No. 45,955. PATENTED JAN. 17, 1865.

L. E. C. MARTIN.

STEAM BOILER.

4 SHEETS—SHEET 1.

Fig 1.

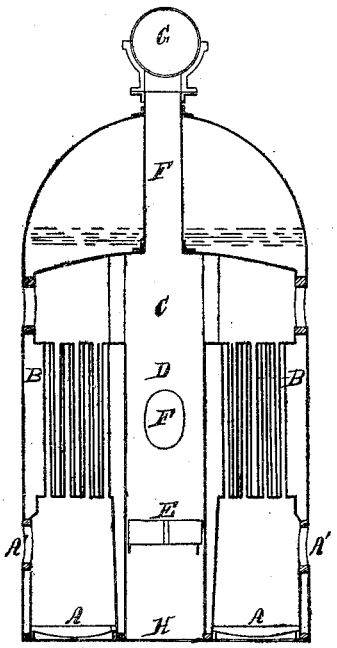


Fig 2.

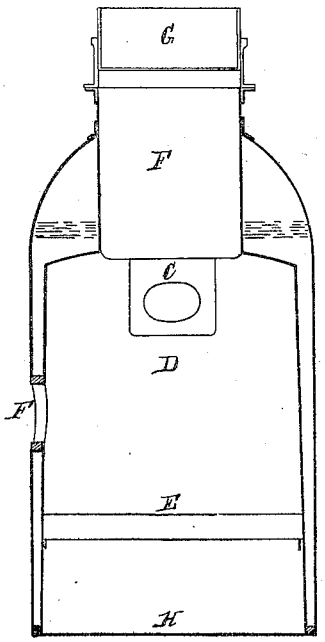
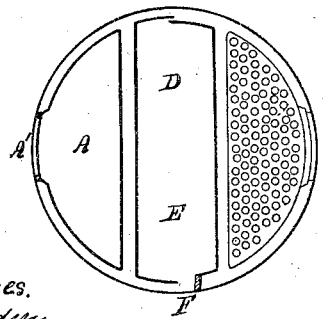


Fig 3.



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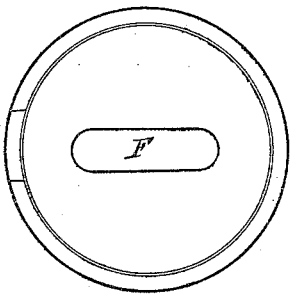

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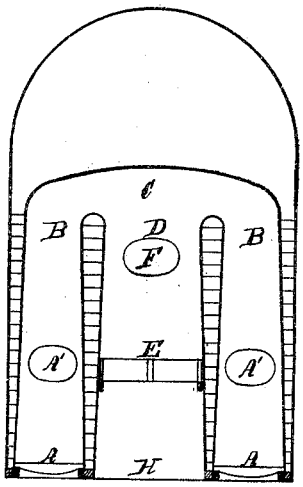
4 SHEETS—SHEET 2.

Fig 5.



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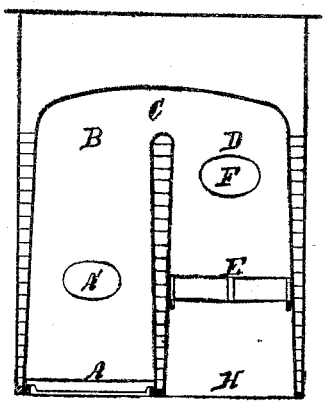


Fig 6.

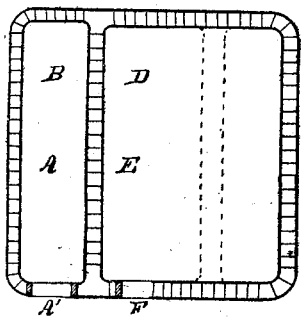
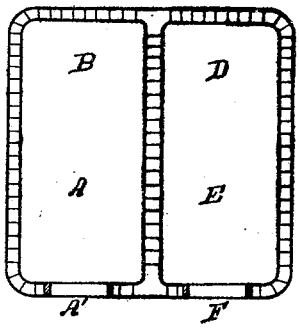


Fig 8.



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STEAM BOILER.

4 SHEETS—SHEET 3.

Fig 11.

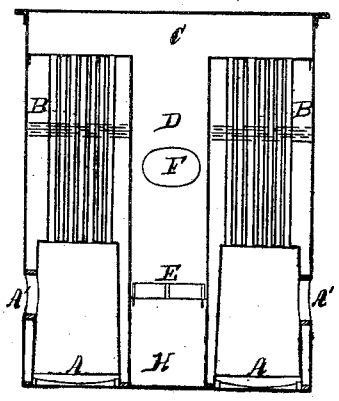


Fig 13.

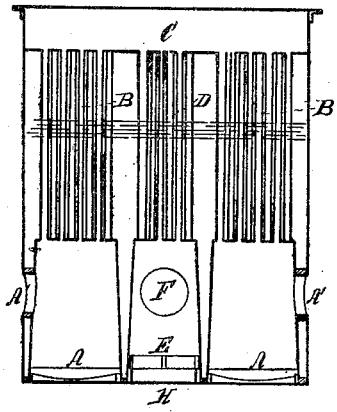


Fig 12.

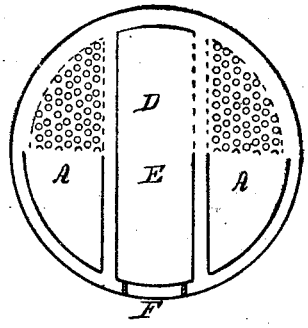
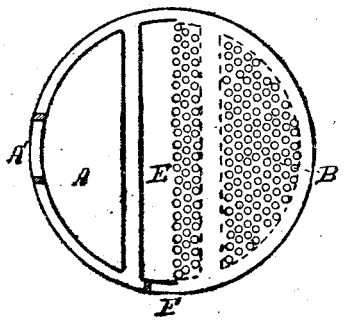


Fig 14.



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STEAM BOILER.

4 SHEETS—SHEET 4.

Fig 9.

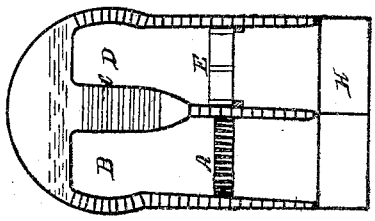


Fig 8.

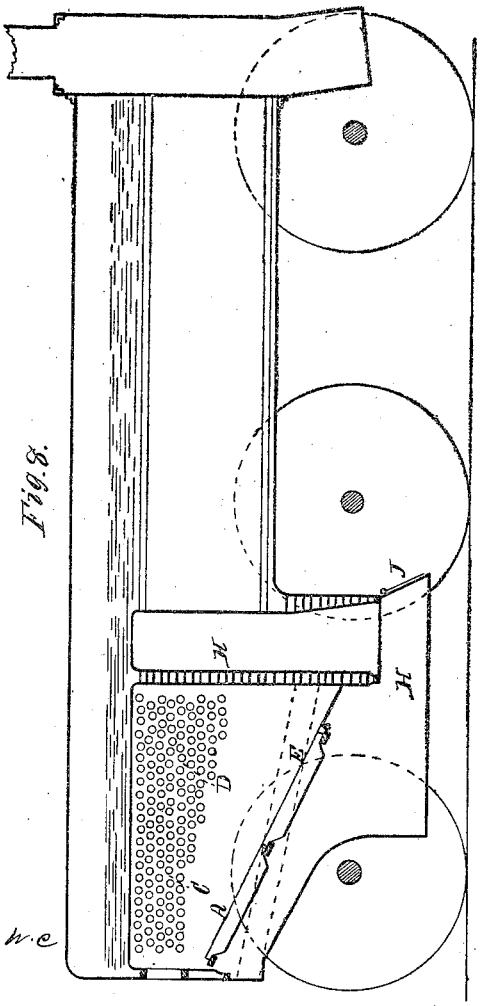
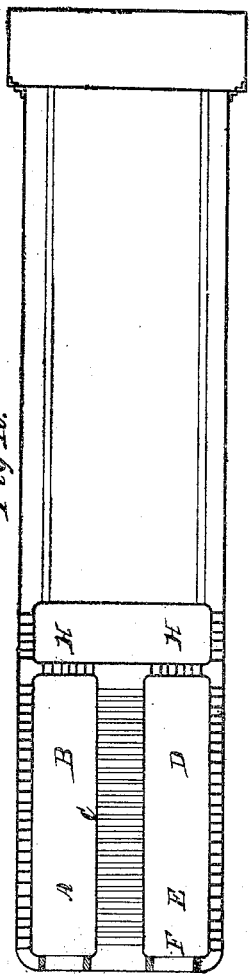


Fig 10.



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UNITED STATES PATENT OFFICE.

LOUIS EMILE CONSTANT MARTIN, OF LONDON, ENGLAND.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **45,955**, dated January 17, 1865.

To all whom it may concern:

Be it known that I, LOUIS EMILE CONSTANT MARTIN, of No. 11 Adam Street, Adelphi, in the county of Middlesex, Kingdom of Great Britain and Ireland, have invented certain new and useful Improvements in Boilers and Apparatus for Generating Steam; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention has for its object improvements in boilers and apparatus for generating steam, with a view to secure a great economy in fuel. For these purposes, in constructing boilers and apparatus for generating steam, two or more fire places or furnaces are by preference employed in each case. The form or construction of each boiler and apparatus may be greatly varied, depending on the use to which the same are to be applied. In constructing a boiler and apparatus where two fire-places or furnaces are used, the external form of the vessel containing the water may be circular in its horizontal section or rectangular or otherwise. The fire places or furnaces are by preference constructed within the lower part of the boiler; but they may, if desired, be arranged below the bottom of the boiler or vessel containing the water. From the upper part of each of the furnaces or fire-places tubular flues rise up to a hollow chamber which is within the boiler or vessel containing the water, and usually the whole of this chamber and the tubular flues leading thereto are below the water-level; but, if desired, arrangements may be made for superheating the steam above the water by some portion of the heated products which rise from the fires. In some cases a steam pipe or pipes is or are used to introduce steam or superheated steam into this chamber to mix with the products of combustion therein. From this chamber there is a descending flue, or it may be flues, at the lower part of which there is a perforated grating or partition of fire-clay or other suitable material, on which there is constantly kept a well-ignited fire of coke or other suitable fuel. Below this horizontal perforated grate or partition there is a chamber or space communicating with a chimney, and a fan or other suitable apparatus may be applied for withdrawing the products, in order that there may at all times be a draft in that direction.

By passing through the second or incandescent fire in this refractory hearth, the usual products of combustion from the first fires are transformed into combustible gases, which are then made to enter a chamber or space where they may be ignited; or, if preferred, they may be taken through a flue or flues, so as to be conveyed away, to be made use of for any other heating purpose required. It is obvious that in apparatus of this description any number of fires producing the usual products of combustion may be combined with any number of incandescent fires, which will transform the usual incombustible products of combustion of the first fires into combustible products, and that these combustible products may then be made available, either to heat the boiler in immediate connection with them, or be conveyed to other boilers at a greater or less distance from the main gas-producing apparatus.

To each of the fire-places or furnaces there is a suitable ash-pit, and combustion of the fuel in the furnaces or fire-places is supported by atmospheric air in the usual manner.

Having thus stated the nature of my invention, I will proceed more fully to describe the manner of performing the same, in order to enable others skilled in the art to make and use it.

Figures 1 and 2, Sheet 1, of the accompanying sheets of drawings, which form a part of this specification, show two vertical sections of a steam-boiler constructed according to my invention. These sections are taken at right angles to each other. Figs. 3 and 4 are two horizontal sections of the same.

A A are the fire-places or furnaces, having feeding-doors at A′ A′. These furnaces or fire-places are connected with the chamber C by tubular flues B, which chamber, in this arrangement shown, is wholly immersed, and is below the water-level in the boiler; but this may be varied, and a part or the whole may rise above the water-level. The products of combustion descend from the chamber C down the flue or passage, or it may be through a series of tubular passages, into the space above the grating or perforated partition E, of fire-clay, on which is kept a fire of coke, or cinders, or charcoal, either through doorways formed

in the sides of the chamber C; or, when desired, the fuel may be passed by suitable openings through the upper passage, F, where it is ordinarily closed by the cylinder-feeder G. (Seen in Figs. 1 and 2 of Plate 1.) The chamber or ash-pit H may, it is obvious, communicate with a fan or other apparatus, to insure a draft in that direction.

The construction of boilers and furnaces may be greatly varied when carrying out my invention, and it is not necessary in each case to have two fire-places or furnaces A, and it may be found desirable in some cases to have more than two fire-places A.

Figs. 5 and 6, Sheet 2, show a vertical and horizontal section of a steam-boiler and furnaces or fire-places wherein two fire-places or furnaces A are used in combination with one fire-place E, to which the description previously given is applicable, excepting that the fire-doors are all shown to be at the sides. Figs. 7 and 8 show a vertical section and a horizontal section of another arrangement of boiler where only one fire-place or furnace A is employed in combination with one fire-place E, in which the ordinary fuel is supplied to the furnace or fire-place A. The products of combustion pass into the upper compartment or chamber C, over the partition, and descend through the grating or perforated partition E, of fire-clay, into the compartment H, from which a draft is constantly induced by a fan or other suitable means.

Figs. 8′, 9, and 10, Sheet 3, show a longitudinal section, a transverse section, and a horizontal section of a locomotive steam-boiler, in which the fire-box is divided by a hollow partition, and has through it numerous tubular passages C, which connect the upper part, B, of the fire-place A with the upper part, D, of the descending flue or compartment where the perforated partition or grating E, of fire-clay, is situated. In this arrangement the supply of air to the ash-pit of the furnace A is by a folding valve or door, J, by which the quantity of air admitted to the fire in the fire-place A is regulated. The products of combustion rising from the fire in A pass through the tubular passages C, and thence descend through the fire in E, as before explained, and thence into and away from the compartment H, the lower part of which is closed, so as to prevent the atmospheric air supplied through the passage J getting into the compartment H, except through the fire in A.

Figs. 11, 12, 13, and 14, Sheet 4, are vertical and horizontal sections of modifications of vertical boilers, in which the water-level is below the tops of the tubes, which, passing through the steam space, more or less superheat the steam contained therein.

In each of the figures shown by the drawings the same letters of reference are employed, and although the forms of the parts thereby referred to are varied, they respectively perform the like functions in each combination or construction.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

The arrangement of one or more fires, substantially in the combination described, to generate the usual products of combustion, with one or more auxiliary incandescent fires, arranged on one or more refractory hearths, substantially as described, through which these usual products are carried, and which, after being transformed into combustible gases, pass through one or more flues into one or more chambers of combustion, where these ultimate gases are ignited, and thus effect a large economy in fuel.

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