

No. 656,536.

Patented Aug. 21, 1900.

D. FITZGIBBONS.
BOILER.

(Application filed Dec. 28, 1899.)

(No Model.)

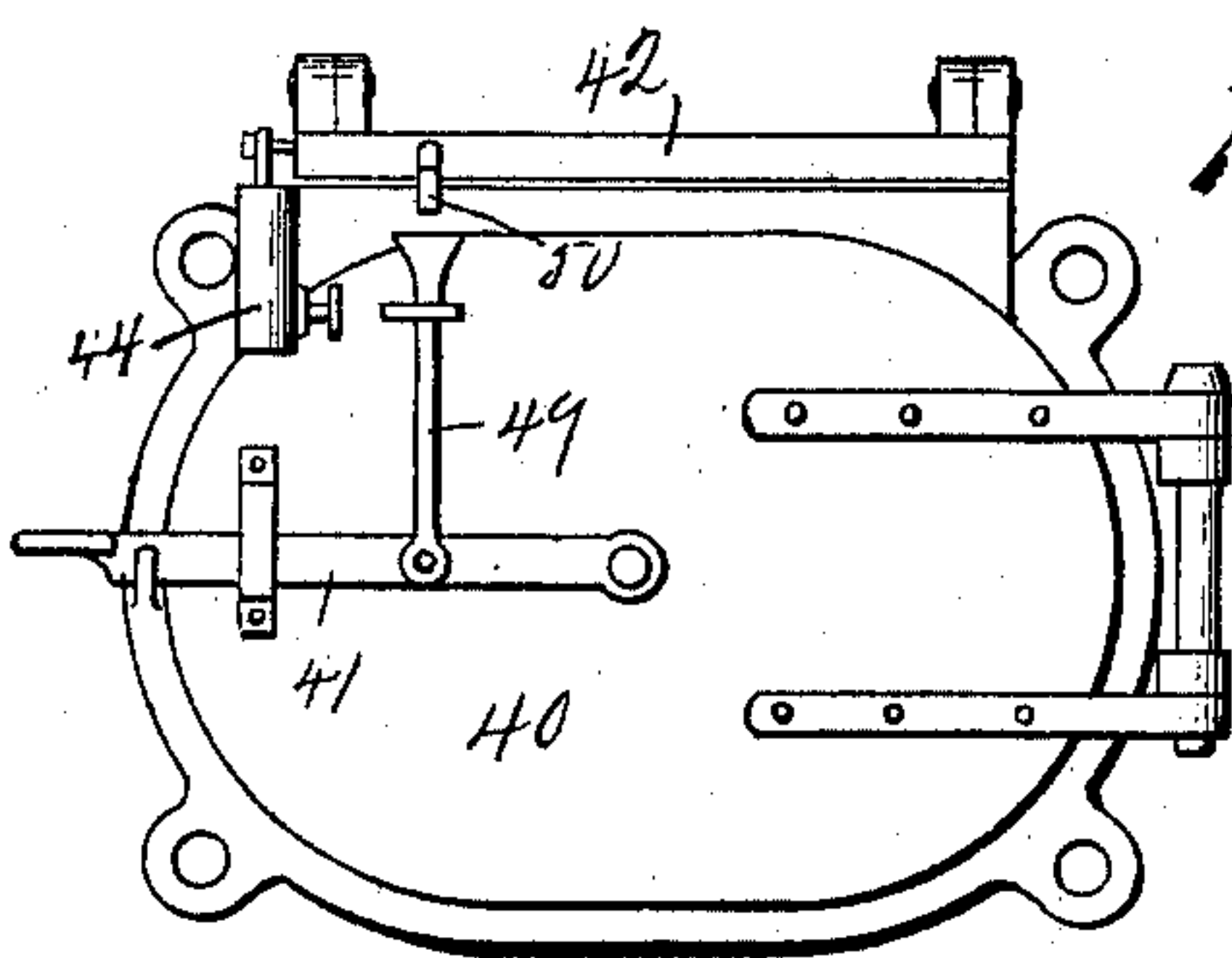
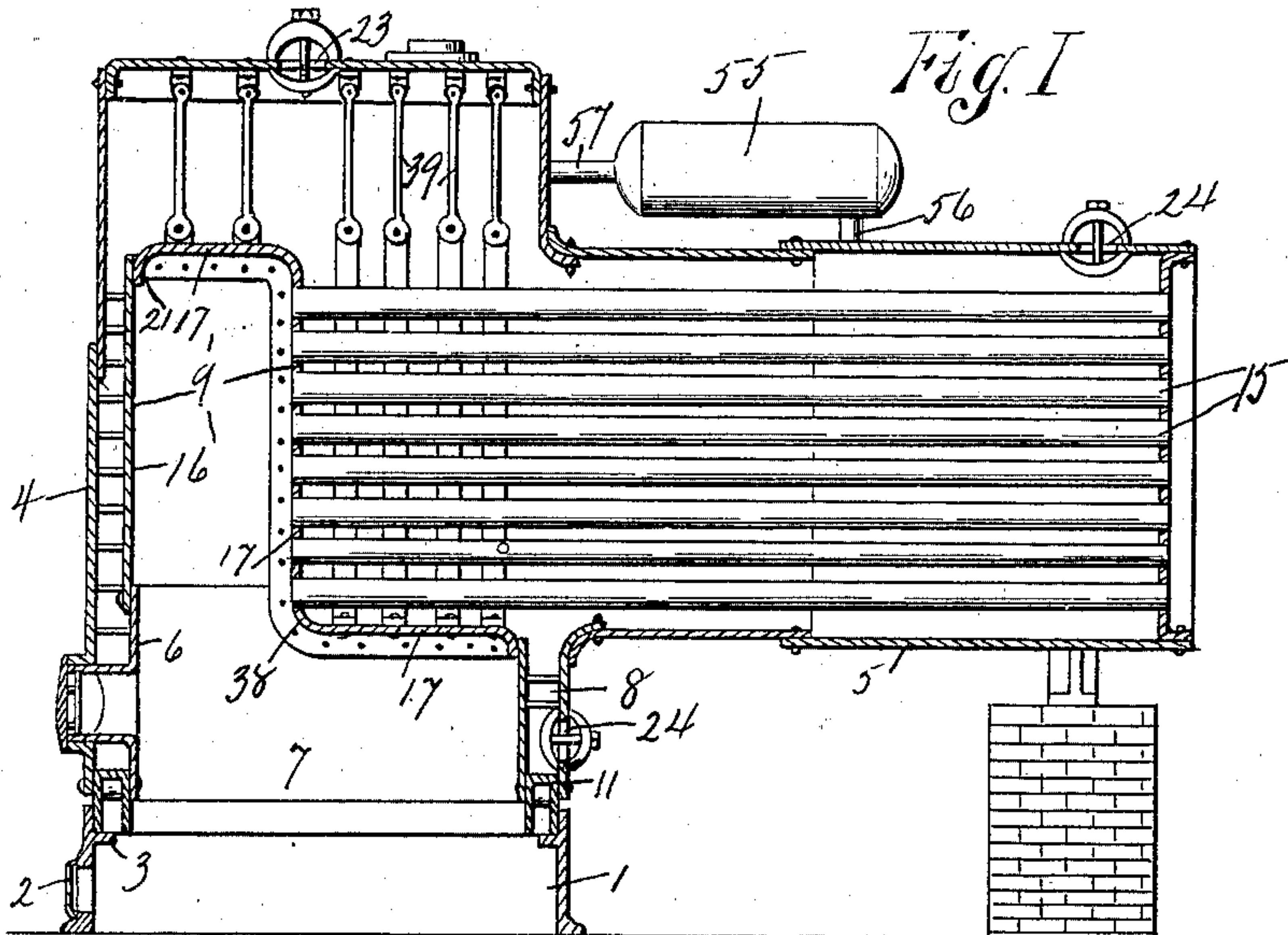


Fig. III.

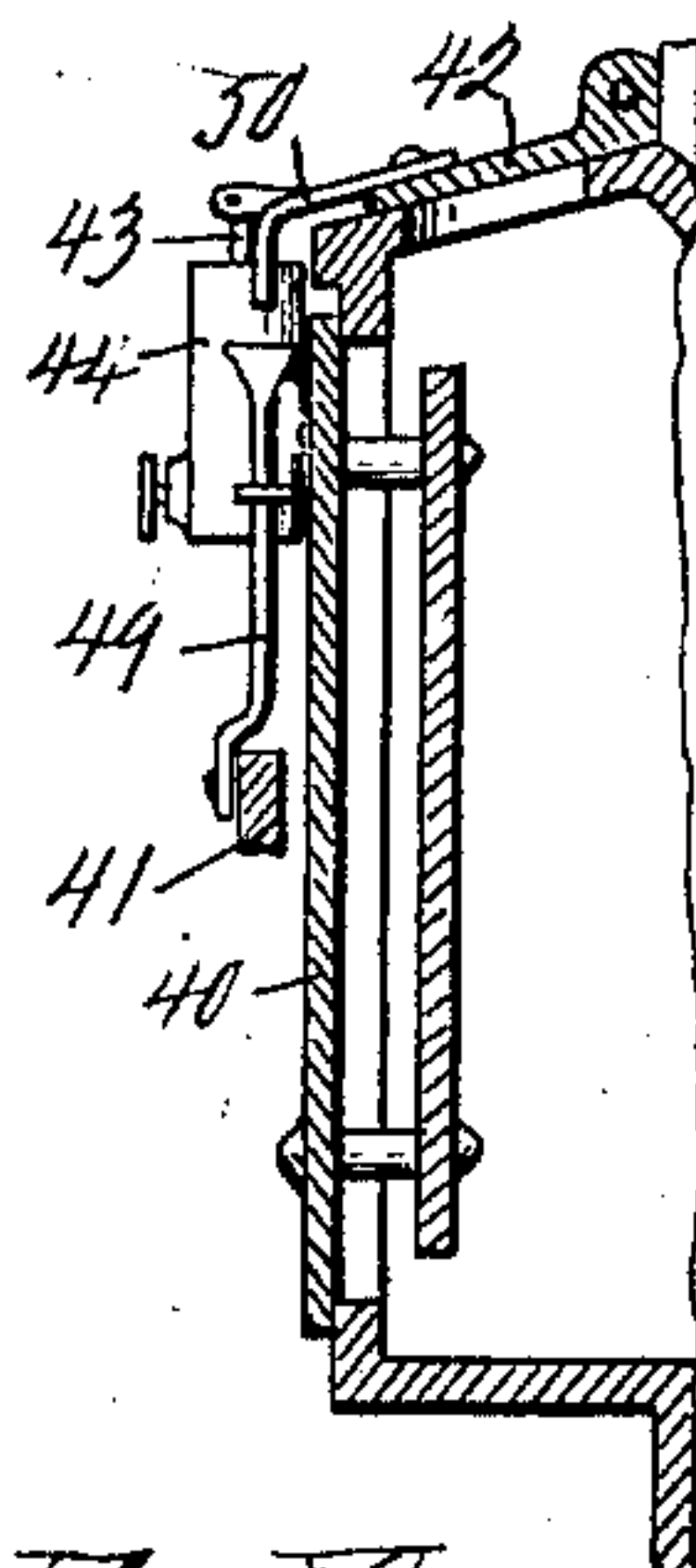


Fig. IV.

Fig. II.

Fig. V.

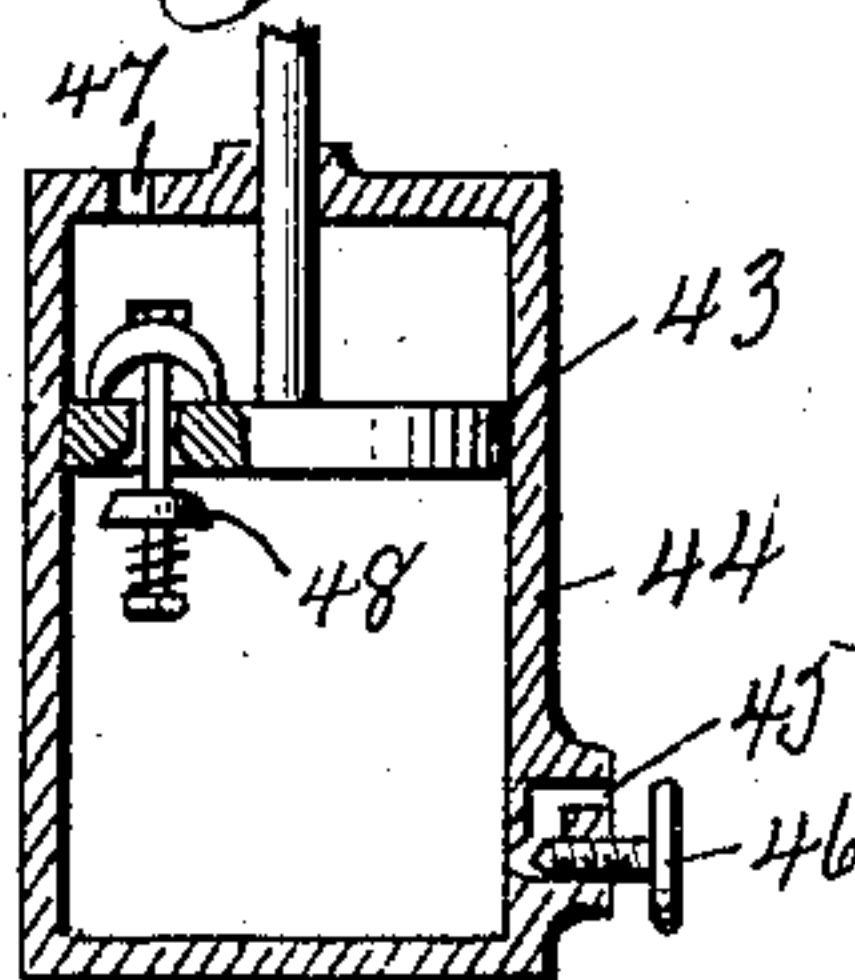


Fig. VI.

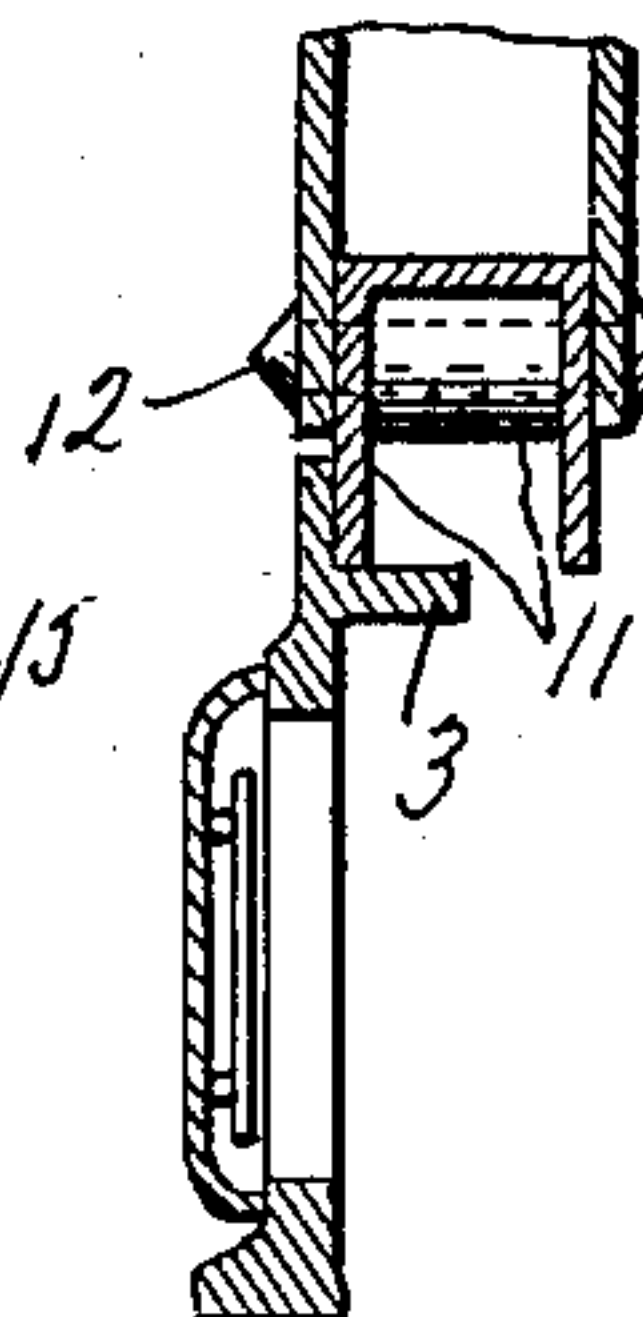
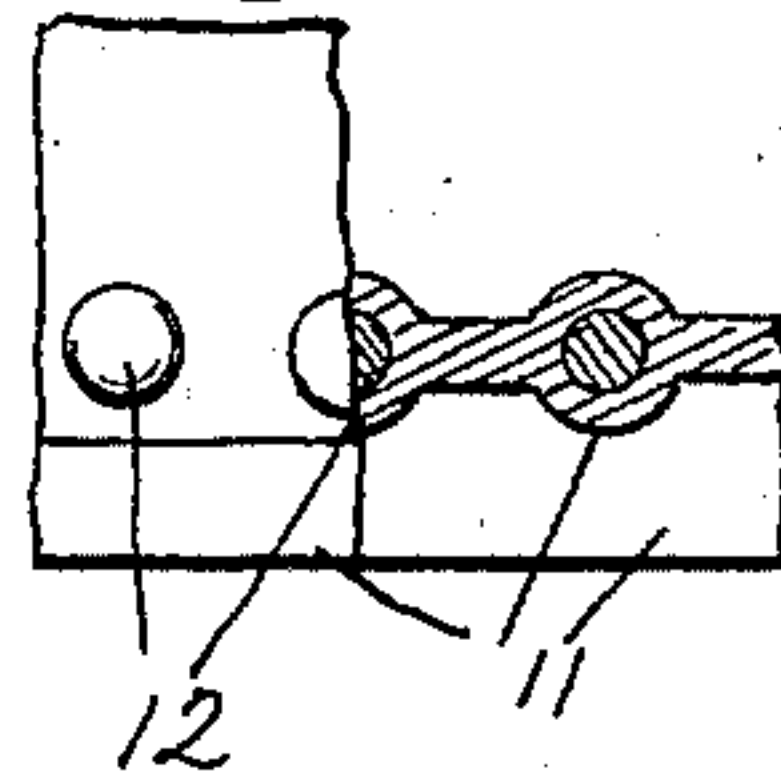


Fig. VII.



WITNESSES:

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DAVID FITZGIBBONS, OF OSWEGO, NEW YORK.

BOILER.

SPECIFICATION forming part of Letters Patent No. 656,536, dated August 21, 1900.

Application filed December 28, 1899. Serial No. 741,782. (No model.)

To all whom it may concern:

Be it known that I, DAVID FITZGIBBONS, of Oswego, in the county of Oswego, in the State of New York, have invented new and useful
5 Improvements in Boilers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to a new construction
10 of steam or hot-water boiler; and it consists in certain features of construction by which the boiler is made strong and more durable and more efficient and economical in operation. Its important feature is the single sheet
15 forming the crown of fire-box and combustion-chamber and rear plate of combustion-chamber.

My invention will be better understood by reference to the accompanying drawings, in
20 which the same reference-numerals indicate the same parts in all the figures.

Figure I is a longitudinal section of my improved boiler. Fig. II is a corresponding section showing a variation in construction, portions being broken away. Fig. III is a front
25 elevation of the fire-door and air-door. Fig. IV is an enlarged vertical section thereof. Fig. V is an enlarged vertical section of the cylinder by which gradual closing of the air-door is effected. Figs. VI and VII are respectively an enlarged vertical section and an elevation, with portions broken away, showing the arrangement of the steel ring between
30 the lower edges of the inner and outer shell.

In the drawings, 1 indicates the cylindrical ash-pit, formed separate from the main portion of the boiler, preferably of steel, having the usual door 2 and an inwardly-extending ledge
35 3 for supporting the front portion of the boiler, whose construction will now be described.

4 indicates the vertical outer shell of the boiler, with the horizontal tube-containing extension 5, and 6 the inner shell forming the substantially-cylindrical lower portion or the
45 fire-box 7, 8 8 indicating the water-leg between the inner and outer shells. From the front portion of said fire-box section extends the upper section 9, substantially semicircular or a little less than a semicircle in cross-section, forming the combustion-chamber.
50 11 indicates the water-space ring, made preferably of steel of sufficient thickness to fill

the space between the lower edges of the inner and outer shells and perforated to receive rivets 12 for securing the parts in position, 55 said ring being preferably corrugated between the rivets to diminish the weight, as shown in Fig. VII. It will be noticed that these water-legs 8 8, between the lower portions of the inner and outer shells, are of substantially-uniform diameter from top to bottom, neither the inner nor the outer shells being bent for the purpose of connecting them together. The ring rests on the annular ledge
60 3 of the ash-pit for supporting the boiler.

The combined fire-box 7 and combustion-chamber 9 are preferably formed, as here shown, with a cylindrical lower portion and a substantially-semicircular upper portion, by which construction the greatest heat is applied directly to the tubes 15, which extend
70 forwardly over and into the hottest part of the fire, and for this exposure to the fire the inner shell is particularly adapted by its special construction. To the top of the lower
75 shell 6 is secured front plate 16, bent into a semicircle, as shown in Fig. I, or bent into a half-dome 37, as shown in Fig. II.

The important feature of my invention is the construction of the plate 17, bent at right
80 angles at the point 38 to form the crown-sheet of the fire-box and the rear plate of the combustion-chamber. By making the plate continuous at this point and forming continuously the top of the combustion-chamber I
85 have done away with joints, thicknesses of metal, &c., and made the plate stronger. This plate 17 may be riveted to the front plate at the joint 21, as shown in Fig. I, or, as shown in Fig. II, may be secured at joint 22 to the
90 face-plate 16, bent toward the rear in the form of a half-dome 37. The tubes 15 are secured in the vertical portion plate 17 by expanding and beading in the usual manner. Stays 39
95 39 are provided, extending between the inner and the outer shell and bracing the various parts of the boiler. By this construction and arrangement of plates I have produced a strong and durable boiler and one in which all joints are easily reached for calking,
100 riveting, and repairing, 23 being the manhole, and 24 24 hand-holes closed by the usual means.

I wish to describe a device of my invention

for opening automatically an air-door and regulating its closing.

40 is the door, provided with usual baffle-plate and latch 41.

5 42 is the air-door, having piston 43, fitting cylinder 44, provided with vent 45 and thumb-screw 46 for regulating escape of air, and with air-hole 47. The piston has the usual check-valve 48. The air-door is automatically
10 opened when coal is added by rod 49 on latch engaging with arm 50 on air-door, and the air entering mingles with the gases and promotes perfect combustion, the amount of air entering being regulated by the speed with
15 which the air-door closes.

The arrangement of steam-drum 55, connected by pipes 56 and 57, respectively, to the horizontal and vertical portion of the steam-space is new and particularly effective.

20 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination in a steam-generator, an outer vertical cylindrical shell, a horizontal cylindrical shell connected to about the mid-
25 dle of the vertical shell and extending rearwardly therefrom, an inner shell arranged concentrically within the vertical shell, said inner shell having a lower cylindrical portion forming a fire-box and an upper substantially-
30 semicylindrical portion forming a combustion-chamber, the crown-sheet of the fire-box and the rear plate of the combustion-chamber being formed of a single continuous sheet bent at right angles at the point 38, and fire-
35 tubes arranged in said horizontal shell and secured in said rear plate.

2. In a steam-generator having inner and outer shells an opening therethrough into the combustion-chamber closed by a fuel-door, a
40 latch for locking said fuel-door, an air-door closing an air-opening hinged above said fuel-door, a rod secured to the fuel-door latch and engaging with said air-door to open the same when the latch is raised, a fixed cylinder, a
45 piston fitting said cylinder and secured to said air-door, and means for permitting the air to escape from said cylinder.

3. In combination in a steam-generator, an outer cylindrical shell, an inner shell concentrically arranged within the outer, a corrugated steel ring secured between the lower
50 edges of said shells and having depending edges, and a separate cylindrical ash-pit section having an inwardly-extending ledge fitted to receive said ring and support said shells.
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4. In combination in a steam-generator, a separate cylindrical ash-pit section having an inwardly-extending horizontal ledge, an outer

vertical cylindrical shell, substantially equal in diameter to the ash-pit section, an inner
60 shell concentrically arranged within the outer, a corrugated steel ring secured between the lower edges of said shells and having a depending edge fitted to said ledge, said inner shell having a lower cylindrical portion
65 forming a fire-box, and a contracted upper portion substantially semicircular in cross-section forming a combustion-chamber, a single sheet forming the upper plate of said fire-box and the rear plate of said combustion-
70 chamber, a horizontal, cylindrical shell connected to said vertical shell at about its middle and extending rearwardly therefrom and a series of fire-tubes contained within said
75 horizontal shell, extending rearwardly from the vertical shell, and forwardly into said vertical shell where they are secured to said plate.

5. In combination in a steam-generator, a separate cylindrical ash-pit section having an
80 inwardly-extending horizontal ledge, an outer vertical, cylindrical shell, substantially equal in diameter to the ash-pit section, an inner shell concentrically arranged within the outer, a corrugated steel ring secured between
85 the lower edges of said shells and having a depending edge fitted to said ledge, said inner shell having a lower cylindrical portion forming a fire-box, and a contracted upper portion substantially semicircular in cross-
90 section forming a combustion-chamber, a single sheet forming the upper plate of said fire-box and the rear plate of said combustion-chamber, the upper portion of the front plate of said combustion-chamber being bent rear-
95 wardly to form a half-dome and being secured to said single sheet along the upper edges of both, a horizontal, cylindrical shell connected to said vertical shell at about its middle and extending rearwardly therefrom, a series of
100 fire-tubes contained within said horizontal shell extending rearwardly from the vertical shell and forwardly into said vertical shell where they are secured to said plate, and a steam-drum arranged above and parallel to
105 said horizontal tube-containing extension immediately behind the upper portion of said vertical shell and pipes connecting said drum both to the horizontal extension and to the upper portion of the vertical shell.
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In testimony whereof I have hereunto signed my name.

DAVID FITZGIBBONS. [L. S.]

Witnesses:

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