

2 Sheets—Sheet 1.

Patented Nov. 1, 1892.

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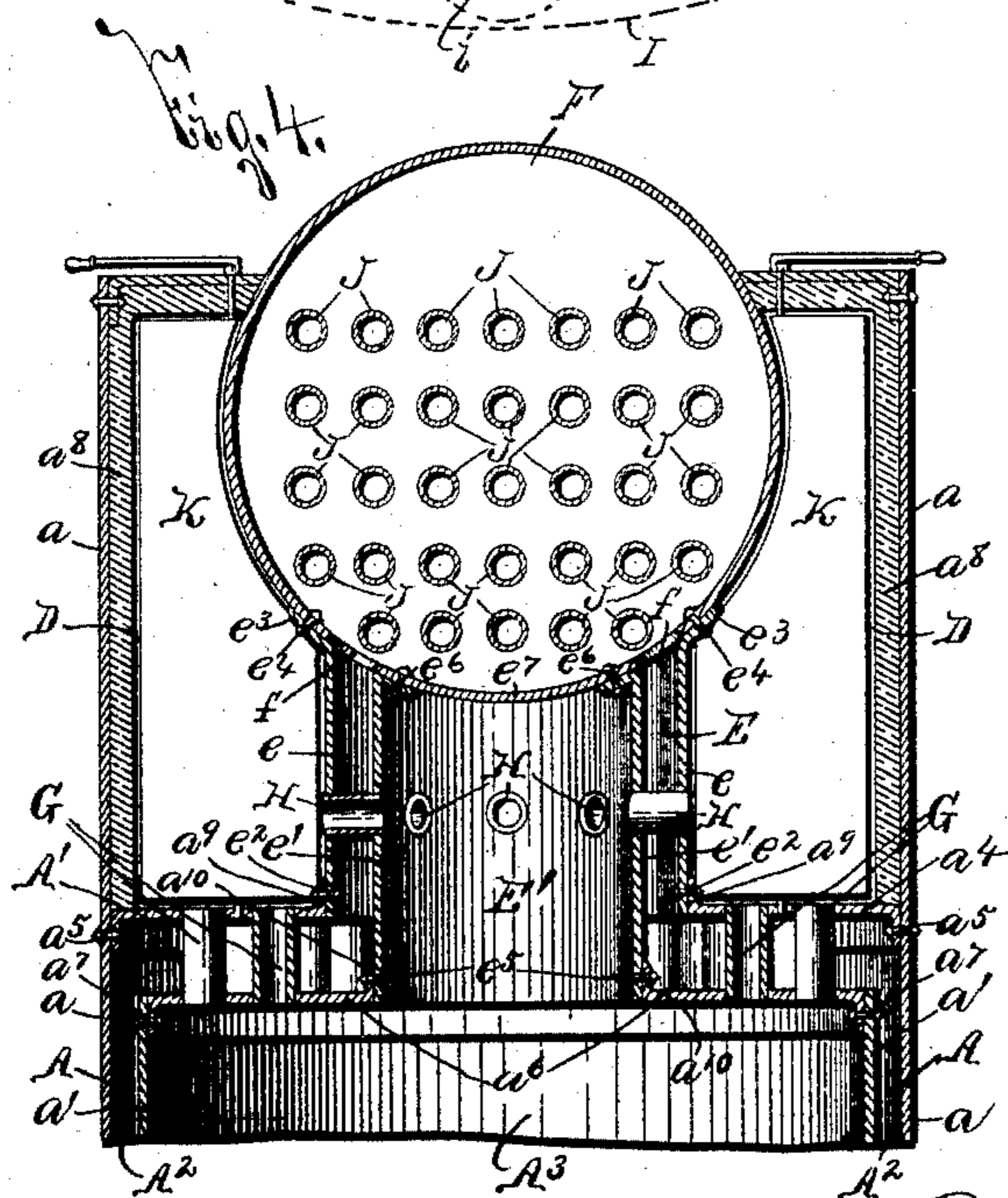
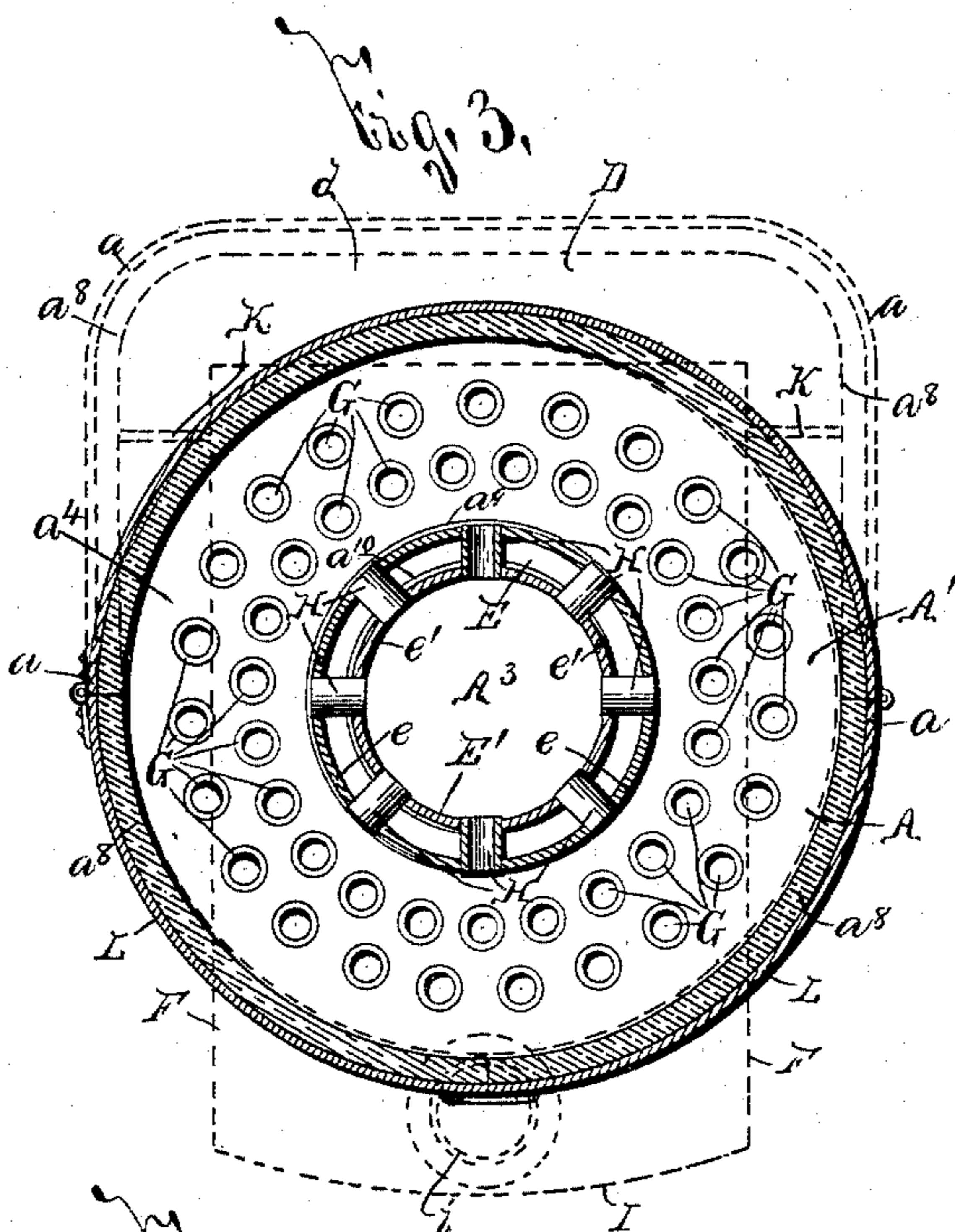
(No Model.)

2 Sheets—Sheet 2.

P. FITZGIBBONS & H. K. EASON.
STEAM GENERATOR.

No. 485,183.

Patented Nov. 1, 1892.



WITNESSES:

H. C. Chase
E. A. Hickling

INVENTORS

Patrick Fitzgibbons
Henry H. Eason

BY

Henry Wilkinson Parsons
ATTORNEYS.

UNITED STATES PATENT OFFICE.

PATRICK FITZGIBBONS AND HENRY K. EASON, OF OSWEGO, NEW YORK.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 485,183, dated November 1, 1892.

Application filed June 1, 1892. Serial No. 435,165. (No model.)

To all whom it may concern:

Be it known that we, PATRICK FITZGIBBONS and HENRY K. EASON, of Oswego, in the county of Oswego, in the State of New York, have
5 invented new and useful Improvements in Steam-Generators, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

10 Our invention relates to improvements in steam-generators, and has for its object the production of a simple, practical, and effective device for generating steam rapidly and efficiently.

15 To this end it consists, essentially, in an upright lower shell having a top wall above the combustion-box, a drum projecting above the top wall of the lower shell and connected thereto and formed with a central chamber
20 for the reception of the products of combustion, a heating-chamber above the top wall of the lower chamber, an upper water-containing shell within the heating-chamber, supported upon the drum or connection and connected
25 thereto, upwardly-extending tubes passed through the top wall of the lower shell, and substantially horizontally-extending tubes passed through the peripheral wall of the drum and lengthwisely through the
30 upper shell.

The invention furthermore consists in the detail construction and arrangement of the parts, all as hereinafter more particularly described, and pointed out in the claims.

35 In describing this invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

40 Figure 1 is a front elevation of our invention. Fig. 2 is a vertical sectional view taken on line 2 2, Fig. 1. Fig. 3 is a horizontal sectional view taken on line 3 3, Fig. 2, the form of the overlying water-containing shell and
45 upper portion of the outer casing being shown by dotted lines; and Fig. 4 is a vertical sectional view taken on line 4 4, Fig. 2.

50 A represents the lower water-containing shell of our invention, which may be of any desirable form, size, and construction. As here illustrated, this shell is circular or round-
ing in cross-section and its sides are formed

by the outer wall a and the inner wall a' of less diameter than the wall a . The lower end of the wall a' is suitably secured at a^2 to the
55 outer wall a above its lower edge a^3 . The lower water-containing shell A is formed with a top wall A', composed of a top plate or wall a^4 , secured to the outer wall a at a^5 , and a lower plate or wall a^6 , secured at a^7 , to the inner
60 wall a' . This construction of lower water-containing shell forms a hollow water-containing cavity A² between the walls a a' a^4 a^6 and forms a combustion-chamber A³ beneath the top wall A' and within the wall a' . Fuel
65 is admitted to this combustion-chamber through an opening A⁴ in the front of the walls a a' , which is closed by a door A⁵.

A suitable grate B is mounted upon any desirable construction of support b at the base
70 of the chamber A³.

Beneath the grate B is the ash-box C, provided with a door c , hinged at c' to the lower extremity of the wall a , previously described.

Above the wall A' of the lower water-containing shell is a heating-chamber D, inclosed
75 by the upper end of the wall a , which is here shown as the outer shell or casing of our improved heater. The upper extremity of this wall a is provided with a suitable lining a^8 ,
80 and it will be evident that, if desired, the entire heater may be inclosed in a second outer casing of metal, brick, or other suitable material.

E is a connection or drum extending upwardly from the top wall A' of the lower shell A and formed of less diameter than said
85 said top wall. As preferably constructed, this drum or connection is formed of an outer wall e and an inner wall e' . The lower extremity of the outer wall e is secured at e^2 to
90 a flange a^9 upon the plate a^4 of the wall A', and its upper end is provided with a flange e^3 , secured at e^4 to the edge of a circular opening f in the base of the upper heating shell
95 F, presently described. The lower end of the inner wall e' is secured at e^5 to a flange a^{10} upon the plate a^6 of the wall A', and its upper end is secured at e^6 to a top plate e^7 within the opening f . The drum or connection
100 E is thus formed with a central chamber E' directly above the combustion-box for receiving the products of combustion.

G is a series of upright tubes or flues ar-

5 ranged at the outside of the drum E, extending through the top wall A' of the lower shell A for conducting the products of combustion from the chamber A³ into the heating-chamber D.

10 H represents a series of substantially-horizontal tubes extending through the wall of the drum or connection E for conducting the products of combustion from the chamber E' above the combustion-chamber A³ into the heating-chamber D. These tubes H are preferably arranged midway between the top wall A' and the base of the upper water-containing shell F.

15 In operation the products of combustion generated within the chamber A³ impinge against the upper extremity of the plate α' of the water-containing shell A and against the plate α'' of the top wall A' of said water-containing shell, imparting thereto a certain percentage of their heat for raising the temperature of the water within the chamber A². A part of the products of combustion then passes upwardly through the tubes or flues G into the chamber D and in its progress further heats the water in the chamber A². The remaining portion of the products of combustion passes into the chamber E' and through the tubes or flues H into the chamber D, thus imparting heat to the water within the drum or connection E. The upper water-containing shell F, previously mentioned, is also preferably cylindrical in cross-section and is arranged in a substantially-horizontal plane above the top wall A' of the lower shell A. As previously mentioned, the base of the shell F is secured to a flange e^3 upon the outer wall of the connection or drum E, and consequently this connection or drum both forms a support for the upper shell and connects the same to the lower shell for producing a circulation of water from one to the other. As best seen at Fig. 5, the shell F is of greater length than the diameter of the drum or connection E, and consequently its extremities project beyond said drum or connection and above the flues G. The upper portion of the shell F preferably projects beyond the heating-chamber D; but the lower portion of said shell is substantially inclosed by said chamber, and consequently the products of combustion discharged into the same through the tubes or flues G H surround the lower extremity of the shell F and then pass to the rear end d of the chamber D between the rear wall f' of the shell F and the adjacent portion of the outer wall or shell α .

60 I represents an outlet-chamber for the products of combustion, arranged at the front extremity of the shell F, and i an outlet or draft pipe opening from said chamber.

65 J are flues or tubes extending in a substantially-horizontal plane lengthwise through the shell F for conducting the products of combustion from the rear end d of the heating-chamber D to the outlet-chamber I, whence they escape by the pipe i .

70 K are dampers at the rear extremity of the heating-chamber D on opposite sides of the lower portion of the upper water-containing shell F for regulating the passage of the products of combustion from the forward extremity of the chamber D to its rear extremity d , and thus governing the action of our generator.

75 L L are doors in the front of the outer wall α for permitting internal cleaning of our invention, and, if desired, similar doors may be provided at the back portion of said wall.

80 I' is a door in the front wall i' of the outlet-chamber I for permitting cleaning of the pipes or tubes J.

85 The operation of our invention will be readily perceived from the foregoing description and upon reference to the drawings, and it will be particularly noted that the path of the products of combustion is quite tortuous, that the heating-chamber D permits a thorough consumption of the heated gases, that the circulation between the lower and upper water-containing shells is positive and effective, and that the parts are simple in construction, easily assembled, and durable and effective in use and operation. It will be readily understood, however, that the detail construction and arrangement of the parts of our generator may be considerably varied from that shown and described without departing from the spirit of our invention. Hence we do not herein limit ourselves to such detail construction and arrangement. 100

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a steam-generator, the combination of 105 an upright water-containing shell formed with a contracted hollow drum, flues extending upwardly through said shell, and a horizontal water-containing shell supported upon and connected to said drum with its extremities directly above said flues, substantially as and for the purpose specified. 110

2. In a steam-generator, the combination of an upright water-containing shell having a contracted upwardly-extending drum, a horizontal water-containing shell supported above the lower shell upon said drum and connected thereto, and flues extending lengthwisely through the latter shell, substantially as and for the purpose specified. 115 120

3. In a steam-generator, the combination of an upright hollow water-containing shell, a horizontal water-containing shell above the former, an upright connection or drum between said shells, formed with an inner chamber for receiving the products of combustion, and flues extending through the wall of said upright connection or drum, substantially as and for the purpose set forth. 125

4. In a steam-generator, the combination of 130 a water-containing shell having a top wall, tubes extending through said wall, a second water-containing shell above the top wall of the former shell, a connection between said

shells, and flues extending lengthwisely through the upper shell, substantially as and for the purpose described.

5. In a steam-generator, the combination of an upright water-containing shell having a top wall, tubes extending through said top wall, and a second substantially-horizontal water-containing shell mounted above said top wall and having its extremities projecting above said tubes, substantially as specified.

6. In a steam-generator, the combination of an upright water-containing shell having a top wall, tubes extending through said top wall, a second substantially-horizontal water-containing shell mounted above said top wall and having its extremities projecting above said tubes, and tubes extending through the latter shell in substantially-horizontal planes, substantially as described.

7. In a steam-generator, the combination of an upright water-containing shell having a top wall, tubes extending through said top wall, a second substantially-horizontal water-containing shell mounted above said top wall and having its extremities projecting above said tubes, tubes extending through the latter shell, a connection between the top wall of the lower shell and the upper shell, and tubes extending through the wall of said connection, substantially as set forth.

8. In a steam-generator, the combination of an upright water-containing shell having a top wall, a water connection or drum extending above the top wall and formed with an inner chamber for receiving the products of combustion and provided with a top wall, and a second chamber supported above the former upon said connection and formed of greater diameter than said connection, substantially as described.

9. In a steam-generator, the combination of a lower water-containing shell formed with a

top wall, a heating-chamber above the top wall, tubes extending through said top wall for conveying the products of combustion to the heating-chamber, an upper water-containing shell mounted above the former within said heating-chamber, an outlet-chamber at one end of the latter water-containing shell, and flues extending through the latter water-containing shell for conveying the products of combustion from the latter heating-chamber to the outlet-chamber, substantially as specified.

10. In a steam-generator, the combination of a lower water-containing shell formed with a top wall, a heating-chamber above the top wall, tubes extending through the said wall for conveying the products of combustion to the heating-chamber, an upper water-containing shell mounted above the former within said heating-chamber, an outlet-chamber at one end of the latter water-containing shell, flues extending through the latter water-containing shell for conveying the products of combustion from the latter heating-chamber to the outlet-chamber, a connection between said water-containing shells for producing a circulation from one to the other, formed with an internal chamber for the products of combustion and provided with a top wall, and flues extending through said connection beneath its top wall, substantially as and for the purpose specified.

In testimony whereof we have hereunto signed our names, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 8th day of February, 1892.

PATRICK FITZGIBBONS.
HENRY K. EASON.

Witnesses:

CLARK H. NORTON,
E. H. WEISBURG.