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Robert Berryman, assr. etc., *Feed Water Regulator for Steam Boilers.*

No. 118,679.

Patented Sep. 5, 1871.

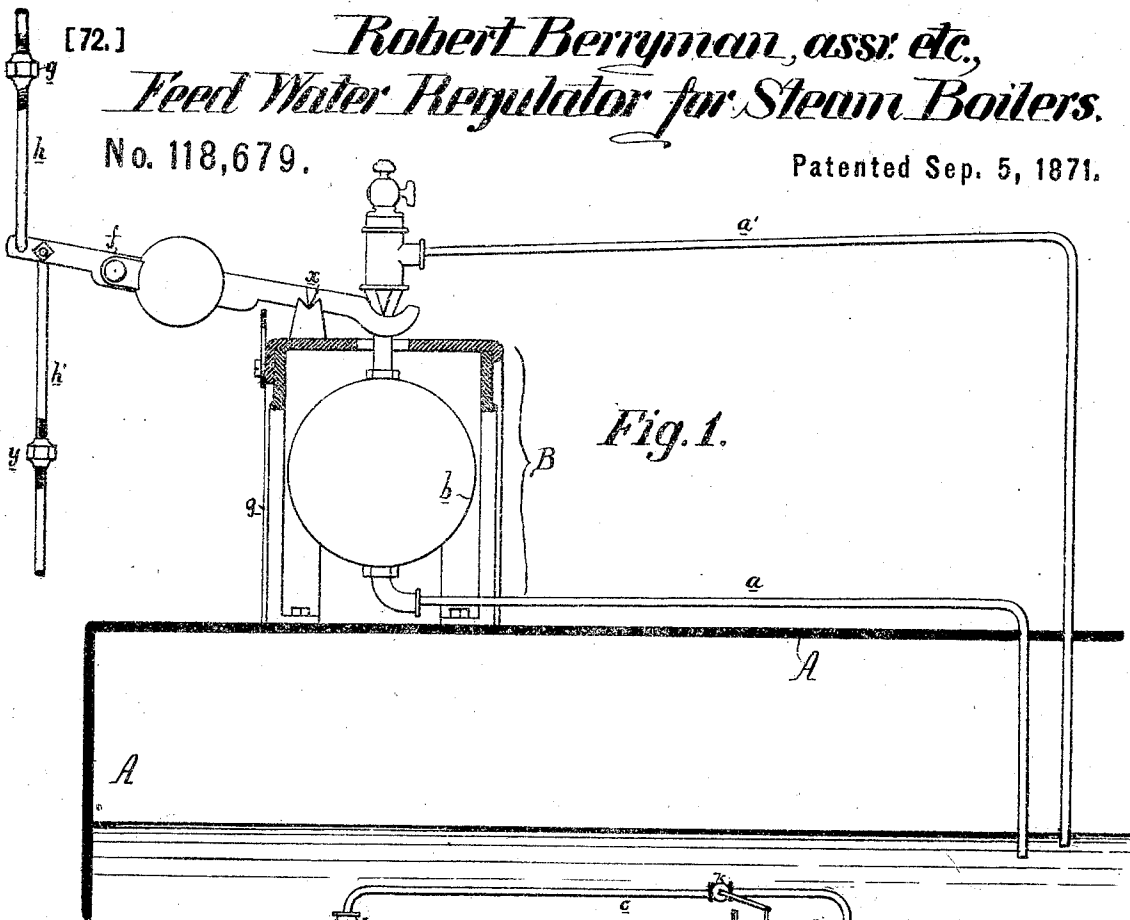


Fig. 1.

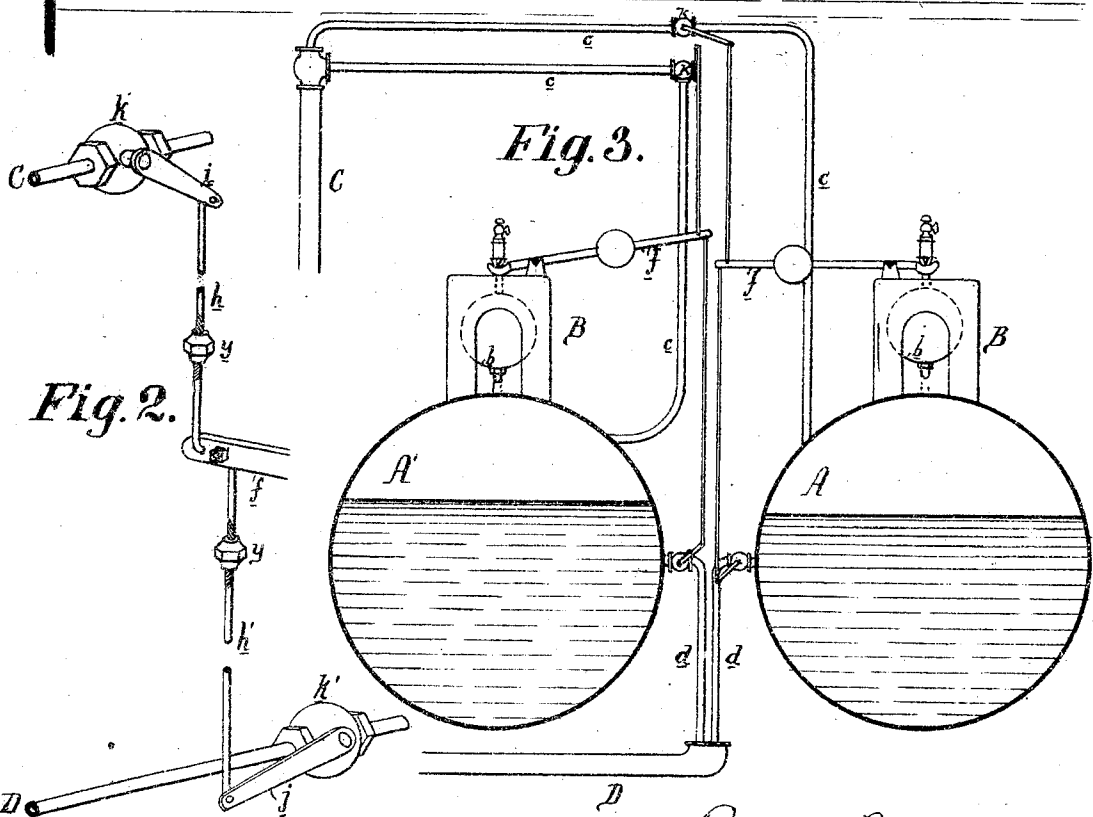


Fig. 3.

Fig. 2.

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ROBERT BERRYMAN, OF HARTFORD, CONNECTICUT, ASSIGNOR TO "THE BERRYMAN REGULATOR AND ALARM COMPANY," OF SAME PLACE.

IMPROVEMENT IN FEED-WATER REGULATORS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. 118,679, dated September 5, 1871.

To all whom it may concern:

Be it known that I, ROBERT BERRYMAN, of Hartford, county of Hartford, State of Connecticut, have invented a Feed-Water Regulator for Steam-Boilers, of which the following is a specification:

My invention consists of a vessel situated outside of a steam-boiler, and controlled by the water and steam within the same, in combination with a valve or cock for regulating the admission of steam to the pumping-engine or injector which supplies the boiler, and with a valve or cock for regulating the supply of water to the boiler; and also in combination with intervening mechanism, whereby the movements of the said valves or cocks are dependent on those of the vessel, all of which will be fully explained hereafter.

Figure 1 is a sectional view of a low-water indicating apparatus connected with the steam and water-pipes of a pumping-engine in accordance with my invention; Fig. 2, a perspective view of a portion of the same; and Fig. 3, a diagram illustrating the invention as applied to two boilers.

On reference to Fig. 1, A represents a portion of a steam-boiler, and B a low-water indicating apparatus attached to the top of the said boiler. This apparatus is similar to that for which Letters Patent were granted to me on the 25th day of January, A. D. 1870; and consists of two flexible pipes, *a* and *a'*, communicating with the interior of the boiler at points below and at the extreme low-water level, and connected at their outer ends to a vessel or receiver, *b*, suspended from the short arm of a weighted lever, *f*, which has its fulcrum at *x* on a suitable frame, *g*, attached to the top of the boiler.

The vessel *b* is controlled in its movements by the height of the water in the boiler, the contents of the vessel being discharged into the boiler through the pipe *a* when the water is at its lowest level, the said vessel being then overbalanced and raised by the action of the weighted lever *f*, and being again filled with water and overbalancing the lever when the water-level in the boiler is raised. The vessel *b* and its weighted lever during their movements furnish sufficient power to operate the valves or cocks in the steam and discharge-pipes of a pumping-engine for supplying the boiler with water, as I will now proceed to describe. Two connecting-rods, *h* and *h'*, Figs. 1 and 2, are connected to the long arm of the lever *f* and to the operating-arms *i* and *j* of two valves

or cocks, *k* and *k'*. The valve *k* is arranged upon the steam-pipe C of the pumping-engine, and the valve *k'* upon the feed-water pipe D, leading from the pump to the boiler. When the weighted end of the lever *f* descends in consequence of the low level of the water in the boiler, the valves *k* and *k'* will both be opened, the feed-pump started, and water forced into the boiler until it reaches the desired height, and as soon as the end of the lever *f* is raised in consequence of this increased height of the water in the boiler, the valves *k* and *k'* will be closed and the motion of the feed-pump stopped.

The diagram, Fig. 3, represents the application of my invention to two adjacent boilers to be supplied with water by a single feed-pump. Each of the boilers has an indicating apparatus, B, with vessel, weighted lever, &c., complete, and each weighted lever is connected by rods to a valve, *k*, in a branch steam-pipe, *c*, leading from its own boiler to the main steam-pipe C of the feed-pump, and to a valve, *k'*, in a branch feed-water pipe, *d*, leading from the main pipe D to its own boiler. When one of the boilers, the boiler A, for instance, needs replenishing with water, its apparatus B will be operated as before described, and the valves *k* and *k'* in its branch pipes will be opened so as to supply steam to the feed-pump, and enable the latter to force water into the boiler, and these valves will be automatically closed, as before described, when the boiler is filled to the proper height. The boiler A' may be replenished in a similar manner independently of the boiler A, or both boilers may, when necessary, be filled at the same time, both boilers in this latter case furnishing steam for the supply of the pump, as all of the valves will be opened at once.

It will be evident that three, four, or a greater number of boilers can be supplied as readily as two, with feed-water by a single-pump, all that is necessary being that each boiler shall be furnished with an indicating apparatus, B, and with branch pipes communicating with the main pipes C and D.

The connecting-rods *h* and *h'* are each made in two sections, threaded at the ends with right-and-left-handed screw-threads, and connected together by a similarly-threaded thumb-nut, *y*. This enables the rods to be lengthened or shortened as desired, in order to regulate the extent of the opening and closing of the valves. It also enables the feed-pump to be worked at a reduced

rate of speed, even when none of the boilers require replenishing, by permitting one or more of the valves *k* in the steam-pipe to remain slightly opened, as under some circumstances it would be objectionable to entirely stop the pump.

It will be evident that by a slight modification of the apparatus an injector could be substituted for the feed-pump.

I claim—

The combination of a pump or injector—a series of boilers, each provided with a low-water apparatus, a series of steam-pipes, C, and a series of feed-water pipes, D, each communicating with one of the boilers, and all communicating with the pump—and mechanism, substantially as de-

scribed, whereby the movement of each low-water apparatus will open or close simultaneously a valve in one of the pipes C and a valve in one of the pipes D, as set forth, so that the said pump will automatically supply all the boilers with water as they may require feeding, one or more at a time, as set forth.

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

ROBERT BERRYMAN.

Witnesses:

RUFUS N. PRATT,
SHERMAN W. ADAMS.