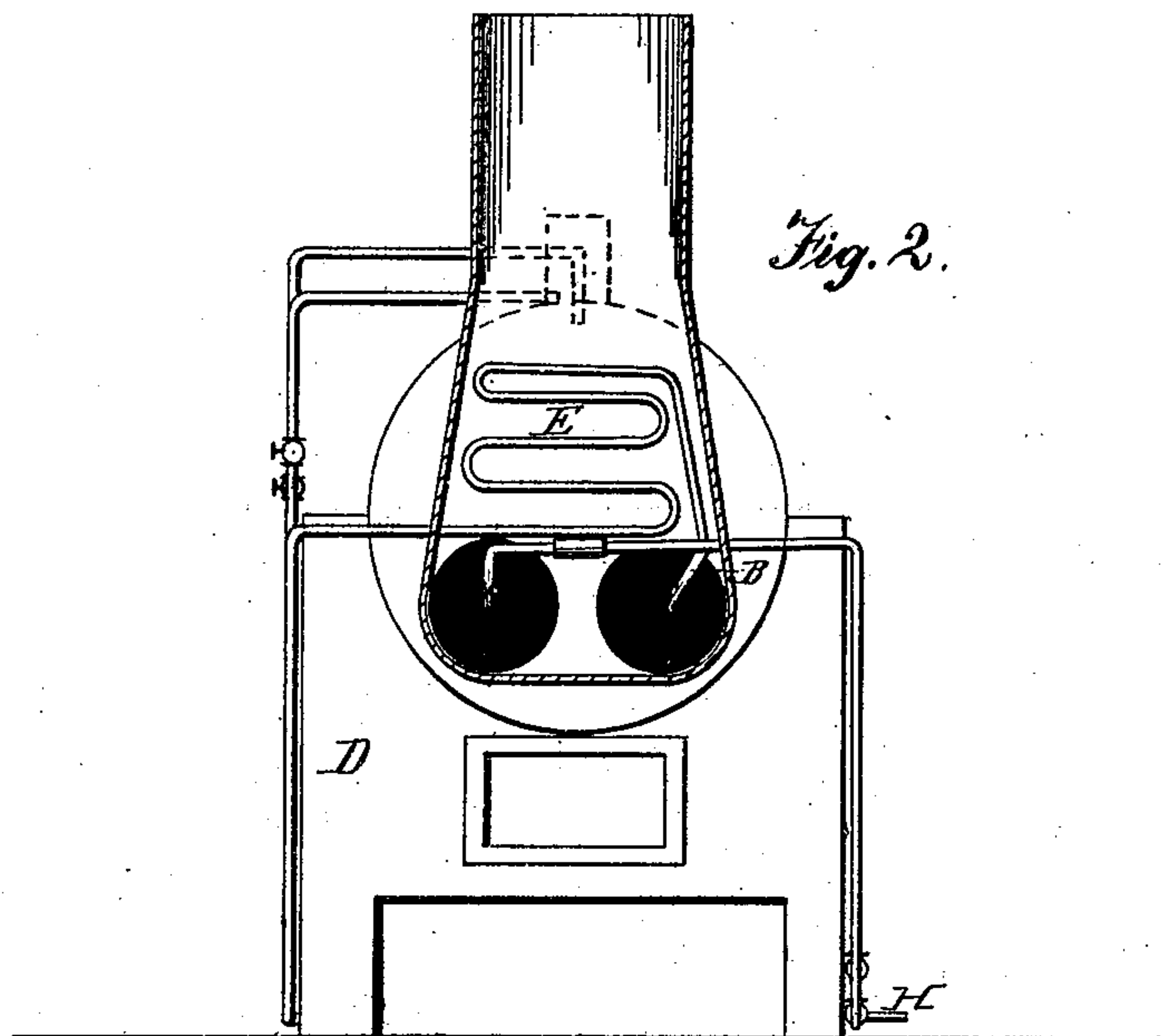
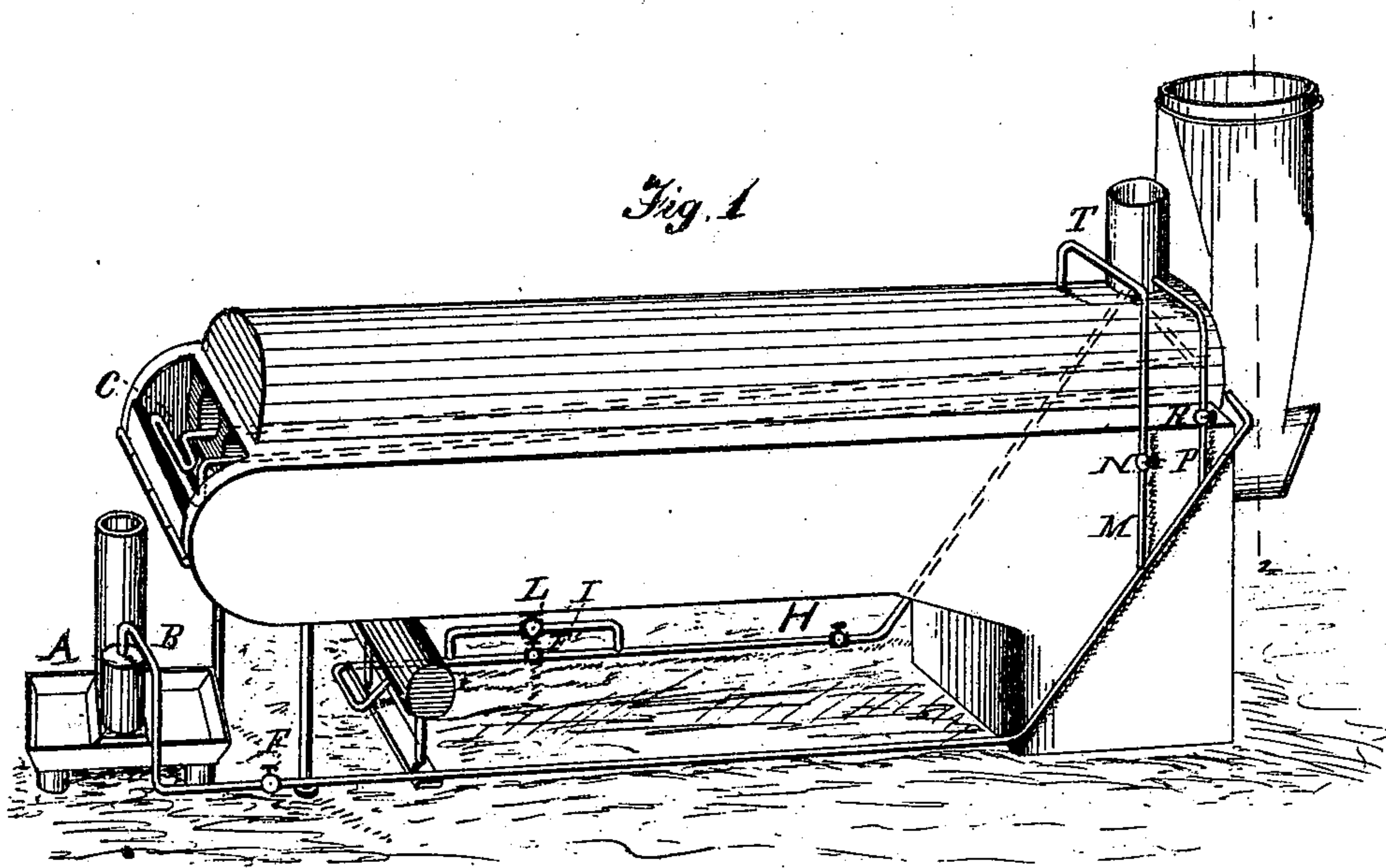


**M. CABBELL.**

## FEED-WATER HEATERS AND FEEDERS.

**No. 180,197.**

Patented July 25, 1876.



Witnesses  
Grenville Lewis  
Chas. C. Gill

Inventor  
Milton Cabell  
by his Attys.  
Leox and Leox

# UNITED STATES PATENT OFFICE

MILTON CABBELL, OF QUINCY, ILLINOIS, ASSIGNOR TO HIMSELF, JOHN M. CABBELL, WILLIAM M. MEAD, AND ROBERT HANNA, OF SAME PLACE.

## IMPROVEMENT IN FEED-WATER HEATERS AND FEEDERS.

Specification forming part of Letters Patent No. **180,197**, dated July 25, 1876; application filed June 8, 1876.

*To all whom it may concern:*

Be it known that I, MILTON CABBELL, of Quincy, in the county of Adams and State of Illinois, have invented a new and useful Improvement in Feed-Water Heaters, of which the following is a specification, reference being had to the accompanying drawings.

The invention relates to an improved device for heating water before it enters a boiler, and is applied, in the present instance, to a steam engine.

The object of the invention is to economize fuel and avoid the expansion and contraction of boilers in which water is heated in the usual manner.

Figure 1 is a perspective view of a device embodying the elements of the invention. Fig. 2 is a sectional view through the line 1 2.

In the accompanying drawings, A represents a force-pump of suitable construction, from which passes the tube B, supplied with valves, as hereinafter indicated. This tube extends downward, thence rearward, below and to one side of the fire-box D, until it nearly reaches the end thereof, where it is deflected upward, and enters the breeching or smoke-box, in which it is formed into a vertical coil, E.

From the coil the pipe B extends forward through one of the flues, forming a coil, C, in the smoke-box, and thence extending rearward through the other flue, and emerges from the opposite side of the chimney, is deflected downward, and carried forward until it reaches a point opposite the feed-water tank, where it is bent inward, and then curved upward, so as to enter the tank from below.

It is obvious that water in the pipe B will be heated in a very short space of time after the fire is kindled in the furnace.

The check-valve F is provided a short distance from the pump, to prevent the reflux of water into the same when the pump is idle. The outlet-valve H is provided on the other side of the tube, to afford an escape for the water when the pump is not working, or when it is desired to drain the pipe B, or when the pipe is being filled before the fires are lit, so as to chill it and prevent its burning. The valve H is only used while getting up steam, and regulates the flow from the tank.

Adjacent the feed-water tank is provided the check-valve F', the purpose of which is to retain the water in the boiler when it is desired to empty the pipe B. Above the valve F' is supplied an auxiliary pipe, I, connecting the pipe B upon each side of the valve F', and furnished with the valve L, the purpose of which pipe and valve is to open communication when the pump is not working, so as to keep the pipe B full.

To the upward incline of the pipe B, first aforesaid, is secured one end of the pipe M, provided with the valve N, and having its other end extending into the crown of the boiler. The purpose of this pipe and valve is to relieve the pipe B of steam by discharging the same into the boiler when the pump is not operating.

Beyond the pipe M another pipe, P, is connected with pipe B, and has a valve, R, and is connected with the cold-water tank T. The purpose of this tank is to supply the pipe B with water before steam is raised, and to do this it is only necessary to open the valve R, which permits a current of water to flow through the tube.

The operation of the device will be obvious from the above description of its parts.

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

1. The pipe B, having the coils C and E and valves F H F', auxiliary pipe I, and valve L, substantially as and for the uses specified.
2. The pipe B, provided with the valve H and coils C E, in combination with the pipe P, valve R, and tank T, as set forth.
3. The pipe B, provided with the pipe M, which enters the steam-space of the boiler, and is furnished with valve N, in combination with pipe P, provided with valve R, substantially for the purpose set forth.

In testimony that I claim the foregoing improvement in feed-water heaters, as above described, I have hereunto set my hand this 20th day of May, 1876.

MILTON CABBELL.

Witnesses:

BERNARD ARNTZEN,  
CHARLES J. ZIMMERMAN.