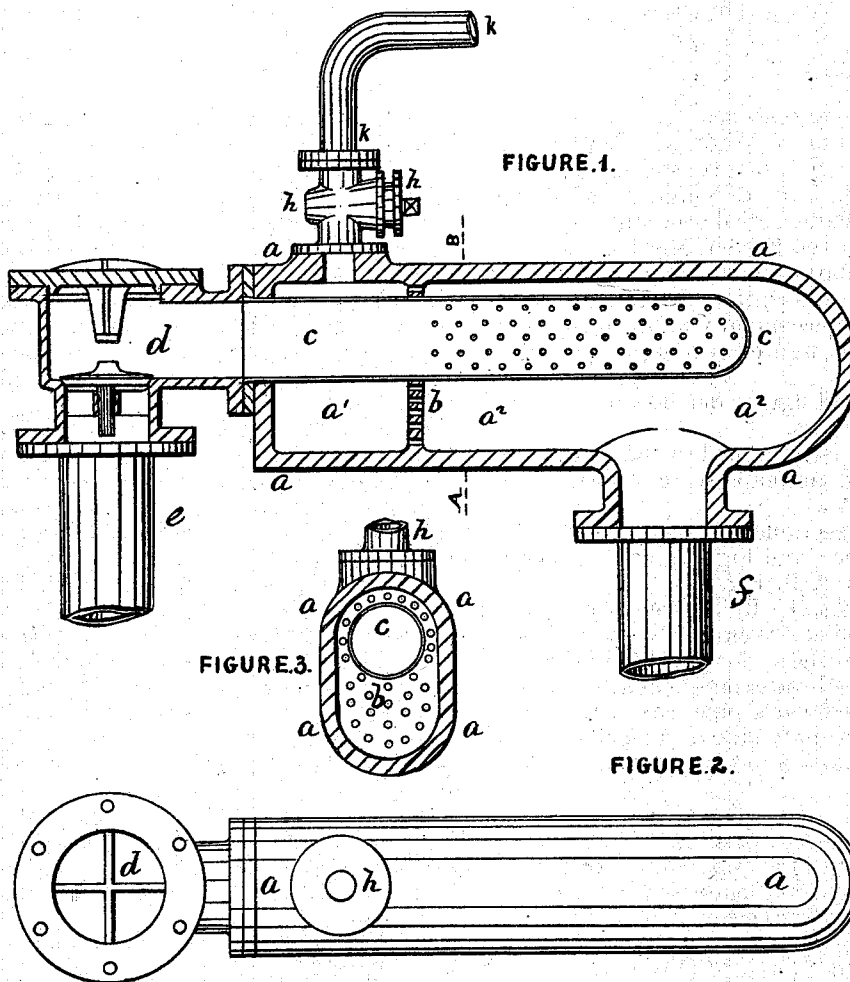


W. SAMBROOK.
Feed-Water Heaters.

No. 146,024.

Patented Dec. 30, 1873.



WITNESSES.
Frederick John Sheehy
John Hamilton Redmond

INVENTOR.
William Sambrook

UNITED STATES PATENT OFFICE.

WILLIAM SAMBROOK, OF LIVERPOOL, ENGLAND.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **146,024**, dated December 30, 1873; application filed July 7, 1873.

To all whom it may concern:

Be it known that I, WILLIAM SAMBROOK, of Liverpool, in the county of Lancaster, in that part of the United Kingdom of Great Britain and Ireland called England, have invented an Improved Feed-Water Heater; and I do hereby declare the following to be a full, true, and exact description thereof, reference being had to the accompanying drawings and to the letters and figures of reference marked thereon.

Like letters and figures denote similar parts in the various views.

My invention is contained in the object represented in the accompanying drawings, of which—

Figure 1 is a sectional side elevation; Fig. 2, a plan of same; and Fig. 3, a section taken through the line A B, Fig. 1.

Upon reference, it will be seen that *a* is a cast-metal chamber or vessel, divided into two parts, *a*¹ and *a*², by the perforated diaphragm *b*. *c* is a perforated feed-water pipe. *d* is a non-return valve; *e*, the feed-water pipe from a pump; *f*, a feed-water or supply pipe to the boiler. *h* is a steam-cock, and *k* a steam-pipe leading from the boiler.

The functions of my improved feed-water heater are: The feed-water is forced by the feed-pump through the pipe *e* and non-return valve *d* and pipe *c*, and enters the chamber *a*² in a spray through the perforations in the pipe *c*. Steam is taken from the steam-chest of the boiler by the pipe *k*, and is admitted, through the cock *h*, into the chamber *a*, from whence it

issues in jets through the perforated diaphragm *b*, and commingles with the water-spray from the perforated pipe *c* in the chamber *a*². The feed-water through the pipe *c* thus absorbs the heat of the steam passing through the perforated diaphragm *b*, and then passes, as a heated feed, to the boiler through the pipe *f*.

In practice, it is advisable that the feed-water heater should be placed three or four feet above the level of the water in the boiler, the feed-pipe *e* rising up to it from the pumps, and descending from it to the boiler. (See pipe *f*.)

Having now fully described and ascertained the nature, object, and purposes of my invention, and how the same is to be carried into practical effect, I wish it to be clearly understood that I disclaim all feed-water heaters now in use; but

What I claim as my invention, and for which I seek Letters Patent, is—

The feed-water heater herein described, consisting of the chamber *a*¹ *a*², combined with a perforated diaphragm-plate and a perforated pipe, and fitted with suitable cocks and valves, the whole constructed and arranged, with reference to each other, substantially as set forth, for the purpose specified.

In witness whereof I, the said WILLIAM SAMBROOK, have hereunto set my hand and seal this 3d day of June, 1873.

WILLIAM SAMBROOK. [L. S.]

Witnesses:

FREDERICK JOHN CHEESBROUGH,

JOHN HAMILTON REDMOND,

Both of 15 Water Street, Liverpool, England.