

W. H. BRUMMER.
 BOILER FEED PUMP REGULATOR.
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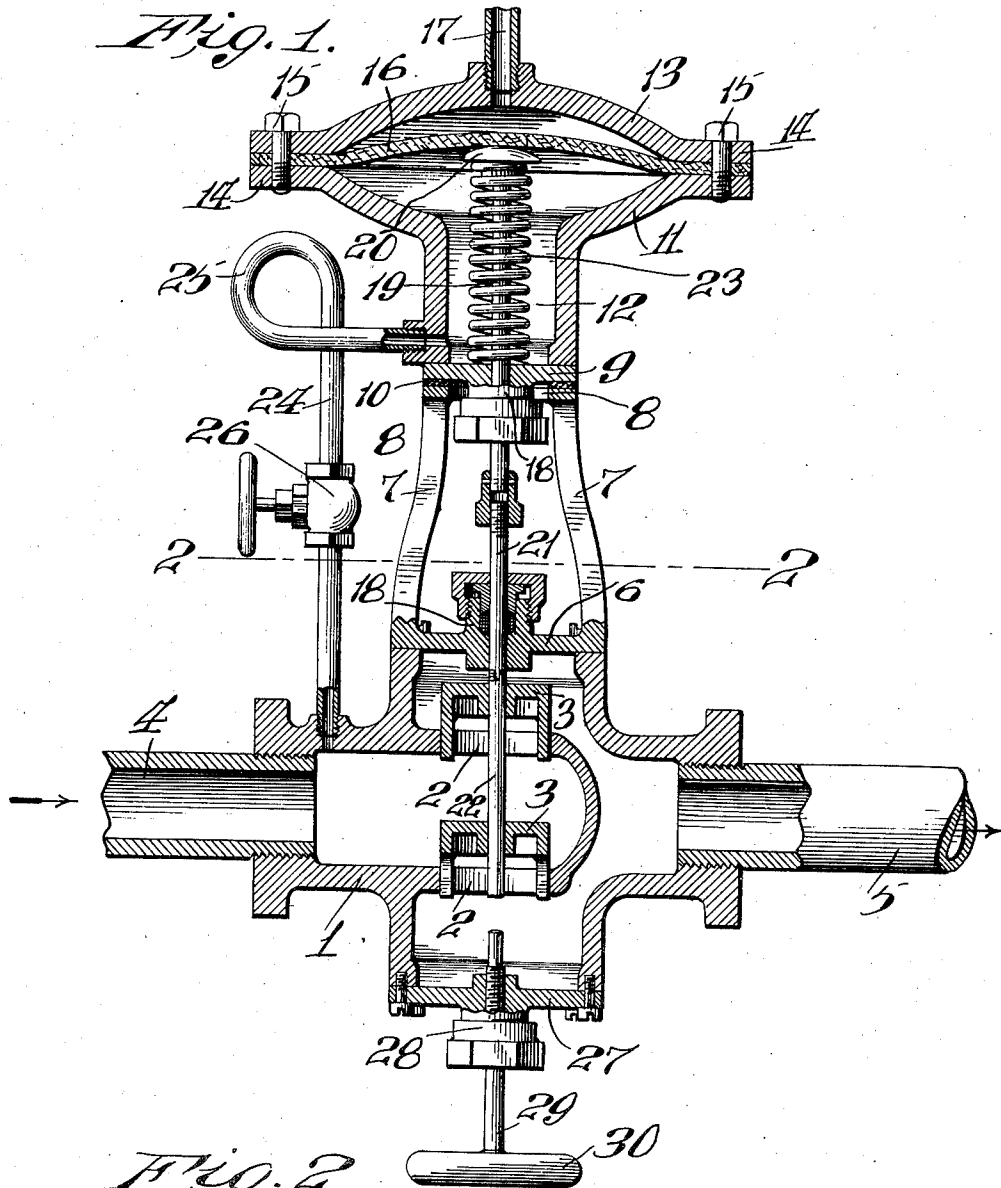
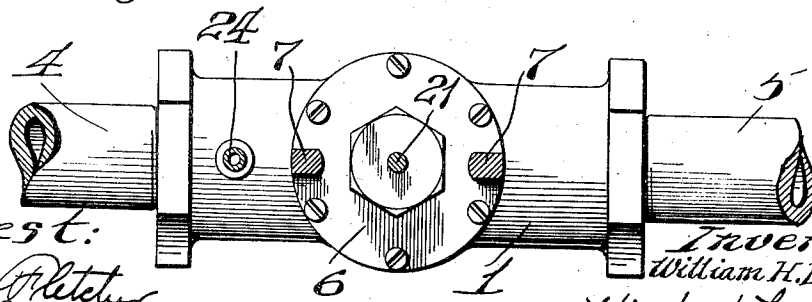


Fig. 2



Attest:
 A. G. Fletcher.
 E. L. Wallace.

Inventor:
 William H. Brummer.
 By Sigdm & Longan,
 attys.

UNITED STATES PATENT OFFICE.

WILLIAM H. BRUMMER, OF VENICE, ILLINOIS.

BOILER-FEED-PUMP REGULATOR.

997,038.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed October 27, 1909. Serial No. 524,798.

To all whom it may concern:

Be it known that I, WILLIAM H. BRUMMER, a citizen of the United States, and resident of Venice, Madison county, Illinois, have invented certain new and useful Improvements in Boiler-Feed-Pump Regulators, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in boiler feed-pump regulators, the object of my invention being to construct an automatic valve for opening or closing the supply of steam to a boiler feed-pump in which a flexible, fibrous diaphragm is employed having a housing for inclosing the diaphragm arranged to receive and hold water beneath the diaphragm, the body of water being first supplied and then maintained by the water of condensation from the steam introduced therein for the operation of the diaphragm, said body of water being utilized to prevent the steam from striking the diaphragm and to keep the diaphragm in a pliable, operative condition.

For the above purposes my invention consists in certain novel features of construction and arrangement of parts as will be hereinafter more fully described, pointed out in the claim and illustrated by the accompanying drawing, in which:

Figure 1 is a vertical, sectional elevation through the complete regulator; and, Fig. 2 is a sectional plan taken on the line 2-2 of Fig. 1.

Referring by numerals to the accompanying drawing: 1 designates the housing of the valve proper, 2 the valve seats therein and 3 the valves of the ordinary balance-valve type.

4 designates a steam pipe leading from the boiler and communicating with the housing 1, and 5 designates a steam pipe leading from the housing 1 to a feed-pump (not shown).

A head 6 is secured to the valve housing on its upper side, and formed integral therewith are standards 7 projecting upwardly from the upper face of the head 6, and formed integral with the upper extremities of the standards is an annular ring 8. Supported by the standards, on top of the annular ring, is a head 9 there being an insu-

lating ring 10 interposed between the ring 8 and head 9.

Secured to the head 9 is a diaphragm casing consisting of a lower diaphragm-casing member 11 having an integral hollow extension 12 which rests upon the head 9 and an upper diaphragm-casing member 13, the members 11 and 13 being elliptical in cross section and having integral flanges 14 which are united by the bolts 15. Interposed between the members 11 and 13 is a flexible, fibrous diaphragm 16.

Formed in the upper diaphragm-casing member 13 is an internally threaded opening in which is seated a water-supply pipe 17. The heads 6 and 9 are each provided with stuffing boxes 18, and arranged for operation through said stuffing boxes is a sectional valve stem comprising a section 19 provided with an enlarged head 20 for operation in the diaphragm-casing and through the stuffing box carried by the head 9; a section 21 detachably secured to the section 19 and arranged for operation through the head 6 and stuffing box carried thereby, and, a section 22 which is pivotally secured to the section 21 and carries the valves 3.

Impinging between the head 20 of the section 19 of the valve stem and the head 9, is an extensile coil spring 23 arranged in such manner as to normally hold the valves 3 open.

Secured to the housing 1 and in communication with the interior thereof is a steam pipe 24 having a coil 25 at its upper end. Connected and in communication with the hollow extension 12 of the diaphragm-casing and located in the pipe 24, is a valve 26.

Secured to the housing 1, on the lower extension thereof, is a head 27 having an integral stuffing box 28 through which is extended a rod 29 which rod is threaded to the head 27 and carried by said rod is a handle 30. The upper end of the rod 29 is arranged for engagement, at times, with the lower end of the valve stem 22. By this arrangement of parts, I am enabled to operate the valves manually in case the automatic means is temporarily disabled.

It will be observed that the head 20 at the upper end of the said valve-stem rests loosely against the underside of the said diaphragm 16, and that the spring 19 normally urges said head into contact with the imperforate center of said diaphragm.

In practical operation, assuming the pipe 4 to be connected to receive steam from a boiler, the pipe 5 to be connected with a feed-pump and the pipe 17 being connected with a water-supply pipe from the feed-pump to the boiler, the pipe 17 being a branch from said water pipe, steam from the boiler (not shown) is admitted to the housing 1, and, assuming that the valves are in their normal open position, the steam will pass through the valve seats through the pipe 5 and operate the pump (not shown). It is to be understood in this connection, that the pipes 4, 5 and the pipe (not shown) from the pump leading to the boiler together with the pipe 17, are normally open and in condition to feed steam to the pump and to permit the passage of water from the pump to the boiler. It is to be understood, further, that the valve 26 in the steam pipe leading from the housing 1 to the diaphragm-casing is normally open.

It will be obvious that steam admitted to the housing 1 will pass upwardly through the pipe 24 and into the diaphragm-casing and will exert a pressure upon the diaphragm equivalent to the boiler pressure, and, when there is an excess water and steam pressure within the boiler and within the water-supply pipe to the boiler from the pump (not shown), such pressure is exerted through the pipe 17 upon the upper face of the diaphragm and such pressure will overcome the combined pressures of the spring 23 and the steam pressure within the diaphragm-casing beneath the diaphragm. Thus the diaphragm will move the valve stem downwardly and seat the valves 3 and cut off communication of steam from the boiler to the pump and thus stop the water feed to the boiler.

An example of the operation of my improved regulator follows: Assuming all of the pipes to be open and the pump operating with one hundred pounds pressure of steam within the boiler, it is obvious that there will be one hundred pounds steam pressure on the lower face of the diaphragm and that the pressure upwardly on the diaphragm by the spring is twenty pounds, and

assuming that it be desired to have a combined steam and water pressure in the boiler, not to exceed one hundred twenty (120) pounds that the flow of steam from the boiler to the pump will be automatically cut off when the pressure from the pipe 17 overcomes the pressure of the steam and spring on the lower face of the diaphragm, the spring 23 being an equalizer between the normal boiler pressure and the excess pressure of water and steam within the boiler.

It is obvious by reason of the connection between the sections 19 and 21 of the valve stem, that the tension of the spring may be regulated as required to adjust the device for different pressures of water and steam within the boiler.

The provision of my improved water-holding diaphragm-casing makes possible the use of a flexible, fibrous diaphragm such as leather which I have found in practice to be more efficient than the metallic diaphragms.

I claim:

The improved boiler feed-pump regulator, comprising a valve housing, a balanced valve in said housing, a diaphragm casing located directly above said housing, a diaphragm in said casing, a valve stem connected to said valve and extending upward to said casing and having its upper end in contact with said diaphragm, a spring for holding said stem in contact with said diaphragm, a steam pipe 24 extending upwardly from the said housing, and having a condensing coil located in a plane above the bottom of the said casing, so that a body of water will be maintained within said casing above the steam pipe entrance thereto, a valve 26 in said steam pipe below said coil, and a water pipe connected to said casing above said diaphragm.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

WILLIAM H. BRUMMER.

Witnesses:

E. E. LONGAN,
E. L. WALLACE.