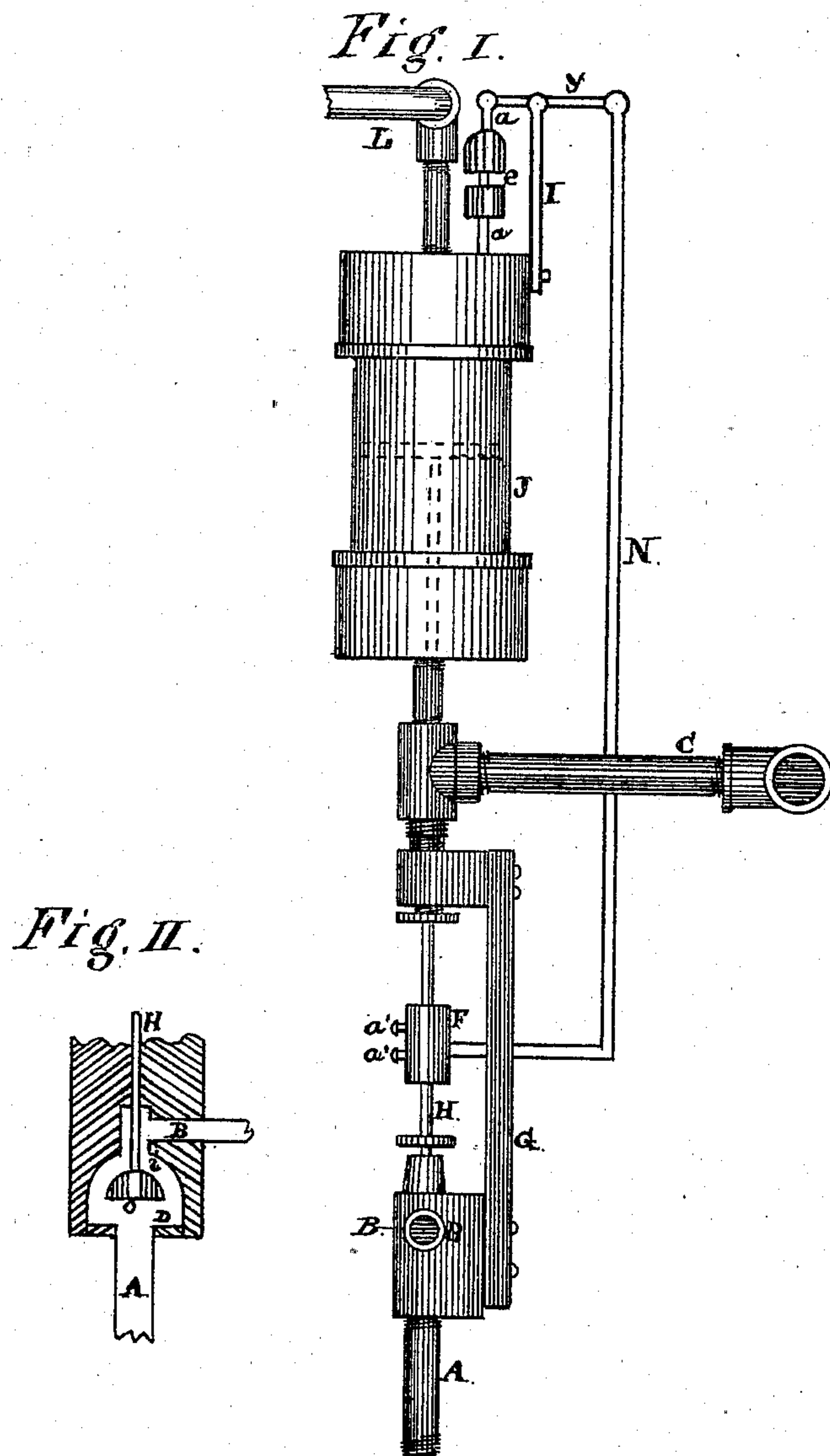


E. C. FERNALD.
Feed-Water Regulators.

No. 137,541.

Patented April 8, 1873.



Witnesses:
Charles Rogers
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN FEED-WATER REGULATORS.

Specification forming part of Letters Patent No. **137,541**, dated April 8, 1873; application filed January 8, 1873.

To all whom it may concern:

Be it known that I, EDWARD C. FERNALD, of the town of Flatbush, in the county of Kings and State of New York, have invented new and useful Improvements in Water-Governors for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

The object of my invention is to provide a sure and perfect water-governor to be attached or connected to steam-boilers that will govern the flow of water to the boiler with unerring certainty, and at the same time if any disarrangement occurs or accident happens to the force-pump an alarm will be immediately given, so that the attention of the fireman or engineer will be called at once to the fact that his pump is out of order and not working, thus giving him time and opportunity to repair the difficulty. The nature of my invention consists in the novel and peculiar construction and arrangement of a float upon which the water in the boiler acts, attached to which is a valve-rod that connects with a valve, which said valve is operated by the float through the medium of the water, being elevated and lowered as the quantity of water is varied in the boiler.

Figure I represents a side elevation of my invention, showing a section of the different water and steam pipes. Fig. II shows a longitudinal section of the valve and water seat.

Letters of like name and kind indicate like parts in each of the figures.

A represents the pipe leading to the water-supply either in a well or tank. The water is brought up through this pipe by means of a suction-pump, which is not shown in the drawing. B represents the orifice of a water-pipe, which said pipe in practice is made to connect with a pump, which connects with and forces the water into the boiler. The pipe C, as shown in the section of the drawing, connects with the boiler below the water-line and conducts the water into the float-chamber J. O is a valve made in the form of a hemisphere, on

the upper or spherical side of which is a valve-seat, *i*, upon which fits the spherical side of the valve. To this valve O is connected a valve-rod, H, which extends upward into the float-chamber and connects with the float. This float I make of light wood perforated with holes, in such a manner as to make air-chambers without destroying the strength or density of the float, and cover it with thin sheet-copper to prevent the water from penetrating to the wood, and make it as buoyant as possible. G represents a stirrup that supports and guides the valve-rod H, which keeps it in proper working condition. L represents the steam-pipe that connects with the steam-dome of the boiler, thus giving a free circulation of steam and water in and out of the float-chamber. N represents a rod that connects at its lower end with the valve-rod H, and extends upward, where it connects with an elbow-joint to a horizontal lever, *y*, that has a fulcrum on an upright pedestal, I. The other end of said lever *y* connects with a joint to the valve-stem *a*, and said stem is attached to a valve that operates the steam-whistle E. At F is represented a sleeve that forms a portion of the valve-rod H. This said sleeve is designed for the purpose of adjusting the length of the valve-rod, and the said sleeve is secured in its position upon the rod by means of set-screws *a' a'*.

The operation of my invention is simple and reliable, as will be readily seen from the fact that, the rod H being connected with the float, when the water in the boiler becomes low, the float settles down, thus carrying with it the rod N, which acts upon the end of the lever *y*, whose fulcrum is at the pivot-joint on the pedestal I, raises the other end of the said lever *y*, which raises the valve connected thereto, and allows the steam to escape into the whistle, thus giving the alarm that the water in the boiler is low, and timely notice for the attendant to repair the difficulty. It will also be seen that when a sufficient quantity of water has been forced into the boiler the float is raised, which carries with it the valve O until the said valve is brought hard to bear upon the seat *i*, when all further supply of water is cut off from

the boiler, and so remains until the water begins to get low by being carried off in steam, when the float again settles down, which again opens the valve, and again allows water to be supplied to the boiler.

By my invention a most perfect feed-water governor and low-water alarm is combined.

Among the advantages of my invention is the fact that it can be readily applied to any design of boiler and perform its functions with equal precision and accuracy at all times, cutting off excessive supplies of water to the boiler, and giving an immediate alarm or notice of any lack or want of water, if at any time the pump fails to do its work.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The water-pipe A provided with valve O, valve-stem H, and float in float-chamber J, combined with alarm *e* and alarm-rod N, all arranged and operating in the manner set forth.

2. The combination with the valve O and float with their connecting valve-rod H, in two parts, joined by the sleeve F provided with binding-screws for the ready adjustment of said rod as to length.

3. The alarm-rod N attached to sleeve F, combined with valve-rod H, so that the adjustment of said rod may be secured without changing the adjustment of the alarm-rod N.

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Witnesses:

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