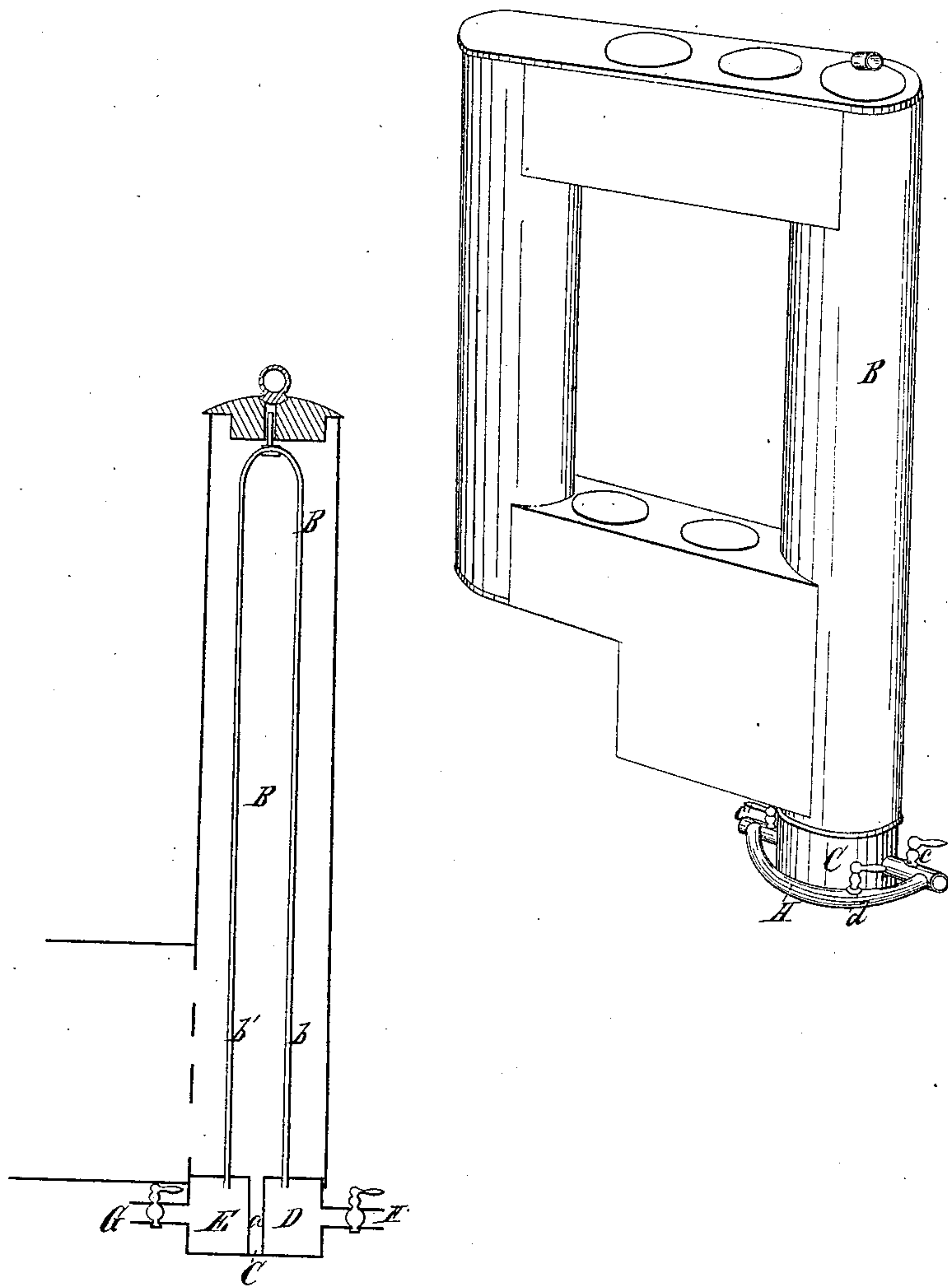


J. M. White,

Steam-Boiler Water-Heater.

N^o 25,296.

Patented Aug 30, 1859.



Witnesses:

L. D. Law
William C. Delamater

Inventor:

John M. White

UNITED STATES PATENT OFFICE.

JOHN M. WHITE, OF NEW YORK, N. Y.

FEED-WATER HEATER FOR STEAM-BOILERS.

Specification of Letters Patent No. 25,296, dated August 30, 1859.

To all whom it may concern:

Be it known that I, JOHN M. WHITE, of the city and State of New York, have invented a new and improved method or arrangement for heating the feed-water of steam-engines, and more particularly applicable to marine and low-pressure engines, and which from the locality where attached I call "the side-pipe heater;" and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon and making a part of this specification.

The drawings show the ordinary steam side pipe, and exhaust side pipe with their connecting steam chests—the exhaust side pipe being extended or continued downward to receive the part to be attached thereto, and constituting my invention for heating the feed water.

The steam and exhaust pipes, the steam chests &c. are all made in the usual manner; indeed the application and use of my invention renders no change necessary in any part of the working parts of the engine, and can be easily applied to any ordinary low pressure engine.

To the bottom or lower end of the exhaust side pipe B, instead of the ordinary cap or head, is bolted, or otherwise securely fastened a chamber C, having in it a vertical division or partition *a*, and thus dividing such chamber into two separate apartments D, and E. Into one of these apartments D, enters the supply pipe F, connected with the pump, and from the other apartment E, extends the pipe G, which feeds the water to the boiler. From the apartment D, also extend pipes *b*, *b*¹, more or less in number, which extend up to the upper end of the exhaust pipe B, and are then curved or bent, siphon like, and again descend through the same pipe B, and enter the other apartment E of the chamber C. The connection of such pipes with the chamber C, is by means of steam and water joints, so that there is no communication between them and the inside of the exhaust B. The partition *a*, of the chamber C, cuts off also all communication between the apartments of such chamber, except through the pipes *b*, *b*¹.

As soon as the pump is put in motion the water is forced through the pipe F, into the apartment D, and from thence up through

the pipes *b*, to the upper end of the exhaust pipe B, and then back through the pipes *b*¹, into the other apartment E of the chamber C, and from thence is conducted by the pipe G, to the boiler. While the engine is in motion, the escape steam is continually passing either into the upper or lower end of the exhaust side pipe B, from whence it passes into the condenser. The escape steam is thus continually in contact with and surrounds the pipes *b*, *b*¹,—the escape steam admitted at the upper end surrounding such pipes their entire length (the steam passing into the condenser from near the bottom of the pipe B,) and that entering at the lower end coming more directly in contact with the upper end of the chamber C, and the lower ends of the pipes *b*, *b*¹,—by means of which the feed water is heated while passing through such circuit, to about 135° Fahrenheit, so that it is delivered into the boiler heated, and thus much less fuel is required to convert it into steam. This arrangement also, either from the siphon shape of the tubes *b*, *b*¹, or because a vacuum is formed in them by the heated water or for some other reason, materially relieves or offsets the action of the pumps. That this is so, is proved by inserting a small pipe, with stop cock, into each of the apartments D, and E, of the chamber C. If the pipe from the apartment D—into which the cold water is received is opened, the water will discharge itself with scarcely any or but very little force; while on the other hand, if the pipe, leading from the apartment E—the heated water reservoir—is opened, the water rushes with a very considerable power.

To guard against any accidents which might happen from the pipes *b*, *b*¹, &c., being choked, injured &c., a connection should be made, outside, between the pipes F, and G, as shown by the pipe H, so that by closing the cocks *c*, *c*¹, and opening the cock *d*, water may be supplied to the boiler directly from the pump. This arrangement however is only a matter of precaution, and is not at all connected with the action of the steam and water pipes *b*, *b*¹.

A substitute for the compartments D, and E, may be made by using a head or cross pipe, into which the pipes *b*, *b*¹, may be brazed or tapped: and in the case of the use of two boilers, these apartments D, and E, may be subdivided so that there shall be a separate receiving and discharging apart-

ment and pipe for each boiler. Changes in form and arrangement may also be employed according to the circumstances of particular cases, without interfering with the principle of my invention and arrangement.

I do not claim the use of the exhaust or waste steam to heat the feed water of the boilers of steam engines.

10 What I claim as my invention is—
The arrangement of the division chamber

C, supply and discharge pipes F, and G, and heating pipes *b*, *b*¹ placed within the exhaust side pipe B, as described, in combination with the relief pipe H, by which, when necessary the water may be passed directly to the boiler without being passed through the heating pipes *b*, *b*¹. 15

JOHN M. WHITE.

Witnesses:

L. D. LAW,

WILLIAM G. DELAMATER.