No. 733,862. PATENTED JULY 14, 1903.

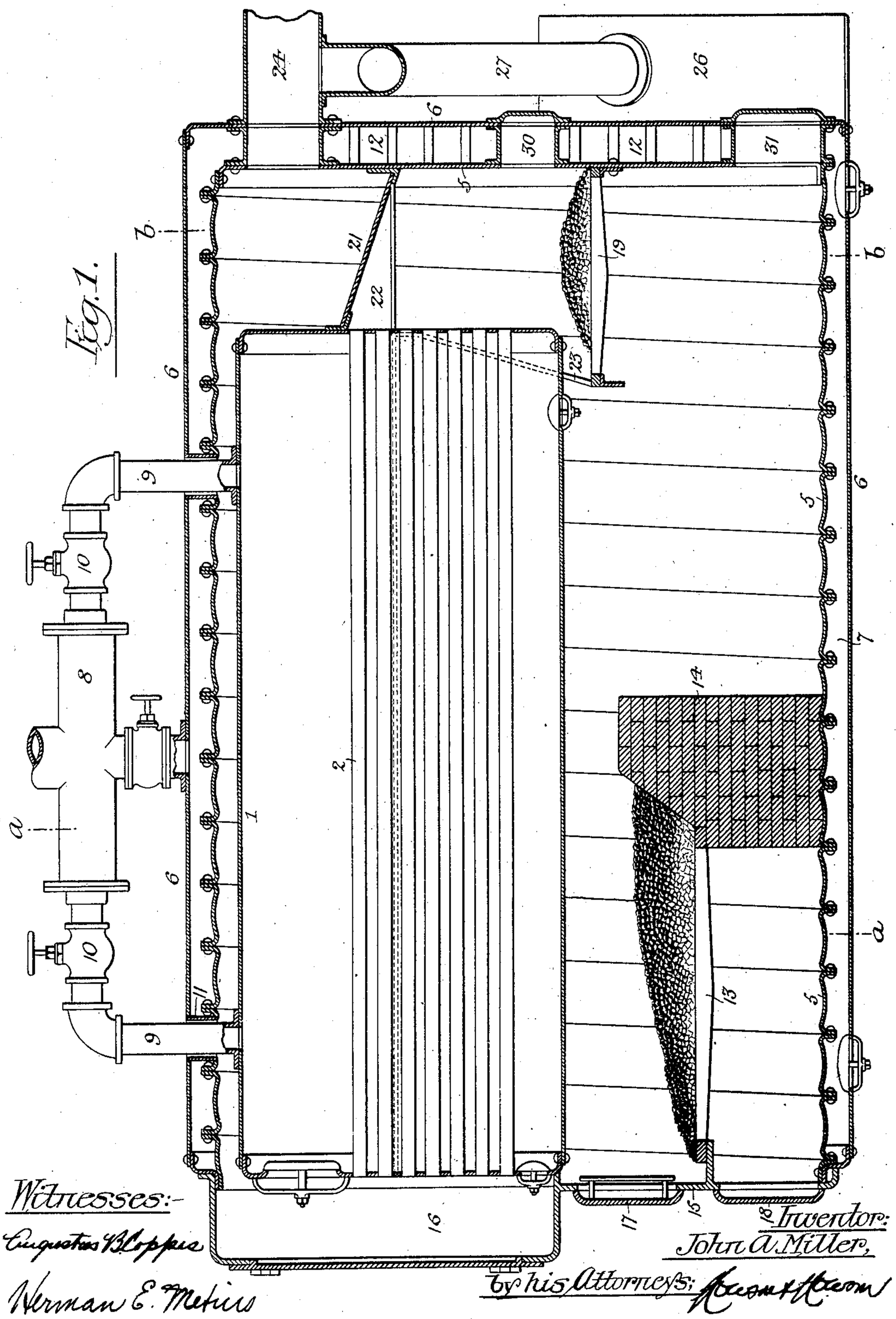
J. A. MILLER.

STEAM GENERATOR.

APPLICATION FILED FEB. 2, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:-

Augustus B. Coppus

Herman E. Metius

Inventor:

John A. Miller,

by his Attorneys: Bacon & Bacon

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Fig. 2.

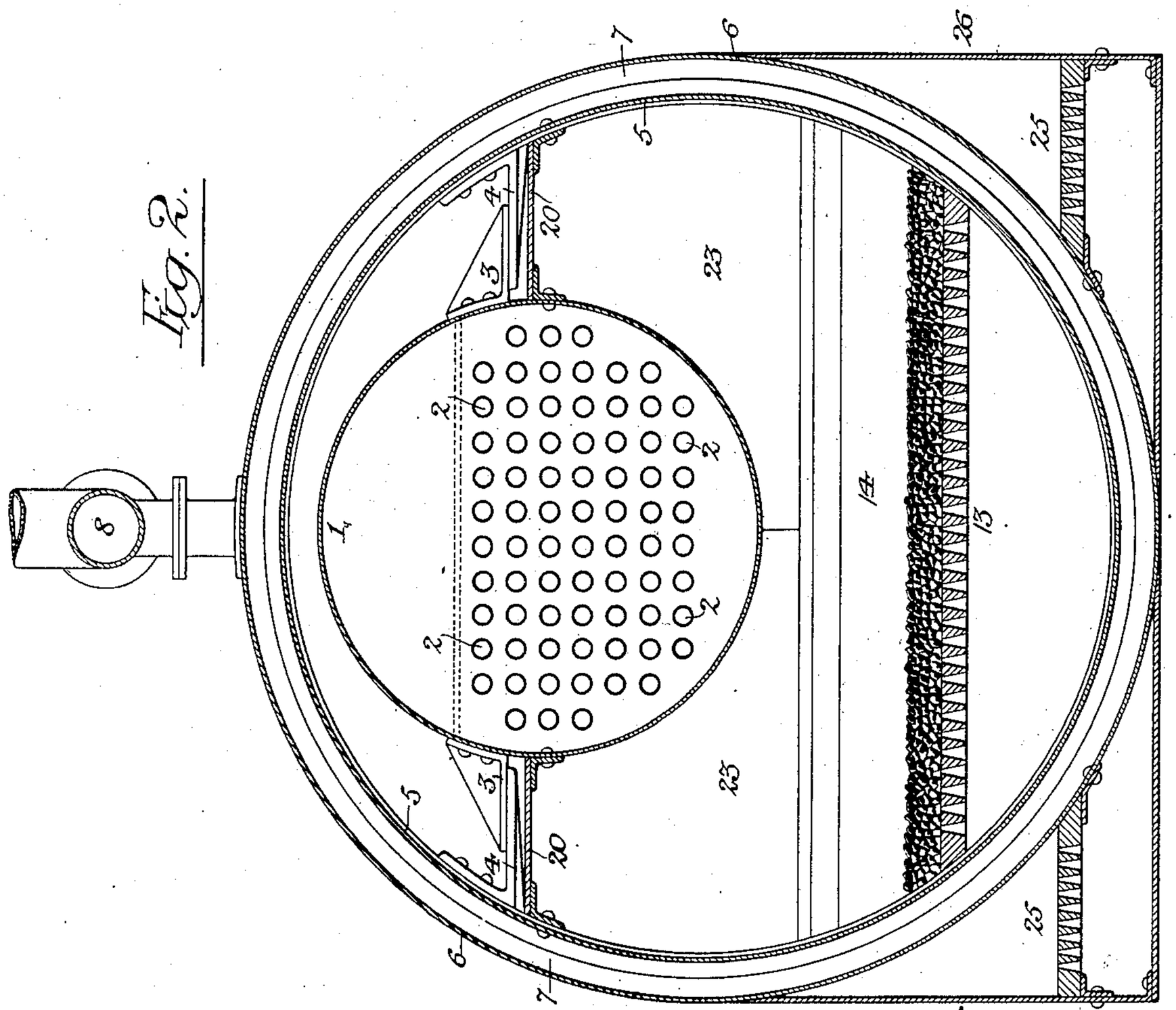
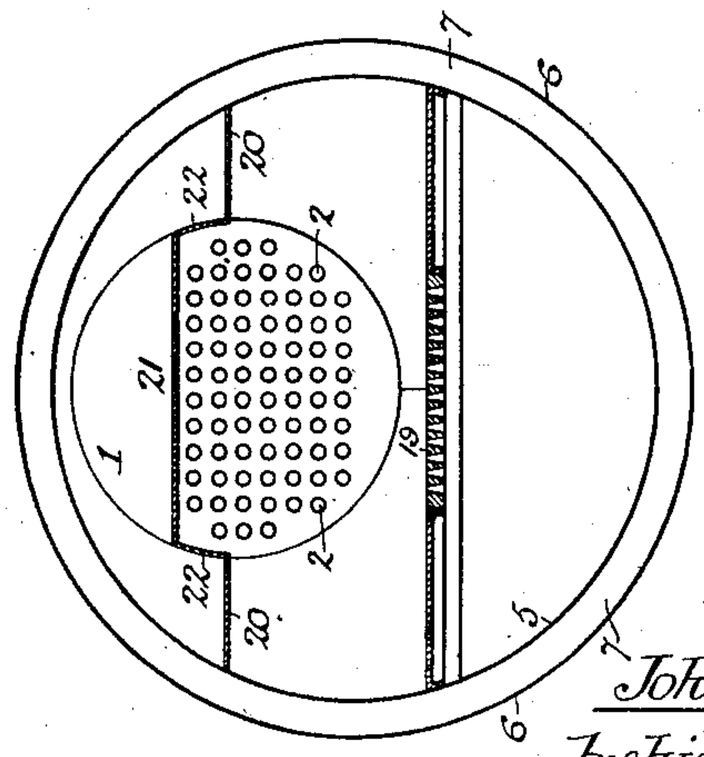


Fig. 3.



Witnesses:-

Frank L. A. Graham.

Herman E. Metius

Inventor:-

John A. Miller,

by his Attorneys;

Howson & Howson

No. 733,862. Patented July 14, 1903.

UNITED STATES PATENT OFFICE.

JOHN A. MILLER, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 733,862, dated July 14, 1903.

Application filed February 2, 1903. Serial No. 141,544. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. MILLER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Steam-Generators, of which the following is a specification.

My invention consists of a steam-generator provided with a water-jacketed casing inclosing the combustion-chamber and taking the place of a brick setting, this water-jacketed casing constituting a supplementary generator.

The invention also comprises certain arrangements of fireplaces and dampers or deflecting-plates whereby extended circulation of the products of combustion is insured, the formation of smoke is prevented, and provision is afforded for heating the supplementary generator or water-jacketed casing alone, if desired.

In the accompanying drawings, Figure 1 is a view, partly in longitudinal section and partly in elevation, of a steam-generator constructed in accordance with my invention. Fig. 2 is a transverse section on the line *a a*, Fig. 1; and Fig. 3 is a transverse section, on a reduced scale, on the line *b b*, Fig. 1.

1 represents a steam-generator of the ordinary cylindrical type with longitudinal tubes 2, this generator being mounted, by means of the usual hangers 3 and 4, within an outer casing comprising an inner shell 5 and an outer shell 6, inclosing a chamber 7, so that said casing constitutes a supplementary steam-generator, the steam-space communicating, through a suitable valved pipe, with a drum 8, with which the steam-space of the generator 1 also communicates through pipes 9, having valves 10, as shown in Fig. 1, said pipes 9 passing through sleeves 11, which permanently connect the inner and outer shells 5 and 6 and form steam and water tight joints therewith.

The flat rear portions of the shells 5 and 6 are provided with internal stays 12, as is usual in constructions of this class; but the cylindrical portion of the inner shell 5 is composed of a strip or plate having opposite edge flanges and by preference bent into concavo-convex form between these flanges, as shown in Fig. 1, this strip being coiled spirally, so that the edge flanges of the same abut and can be secured by riveting, welding, or in any other available manner, so as to form a continuous water-tight shell, which is stiffened and strengthened against collapse under pressure, first, by reason of the concavo-convex form of the coiled strip or plate of which it is composed, and, secondly, by reason of the stiffening and strengthening of the shell by the external ribs formed by the united flanges of said strip or plate.

The lower portion of the combustion-chamber within the shell 5 has a fireplace 13 and transverse bridge-wall 14, and the front of said combustion-chamber is closed by a plate 15, having a smoke-box 16, fire-door 17, and ash-pit door 18, and at the rear of the combustion-chamber is a second fireplace 19, extending across the same and from the rear end of the generator 1 to the rear end of the inner shell 5.

Extending from the shell of the generator 1 to the shell 5 on each side of said generator 1 is a partition-plate 20, and extending from the rear end of said generator 1 to the rear end of the shell 5 is another partition-plate 21, having side portions 22, Fig. 3, which join the rearwardly-extending portions of the side partition-plates 20.

Extending from the side partition-plates 20 to the front of the grate of the rear fireplace 19 are partition-plates 23, the result of this construction being that the products of combustion arising from the front fireplace 13 envelop the lower portion of the generator 1, but are prevented from rising into the upper portion of the combustion-chamber within the shell 5 by reason of the side partition-plates 20.

Direct flow of the products of combustion into the space beneath the rear partition-plate 21 is also prevented by the plates 23. Hence the products of combustion after circulating around the lower portion of the generator 1 and in contact with the lower portion of the shell 5 are caused to pass through the incandescent fuel contained in the rear fireplace 19, the products of combustion from both fireplaces then passing through the tubes 2 of the boiler to the smoke-box 16 and from the latter rearwardly through the upper portion of the combustion-chamber within the shell 5, thereby enveloping the upper portion of the

generator 1 and being brought into intimate contact with the upper portion of said shell 5 before escaping through the discharge-flue 24 at the rear of the outer casing. By causing the products of combustion from the main or forward fireplace 13 to pass through the fire in the rear or supplementary fireplace 19 the free carbon escaping from the front fireplace is consumed, and discharge of smoke is thereby prevented and the full heat of the products of combustion is utilized.

On each side of the outer casing of the generator are fireplaces 25, whose casings 26 extend rearwardly beyond said outer casing, as shown in Fig. 1, each of these rearwardly-projecting casings communicating with the discharge-flue 24 through a branch pipe 27. The purpose of these supplementary fireplaces 25 is to generate steam in the outer casing when the contents of the generator 1 have been blown off for cleaning or other purposes, the supply of steam from the supplementary generator formed by the outer casing being sufficient to operate the pump, whereby the main generator 1 is supplied with water preparatory to again raising steam therein. These supplementary fireplaces may not, however, be necessary in all cases, as the pressure of steam in the outer casing may be sufficient for all needful purposes after the generator 1 has been disconnected by closing the valve 10, so as to permit of the blowing off of the same.

The rear portion of the outer casing has a feed-opening 30 and an ash-discharge opening 31, provided with suitable doors, and both the generator 1 and the outer casing are provided with the necessary manholes and handholes for permitting access to the interior of the same, as usual.

The outer casing not only serves as a supplementary generator, but also as a mounting for the main generator 1 in place of a permanent brick setting therefor, the structure as a whole constituting a portable unit.

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

1. The combination of a main steam-generator with a water-jacketed casing constituting a supplementary generator, both of said generators communicating with a common steam-drum above the same and said outer casing containing a fireplace and a combustion-chamber within which the main generator is mounted, substantially as specified.

2. The combination of the main steam-generator having longitudinal tubes therein, a water-jacketed casing containing a combustion-chamber in which said main steam-generator is mounted, a fireplace in the forward portion of said combustion-chamber, and partition-plates extending from the sides and rear of the main generator to the sides and rear of the casing above the level of the tubes of said main generator, substantially as specified.

3. The combination of the main steam-generator, a water-jacketed casing containing a combustion-chamber in which said main steam-generator is mounted, longitudinal tubes in said main steam-generator, front and rear fireplaces in the combustion-chamber, and partition-plates extending from the sides and rear of the main steam-generator to the sides and rear of the outer casing above the level of the tubes of said main generator, substantially as specified.

4. The combination of the main steam-generator, the water-jacketed casing containing a combustion-chamber within which said main steam-generator is mounted, a fireplace in the forward portion of said combustion-chamber, side partition-plates extending from the main steam-generator to the inner shell of the casing throughout the length of said generator, other partition-plates extending from the sides of the generator to the inner shell of the outer casing at the rear of said generator, and a partition-plate extending from the rear of said generator to the rear end of the inner shell of the casing, substantially as specified.

5. The combination of the main steam-generator, a water-jacketed casing containing a combustion-chamber in which said main generator is mounted, a fireplace in said combustion-chamber, and a fireplace outside said casing, substantially as specified..

6. The combination of the main steam-generator, a water-jacketed casing containing a combustion-chamber in which said main generator is mounted, a fireplace in said combustion-chamber, and a fireplace outside of said casing, the latter fireplace extending rearwardly beyond the casing and said rearward extension communicating with the discharge-flue, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN A. MILLER.

Witnesses:
F. E. BECHTOLD,
JOS. H. KLEIN.