

No. 647,761.

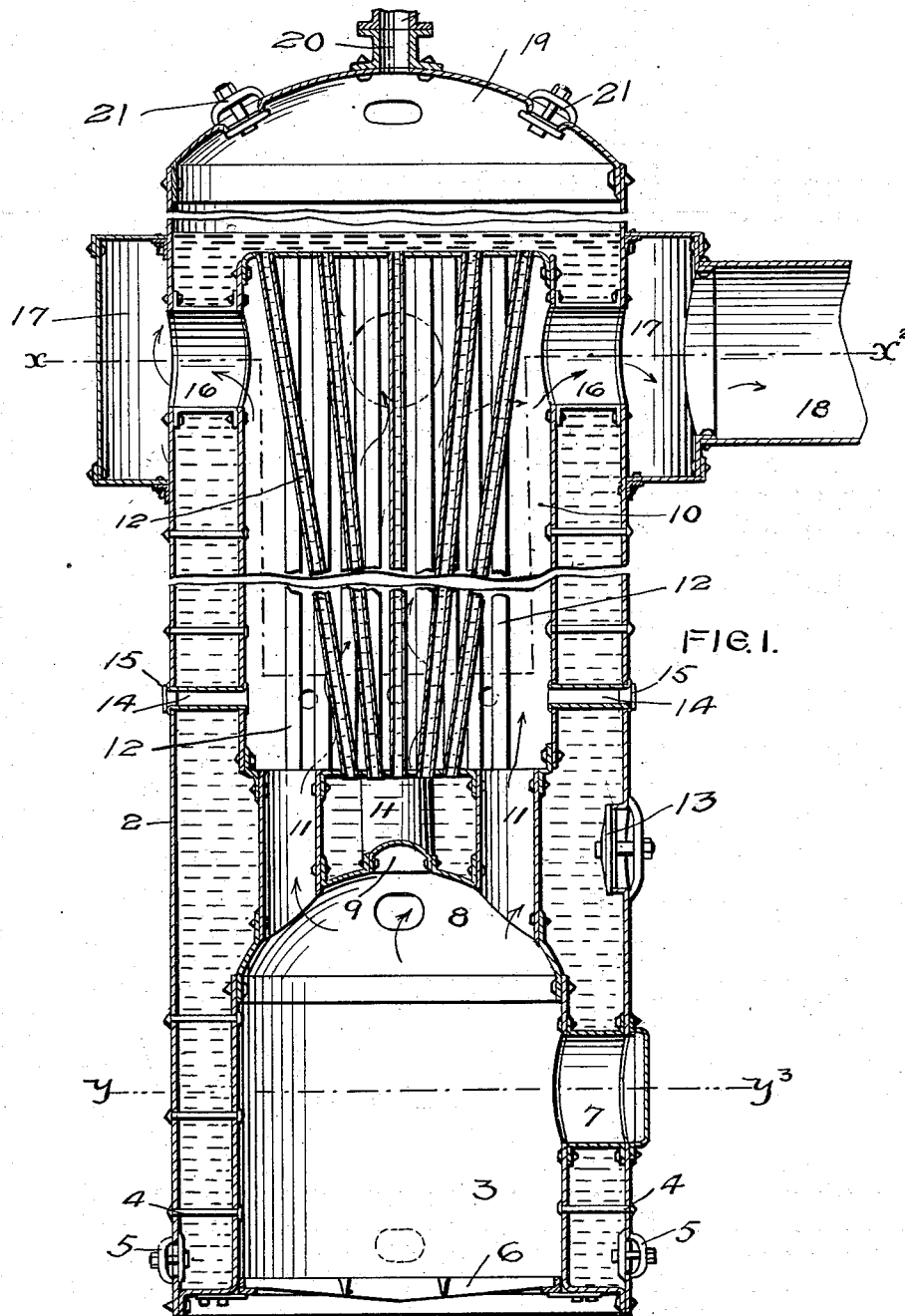
Patented Apr. 17, 1900.

W. J. RANTON.
STEAM GENERATOR.

(Application filed Oct. 9, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES.

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Richard Paul

INVENTOR

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BY

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HIS ATTORNEYS

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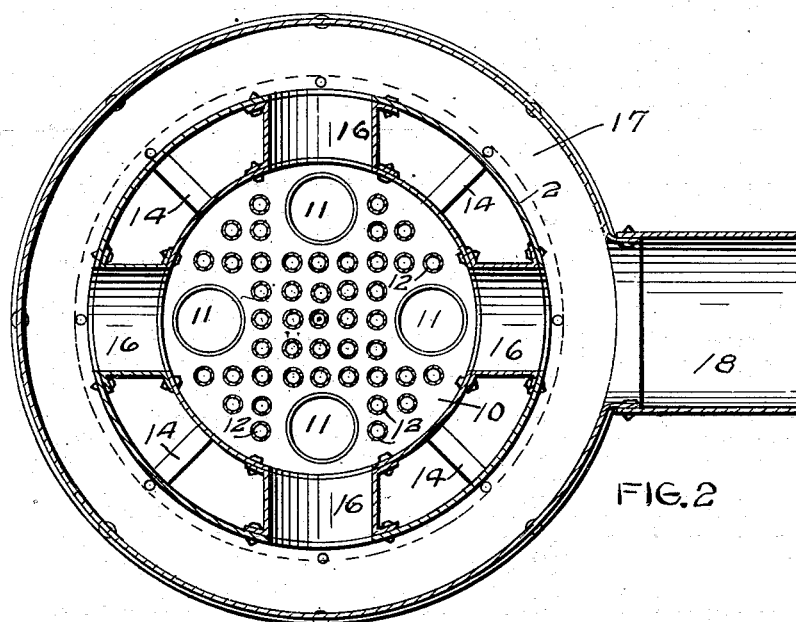


FIG. 2

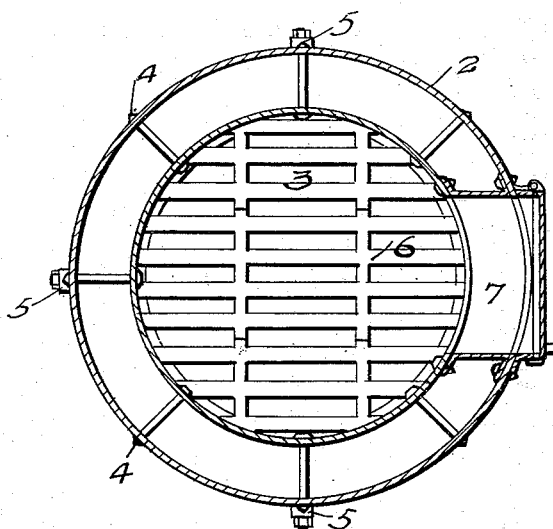


FIG. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM J. RANTON, OF MINNEAPOLIS, MINNESOTA.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 647,761, dated April 17, 1900.

Application filed October 9, 1899. Serial No. 733,006. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. RANTON, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

My invention relates to upright steam generators or boilers; and the objects of the invention are, first, to provide an upright steam-generator wherein the use of castings is avoided and being of but few parts is in consequence economical to manufacture; second, to provide an upright steam-generator of the stationary class wherein the fire-pot and water-tubes are inclosed within a shell or jacket and the use of brick settings avoided, and, third, to provide an upright steam-generator wherein an unusually-large heating-surface is exposed to the flames, insuring the rapid generation of steam with a minimum amount of fuel.

The invention consists generally in providing an upright steam-generator wherein the vertical water-tubes and fire-pot are completely submerged in and protected by a circulating body of water.

Further, the invention consists in providing a fire chamber or drum having a series of water-tubes and arranged in the upper part of the shell or jacket, with a series of flues connecting said drum with the fire-pot.

Further, the invention consists in providing an annular ring or drum outside the shell of the furnace and a series of openings in the shell or jacket communicating with said ring and with the fire-chamber.

Further, the invention consists in providing particular means for obtaining access to the interior of the fire-chamber for cleansing purposes.

Further, the invention consists in particular constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a vertical sectional view of an upright boiler embodying my invention. Fig. 2 is a sectional view on the line *xx* of Fig. 1. Fig. 3 is a similar section on the line *yy* of Fig. 1.

In the drawings, 2 represents a steel shell or jacket within which, at the base, a fire-pot 3 is concentrically arranged, having an outwardly-turned flange at its lower end secured to and forming a water-tight joint with the inner wall of said shell, a sufficient space being provided between said fire-pot and said shell to permit the free circulation of water therein. The shell of the generator or boiler rests upon a suitable base, and the fire-pot is rigidly secured by a series of stay-bolts 4, passing through the walls of the same and through the inclosing shell, and access to the water-space surrounding said fire-pot is permitted through hand-holes 5, provided in said shell. A grate 6 is provided in the lower part of said fire-pot, and a fuel-opening is provided in its walls opposite a corresponding opening in said shell and connected therewith by a sleeve 7, forming a passage for the fuel, its outer end being closed by the usual fuel-door. At the top of the fire-pot is a curved crown-sheet 8, securely riveted to the top of said pot and having in its center a circular opening covered by a curved disk or plate 9, forming a pocket or recess in the center of the crown-sheet, into which the flames and products of combustion pass and are deflected back and to the sides of the pot. Above said fire-pot in the upper part of said shell is a cylindrical drum or chamber 10, concentric with said shell and fire-pot and rigidly secured by a series of stay-bolts, in the manner heretofore described, and connected with the top of said fire-pot by a series of vertical flues 11, that are riveted over openings in the top of said crown-sheet and in the bottom of said chamber, forming passages through which the flames, smoke, and products of combustion pass from the fire-pot into the interior of said drum. A sufficient space is provided between said drum and the shell of the generator to permit the water to circulate freely therein around and over the top of said drum and between the flues connecting the bottom of the same with said fire-pot, and becoming heated by contact with the walls of said drum, fire-pot, and flues permits the rapid generation of steam. To increase the heating-surface of

the boiler, and thus quicken the generation of steam, I provide a series of vertical water-tubes 12 within said drum 10, the ends of said tubes being open and secured to the heads of said drum, and being arranged around the tops of said flues are subjected to an intense heat from the fire-pot, causing the water in said tubes to be heated very rapidly, quickening the circulation of the same and the generation of steam. These water-tubes I prefer to arrange substantially in the manner shown in Fig. 1, wherein the tubes near the walls of the drum are substantially vertical and arranged a uniform distance from each other and the walls of the drum, while the tubes at the center of the drum are slightly inclined or staggered to compensate for the space taken up by the flues at the bottom of the drum. Access is permitted to said flues, said crown-sheet, and the bottom of the drum through a manhole 13, provided in the shell of the generator, and I also provide a series of tubes 14, fitting within holes in said shell and said drum, through which access may be had to said water-tubes to clean the soot and dirt therefrom, the outer ends of said tubes being normally closed by small caps 15. At the top of the generator I provide a series of sleeves 16, securely riveted to the shell and said drum over corresponding openings therein and forming smoke-outlets leading to an annular drum or chamber 17, that is riveted to the outside of said shell over said smoke-outlets and having in its wall an opening leading to the smoke-pipe 18. This construction permits the smoke and products of combustion to be discharged from the top of the drum on four sides, and the smoke circling through the chamber 17 aids in heating the body of water inclosed within said shell around and over the top of said drum. The top of the boiler is completed by a steam-dome 19, securely riveted to the shell of the generator and having a steam-outlet pipe 20 and a series of manholes 21, through which access may be had to the interior of said dome and the top of said drum. In the construction and setting up of the boiler heretofore described no castings are used and the brick-work ordinarily employed in the setting of a boiler is dispensed with. By providing a water-circulating space around the fire-pot, the flues, and the fire-chamber or water-tube drum an unusually-large heating-surface is exposed to the contact of the water, and in consequence rapid generation of steam is insured.

The water-tubes vertically arranged within the drum are directly exposed throughout their entire length to the action of the flames, smoke, and products of combustion that pass up through the vertical flues connecting the top of the fire-pot and said drum, quickening the circulation of water therein and the generation of steam, and as the top of the water-tube drum is covered with water the ends of

the tube at each head of the drum are protected.

In various ways the details that I have here-in described may be modified, and I therefore do not wish to be confined to the particular construction set forth.

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

1. In a steam-generator, the combination, with an upright shell or jacket having a combustion-chamber at one end and a steam-dome at the other, of a drum arranged between said combustion-chamber and said dome, a space being provided between the walls of said drum and said jacket wherein water circulates, a series of stay-bolts connecting said drum and jacket, a series of water-tubes provided within said drum, a series of flues connecting said drum with said combustion-chamber, said flues being near the circumference of said drum and chamber, whereby access to the outer tubes and said stay-bolts is permitted, and smoke-outlet passages provided in said drum and jacket, substantially as described.

2. In a steam-generator, the combination, with an upright shell or jacket, of a combustion-chamber arranged in the base thereof, a drum above said combustion-chamber, a space being provided between the walls of said drum and said jacket wherein water circulates, a series of stay-bolts connecting said drum and said jacket, a series of flues leading from said combustion-chamber to said drum, said flues being near the circumference of said chamber and said drum whereby access may be had to the inner walls of said drum, a series of water-tubes provided in said drum, the tubes near the center of said drum being outwardly inclined or staggered from the bottom toward the top, smoke-outlet passages provided in said drum and jacket, and a steam-dome arranged above said drum, substantially as described.

3. In a steam-generator, the combination, with a shell, of a fire-pot therein having a curved crown-sheet provided with a central opening, a curved plate covering said opening and forming therewith a recess or pocket, a drum above said fire-pot, a space being provided between the same and said shell wherein water circulates, a series of water-tubes provided within said drum, a series of flues connecting the lower end of said drum and said fire-pot, said flues being near the circumference of said drum and fire-pot and inclosing said pocket and permitting convenient access to said drum, substantially as described.

4. In an upright steam-generator, the combination, with a shell, of a combustion-chamber arranged in the lower part thereof, a drum supported above said chamber, a series of flues connecting said drum and said chamber, said flues being near the circumference of said drum and chamber, a series of water-tubes

provided in said drum, their lower ends being accessible through said flues, the central or middle tubes of the series being staggered or inclined from the bottom of said drum toward the top, a steam-dome provided in the top of said shell above said drum, and a series of hand-holes provided in said dome through which access may be had to the up-

per ends of said tubes for removal or repairs, substantially as described. 10

In witness whereof I have hereunto set my hand this 4th day of October, 1899.

WILLIAM J. RANTON.

In presence of—

RICHARD PAUL,
M. C. NOONAN.