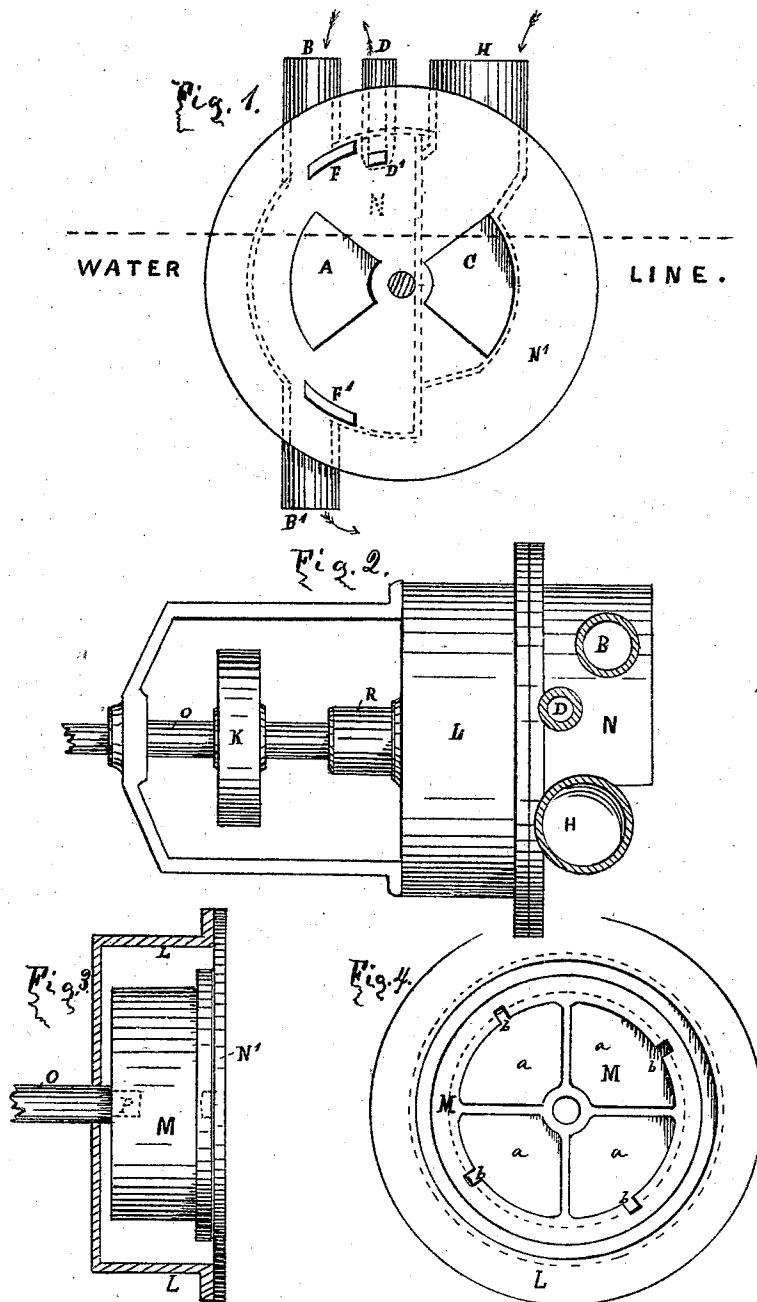


P. T. BROWNELL.
Water-Feed Devices.

No. 147,365.

Patented Feb. 10, 1874.



WITNESSES.

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IMPROVEMENT IN WATER-FEED DEVICES.

Specification forming part of Letters Patent No. **147,365**, dated February 10, 1874; application filed September 12, 1873.

To all whom it may concern:

Be it known that I, PHILIP T. BROWNELL, of Elmira, in the county of Chemung and State of New York, do hereby declare that the following is a full and exact description of a Water-Feed Device of my invention, reference being had to the accompanying drawings and to the letters of reference marked thereon.

In the accompanying drawings, Figure 1 is a vertical section, showing the internal construction of the part N of Fig. 2. Fig. 2 is a plan of the feed device complete. Fig. 3 is an exterior view of the bucket-wheel contained within the case L of Fig. 2, and Fig. 4 is a plan of the same.

The device is attached to the boiler at any convenient point by means of pipes uniting with B B'. The water-line (shown in Fig. 1) should correspond with that which it is desired to maintain in the boiler.

In Fig. 1 the dotted lines show the internal arrangement of chambers and parts for receiving the water, and finally delivering it to the boiler. The parts L and N of the device are separated from each other by a partition, the face of which is shown in Fig. 1, represented by N', and serves as a seat for the bucket-wheel M, Fig. 3. The openings in the partition at A and C register, alternately, with the buckets of the bucket-wheel M, which is inclosed in the steam-drum L, as shown in Figs. 3 and 4. The bucket-wheel M is operated by means of a shaft, (shown in Fig. 2,) to which a pulley or gear-wheel is attached, to receive positive motion. The shaft works through a stuffing-box in the steam-drum L. The end attaching to the bucket-wheel M inside the drum L is made to fit loosely, in order that the bucket-wheel may adjust itself freely to its seat on the face of N', Fig. 1. The water to be fed to the boiler passes into the pipe H from a tank, or some point elevated above the feed, thence through the opening C into one of the buckets *a* of the revolving bucket-wheel M, and is carried around to the opening A and delivered into the chamber N, which communicates freely with the water of the boiler, through the pipe B', and with the steam of

the boiler through the pipe B. If the boiler should be filled so as to rise in the chamber N above the top of the opening A, no water will be delivered to the boiler; but if the water is at or below the water-line, then the water in the bucket is delivered without injecting force, and the bucket is, to the same extent, filled with steam at equal pressure with that of the boiler; it then passes on, to be again filled with water. It will be seen, however, that if the steam in this bucket is retained at its high pressure until it reaches the opening C from the pipe H, the steam will force the water back in the pipe H, and the filling of the bucket with water will be uncertain, and a pounding on the condensing of the steam is caused. To overcome this, I make an opening, *b*, in the rim of the bucket-wheel for each bucket, which opening registers with the port D' of an exhaust-pipe, D, Fig. 1. This leaves in the bucket only a small portion of steam at the pressure of the atmosphere, which, when the bucket reaches the water-entrance C, is quickly condensed, and the bucket is filled with water, the amount of steam condensed aiding in heating the water before being carried into the boiler. The exhaust-pipe D D', relieving the bucket of its steam at high pressure before reaching the water-port C, is one of the important features of my invention.

As the bucket, which has been replenished with feed-water, is moved around upon its seat, the advanced edge begins to open at the lower part of the opening A, which is below the water-line, thus allowing the feed-water to mingle freely with the hot water in the chamber N of Fig. 1, and as soon as the advanced edge of the bucket rises above the water-line, it begins to fill with steam, leaving the water to find a common level with that of the boiler, and thus the surface of the water in the chamber N is left unbroken, so that in case cold water is fed no rapid condensing of steam will take place in the chamber N.

A reverse movement of the bucket-wheel for feeding the boiler should not be permitted, as it will be seen that the water-line would be changed to or below the lower part of the opening A, Fig. 1, thereby allowing the steam

to condense so rapidly upon the water as it discharges at the top of the opening A as to cause in the chamber N a constant variation of the water-line, and an unreliable supply of water to the boiler.

Steam is allowed to enter into the chamber of the drum L through the port F, and hot water from the boiler at same pressure through the port F'. The pressure, therefore, within the drum is slightly greater than that within the bucket-wheel. This holds the bucket-wheel

lightly to its seat without much friction, and keeps the bearings constantly lubricated.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the ports F F' with the drum L and the bucket-wheel M, for the purpose herein shown and described.

PHILIP T. BROWNELL.

Witnesses:

MERRITT GALLY,

NATHAN K. ELLSWORTH.