-threaded cover 22, is provided for the cylindrical surface of the piston extension 16.

In operation the casing would be connected at the openings 7 and 8 with the line of pipe leading from the steam-boiler to the steam-cylinder of a feed-pump, and communication would be made from the water-delivery pipe of the pump and the casing by a pipe 23 entering the latter within the cylinder 5 and upon the opposite side of the piston 15 to the valve-chamber. Communication is made between the cylinder 4 and the external atmosphere through the cover 22 by an aperture 25, which aperture is screw-threaded for the reception of a key 26 (shown detached in the drawing) for the purpose presently to be described.

Having described the construction of my invention, I will now explain its operation, which is as follows: With the several parts in the position shown in the drawing steam is admitted through the valve to the pump to actuate the same and likewise is conveyed to the spaces 27 and 28 at the opposite ends of the valve to balance it and by way of the steam-passage 6 to the adjacent face of the piston 15, with the tendency of forcing the latter and the valve to move in the direction indicated by the arrow Y. This steam-pressure, however, is counteracted by the resistant force of the water upon the opposite side of the said piston, equal in pressure to that within the water-delivery pipe of the pump. When the resultant of these pressures—that is, of the steam and the water—is equal, then there will obviously be no movement of the piston or of the valve connected thereto; but if either of these pressures exceed that of the other then the valve will be further opened or closed, according to which of said pressures predominate. This function of the invention makes it possible to regulate to a nicety the flow of steam to the pump in proportion to its required duty, which can be predetermi-

nately regulated by varying the relative areas of the faces of the piston which are presented to the action of the aforesaid opposing fluids. For example, suppose the piston area which is acted upon by the steam to exceed the area thereof which is acted upon by the water by twenty-five per cent., then it is apparent that the valve will remain stable while these fluids are in a reciprocally similar ratio of pressures, and any change from this relation will alter the position of the valve to throttle the steam or enlarge the areas of the valve port-openings for an increased supply of steam until the condition of equilibrium of the opposing-pressures be attained. When from any cause the water-pressure upon the piston 15 is greatly reduced—as, for instance, by the failure of the water-supply or by a break in the water connections—then the valve, under the action of the steam upon the said piston and by reason of the reduced pressure upon the opposite side thereof, will move the valve so that its ports will be full open, and should the increased speed of the pump under this condition be insufficient to restore the pressure of the water the valve will continue to travel in the same direction and close the ports and make the pump inoperative. To return the valve to a position within the normal range of its travel or wherein the device will be automatic in its action, I preferably use a key such as 26, which being screwed into the said aperture 25 is capable of accomplishing this movement. After the working pressure has been restored the key should be withdrawn to allow the unrestrained automatic movements of the controlling parts.

The advantages among others which the present construction of the device has over that illustrated and described in my former patent are as follows: First, the entire area of the respective exposed piston areas are equally effective; second, the use of a piston instead of a diaphragm permits of a construction capable of withstanding more severe and longer-continued usage with less liability of its breakage to admit water into the steam end of the pump, and, third, the travel of the valve is such that in the event of an emergency, such as hereinbefore referred to, the pump is prevented from running at an abnormal speed or "racing" to its possible injury.

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

1. A device of the class described, comprising, in combination, a steam-controlling valve, a piston connected by a stem to the said valve, a casing for said valve and piston, said casing having steam inlet and outlet openings for the steam, and water and air openings upon the opposite side of the piston from the said steam-openings.

2. A device of the class described, comprising a casing provided at one end with a steam-cylinder, an air-cylinder at its opposite end and a water-cylinder intermediate thereof; a valve and a piston connected to each other and respectively positioned in said steam and water cylinders, said piston being provided with a cylindrical extension projecting into said air-cylinder.

3. In a device of the class described, the combination with a 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 piston integrally connected by a stem to the said valve, a portion of the area of one surface of the piston being exposed to the action of the atmosphere while the remaining portion thereof is exposed to the action of the water from said water-delivery pipe and the opposite surface of the piston being acted upon by the steam, the difference between these opposing pressures acting to operate the valve and maintain an excess of water-pressure above the steam-pressure sufficient to maintain a positive feed of water to the boiler.

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

ROYAL J. MULLIN.

Witnesses:

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