

B. T. BABBITT.
Boilers and Condensers.

No. 142,664.

Patented September 9, 1873.

Fig. 1.

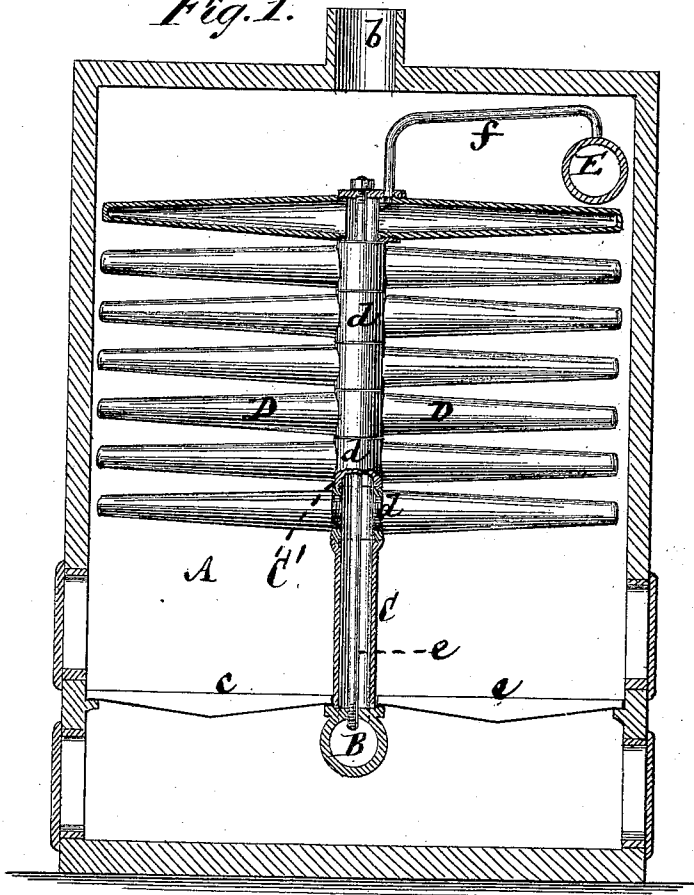


Fig. 6.

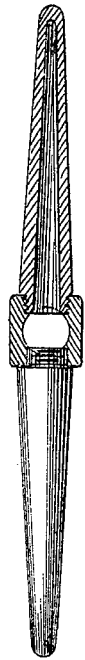
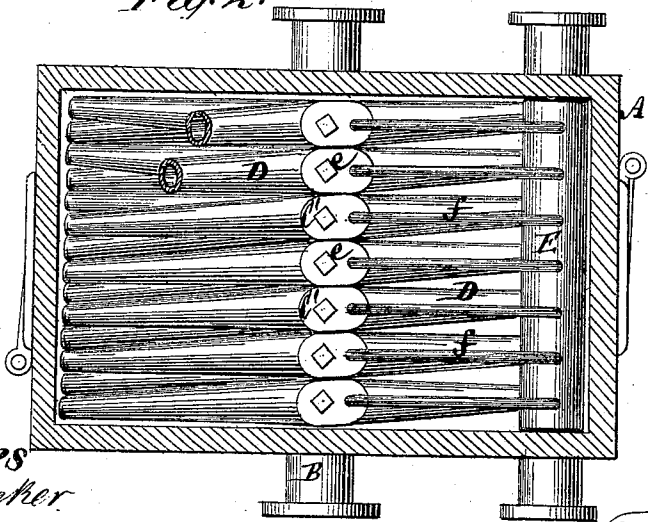


Fig. 2.



Witnesses
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Fred Wagner

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by his Attorneys
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Fig. 3.

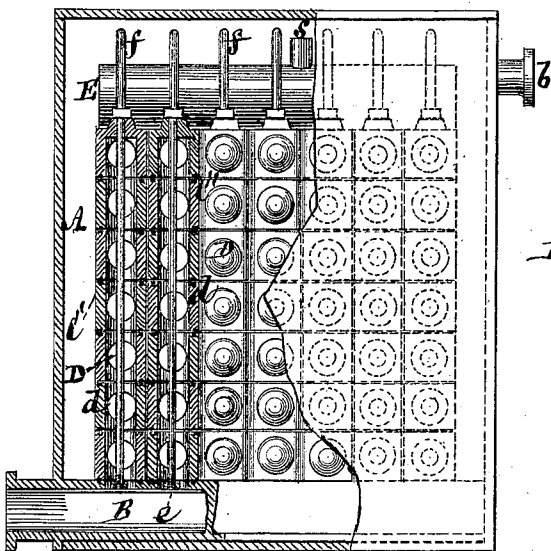


Fig. 4.

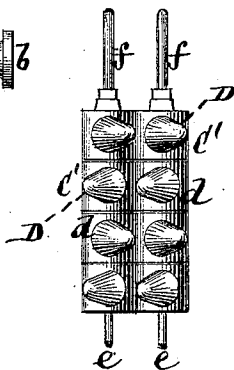
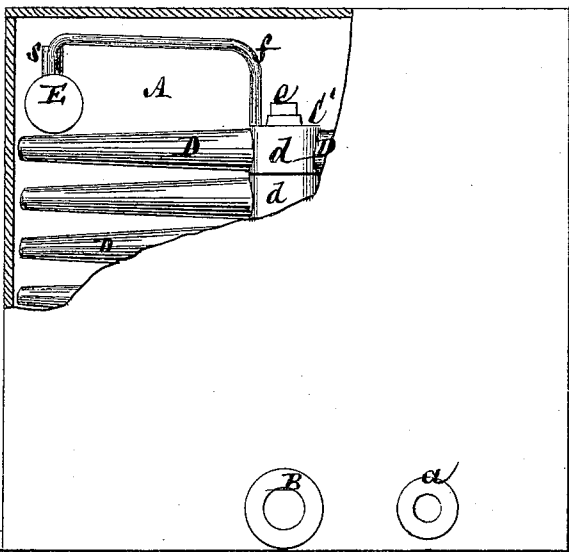


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

BENJAMIN T. BABBITT, OF NEW YORK, N. Y.

IMPROVEMENT IN BOILERS AND CONDENSERS.

Specification forming part of Letters Patent No. 142,664, dated September 9, 1873; application filed June 25, 1873.

C.

To all whom it may concern:

Be it known that I, BENJAMIN T. BABBITT, of the city, county, and State of New York, have invented an Improvement in Boilers and Condensers, of which the following is a specification:

This invention generally consists in an arrangement, within a suitable chamber, of a number of straight upright or vertical tubular passages, arranged side by side, and composed of hollow eyes or bosses, having opposite hollow tapering radial arms projecting from them, and set, by the turning or adjustment of the bosses, one upon or within the other, so that they form a staggering cluster of radial arms or tubes, in connection by branch pipes with an upper drum or passage, and in communication, below or at the base of the bosses of which the upright tubes are composed, with a further drum or passage, the whole constituting either a most efficient boiler or condenser.

In the accompanying drawing Figure 1 represents a vertical, and Fig. 2 a horizontal, section of the invention as applied to a steam-boiler. Fig. 3 is a partly broken and sectional end view of the invention as applied to a condenser; Fig. 4, a view in detail of certain of the radial arms or tubes after they have been turned or adjusted by their bosses to give them a staggering arrangement; Fig. 5, a partly-broken side view of the condenser; and Fig. 6, a view showing one mode of constructing the hollow radial arms and the bosses from which they project.

Referring, in the first instance, to Figs. 1 and 2 of the drawing, A is a chamber or case, the upper part of which may constitute the combustion-chamber, having an outlet, *b*, and the lower part of it the ash-pit of the boiler, *c* being the grate. B is a cross drum or passage, preferably arranged below the grate, and which may be the mud-drum of the boiler; also, to or through which the water may be fed. Mounted on this drum are a number of stand-pipes, C, arranged side by side, and serving to carry or form part of a number of straight tubes or vertical passages, C', each of which is composed of a number of hollow eyes or bosses,

d d, fitted and arranged to turn one upon or within the other, and having attached to them or carrying oppositely-disposed hollow tapering radial arms or tubes D D, the whole—that is, each upright row of bosses *d*, with attached opposite radial tubes or arms—being held in position and secured together by bolts *e*. The hollow tapering radial arms or tubes D in the several series, which, combined, form a cluster, are so set or arranged, by turning or adjusting the bosses *d*, that each alternate horizontal row of radial arms or tubes D in the cluster occupy an intermediate position with those immediately above or below them, as represented in Fig. 2, and which, by causing the fire and heated gases to take a serpentine or zigzag course between the radial arms or tubes, prolongs, or more thoroughly utilizes, the action of the heated gases on said arms. E is a steam-drum, with which the hollow straight uprights C' are connected by bent branch pipes *f*.

A boiler thus constructed is not only economical and efficient, and has many other general or specific advantages, including independent expansion of the parts, but, by the facility which is afforded for varying the angular relation of any one horizontal row of radial hollow arms with the arms immediately above or below it, the indirect circulation or passage of the heated gases between the arms is regulated, as desired.

Advantages of like importance in part or in whole are obtained for the application of the invention to a condenser, and the construction, as a general thing, is the same. Thus, referring to Figs. 3, 4, and 5 of the drawing, A is the outer chamber or case, through which the water or fluid to effect condensation is circulated, the same entering at *a* and escaping at *b*. C' C' are the straight upright passages or vertical tubes mounted on the lower drum or passage B, and connected above by bent pipes *f* with a drum or passage, E, to which the steam or vapor to be condensed may be admitted at a branch, *s*, and, after circulating through the uprights C' and hollow arms D, pass off (that is, the water or products of condensation) by the lower drum or passage B.

The upright tubes or passages C' are constructed, as in the case of the boiler shown in Figs. 1 and 2, of hollow eyes or bosses *d*, fitted to turn the one upon or within the other, and having their hollow opposite tapering arms D similarly arranged, Fig. 4 showing said arms after the bosses carrying them have been turned or adjusted to throw the arms out of straight line with one another, shown by full lines in Fig. 3, to the staggering arrangement shown for them in Fig. 4, and which corresponds with the staggering arrangement described for them with reference to the boiler shown in Figs. 1 and 2, and whereby the water or fluid used to effect condensation is made to take a circuitous travel through the condenser. In some cases the steam or vapor to be condensed may be passed through the case A, and the water by which condensation is effected through the tubes C' and arms D.

When it is objectionable to construct the radial arms D and their bosses *d* of ordinary cast-iron of suitable quality, then the bosses *d*

may be made of malleablized cast iron, and the arms D of wrought-iron, and be screwed into the bosses, as shown in Fig. 6.

It is immaterial, so far as the invention is concerned, how the outer shell or case is constructed, as such may vary both in shape and construction, according to the purpose to which the invention is designed to be applied, and other circumstances.

What is here claimed, and desired to be secured by Letters Patent, is—

The combination of the straight upright tubes or passages C', composed of hollow bosses *d*, fitted to turn the one upon or within the other, the oppositely-disposed radial hollow tapering arms D, set staggering, as described, the drums or passages B E, the connecting-pipes *f*, and the case A, substantially as shown and described.

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Witnesses:

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