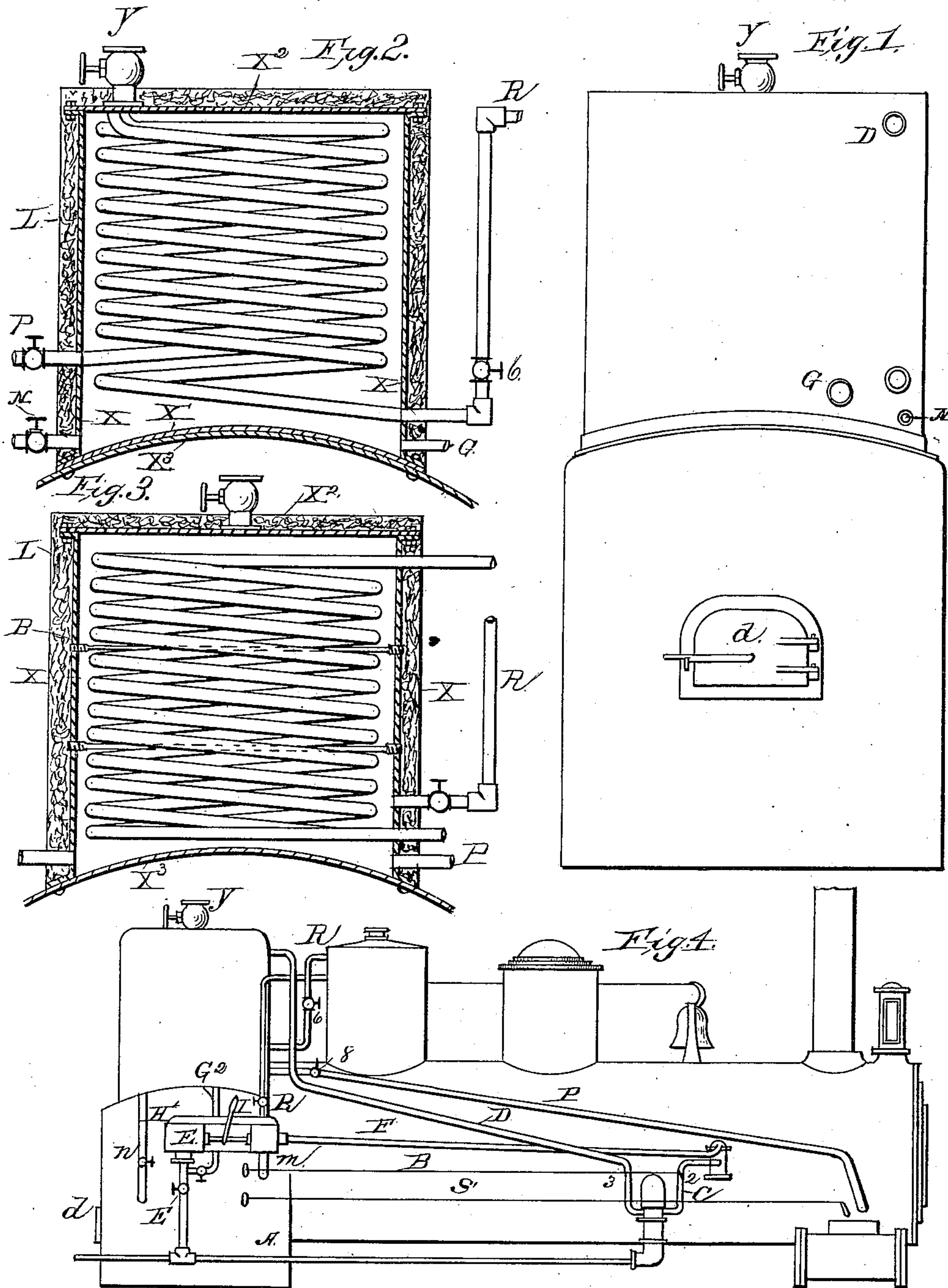


(No Model.)

O. ROTHROCK.  
FEED WATER HEATER.

No. 334,197.

Patented Jan. 12, 1886.



Witnesses  
Harry J. Lohm  
John Enclos Jr.

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his Atty's



# UNITED STATES PATENT OFFICE.

OSCAR ROTHROCK, OF NEW YORK, N. Y.

## FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 334,197, dated January 12, 1886.

Application filed November 10, 1885. Serial No. 182,374. (No model.)

*To all whom it may concern:*

Be it known that I, OSCAR ROTHROCK, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Feed-Water Heaters for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is an end view of a boiler with my heater in position. Fig. 2 is a sectional view of the heater, showing the live and exhaust steam pipes. Fig. 3 is a modification in which the top of the boiler forms the bottom of the heater; and Fig. 4 is a side view of a locomotive, showing my heater in position and its connecting-pipes.

This device is an improvement upon that shown in my application filed June 9, 1885, Serial No. 168,167, September 8, 1885, Serial No. 176,519, and October 19, 1885, Serial No. 180,467.

My invention consists in permanently attaching the heater-shell to that of the boiler, the introduction of live and exhaust steam pipes into the heater, and other minor details, that will be hereinafter described, and pointed out in the claims.

The heater in the present application consists of shells  $x$   $x'$   $x''$   $x'''$ , for containing the water to be heated, the bottom being formed of a separate piece; but in certain cases the shell of the boiler may form the bottom, as shown in Fig. 3.

The shell or heater is riveted or bolted to the boiler by the flanges, either with or without the bottom, directly over the fire-box.

Within the shell are two sets or series of pipes for conducting live and exhaust steam independently or at the same time through the water to be heated.

The exhaust set of pipes  $P$  are supplied with steam from the exhaust-nozzle, which has within it a valve that is under control of

the engineer, which has been fully described in one of my applications heretofore mentioned.

The exhaust-steam passes through the pipe and out at the valve-opening  $y$ .

The steam set of pipes  $R$  are similar to the exhaust-pipes, and are provided with the valve 6, for controlling or shutting off the steam. These pipes can be used while running, but will be most in use when the locomotive is standing still, for at that time, while making short stops at a station, the surplus steam may be blown off through the heater, and the greater part of its heat utilized to heat the water. The valve  $y$  may be closed when using live steam alone, and thereby utilizing all of the heat of the steam that enters the pipes.

The shell of the heater is provided with a valved pipe,  $N$ , for drawing off the water in case of necessity for repairing, and also with a water-supply pipe,  $D$ , from the pump, and a supply-pipe,  $P$ , from the heater to the injector for feeding the boiler.

The top of the heater is bolted on, so that it may be readily removed for repairs or inspection within.

The heater is covered with some non-conducting material.

The sides of the heater are stayed with bolts  $B$ , which extend from one side to the other, the ends being enlarged and provided with screw-threads.

Fig. 4 shows the general arrangement of the heater when riveted or bolted over the fire-box on a locomotive-boiler, with the various pipes, pump, and injector connections.  $H$  is the heater;  $S'$ , rod to control valves 2 and 3.  $E$  is the injector;  $E'$ , extra injector-pipe;  $d$ , the usual fire-door; 8, valve in pipe  $P$ ;  $D$ , feed-water pipe from pump to heater;  $C$ , feed-water pipe from pump to boiler;  $B$ , rod controlling valve in exhaust-pipe in smoke-box;  $G''$ , hot-water pipe leading from heater to injector.

Having described my invention, what I desire to secure by Letters Patent, is—

1. In a feed-water heater, the combination of a shell riveted to and located over the fire-box of a boiler, with a series of live and ex-

haust steam pipes within the said shell, substantially as shown and described.

2. In combination with a boiler, a shell for a feed-water heater riveted thereto, and a series of coiled live steam and exhaust pipes, substantially as shown and described.

In testimony that I claim the foregoing as

my own I affix my signature in presence of two witnesses.

OSCAR ROTHROCK.

Witnesses:

FRANZ LIES,

DANL. HAGGERTY.