

E. Ayer,
Steam-Boiler Fire-Tube.
N.º 5,546. Patented May 2, 1848.

Fig. 3.

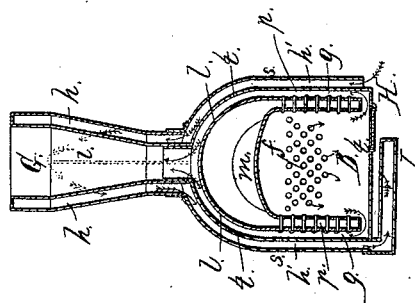


Fig. 2.

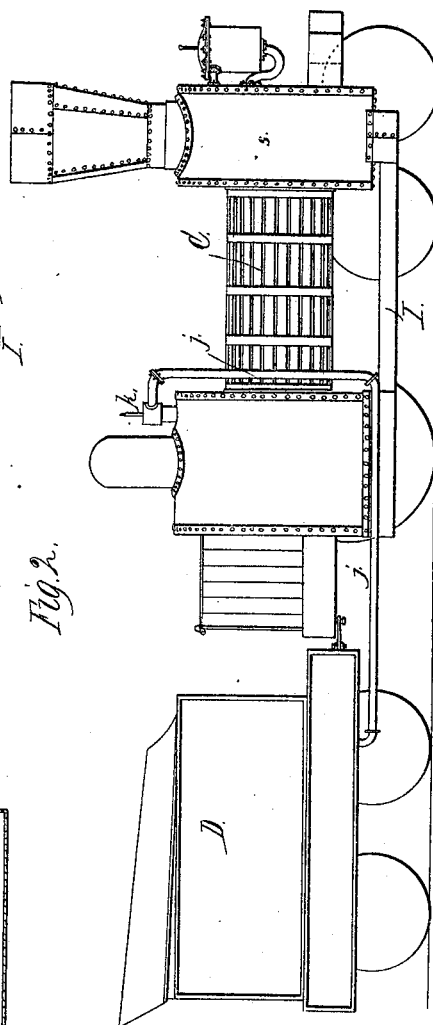
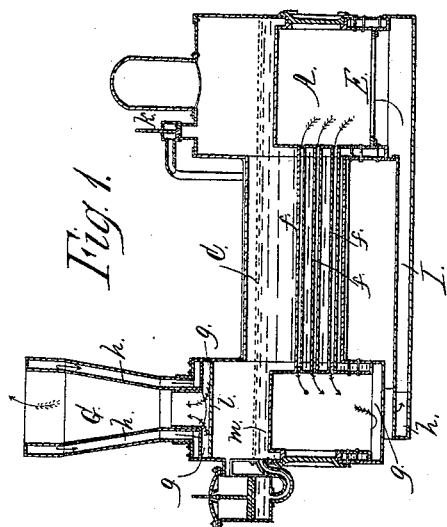


Fig. 1.



UNITED STATES PATENT OFFICE.

ELISHA AYER, OF NORWICH, CONNECTICUT.

IMPROVEMENT IN LOCOMOTIVE STEAM-BOILERS.

Specification forming part of Letters Patent No. 5,546, dated May 2, 1848.

To all whom it may concern:

Be it known that I, ELISHA AYER, of Norwich, in the county of New London and State of Connecticut, have invented a new and Improved Steam-Boiler; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical longitudinal section, and Fig. 3 a transverse section, of my improved boiler; and Fig. 2 is a side elevation thereof attached to a tender.

Similar letters indicate like parts in all the figures.

A is the furnace, which may be located in or under the rear end of the boiler in any usual or well-known manner.

B is a radiating-chamber placed in the front end of the boiler, connected to the furnace by means of the tubes *ff*.

m is a casing inclosing the radiating-chamber B, surrounded by water, as represented in Figs. 1 and 3.

p is a water-space between the internal casing, *m*, and the external casing, *l*, of the boiler surrounding the radiating-chamber. Two external metallic casings, *t* and *s*, inclose the front end of the boiler, (opposite the radiating-chamber B,) with a space, *g*, between the outer casing, *l*, of the boiler and the casing *t*, and a space, *h'*, between the casing *t* and the outer casing, *s*. The space *g* communicates with the base of the radiating-chamber B on both sides, and connects the same with the chimney G, as represented in Fig. 3. The chimney is composed of two casings with a space, *h*, between, divided into two equal parts by vertical division-plates *i*, extending from its base nearly to the top of the same, as represented in Fig. 3. The space *h'* between the plates *t* and *s* communicates with the space *h* between the chimney-casings. The space *h'* is open at its base on one side of the boiler at H, and on the opposite side it is connected with a horizontal pipe, I, which leads into the ash-pit under the grate-bars E in the furnace.

The object and effect of forming the radiating-chamber B in the front end of the boiler and inclosing it in the external casings, *t* and *s*, are as follows: First, it increases the draft of the furnace; second, it forms a large addition of heating water and air surface;

third, it enables me to furnish the furnace with hot air for the purpose of combustion, thereby producing a very great saving of fuel.

The flame and gaseous products of combustion pass from the furnace through the tubes *ff* into the radiating-chamber B, and, reverberating therein, descend and enter the apertures on each side thereof leading into the spaces *g g*, in which they ascend into the chimney G, acting upon a water-surface on one side and an air-surface on the other.

The air for supporting combustion in the furnace enters at H, Fig. 3, into the space *h'*, and, ascending therein, enters the space *h* between the chimney-casings, and, rising nearly to the top of the same, passes over the tops of the division-plates, *i*, and descends into the horizontal tube I, which conducts the heated air to the furnace.

The safety-valve on my improved boiler I inclose with a cap, *k*, and connect the same with the reservoir of water in the tender D by means of the pipe *j*, for the purpose of conveying all the waste steam blown off into the water, and thereby absorbing and saving the heat contained therein.

Having thus fully described my improved steam-boiler, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The locating the radiating-chamber B in the end of the boiler opposite the furnace and connecting the same with the chimney by means of the flue-spaces *g g* between the external casing of the boiler and the inclosing-casing *t*, substantially in the manner and for the purpose herein set forth.

2. The manner of heating the air for combustion previous to its entering the furnace by means of the space *h'* between the flue-casing *t* and the external casing, *s*, (inclosing the same,) connected to the space *h* between the double casings of the chimney and with the furnace by means of the tube I, substantially as herein set forth.

3. The inclosing of the safety-valve with a cap, *k*, and connecting the same with the water-reservoir for supplying the boiler by means of a suitable pipe, for the purpose herein set forth.

ELISHA AYER.

Witnesses:

JOHN D. PARK,
JOEL CHENEY, Jr.