

(No Model.)

E. MAKIN, Jr.
STEAM GENERATOR.

No. 546,170.

Patented Sept. 10, 1895.

Fig. 1.

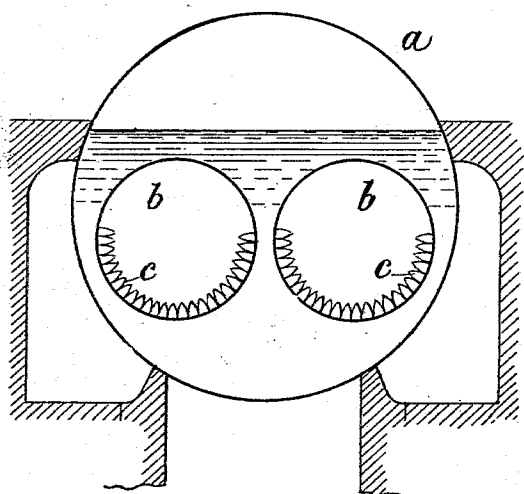


Fig. 3.

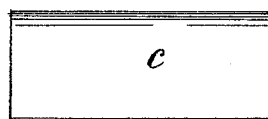


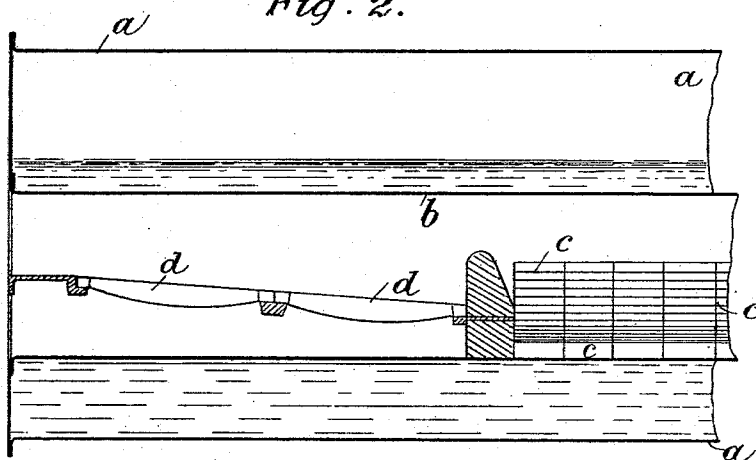
Fig. 5.



Fig. 4.



Fig. 2.



Witnesses

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by

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UNITED STATES PATENT OFFICE.

EDWARD MAKIN, JR., OF MANCHESTER, ENGLAND.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 546,170, dated September 10, 1895.

Application filed June 24, 1895. Serial No. 553,797. (No model.) Patented in England October 13, 1893, No. 19,249.

To all whom it may concern:

Be it known that I, EDWARD MAKIN, JR., a subject of the Queen of Great Britain, and a resident of 40 New Brown Street, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Steam-Generators, (for which I have obtained Letters Patent in Great Britain numbered 19,249, bearing date October 13, 1893,) of which the following is a specification.

My invention relates to improvements in steam-generators, and the chief object of my improvements is to arrest, absorb, and utilize for steam-generating purposes a large proportion of the heat from the gases passing from the furnace through the boiler-flues and along the boiler sides. I accomplish this object by building in the flues an inner wall of metallic bricks or segmental pieces in such manner as to form an additional heat-absorbing area.

In order that my invention may be fully understood and readily carried into effect, I will describe the accompanying sheet of drawings, reference being had to the letters marked thereon.

Figure 1 is a front sectional elevation, and Fig. 2 a longitudinal section, of the furnace end of a Lancashire or two-flued boiler fitted with my improvements. Figs. 3, 4, and 5 are detail views of the preferred form and section of metallic brick.

In Figs. 1 and 2, *a* designates the shell of the boiler; *b b*, the furnace-flues; *c*, the metallic bricks, one of which is shown detached in the detail views, Figs. 3, 4, and 5, and *d* the furnace-bars. The metallic bricks *c* being of the form shown do not require any bolts, riv-

ets, or other fastenings, but are self-securing in position and are arranged round the sides of the flues, as illustrated in Figs. 1 and 2. The bricks *c* are preferably made of iron and in any suitable shape, so long as one of the essential features of my invention is retained—that is to say, the form of the metallic bricks must be such that they will keep their position in the flue without the use of any fastening. It will be obvious that the metallic bricks *c* are easily applied and as readily removed when not required or for repairing or other purposes.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim, and desire to secure by Letters Patent of the United States, is—

1. In combination in a boiler, the horizontal flues and a series of independent metallic bricks forming a lining to said flues projecting inwardly therefrom and supported one against the other about the lower part of the flues and up the sides thereof, substantially as described.

2. In combination, the flues and the metallic bricks projecting inwardly from the walls of the flue and from opposite sides radially and independently removable, said bricks being of wedge shape in cross section with their points projecting inwardly.

In witness whereof I have hereunto set my hand in presence of two witnesses.

EDWARD MAKIN, JR.

Witnesses:

HENRY BERNOULLI BARLOW,
HERBERT R. ABBEY.