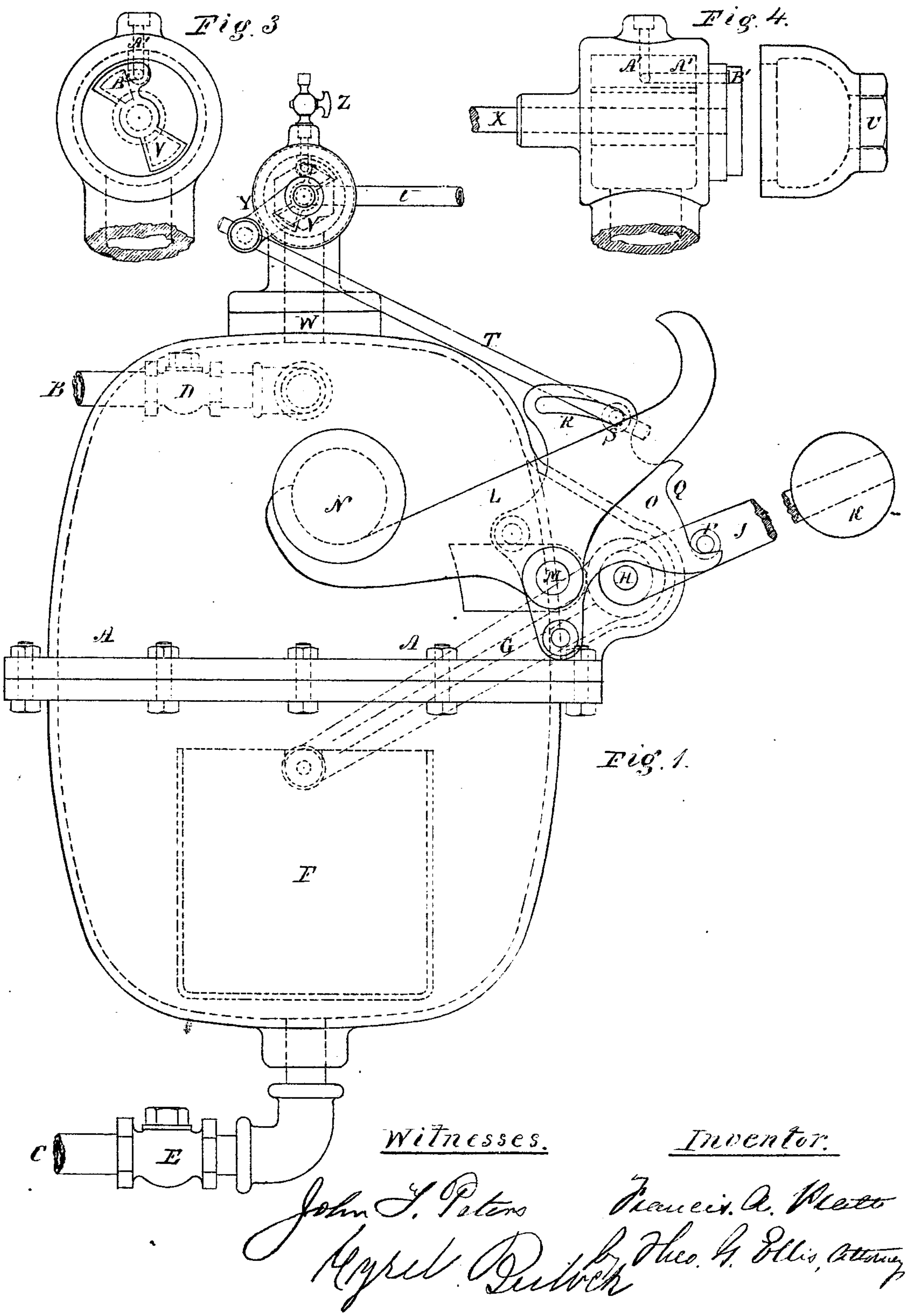
2 Sheets—Sheet 1.

F. A. PRATT.

BOILER-FEEDERS.

No. 183,817. Patented Oct. 31, 1876.



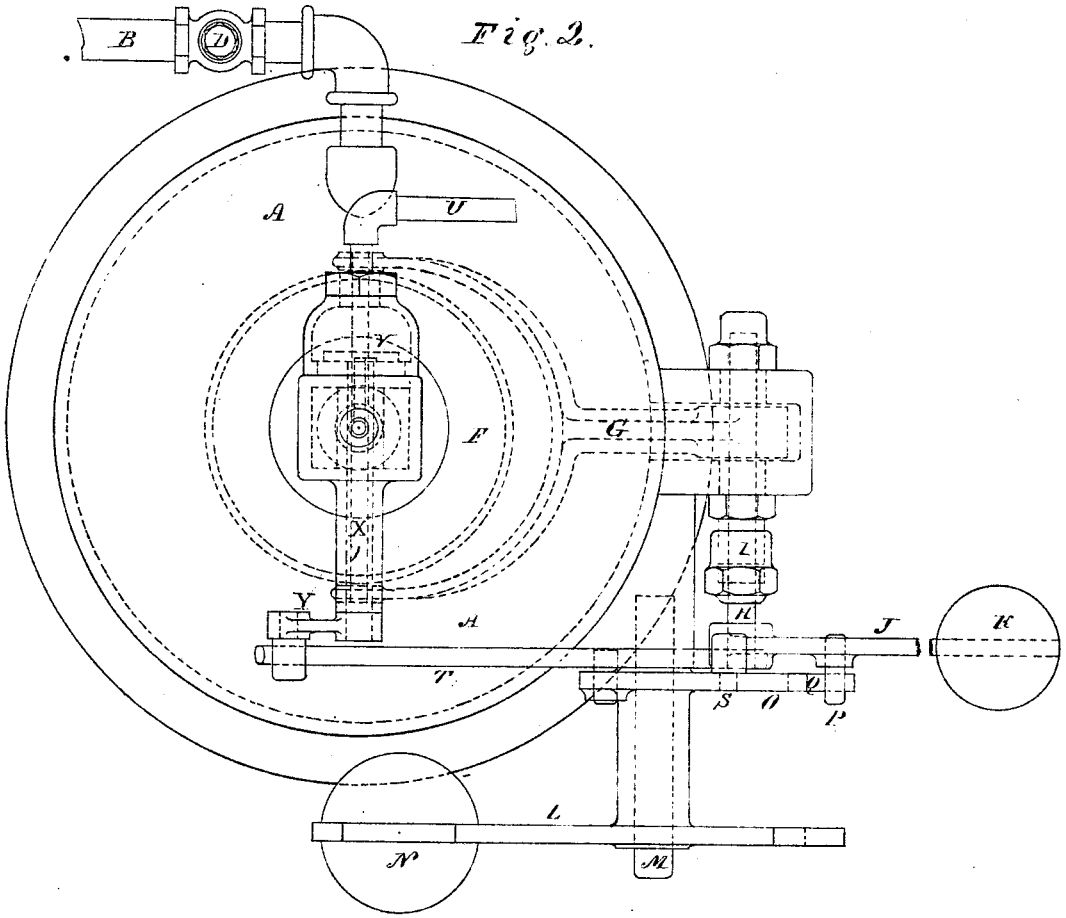
2 Sheets—Sheet 2.

F. A. PRATT.

BOILER-FEEDERS.

No. 188,817. Patented Oct. 31, 1876.

Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

FRANCIS A. PRATT, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN BOILER-FEEDERS.

Specification forming part of Letters Patent No. **183,817**, dated October 31, 1876; application filed July 31, 1876.

To all whom it may concern:

Be it known that I, FRANCIS A. PRATT, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Boiler-Feeders; and I do hereby declare that the following is a full, clear, and exact description thereof, whereby a person skilled in the art can make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Like letters in the figures indicate the same parts.

My invention relates to an apparatus for admitting water into a steam-boiler automatically, under any pressure of feed-water, or any pressure of steam in the boiler. My improved apparatus can be used for the purpose of maintaining a uniform height of water in the boiler, or it can be used as a steam-trap to return the drip or water of condensation from a series of steam heating pipes back to the boiler. My invention has for its object the production of a simpler and more surely operating mechanism for the accomplishing of this purpose than has heretofore been in use.

In the accompanying drawings, on two sheets, Figure 1 shows a side view of my improved boiler-feeder. Fig. 2 shows a top view of the same. Fig. 3 shows an enlarged front view of the valve for admitting and shutting off the steam. Fig. 4 shows a side view of the same, with the cap of the valve-chamber detached.

A is a closed reservoir, into which water is admitted through the pipe B, and is discharged through the pipe C. D is a check-valve in the pipe B, and E is a check-valve in the pipe C. F is a float in the interior of the reservoir A. It is attached to the inner end of the lever G, which is keyed onto a shaft, H, passing out of the reservoir through a stuffing-box, I. On the outer end of this shaft is the arm J, which carries the counterpoise K, for balancing the weight of the float F. L is a rocking lever turning upon the shaft M. Upon its top edge it carries the grooved ball N, which rolls to one end or the other, according as the lever is inclined to start it. O is a rocking arm or plate attached to the same axis as the rocking lever L, to which motion is communicated from the float F by means of the pin P on the arm J. This arm or plate O also operates the steam-valve V, as will be hereinafter explained. The plate O has an elongated notch or opening, Q, in which the pin P moves, and which permits the plate O to move a short distance independently of the arm J, while the latter remains stationary. The plate O also is furnished with the slot R, in which the pin S moves, and allows the plate O to move some distance without giving motion to the connecting-rod T, which throws the valve V. U is the steam-entrance, connected by a pipe with the boiler, through which the steam enters to the valve V, and passes downward through the pipe W to the interior of the reservoir A. V is a rotating or "butterfly" valve, resting on a flat valve-seat and covering two ports, as shown in the drawings. It is attached to the stem X, which passes out through a stuffing-box, and is connected by means of the crank Y to the rod T, from which it receives its motion. Z is a cock for opening and closing the passage A′, which reaches from under the valve V to the open air. Upon the under side of the valve is a channel or groove, B′, which opens a communication between the interior of the reservoir A and the passage A′, when the valve is turned so as to close the steam-ports. The cock Z is usually left open sufficiently to admit of the escape of the steam contained in the reservoir on the closing of the valve, but it may be shut when required.

The operation of my invention is as follows: In the drawing, the parts of the machine are in the position they assume when the water has finished discharging through the pipe C, and the valve has just been reversed to allow the reservoir to fill. The passage A′ to the atmosphere is open, and the steam-ports are closed. The contained steam first escapes, which removes the pressure from the interior at once. The water then enters through the pipe B, and gradually fills the reservoir. The float F rises, and the pin P pushes down the plate O, which turns the lever L and raises the weight N. When the top of L passes the horizontal position, the weight rolls to the other end and tips the bar L so that the opposite end of the slot Q rests upon the pin P. While the weight N is rising, the pin S re-

mains stationary, on account of the slot R, the opposite end of which strikes it just as the bar L tips, so that the sudden movement of the weight throws the valve by means of the rod T, and crank Y opens the steam communication with the boiler and closes the outlet A′. The steam-pressure upon the surface of the contained water now forces it out through the pipe C, and the float F descends.

The reverse of the operation above described now takes place. O is raised by the pin P, the bar L is tipped back again, the pin S passes to the other end of the slot R, and as the weight N rolls to the end of L, (shown in the drawing,) the sudden motion of L closes the valve V and opens the passage A′. The stop-pins O′ O″ are placed upon the plate O to strike upon the frame of the apparatus and prevent any jar to the valve or levers by the sudden motion of the bar L and weight N. In order to maintain the water at a uniform height in the boiler, the steamp-pipe U is carried to the desired level in the boiler. This admits steam when the water is below it, and shuts it off as soon as it rises above the required height. The pipe from the outlet C is carried into the boiler below the water-level.

When it is desired to use the apparatus to return water of condensation into the boiler as fast as it accumulates in the reservoir, independently of the level in the boiler, the steam-pipe from U is carried into the steam-space of the boiler, where it will always be above the water-line. It will be observed that the check-valves D and E prevent any reflux of water or steam through the apparatus.

What I claim as my invention is—

1. The combination of the plate O, with its slot Q and R, and the lever L with its rolling weight N, with the lever J of the float F, for the purpose of operating the valve V at the proper time, substantially in the manner herein set forth.

2. The combination in a boiler-feeder, of a valve, V, for alternately opening and closing the steam-pipe U, and which opens an exhaust-port, B′, communicating with the chamber A when the main pipe U is closed, with an alternately filling and discharging chamber, A, substantially as herein described.

FRANCIS A. PRATT.

Witnesses:

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