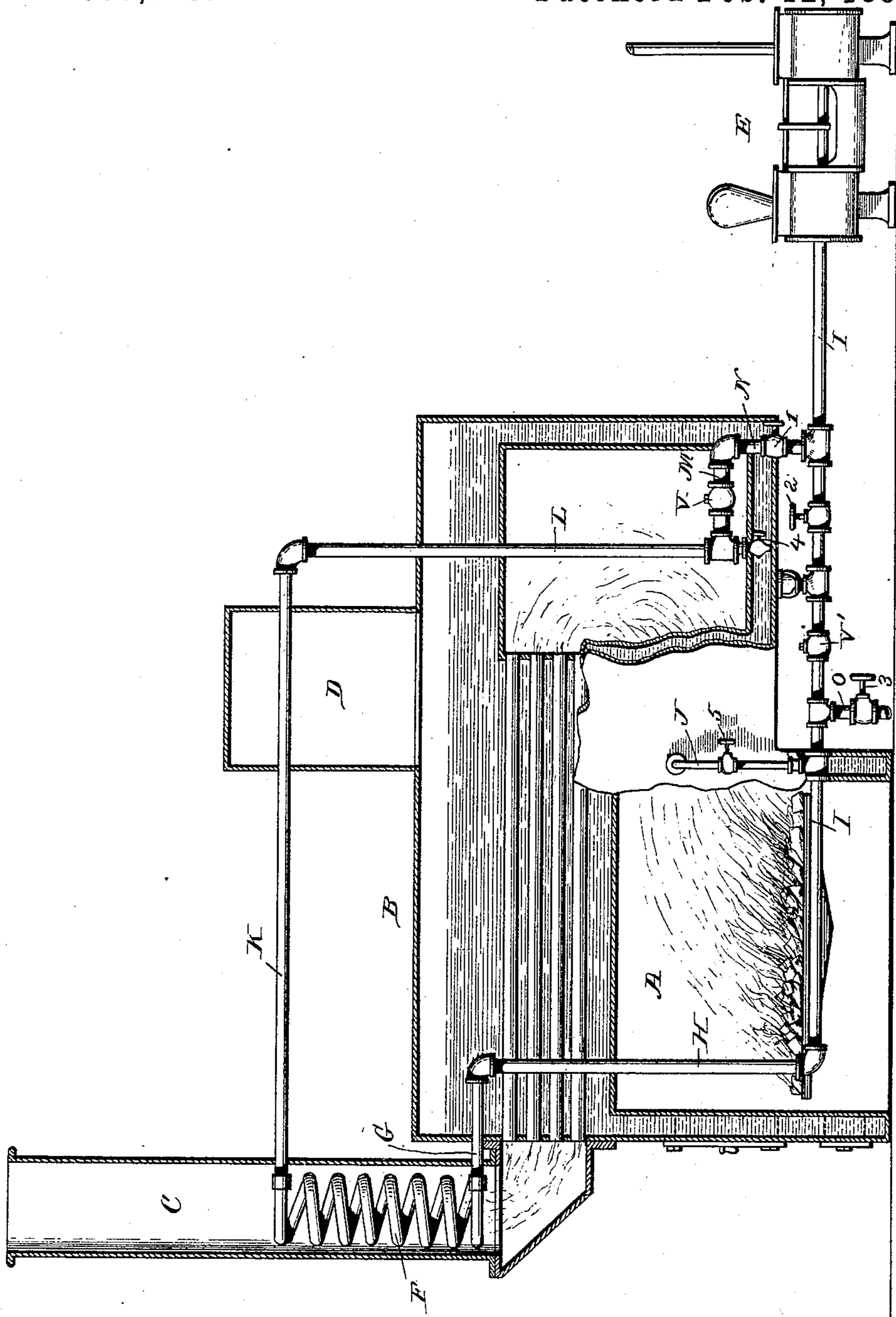


(No Model.)

W. NOBLE.  
FEED WATER HEATER.

No. 397,870.

Patented Feb. 12, 1889.



Witnesses,

*Albert Spidew,*  
*Robert Luens.*

Inventor,

*William Noble.*

By His Attorneys,

*Anderson & Myers.*

# UNITED STATES PATENT OFFICE.

WILLIAM NOBLE, OF MILWAUKEE, WISCONSIN, ASSIGNOR OF ONE-HALF TO  
WILLIAM H. WOLF AND THOMAS DAVIDSON, BOTH OF SAME PLACE.

## FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 397,870, dated February 12, 1889.

Application filed July 27, 1888. Serial No. 281,217. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM NOBLE, a citizen of the United States of America, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Feed - Water Heaters, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to that class of feed-water heaters wherein the waste products of combustion are utilized to raise the temperature of the water before the water is admitted to the boiler, and particularly to that class of heaters having a coiled water-pipe located within the smoke-stack or chimney.

The invention will first be described in connection with the accompanying drawing, and then pointed out in the claims.

The accompanying drawing is a longitudinal section of a furnace and boiler of ordinary construction with my invention applied, the boiler-flues and water-pipes and pump being in elevation.

Referring to the drawing, A represents the furnace, B the boiler, C the chimney or stack, D the dome, and E the pump, all of any ordinary construction.

F represents the water-coil, located in the furnace stack or chimney as low down as possible without interfering with the cleaning of the boiler-flues, and low enough so that its lower end will lie below the water-line in the boiler.

Connected with the lower end of the coil is a pipe, G, which leads out through the stack and to one side of the boiler, where it joins a vertical pipe, H, extending down alongside the furnace, the latter pipe in turn connecting with the horizontal main pipe I, leading from the pump, located, preferably, in rear of the boiler. At any suitable point on the main pipe I, I connect the feed-pipe J, which enters the boiler at any desired distance below the water-line.

From the upper end of the coil a horizontal pipe, K, leads out through the stack and to one side of the boiler nearly to its rear end, where it joins onto a vertical pipe, L, to the lower end of which is connected a short horizontal pipe, M, which in turn is connected to

a short vertical pipe, N, in open communication with the main pipe I.

In order to govern the flow of water through the various pipes and to constantly maintain water in the coil, I locate the valves as follows: I provide pipe N with a globe-valve, 1, and place a check-valve, V, in pipe M. I also provide pipe I near pipe N with a globe-valve, 2, and in this pipe, between valve 2 and the feed-pipe J, I locate another check-valve, V'. Between check-valve V' and the feed-pipe I connect a drip-pipe, O, which I provide with a globe-valve, 3, and for the purpose of draining pipe L, I provide it at its lower end with a drip-cock, 4. The feed-pipe J also is provided with a globe-valve, 5.

The operation of my invention is as follows: In order to feed water to the boiler through the coil, globe-valve 2 is closed and globe-valves 1 and 5 are opened. Then, when the pump is put in operation, the water will be forced up through pipes N, M, L, and K and into the coil F, from which it will flow through pipes G, H, I, and J into the boiler. Of course, as soon as the pumping ceases the check-valve V will close and hold the water above it, when, should there be no pressure of steam in the boiler, the water will flow through the coil until the water-level is the same in the boiler and coil. On the other hand, however, when there is steam-pressure the water will be thereby forced backward in the coil and over into pipes K and L, thus keeping them, as well as the coil, full of water all the time that steam is up.

If at any time a direct feed would be desirable, the boiler may be fed direct through pipes I and J by closing valve 1 and opening valves 2 and 5, as will be apparent, in which case the coil and its connected pipes will be kept supplied with water by the means above indicated.

The whole system of pipes may be drained by opening valves 3 and 4.

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

1. The combination, with the smoke-stack or chimney, the boiler, and the pump, of the coil so located in the stack or chimney as that its lower end will be below the water-line in

the boiler, the main pipe leading from the pump, the feed-pipe connected with the main pipe and entering the boiler below the water-line, the pipes connecting the main pipe with  
5 the lower end of the coil, the pipe-connection placing the upper end of the coil in communication with the main pipe between the pump and the feed-pipe, a check-valve located in said pipe-connection, and a globe-valve lo-  
10 cated in the main pipe between the feed-pipe and the pipe-connection, for the purpose set forth.

2. The combination, with the smoke-stack or chimney, the boiler, and the pump, of the  
15 coil so located in the stack or chimney as that its lower end will be below the water-line in the boiler, the main pipe provided with a globe-valve and a check-valve between the

feed-pipe and pump, the pipes connecting the main pipe with the lower end of the coil, the  
20 feed-pipe connected to the main pipe and entering the boiler below the water-line, and a series of pipes connecting the upper end of the coil with the main pipe between the globe-  
25 valve in said main pipe and the pump, one of the pipes of said series being provided with a check-valve and another with a globe-valve below the check-valve, for the purposes set forth.

In testimony whereof I affix my signature in  
30 presence of two witnesses.

WILLIAM NOBLE.

Witnesses:

THOMAS W. SHERIFF,  
JOHN S. T'AMBLE.