

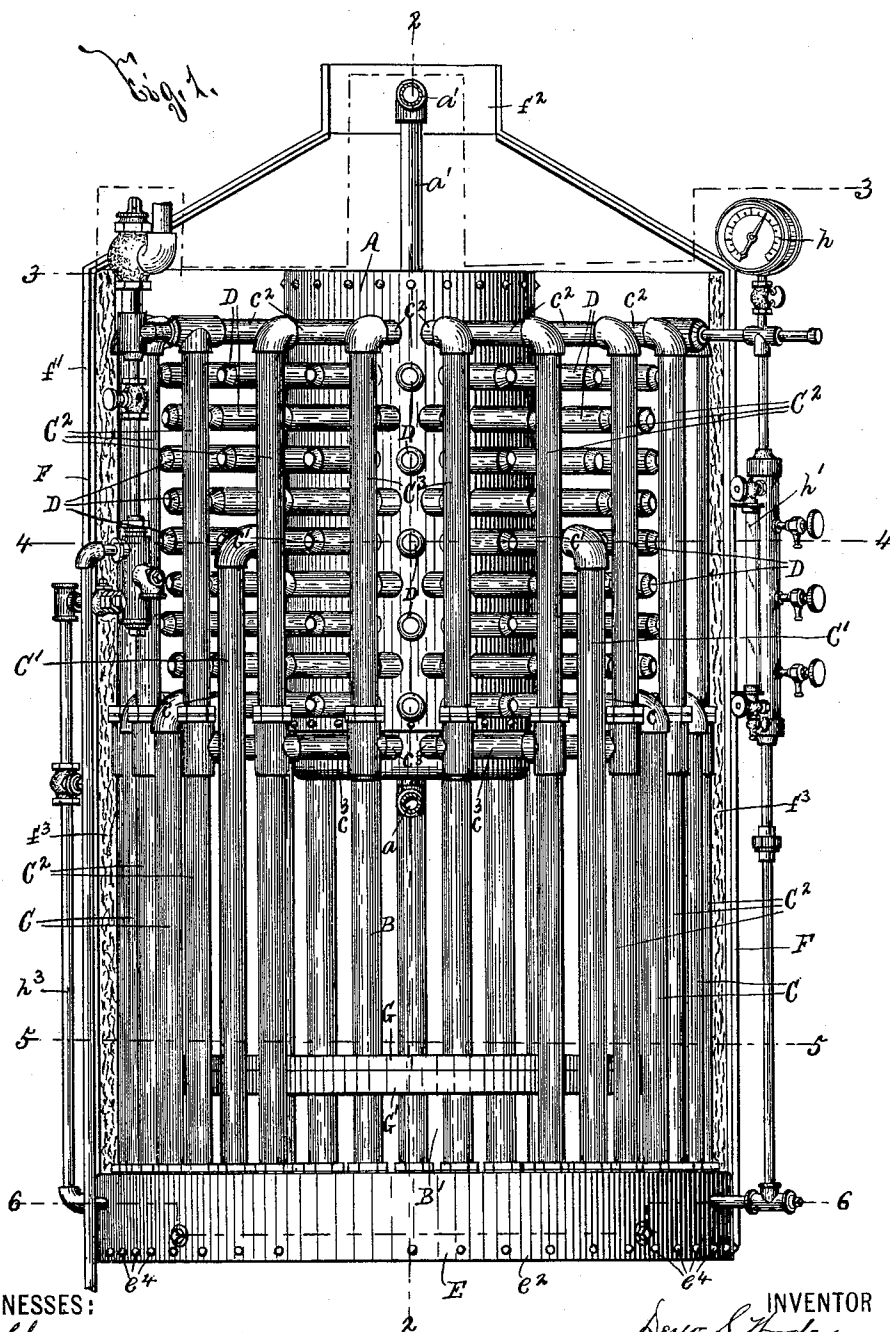
(No Model.)

5 Sheets—Sheet 1.

D. S. WORDEN.
STEAM GENERATOR.

No. 582,969.

Patented May 18, 1897.



WITNESSES:

H. C. Chase.
H. A. Thibault.

INVENTOR

Deyo S. Worden

BY

Wey & Parsons
ATTORNEYS.

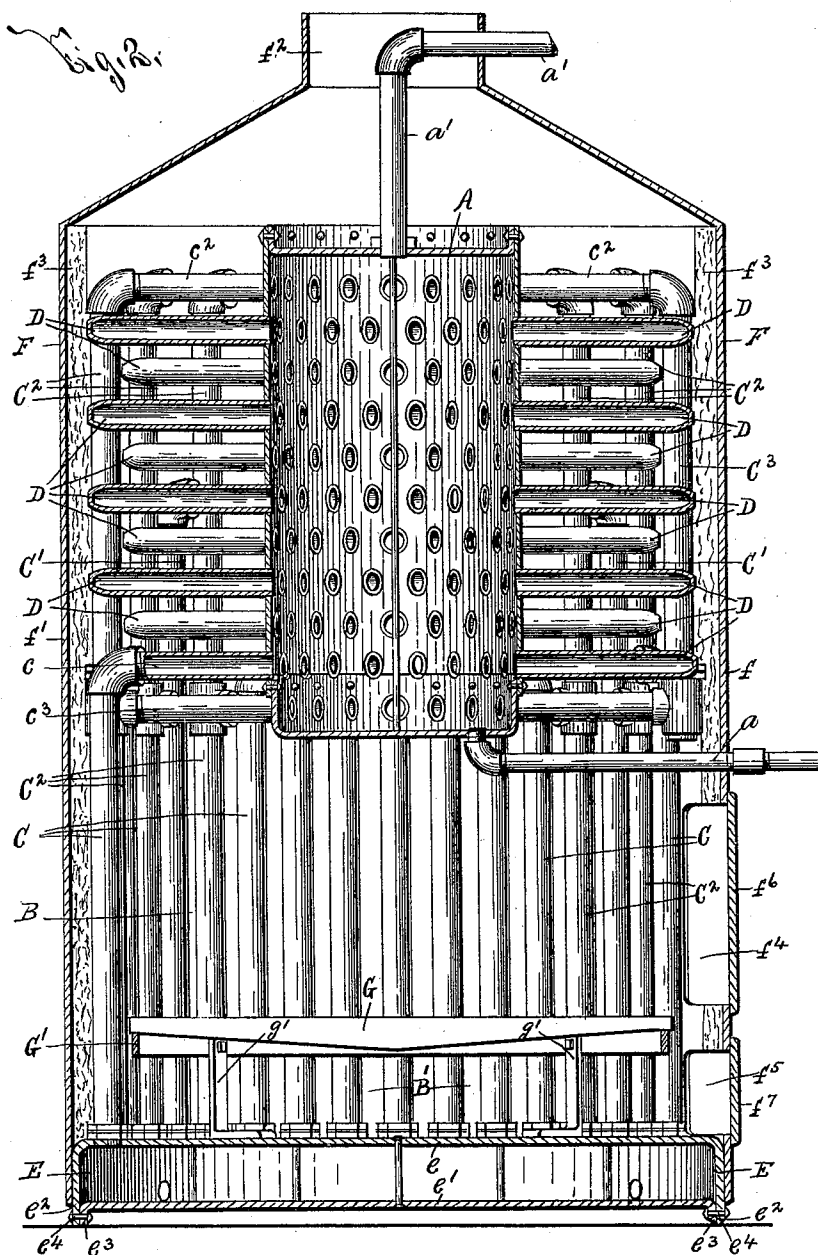
(No Model.)

5 Sheets—Sheet 2.

D. S. WORDEN.
STEAM GENERATOR.

No. 582,969.

Patented May 18, 1897.



WITNESSES:

H. C. Chase
H. A. Theobald

INVENTOR

D. S. Worden

BY

Key & Parsons
ATTORNEYS,

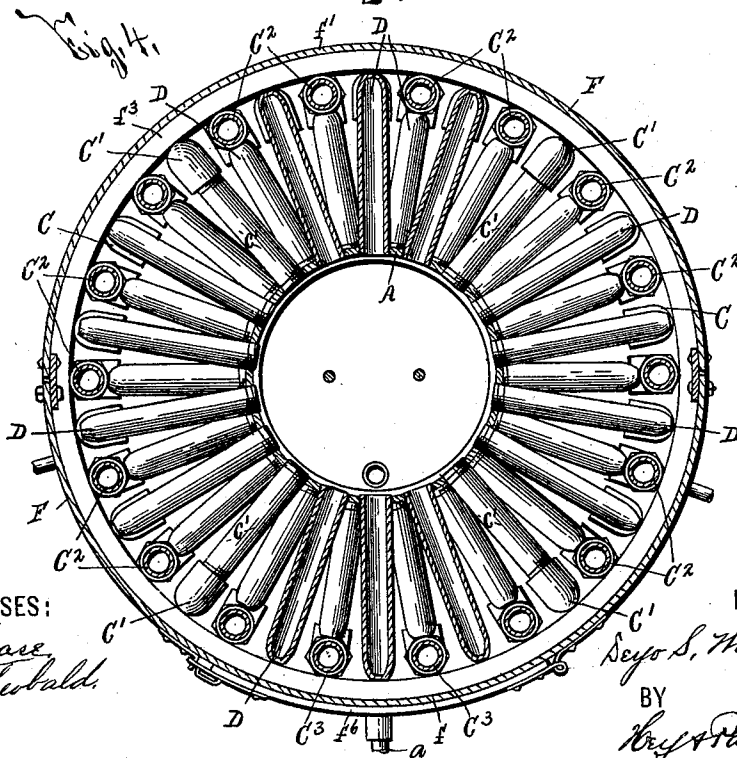
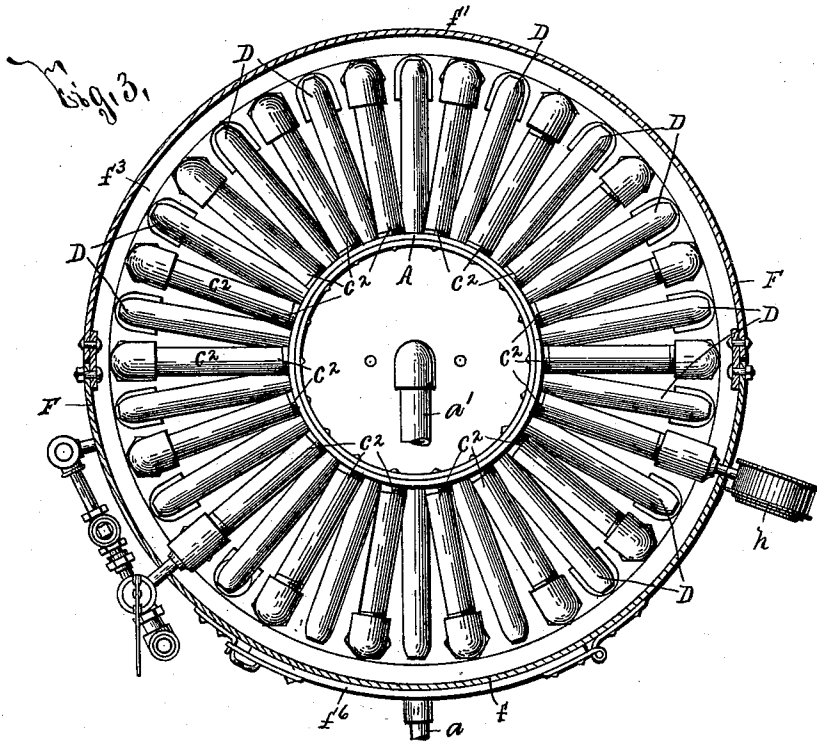
(No Model.)

5 Sheets—Sheet 3.

D. S. WORDEN.
STEAM GENERATOR.

No. 582,969.

Patented May 18, 1897.



WITNESSES:

H. C. Chase
H. H. Thibault

INVENTOR

Deyo S. Worden

BY

Key & Parsons
ATTORNEYS,

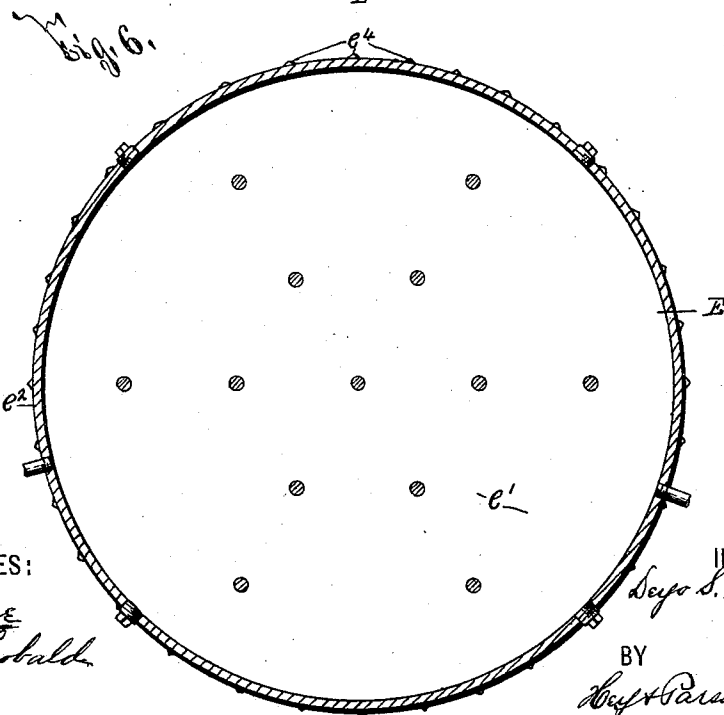
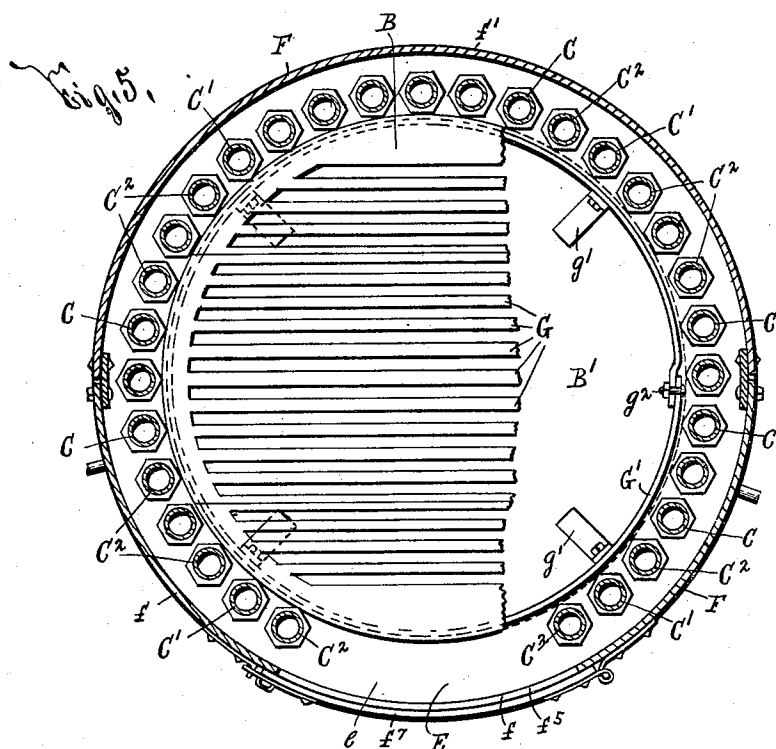
(No Model.)

5 Sheets—Sheet 4.

D. S. WORDEN.
STEAM GENERATOR.

No. 582,969.

Patented May 18, 1897.



WITNESSES:

W. Chase
N. H. Thorburn

INVENTOR

Deigo S. Horden

BY

Wey & Parsons
ATTORNEYS

ATTORNEYS,

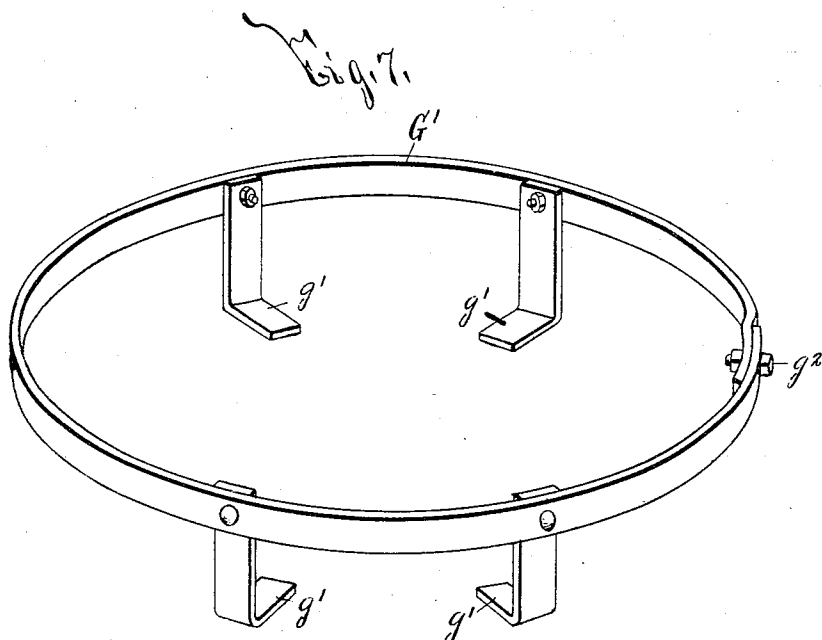
(No Model.)

5 Sheets—Sheet 5.

D. S. WORDEN.
STEAM GENERATOR.

No. 582,969.

Patented May 18, 1897.



WITNESSES:

H. C. Chace
J. F. Brewer

INVENTOR

Deyo S. Worden

BY

Key & Parsons

ATTORNEYS,

UNITED STATES PATENT OFFICE.

DEYO S. WORDEN, OF PENFIELD, NEW YORK.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 582,969, dated May 18, 1897.

Application filed February 1, 1896. Serial No. 577,720. (No model.)

To all whom it may concern:

Be it known that I, DEYO S. WORDEN, of East Penfield, in the county of Monroe, in the State of New York, have 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.

My invention relates to improvements in steam-generators, and has for its object the production of a device which is economically manufactured, is readily assembled and repaired, and is particularly effective and durable in use; and to this end it consists, essentially, in the general construction and arrangement of the component parts of a generator, all as hereinafter more particularly described, and pointed out in the claims.

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.

Figure 1 is a front elevation of my improved generator, the front section of the inclosing shell or jacket being removed for disclosing the interior construction. Fig. 2 is a vertical section taken on line 2 2, Fig. 1. Figs. 3 4, 5, and 6 are horizontal sections taken, respectively, on lines 3 3, 4 4, 5 5, and 6 6, Fig. 1; and Fig. 7 is a perspective view of the detached grate-support.

A is a drum supported above the combustion-chamber B of my generator, and C C' C² are upright heads arranged at the side of said combustion-chamber.

The drum A is preferably cylindrical and of greater length than diameter, is arranged in a substantially vertical plane, and is provided with blow-off and steam-discharge pipes a a', communicating with its upper and lower ends. The heads C C' C² are of suitable size, are preferably arranged in a substantially circular series, and are usually utilized to form the upright wall of the combustion-chamber B. None of the heads C C' C² are arranged directly in front of the combustion-chamber B, as best seen at Fig. 1, in order that said combustion-chamber and the ash-box B', beneath the same, may be readily accessible through openings in the inclosing shell or jacket, presently described. I therefore arrange above the plane of the combustion-

chamber B at the front side of the drum A additional heads C³, having their opposite extremities connected to the upper and lower ends of the drum.

The drum A is connected to the heads C C' C² by suitable water connections or pipes c c' c² c³, which usually extend laterally from said drum and heads and are arranged one above the other, thus obviating undue weakening of the shell of the drum A and facilitating the practical operation and repair of the generator. The heads C C' C² extend upwardly, respectively, to the base, the intermediate portion, and the top of the drum A, and the water connections c c' c² extend laterally from the upper extremities of said heads and are connected, respectively, to the base, the intermediate portion, and the top of the drum A. The connections c³ are arranged beneath the connections c² and are interposed between the intermediate portions of the heads C² and the base of the drum A, and in order to facilitate securing of the connections c³ said heads are composed of upper and lower sections detachably secured together.

My improved generator, having its drum A and its heads C C' C² arranged and connected as described, is particularly durable and efficient, as the parts expand and contract freely and the water circulates in short substantially upright paths and passes both downwardly and upwardly from the base of the drum through said heads. The efficiency of the generator is additionally increased by tubes D, which are formed with closed outer ends and project laterally from the drum A, above the connections c c' c³ and below the connections c' c². The outer ends of the pipes D are preferably contracted for obviating the accumulation of sediment therein.

The lower ends of the heads C C' C² may be suitably connected, but I preferably provide my generator with a water-containing base E, from which said heads project upwardly. The base E is preferably formed by top and bottom plates e e', having depending flanges e² e³ at their outer edge, which extend beneath the lower face of the bottom plate e' and are suitably secured together by rivets e⁴. A base of this construction is economically formed, since it consists of but two plates, one of which forms both the top and upright walls

thereof, and it is particularly durable, as both plates are secured together at a point beneath the water-line in the base, thus obviating undue expansion of the joint between said plates.

5 My improved generator is provided with an inclosing shell or jacket F, consisting, preferably, of vertical front and rear sections ff' , detachably secured together at their adjacent edges and provided with converging upper
10 ends formed with a smoke-outlet f^2 . The shell or jacket F is preferably provided with an asbestos lining f^3 , and its lower end surrounds the base E and rests upon the rivets e^4 . Suitable openings f^4 f^5 are formed in the
15 shell or jacket F for permitting access to the combustion-chamber B and the ash-box B', and these openings are closed by doors f^6 f^7 , as best seen at Fig. 1.

The grate G for my generator may be of any
20 suitable construction and is here illustrated as consisting of separable sections for facilitating its securement and removal. This grate is preferably mounted upon a support G', which consists of a split ring provided
25 with detachable feet g' , mounted on the base E and having its opposite ends detachably secured together by suitable fastening means g^2 . A grate-support of this construction is readily withdrawn through the opening f^1 by
30 separating its adjacent ends and passing one end through said opening and turning the support until the opposite end is withdrawn. My improved generator is also provided with a suitable pressure-gage h , a water-glass h' ,
35 and a feed-pipe h^3 , which form no part of this present invention and are not herein specifically illustrated and described.

The operation of my generator will now be readily understood upon reference to the
40 foregoing description and the accompanying drawings.

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

45 1. In a generator, the combination of a drum supported above the combustion-chamber, upright heads arranged at the side of the combustion-chamber, connections or pipes for
50 connecting the upper ends of said heads to the drum, additional upright heads of greater length than the former heads arranged at the side of the combustion-chamber and extending
55 upwardly therefrom, and connections or pipes arranged above and beneath the former connections or pipes and connected to said drum and to the additional heads, substantially as and for the purpose described.

2. In a generator, the combination of a drum supported above the combustion-chamber,
60 upright heads arranged at the side of the combustion-chamber, connections or pipes for connecting the upper ends of said heads to the upper end of the drum, additional connections or pipes for connecting the intermediate
65 portions of said heads to the base of the drum, and additional upright heads formed

of less length than the former heads and arranged between said former heads, said additional heads having their lower ends arranged at the side of the combustion-chamber and their upper ends connected to the intermediate portion of the drum, substantially as and for the purpose specified.

3. In a generator, the combination of a drum supported above the combustion-chamber,
75 upright heads arranged at the side of the combustion-chamber, connections or pipes for connecting the upper ends of said heads to the drum, additional upright heads of greater length than the former heads arranged at the
80 side of the combustion-chamber and extending upwardly therefrom, connections or pipes arranged above and beneath the former connections or pipes and connected to said drum and to the additional heads, and tubes projecting
85 outwardly from the drum between said connections or pipes and formed with closed outer ends, substantially as and for the purpose set forth.

4. In a generator, the combination of a drum
90 supported above the combustion-chamber, upright heads arranged at the side of the combustion-chamber, connections or pipes for connecting the upper ends of said heads to the upper end of the drum, additional connections or pipes for connecting the intermediate
95 portions of said heads to the base of the drum, additional upright heads formed of less length than the former heads and arranged between said former heads, said additional
100 heads having their lower ends arranged at the side of the combustion-chamber and their upper ends connected to the intermediate portion of the drum, and tubes projecting outwardly from the drum between said connections or pipes and formed with closed outer ends, substantially as and for the purpose described.

5. In a generator, the combination of a drum supported above the combustion-chamber,
110 upright heads arranged at the side of the combustion-chamber and extending upwardly therefrom and having their upper ends and intermediate portions connected to the drum, and tubes formed with closed outer ends and
115 projecting outwardly from the drum, substantially as and for the purpose described.

6. In a generator, the combination of a water-containing base, a drum supported above the combustion-chamber, upright heads arranged at the side of the combustion-chamber and having their lower ends connected to the base and their upper ends extended above the combustion-chamber, water connections between the drum and the upper ends and
120 the intermediate portions of the heads and tubes extending laterally from the drum between the water connections, substantially as and for the purpose specified.

7. In a generator, the combination of a drum
130 supported above the combustion-chamber, upright heads arranged at the side of the

combustion - chamber and extending upwardly therefrom and having their upper ends connected to the intermediate portion of the drum, and tubes formed with closed outer ends and projecting outwardly from the drum above said heads, substantially as and for the purpose described.

8. In a generator, the combination of a water-containing base, an upright drum supported above the combustion-chamber, upright heads of unequal length arranged at the side of the combustion-chamber and having their lower ends connected to the base, and their opposite ends provided with connections extending laterally, and opening, respectively, into the top, the intermediate portion, and the base of the drum, and tubes formed with closed outer ends and projecting outwardly from the drum between the connections of the heads, substantially as and for the purpose set forth.

9. In a generator, the combination of a water-containing base, a drum supported above the combustion-chamber, upright heads arranged at the side of the combustion-chamber and having their lower ends connected to the base and their upper ends extended above the combustion-chamber, water connections between the drum and the upper ends and the intermediate portions of the heads, and tubes extending laterally from the drum and having closed contracted outer ends, substantially as and for the purpose specified.

10. The herein-described water-containing base for a generator, the same consisting of a bottom wall having a downturned flange at its outer edge, a top wall provided with a downturned flange at its outer edge lapping upon the former flange, and forming the side wall of the chamber, and rivets passed through

said flanges, substantially as and for the purpose described.

11. In a generator, the combination of a drum supported above the combustion-chamber, upright heads arranged at the side of the combustion-chamber and extending upwardly therefrom and having their upper portions connected to the drum, the lower ends of two of the heads being separated a greater distance than the corresponding ends of the remaining heads, a shell inclosing said drum and upright heads and formed with an opening therein aligned with the space between said two of the heads, a grate-support arranged within the shell and inclosed by the upright heads, said grate-support consisting of a split ring formed of less height than the opening in the shell and having its opposite ends detachably secured together, substantially as and for the purpose described.

12. In a generator, the combination of a drum supported above the combustion-chamber, upright heads arranged at the side of the combustion-chamber and extending upwardly therefrom and having their upper ends and intermediate portions connected to the drum, and an inclosing shell consisting of vertical sections removably secured together for permitting access to the heads, substantially as and for the purpose specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Fairport, in the county of Monroe, in the State of New York, this 25th day of January, 1896.

DEYO S. WORDEN.

Witnesses:

LEVRET B. HARKNESS,
EUGENE BAKER.