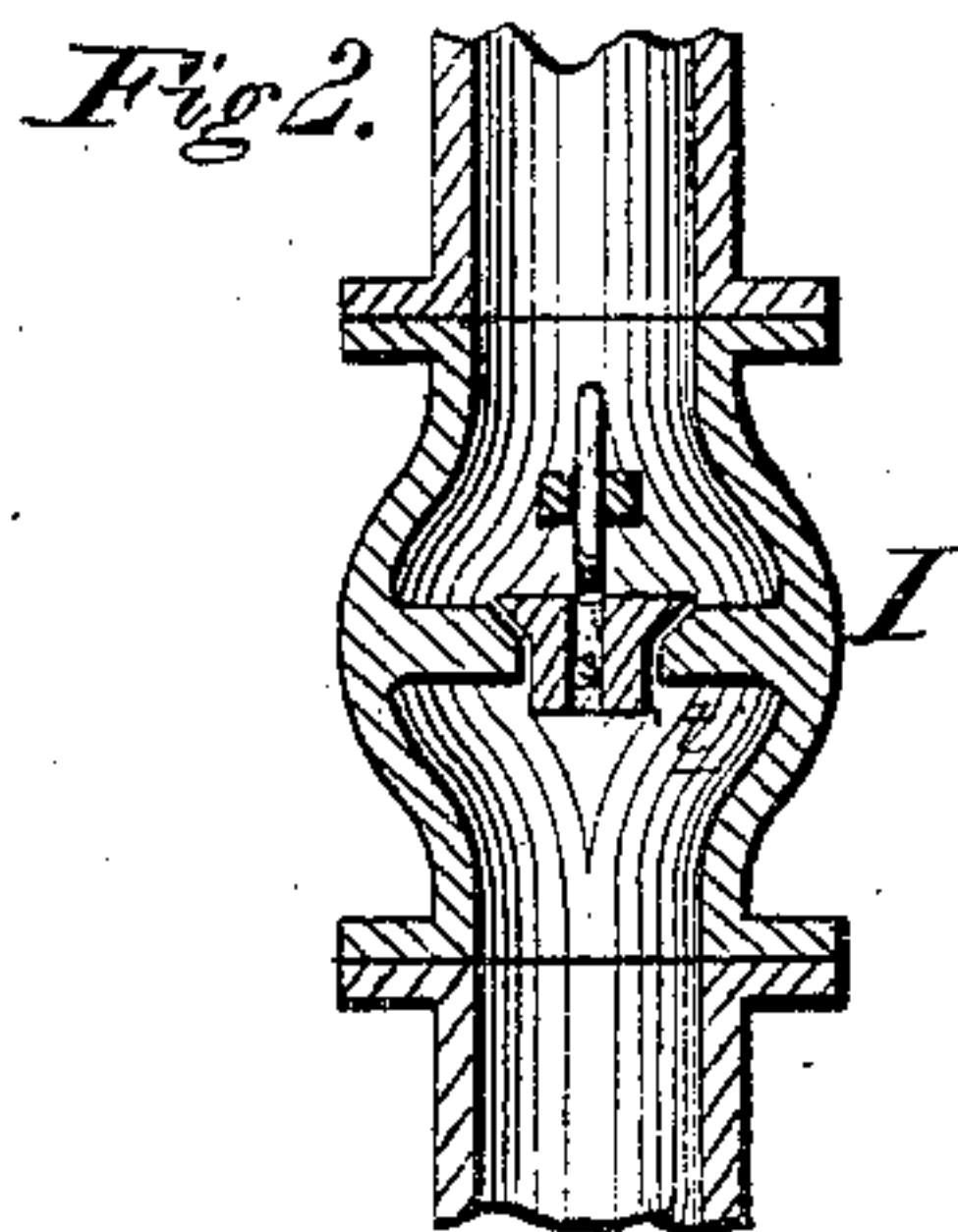
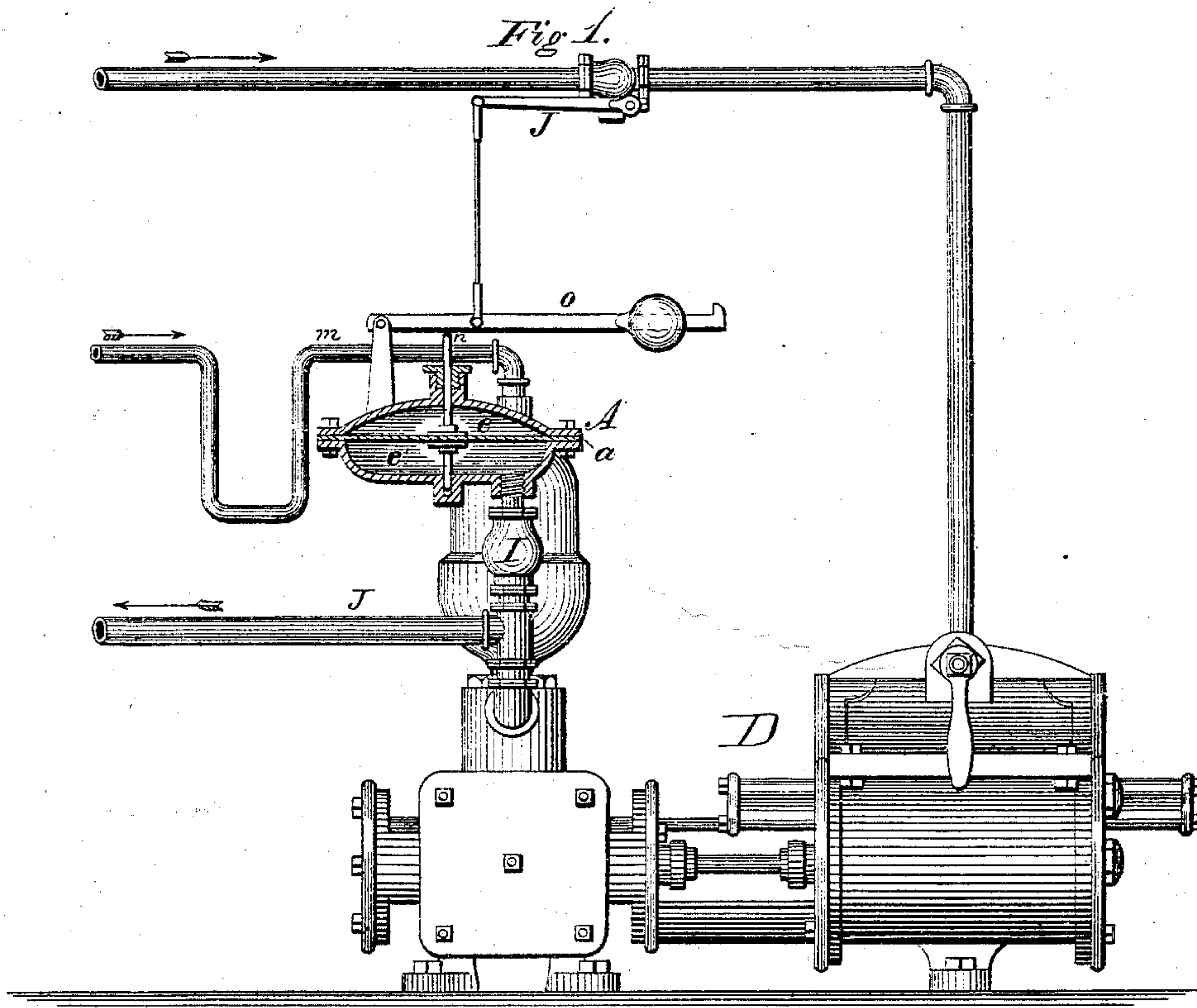


R. BERRYMAN.

Feed Water Apparatus for Steam-Boilers.

No. 135,757.

Patented Feb. 11, 1873.



Witnesses.

Edw. F. Brown

Edw. W. Down

Inventor.

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Hewson and Son

# UNITED STATES PATENT OFFICE.

ROBERT BERRYMAN, OF HARTFORD, CONNECTICUT.

## IMPROVEMENT IN FEED-WATER APPARATUS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. 135,757, dated February 11, 1873.

*To all whom it may concern:*

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

The object of my invention is to arrest or retard the action of a feed-pump supplying a series of boilers when, in consequence of the closing of one or more valves, the passage of water from the feed-pipe to the boilers is in whole or in part prevented. I accomplish this result by means of a "regulator," consisting of a casing, A, divided by a flexible diaphragm, *a*, into two chambers, *e e'*, one communicating with the boilers through a pipe, *m*, the other with the feed-pipe J at a point between the pump D and a valve or valves in branches of the feed-pipe leading to the different boilers. These valves may be connected to any suitable regulating apparatus, so as to be closed automatically as the boilers are filled.

A short shaft, *n*, connected to the diaphragm *a* extends through a stuffing-box at the top of the case A and bears against a weighted lever, *o*, connected with the throttle in the steam-pipe which supplies the pump. When, owing to one or more of the boilers having a sufficient supply of water, the feed-water regulator closes or partly closes the valve or valves in the pipes leading to the boilers, the pressure in the lower chamber *e'* is increased and the diaphragm is raised, elevating the lever *o* and closing or partly closing the throttle so as to arrest or retard the movements of the pump. Upon the valves being opened the pressure becomes equalized on both sides of the diaphragm which descends and opens the throttle.

I have found that when the chamber *e'*

communicates directly with the supply-pipe the momentary increase of pressure on each motion of the pump elevates the diaphragm, which descends quickly as the piston reaches the end of its stroke, imparting thus a continued intermittent motion to the throttle. To prevent this I insert in a case, I, in the pipe J, a check-valve, *t*, Figure 2, opening upward, and either having a slight "lead" or being bored through the center to form an opening, *s*. As the water is forced upward the valve rises, but falls quickly as the upward flow diminishes, so that the water above it can pass downward only through the opening *s*; so slowly as to prevent any sudden descent of the diaphragm.

I do not claim the casing and its flexible diaphragm and spindle, nor the combination of such a device with a valve operated by the movement of the diaphragm; but

I claim—

1. The regulating apparatus, consisting of a case, A, diaphragm, chambers, and levers, or its equivalent, in combination with a pump and with a series of boilers, all arranged substantially as described, so that the pressure of water in the pipe leading from the pump to the boilers is made the means of regulating the throttle, and of automatically retarding, stopping, and starting the pump, for the purpose set forth.

2. The combination, with the pipe leading to the chamber *e'*, of a valve, *t*, having a "lead" or opening, and operating as set forth.

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

ROBERT BERRYMAN.

Witnesses:

CHARLES E. FOSTER,  
EDM. F. BROWN.