

No. 669,669.

Patented Mar. 12, 1901.

C. E. SQUIRES.
FEED PUMP GOVERNOR.
(Application filed July 5, 1900.)

(No Model.)

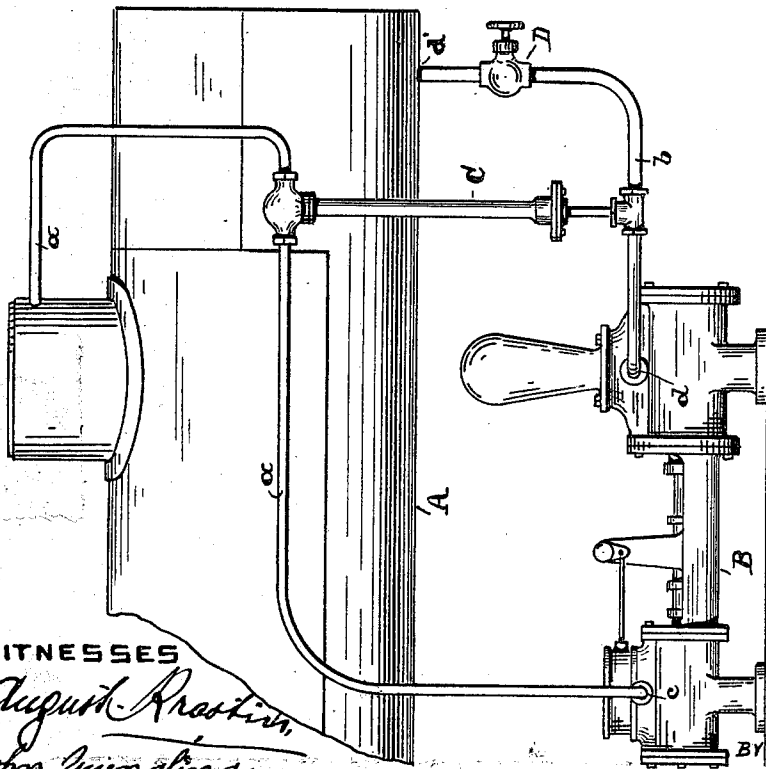
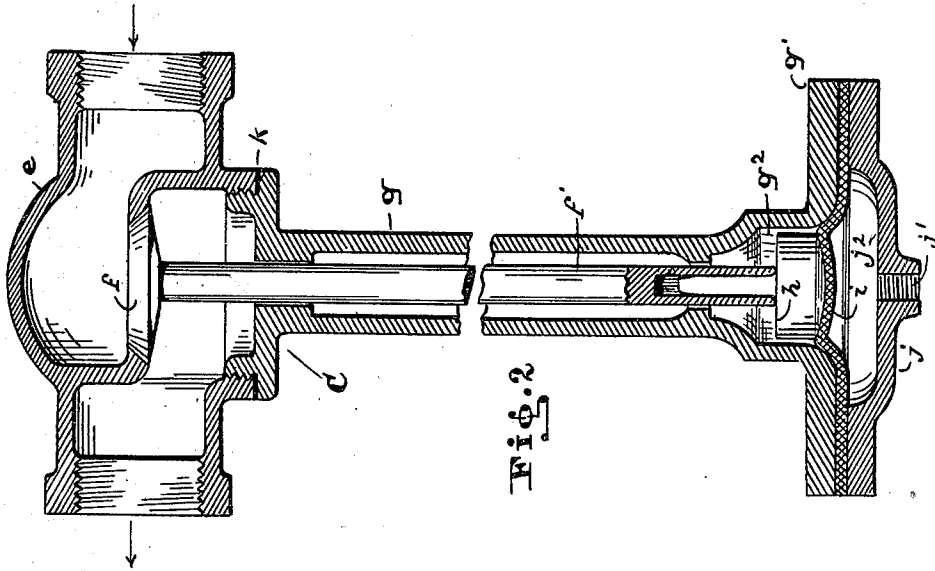


FIG. 1

WITNESSES
August Prastin,
John Guentling

INVENTOR
Ch. E. Squires
BY *R. F. Eibler,*
Atty

UNITED STATES PATENT OFFICE.

CHARLES E. SQUIRES, OF CLEVELAND, OHIO.

FEED-PUMP GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 669,669, dated March 12, 1901.

Application filed July 5, 1900. Serial No. 22,497. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EDWARD SQUIRES, a citizen of the United States of America, residing at No. 42 Forestdale avenue, in the city of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Feed-Pump Governors, of which the following is a specification.

My invention relates to improvements in means for controlling the water-pressure of steam-actuated boiler-feed pumps; and the object of my improvement is to provide for an apparatus which is extremely simple in point of construction and invariable positive and devoid of friction and leakage in point of operation. I attain this object in an apparatus constructed and arranged substantially as shown in the accompanying drawings, in which—

Figure 1 represents an exterior elevational view of said apparatus shown in connection with a steam-boiler and the steam-actuated water-feed pump therefor. Fig. 2 represents said apparatus detached, enlarged, and in a vertical sectional view.

Like letters of reference denote like parts in the drawings and specification.

Referring to Fig. 1, there is shown a part of a steam-boiler, as at A, a steam-pump B, and the pump-governing apparatus C, the latter being interposed between the steam-pipe line *a* from the boiler and the water-pipe line *b*, leading to said boiler. The steam-pipe *a* connects with the steam-cylinder of said pump, as at *c*, and the feed-pipe line extends from the pump-cylinder, as at *d*, to the boiler, as at *d'*. Such or similar may be the conditions for which said governing apparatus is adapted and rendered useful in controlling a predetermined water-pressure for said boiler or other vessel containing water under pressure.

Substantially this apparatus comprises a valve-casing *e*, the valve *f*, the sleeve *g*, the plug *h*, the diaphragm *i*, and bonnet *j*. The valve-casing may be of the ordinary "globe-valve" style, within which is seated, from the under side, said valve *f*, as seen enlarged in Fig. 2. The sleeve *g* has suitable connection with said casing, as at *k*. The former is preferably elongated and terminates in a flange

g', which is a counterpart of bonnet *j*. The stem *f'* of said valve extends to well nigh the bottom of said sleeve and loosely connects with the plug *h*, which latter member also loosely fits within the cavity *g*². Between flange *g'* and bonnet *j* is held secure the diaphragm *i* for support of said plug and to impart pressure to same and exclusion of leakage past said plug. The diaphragm preferably consists of elastic material, such as sheet-rubber or the like. At *j'* communication is established with the water-discharge pipe from the pump and the cavity *j*³, which is formed by said bonnet.

The conditions under which this contrivance is intended to operate are such that the valve *f* remains removed from its seat as long as the pump furnishes water under a predetermined pressure. For obvious reasons such pressure should always be in excess of that of the steam-pressure; but it should not be unduly higher than the steam-pressure.

With this apparatus a certain predetermined water-pressure can be maintained simply by selecting a proper plug area in relation to the valve area. Now since the water-pressure should be higher than the steam-pressure it is evident that the plug area must be smaller than the area of the valve-opening, and if the relation is such then the valve *f* will remain open even though the water-pressure is higher than the steam-pressure; but should the water-pressure in the feed-pipe to the boiler rise above the normal pressure then a closing of the valve can and will be effected, since an unduly higher pressure would overcome the steam-pressure even though the valve area is larger than the plug area.

The diaphragm *i* serves in the capacity of a flexible partition between the water and steam space of said apparatus. Therefore no leakage is possible between one space and the other. Furthermore, there is no loss in pressure due to friction, as is the case in other apparatuses for this purpose where stuffing-boxes are employed. The full water-pressure is imparted to the valve by the intervention of this diaphragm. Thus as soon as the water-pressure would rise above the intended pressure the valve *f* will be forced upward to

close upon its seat and remain so until the water-pressure diminishes to the normal state. The stem *g* is made elongated simply for the purpose of retaining the heat from the steam
 5 away from said diaphragm. In a long sleeve the steam becomes condensed. Therefore only hot water will come to bear upon said diaphragm, which at times may be drained by way of a petcock or the like. Eventually the
 10 valve-stem proper, also the sleeve, may be so enlarged as to dispense with a separate plug without departing from the nature of my invention.

The pressure of the water in the discharge-
 15 pipe line *b* is regulated by means of the valve *D*. Furthermore, the speed of the pump and the closing action of the governing apparatus can be adjusted by manipulating said valve as conditions may require. When the valve
 20 *D* is once adjusted so that the pump at a normal speed will furnish the necessary quantity of water, then an increase in the pump speed would cause an abnormally-high pressure in the pipe-line *b* and bonnet *j* under dia-
 25 phragm *i*, whereupon the valve *f* will be forced toward its seat and for a time interrupt the flow of steam to the pump until normal conditions are established. The condensation of steam (water) which accumulates in
 30 sleeve *g* forms a medium of protection for the diaphragm against live steam. The pressure upon the inner side of the diaphragm does in no way affect the condition of the

valve *f*, since the plug can be moved independently away from the valve.

From the foregoing it may readily be seen and understood that the above-described apparatus may be used in connection with a feed-pump supplying water to other vessels than a boiler.

What I claim, and desire to secure by Letters Patent, is—

A steam-pump governor comprising the combination of a suitable valve-casing arranged in the steam-pipe line from boiler to
 45 pump, an elongated, flanged valve-stem sleeve depending from said casing, a diaphragm adjacent the flange of said sleeve, a recessed bonnet securing the diaphragm to said flange and the chamber formed by said
 50 bonnet and diaphragm being arranged in open relation with the water-pressure pipe-line between the feed-pump and boiler and a valve seating against the steam-pressure in said
 55 casing and having an inclosed plug in contact with said diaphragm the area of said plug being smaller than that of the valve for the purpose of maintaining an overbalance of
 60 water-pressure over the steam-pressure as set forth.

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

CHARLES E. SQUIRES.

Witnesses:

BERNHARD F. EIBLER,
 AUGUST KRASTIN