No. 809,366. PATENTED JAN. 9, 1906.

D. FITZGIBBONS.

STEAM GENERATOR.

APPLICATION FILED MAY 27, 1905.

FIG. I.

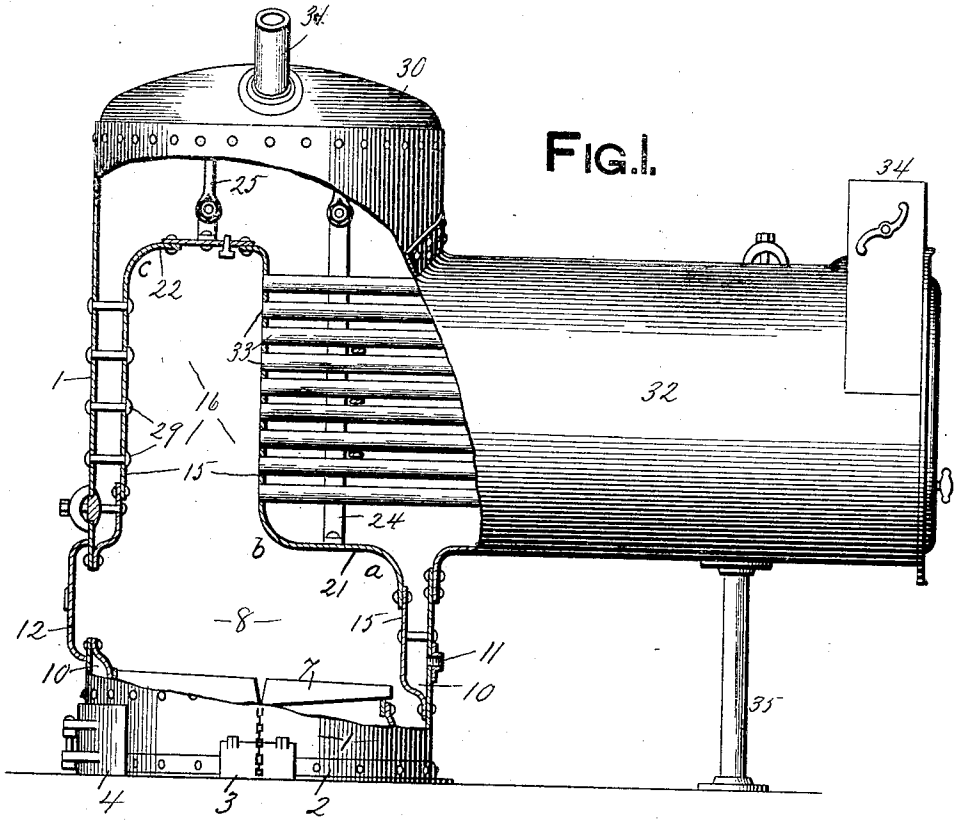
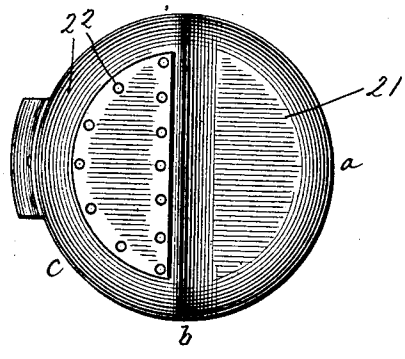


FIG. II.



WITNESSES:

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DAVID FITZGIBBONS, OF OSWEGO, NEW YORK.

STEAM-GENERATOR.

No. 809,366. Specification of Letters Patent. Patented Jan. 9, 1906.

Application filed May 27, 1905. Serial No. 262,588.

To all whom it may concern:

Be it known that I, DAVID FITZGIBBONS, a citizen of the United States, residing at Oswego, in the county of Oswego and State of New York, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved construction of steam-generator which is strong, simple, and economical to manufacture and of a high efficiency.

It consists, essentially, of a vertically-arranged cylindrical shell containing the ash-pit, grate, fire-box, and combustion-chamber and of a horizontal cylindrical shell extending from the middle of the vertical shell and containing the tubes. In the vertical shell is arranged an inner shell or crown-sheet forming a circular fire-box, permitting a large grate to be used, and a substantially semicircular combustion-chamber above the fire-box. I have discovered that by constructing this inner shell or crown-sheet with large easy curves instead of with sharp bends I have produced a generator giving substantially perfect combustion and a high degree of efficiency, because the gases are unimpeded by sharp turns or corners in their flow to the combustion-chamber, there is an unimpeded circulation of water around the exterior of the crown-sheet, avoiding the danger of burning, all parts are heated uniformly to a high degree, and more or less dead corners are avoided. Such a crown-sheet is almost or practically self-sustaining, requiring few braces, and thus greatly simplifying the construction and diminishing the cost of construction and repairs and rendering the boiler easier to be cleaned. The furnace and the boiler are combined in a generator which is self-containing, self-sustaining, and self-supported. As it needs no foundation, it can be easily used in many locations.

My invention will be understood by reference to the drawings herewith, in which the reference letters and numerals of the specification indicate the corresponding parts in both the figures.

Figure I is a side elevation, partly in section, of my complete generator. Fig. II is a top plan of the crown-sheet detached.

In the figures, 1 indicates the vertical cylindrical shell fitted to an annular casting 2, forming a standard on which the generator is supported.

3 is the damper; 4, the ash-door to the ash-pit.

7 is the large grate arranged in the circular fire-box 8, substantially surrounded by water-leg 10.

11 is a blow-off.

12 is the feed-door.

15 is the inner shell or crown-sheet forming the water-leg around the fire-box and inclosing in its upper portion the substantially semicircular combustion-chamber 16. This crown-sheet is secured by the usual rivets to the outer shell at its lower margin. Where bent at *a*, *b*, and *c* to inclose the fire-box and the combustion-chamber and to form the half-domes 21 and 22, respectively, over the rear of the fire-box and over the combustion-chamber the sheet is not bent at right angles, forming sharp corners, but in large curves, the arcs of comparatively large circles. It is therefore substantially self-supporting, requiring for each of said half-domes one brace only, 24 and 25, instead of several. It will be undertood that these curves are made as large as possible, and, particularly referring to curve *b*, this is as near a self-sustaining curve as is possible. To carry this curve up any higher in the crown-sheet would cut off some of the tubes. It will be understood that each brace added to a boiler involves not only so much weight and material, but also considerable labor in construction. Where the braces are reduced in number, as here shown, and almost done away with entirely, the interior of the boiler is not filled up with functionally-useless parts, which also positively interfere with the convenience of access to the interior in case of cleaning and repairs. It will be understood that not only constructionally is this foundation of crown-sheet of great importance, but functionally as well, because the large curves *a* and *b* do not impede or check the gases like sharp bends and corners, but permit the gases generated, particularly at the rear of the grate, to pass therefrom freely and unimpeded into the combustion-chamber, effecting a more uniform and steady combustion, and therefore a greater efficiency. By making the curve at *a* large there is avoided a more or less dead corner, which in case of a sharp

bend is not perfectly reached by the heat, and therefore incompletely heated. Within the boiler-space the water circulates more freely, steadily, and unimpeded around these large curves of the crown-sheet than around sharp corners, thereby avoiding the danger of burning out the metal.

29 represents the stay-bolts securing the crown-sheet in position to the front of the boiler.

30 is the dome; 31, the steam-pipe; 32, the horizontal cylindrical extension extending rearwardly from about the center of the vertical shell and containing the tubes 33, tapped into the crown-sheet and opening in the combustion-chamber.

34 is the smoke-flue, and 35 a supporting-column for the horizontal shell.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a steam-generator, the combination with a vertical cylindrical shell inclosing an ash-pit below, of an inner shell having a cylindrical lower portion forming a fire-box and a semicylindrical upper portion forming a combustion-chamber, said inner shell being arranged within the cylindrical shell and having its lower margin connected thereto to form a water-leg around the fire-box, a grate above the ash-pit, a horizontal cylindrical shell extending rearwardly from the vertical shell, tubes in the horizontal shell secured to the rear wall of the combustion-chamber, and two braces supporting the inner shell in the outer shell, one brace being connected to the front higher portion of the inner shell and one brace being connected to the rear lower portion of the inner shell.

2. In a steam-generator, an outer, vertical cylindrical shell, an annular flanged, supporting-casting fitted to the foot of said shell, an inner shell or crown-sheet arranged within the outer shell and riveted to said outer shell around its lower margin, said inner shell being formed with a cylindrical lower portion, a semicylindrical upper portion arranged above the front of the lower portion and a straight vertical wall forming the rear face of said upper portion, said lower portion forming the fire-box and having a rear half-dome over the fire-box, said upper portion forming a combustion-chamber and having a front half-dome over the combustion-chamber, the curves between the fire-box wall, and the rear half-dome, between said rear half-dome and said vertical wall, and between the combustion-chamber front wall and the front half-dome being curves in the arcs of large circles, and a horizontal, cylindrical shell containing tubes extending from the vertical shell.

3. In a steam-generator, an outer cylindrical shell, vertically arranged, an inner shell inclosed within the outer and having its lower margin secured thereto, the inner shell having a lower cylindrical portion forming a fire-box, and an upper semicylindrical portion above the front of the fire-box forming a combustion-chamber, the top of said upper portion, and the top of said lower portion behind the combustion-chamber being in the form of half-domes, the bends in said inner shell being arcs of large circles, a single brace between each of said half-domes and the outer shell, and a horizontally-arranged cylindrical shell rearwardly extending from the vertical shell and containing the fire-tubes, substantially as described and shown.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID FITZGIBBONS.

Witnesses:
MORTON J. SANFORD,
J. F. MARSDEN.