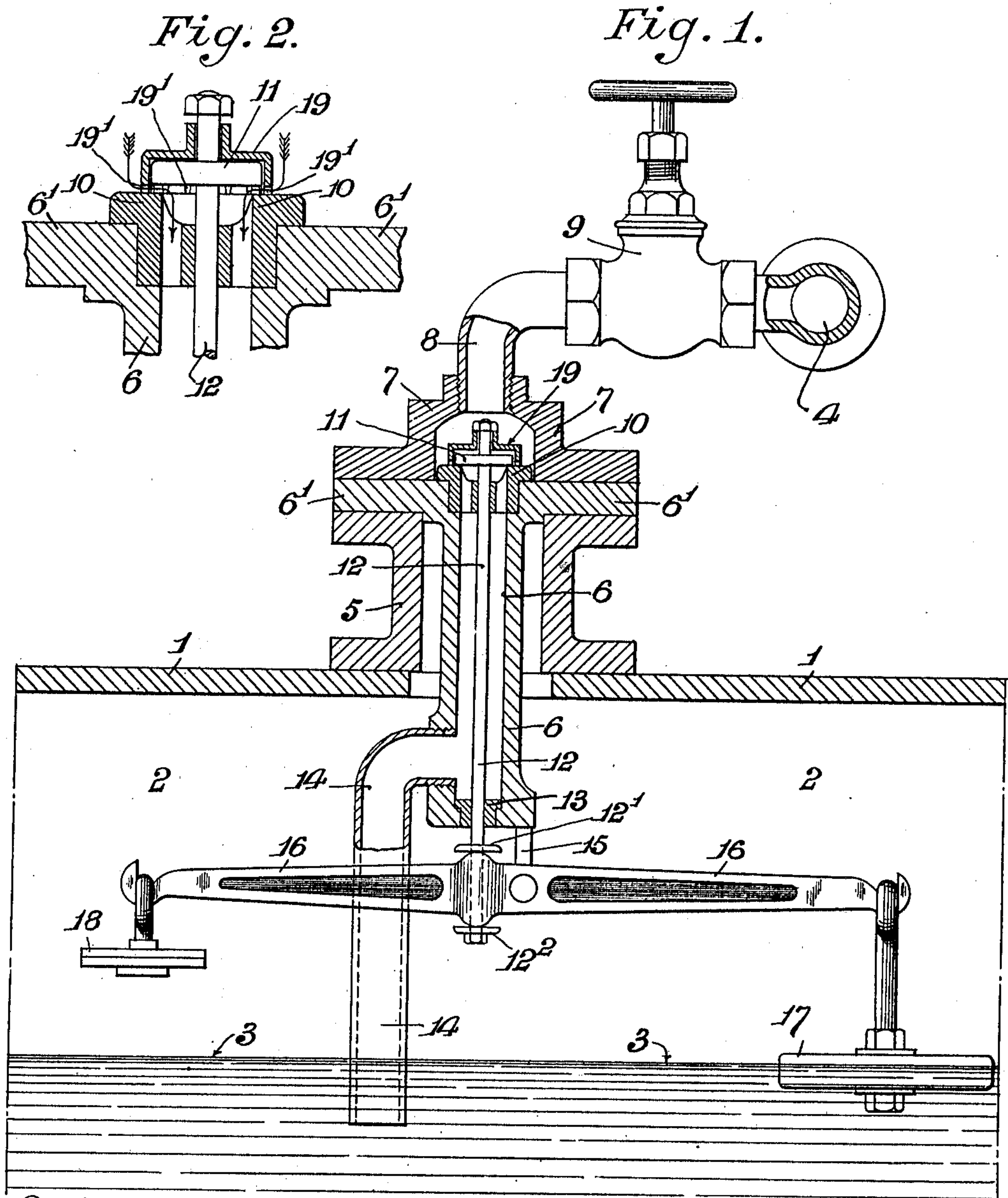


J. E. & A. SHAW & W., T. W. & A. LEES.
 FEED WATER REGULATOR FOR STEAM GENERATORS AND THE LIKE.
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UNITED STATES PATENT OFFICE.

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FEED-WATER REGULATOR FOR STEAM-GENERATORS AND THE LIKE.

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Specification of Letters Patent.

Patented Dec. 13, 1910.

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To all whom it may concern:

Be it known that we, JOHN EDWARD SHAW, AUSTIN SHAW, WALTER LEES, THOMAS WILLIAM LEES, and ARCHIBALD LEES, subjects of King Edward VII of Great Britain, and residents of Halifax, in the county of York, England, have invented certain new and useful Improvements in Feed-Water Regulators for Steam-Generators and the Like, of which the following description, in connection with the accompanying drawings, is a specification.

Our invention relates to feed water regulators for steam generators and the like and particularly to feed water regulators of the class in which a float actuated valve is located in a branch from the main feed pipe.

The object of our invention is to combine with the float actuated valve in the branch from the main feed pipe, a novel form of valve device by means of which the water is maintained at a constant level and "water hammer" or chattering in the feed pipes is prevented.

Our invention consists in certain novel features of our improvements as will be hereinafter fully described.

Referring to the drawing:—Figure 1 is an elevation partly in section showing an embodiment of our improvements applied to a steam generator, and Fig. 2 is a detail hereinafter referred to.

In the accompanying drawing, 1 represents the top of a boiler or steam generator, 2 the steam space, 3 the normal or working level of the generator, and 4 the ordinary or main feed pipe, which leads into the generator in the usual manner and is provided with an ordinary and suitable form of stop valve.

We have not deemed it necessary to show the feed pipe leading into the generator, nor the stop valve in said pipe, as these parts and their arrangement are well known to engineers and form no part of our invention.

In carrying out our invention we secure over an opening made at a suitable position in the top of the boiler 1, a saddle or hollow casing 5, preferably cylindrical in section and suitably flanged at each end. Extending down through the casing 5 into the steam space 2 of the generator, is a hollow chamber 6 flanged at its upper end as at 6' and secured in position on the upper end

of the casing or block 5 by a hollow cap or cover 7. Leading from the cap or cover 7 is a branch pipe 8 connecting the interior of the regulator with the main feed pipe 4. A suitable stop and check valve 9 is provided in the branch pipe 8 to enable the regulator to be put out of action when desired. The upper end of the hollow chamber 6 is provided with a valve seating 10 on which is adapted to rest, so as to normally close admission to said chamber, a suitable form of valve 11 provided on its underside with a vertical spindle 12 which extends down through a bush 13 in the bottom of the chamber 6 and projects a short distance beyond same. Near the bottom of the chamber 6 is an elbow pipe 14 leading therefrom and extending down below the normal or working water level 3 of the generator. Secured to or pivotally suspended from the bottom of the chamber 6 by an eye bolt 15, or other suitable means, is a balance lever 16, one arm of which is provided with a float 17 adapted to normally ride on the surface of the water in the generator, the other arm being provided with a balance weight or weights 18 to balance the lever and float. The lower end of the valve spindle 12 passes through an opening in the lever 16 and is provided with collars 12', 12², which embrace the lever.

The arrangement of the parts is such, as will be understood from the drawing, that so long as the water in the generator reaches the working level, the balance lever 16 will keep the valve 11 closed. Immediately the water level falls below the normal and the float 17 drops, the movement of the lever 16 will cause the valve spindle 12 to be raised, thus opening the valve 11 and admitting water to the generator, until the normal water level is reached, when the action of the float will cause the lever to close the regulator valve and shut off the water supply. The usual excess of pressure on the feed or upper side of the valve 11 assists in closing it against the boiler pressure.

Supported on the valve spindle 12, over the valve 11, we provide a loose shell or cover 19 perforated at intervals, as at 19'. The action of the perforated shell or cover will be understood by referring to Fig. 2, which shows the valve just about to close. As the valve spindle is drawn down by the lever 16 the feed pressure causes the loose

shell 19 to come into contact with the valve seat slightly in advance of the valve itself. This reduces the area of flow by an amount dependent upon the number and area of the perforations 19', so that when the valve itself reaches its seat, the flow has been partially checked and no "hammer" is caused. If only a small feed of water is required, the valve is only raised a short distance from its seat and the cap is not raised, being kept down by the pressure of the feed water. The feed water flows slowly through the small openings in the periphery of the cap, and the valve closes gently. When a large feed of water is required quickly, the valve and the cap are both raised, and the water flows rapidly in the feed pipe until the cap closes and reduces the speed of the flow so that the valve finally closes as gently as when a small feed of water is supplied.

The improved valve device is applicable to and may be advantageously employed in other forms or constructions of water regulators than that referred to.

It will be understood that the details of construction of our improvements may be varied if desired, and instead of arranging the valve 11 to be lifted up from its seat by the action of the float lever to admit water to the generator, the float lever may be arranged to open the said valve by pulling it

down from its seat, in which case a spring or springs might be provided to help to return the valve to its seat against the feed pressure.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

In a valve for a feed water regulator, the combination, with a casing provided with an inlet and an outlet and having also a valve-seat between the inlet and outlet, of a valve provided with a stem and operating to close the outlet, and a cap mounted to slide on the said stem above the valve and inclosing the said valve and provided with passages of collectively less area than the area of the opening through the valve-seat, said cap being raised by contact with the said valve after the said valve is opened and descending automatically onto the said valve seat to reduce the flow of water before the valve is closed.

In testimony whereof we affix our signatures in the presence of two witnesses.

JOHN EDWARD SHAW.

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