

No. 679,520.

Patented July 30, 1901.

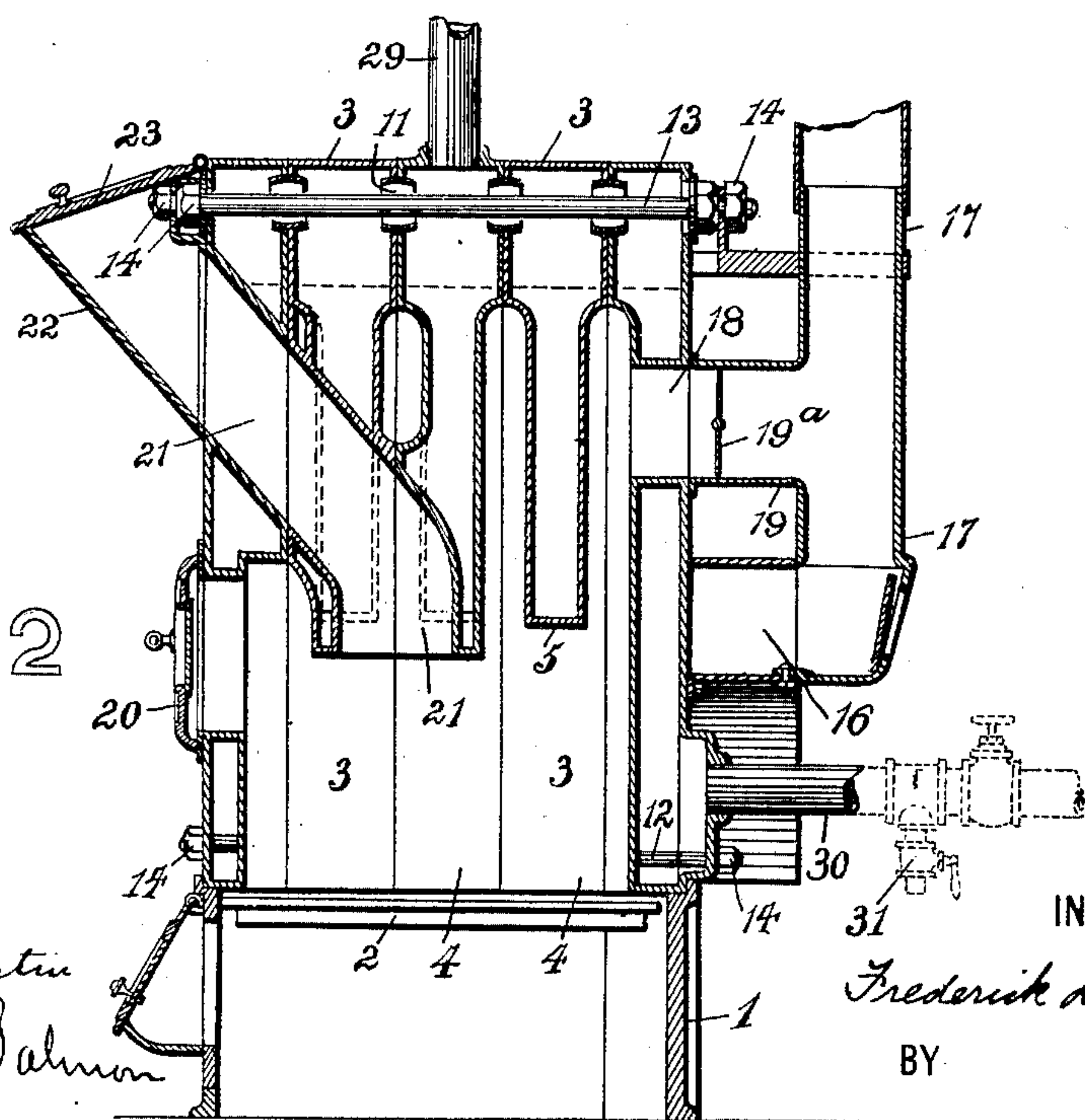
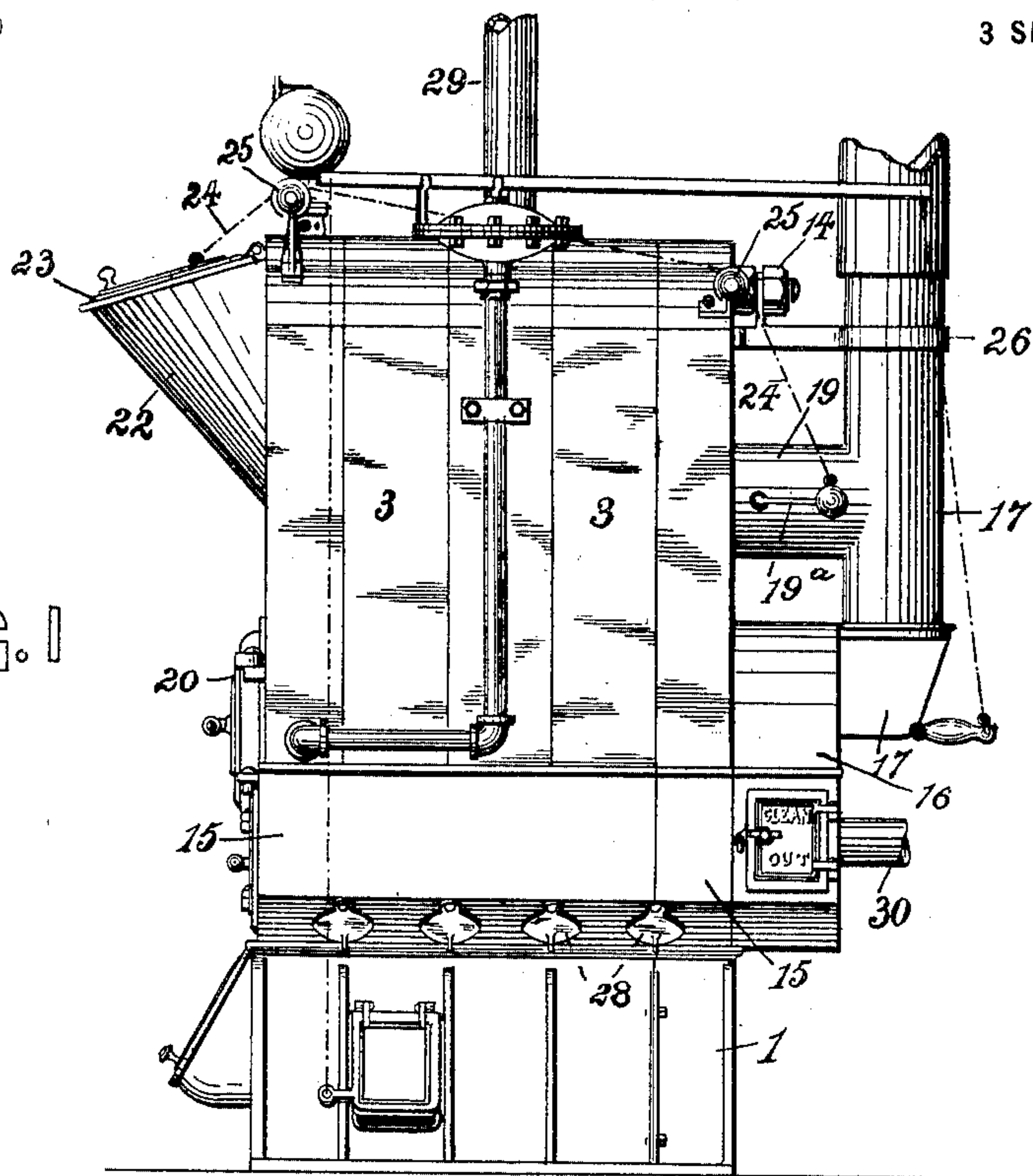
F. D. STEPHENS.

HEATER.

(Application filed Nov. 17, 1900.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

Harry Martin

A.B.C. Salmon

INVENTOR

Frederick A. Stephens

BY

W^m Hamfield, Jr. ATTORNEY.

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FIG. 3

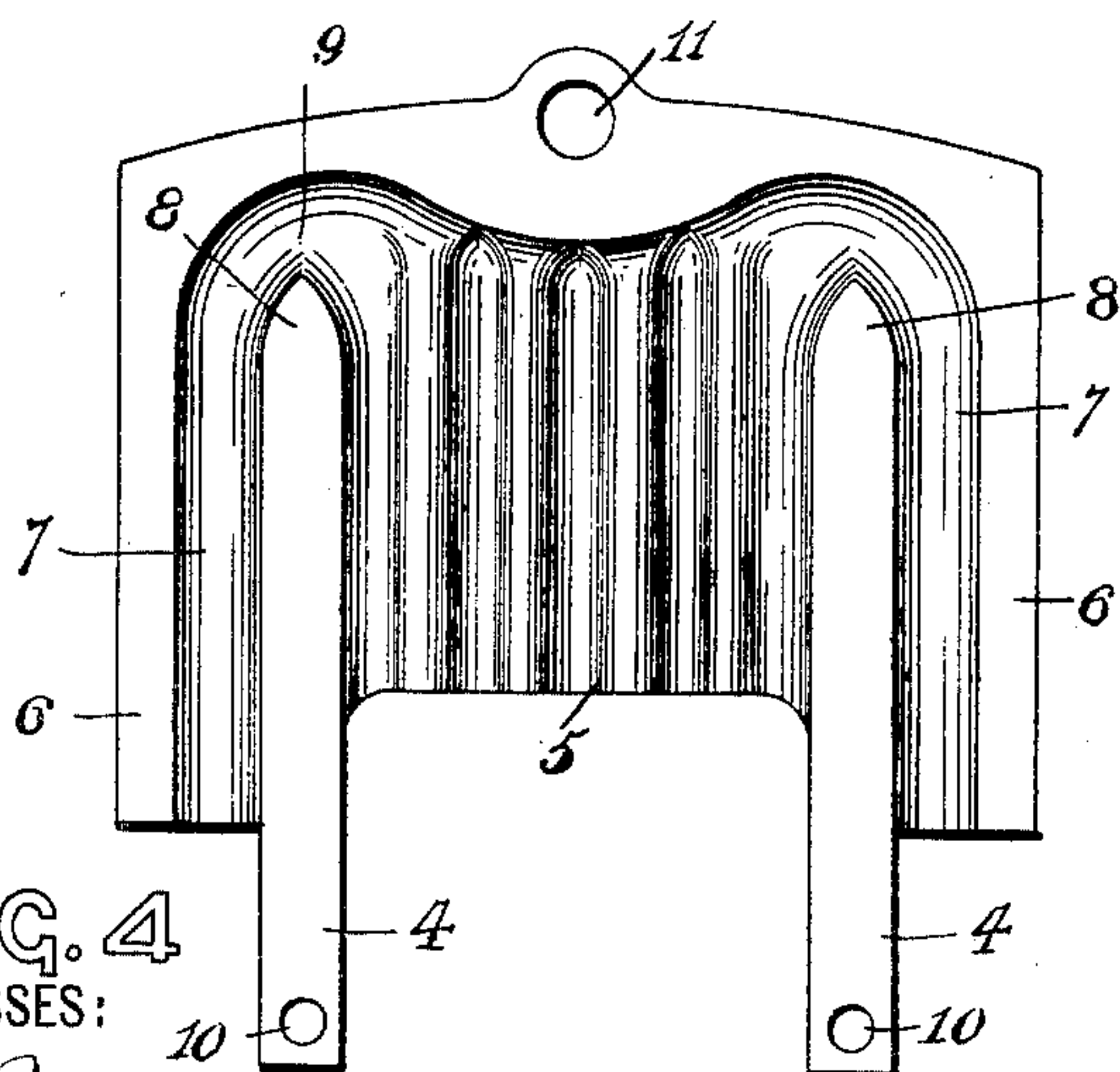
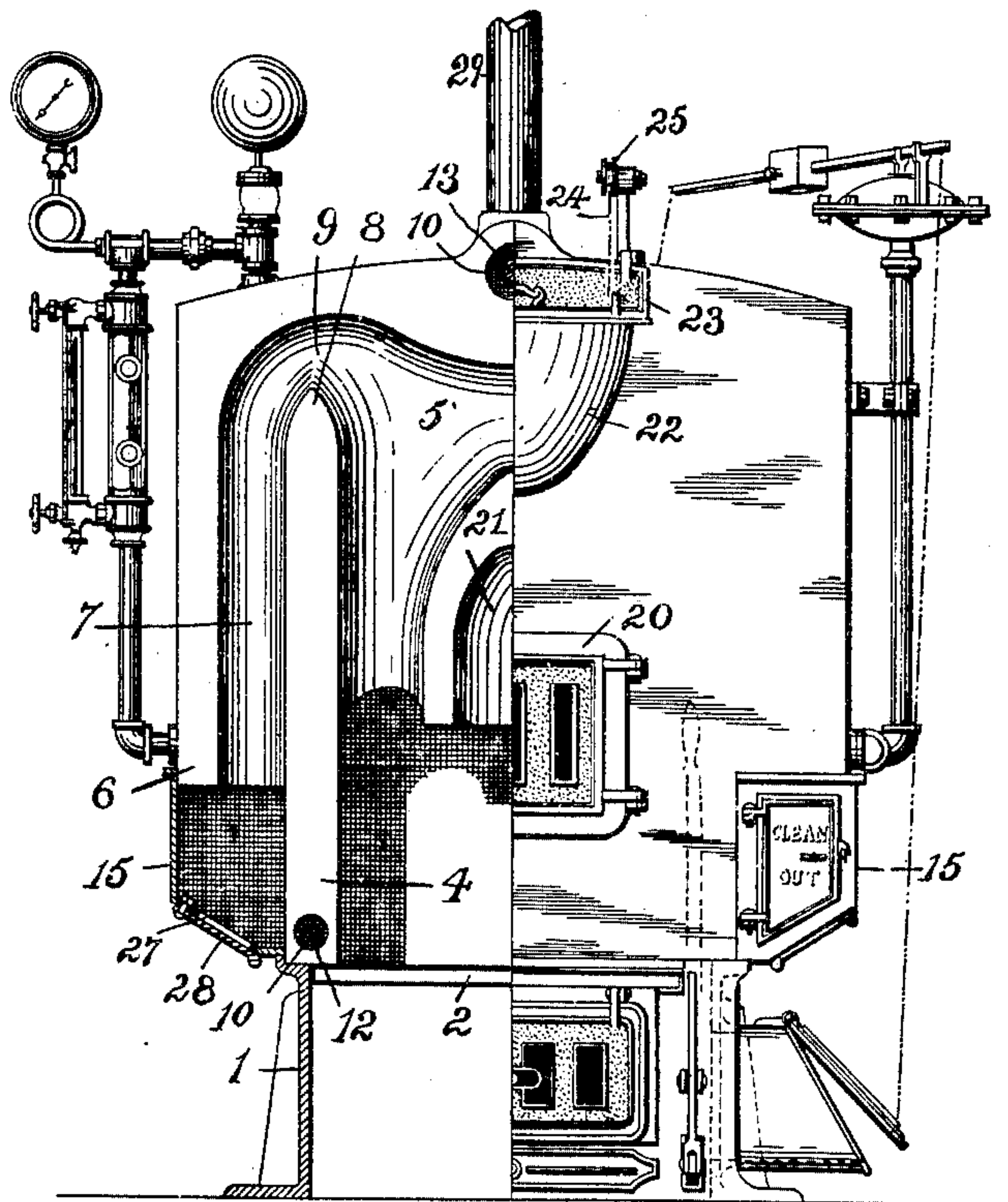


FIG. 4

WITNESSES:

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Harry Martin

Art. Salmon

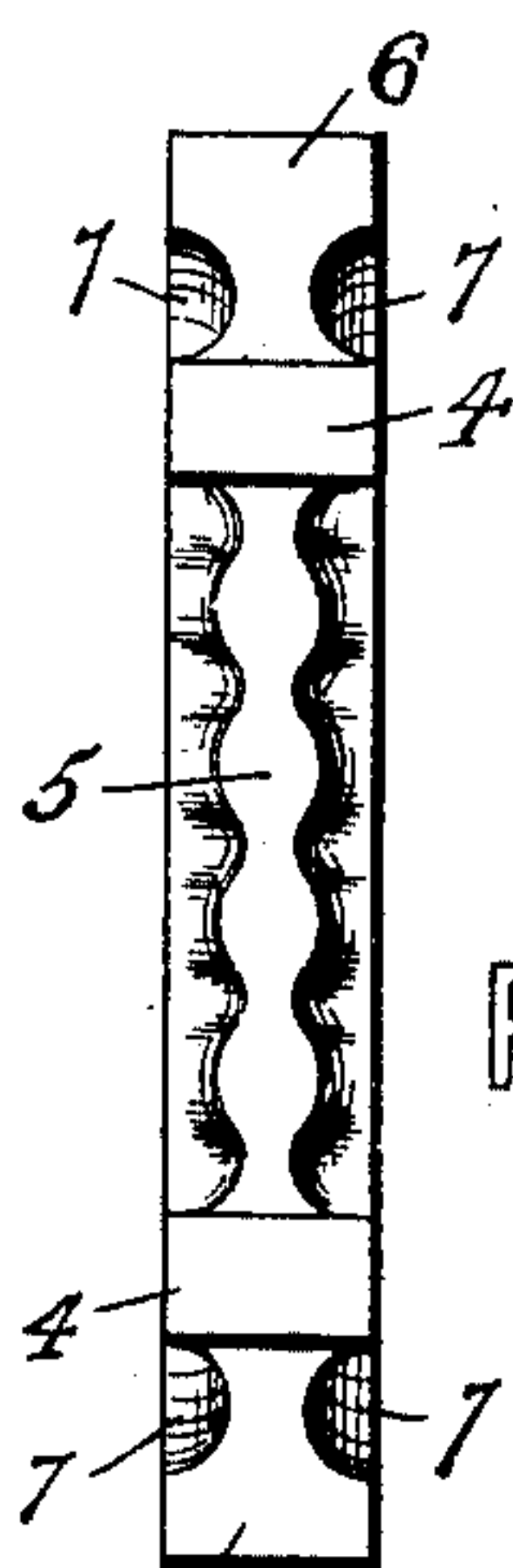


FIG. 5

INVENTOR

Frederick W. Stephens

BY

Wm H Camfield, Jr. ATTORNEY.

No. 679,520.

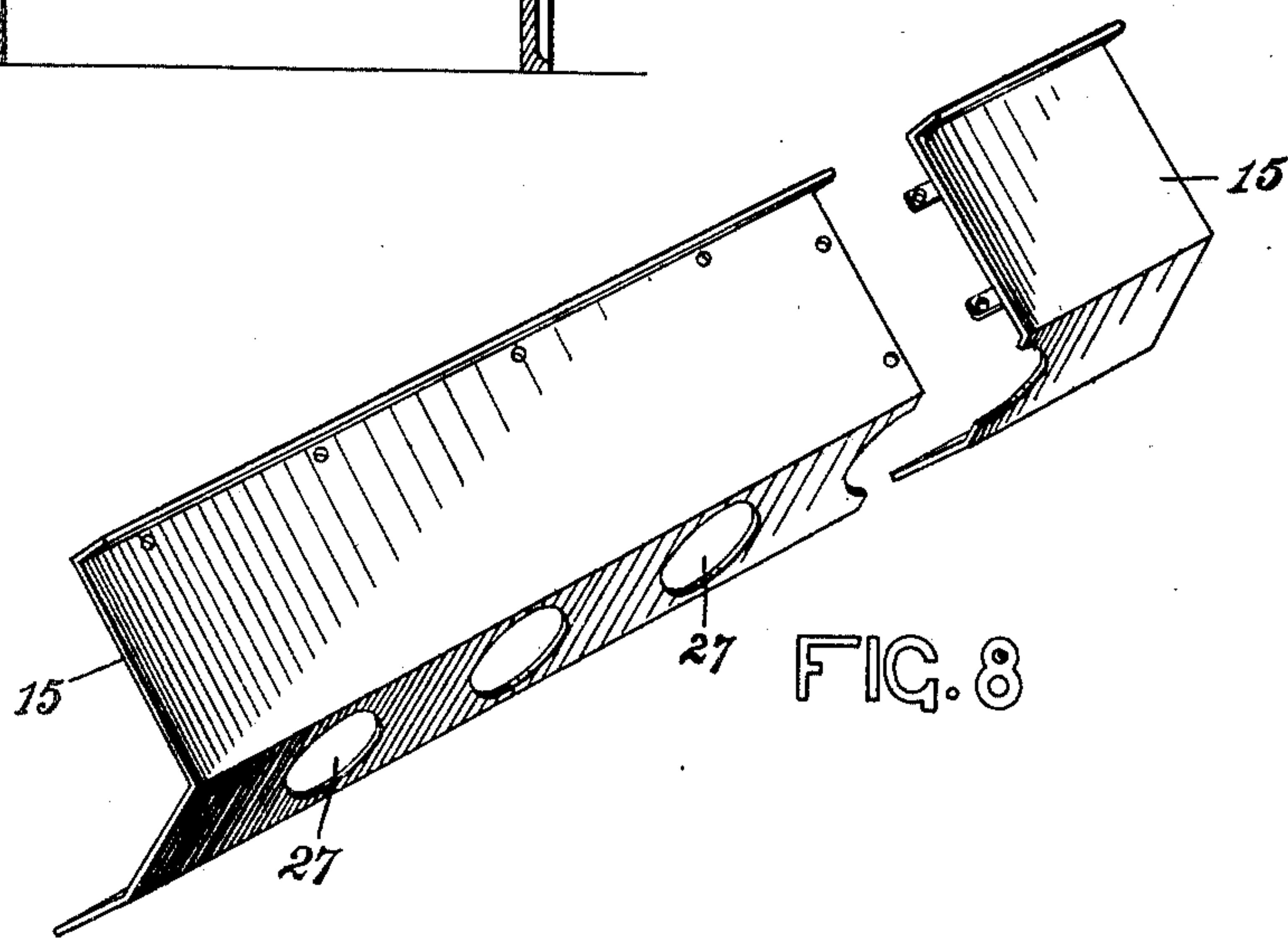
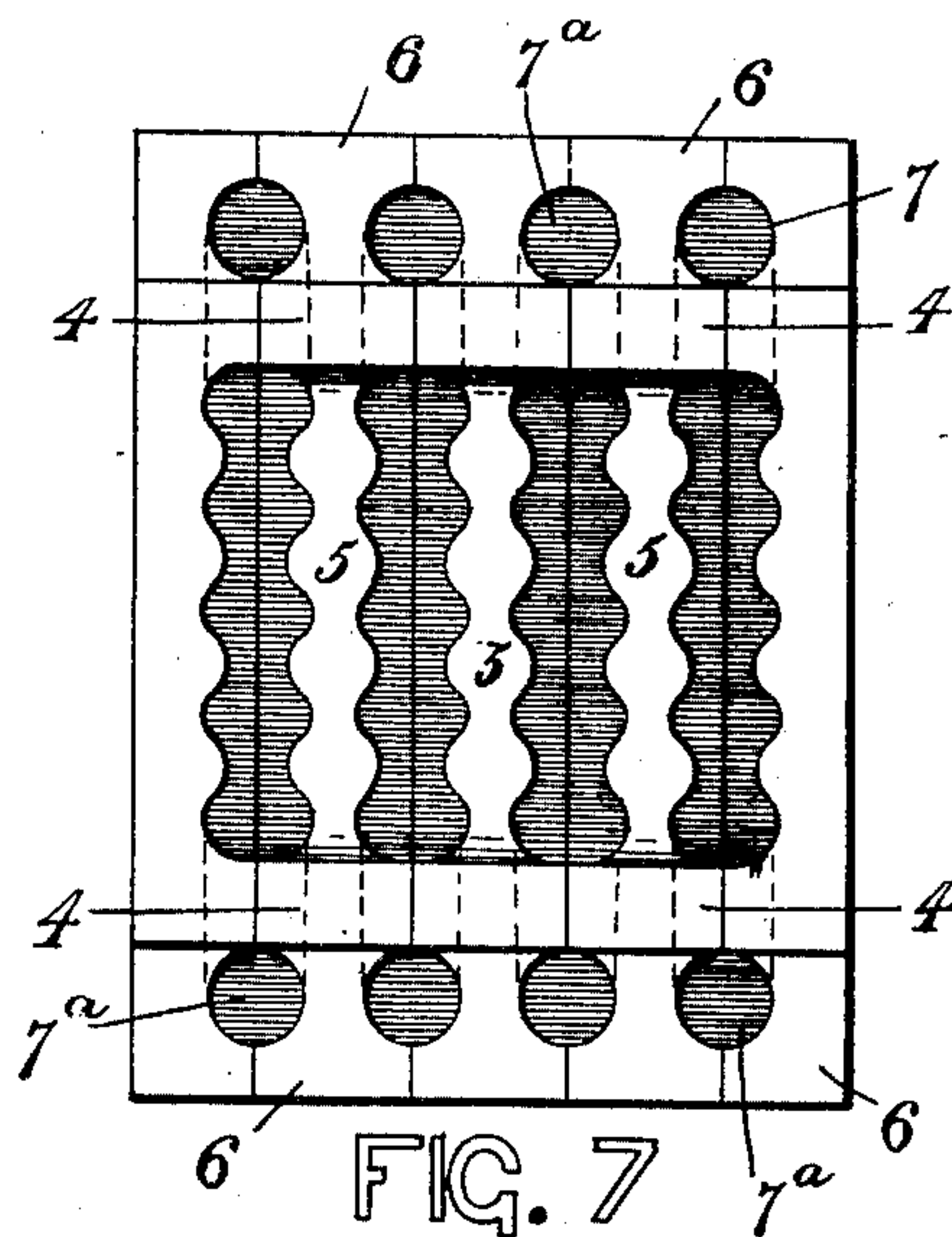
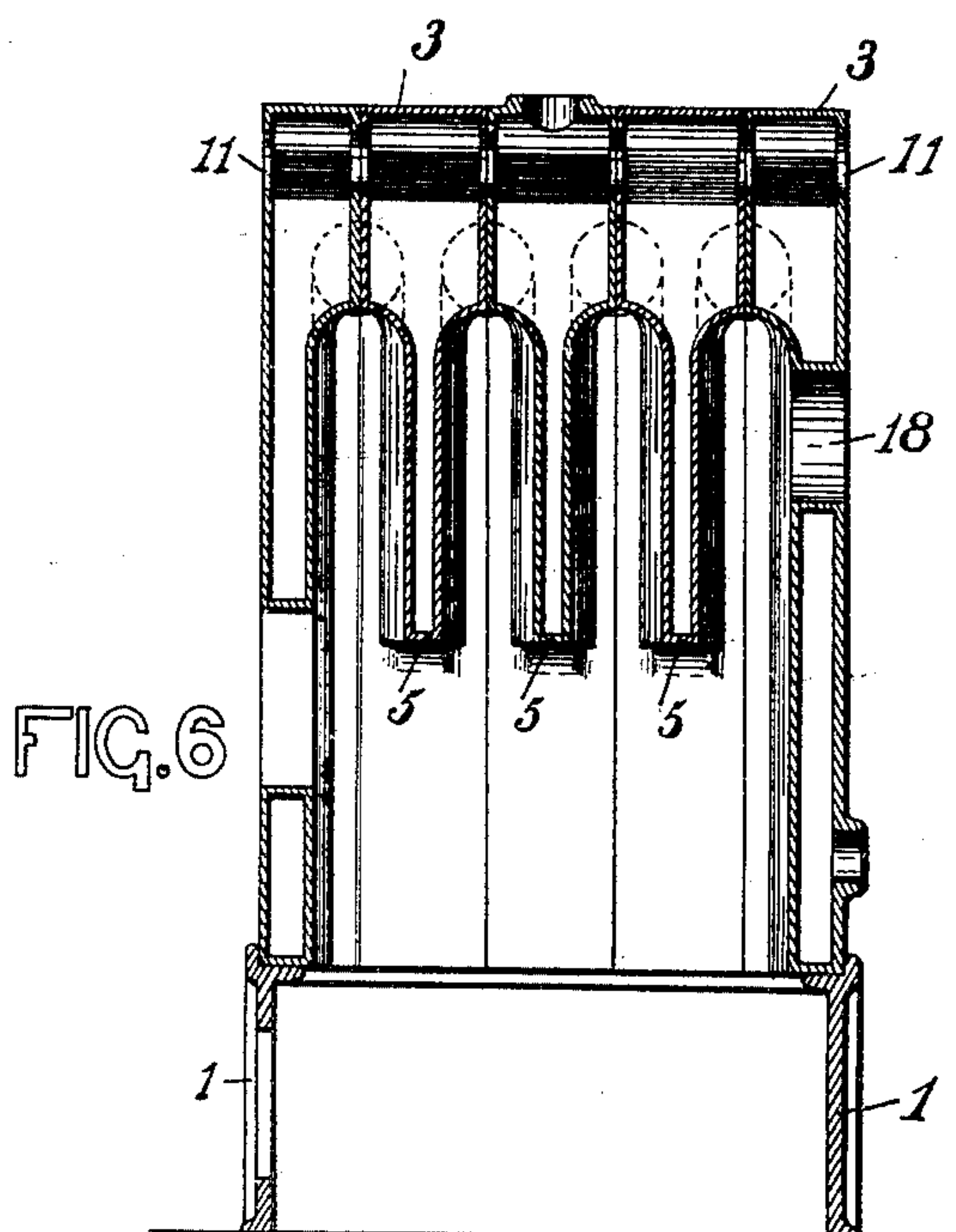
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3 Sheets—Sheet 3.



WITNESSES:

Harry Martin
Arsl Salmon

INVENTOR

Frederick D. Stephens

BY

Wm H. Campfield, Jr. ATTORNEY.

UNITED STATES PATENT OFFICE.

FREDRICK D. STEPHENS, OF GERMAN VALLEY, NEW JERSEY.

HEATER.

SPECIFICATION forming part of Letters Patent No. 679,520, dated July 30, 1901.

Application filed November 17, 1900. Serial No. 36,796. (No model.)

To all whom it may concern:

Be it known that I, FREDRICK D. STEPHENS, a citizen of the United States, residing at German Valley, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to a hot-water or steam heater, and refers principally to that class of heaters known as "square" heaters, being built up of heater-sections, which are assembled to constitute the heater.

The present construction of heater can be enlarged or reduced with ease and without greatly increasing the cost of the heater, as the parts inserted or removed are substantial duplicates.

The object of the heater is to provide a square heater and containing vertical flues and one that is practically self-cleaning and that can also be cleaned from the outside with ease.

This invention also furnishes a heater of the square pattern that contains a magazine for fuel and makes the heater self-feeding and decreases the heating-surface to a very little extent.

The heater herein shown also supplies a large heating-surface and a free and unobstructed circulation of water or steam, and the cost of manufacturing which is small.

The construction of my new form of heater is shown in the accompanying views, in which—

Figure 1 is a side view, and Fig. 2 a longitudinal vertical section, of the same. Fig. 3 is a part elevation and part cross-section of the heater, the section being taken on line 3 3 in Fig. 2. Figs. 4 and 5 are a face and bottom view of one of the heater-sections. Fig. 6 is a section of a heater with the sections assembled, with the omission of the magazine. Fig. 7 is a bottom view of the sections. Fig. 8 is a perspective view of the plates inclosing part of the smoke-chamber.

In said views, 1 illustrates the base of the

heater, which is made either integral or with removable side and rear plates. The grate 2 is supported by said base and is preferably made with a removable frame and grate-bars, so that when a heater is changed in size the frame can be removed and a new frame inserted, with its requisite number of grate-bars. On said base are arranged the heater-sections 3, which are shown detached in Figs. 4, 5, and 7, and consist, essentially, of the leg portion 4, the bridge portion 5, and the overhang 6, as will be evident from the drawings. The bridge portion 5 may have a corrugated surface or plain, as desired, and is reduced in width as compared with the leg and overhang to allow for the circulation of heat from the fire-box formed by the legs 4, and the overhang is provided on its opposite sides with cut-away portions or grooves 7, that may be of any configuration in section, which when the sections are assembled form the flues 7^a, as will be seen from Fig. 7. The leg portion 4 is finished off at its top with the pointed end 8, and so forms with the bridge portion and overhang the connecting-flue 9 between the flue 7^a and space between the bridge portions. The heater-sections are preferably provided with perforations or holes 10 in the leg portions 4, near the bottom thereof, and the holes 11 at the top to permit the ready circulation of the heating medium, and at the same time may be used for the insertion of the retaining or holding bolts 12 and 13, respectively, which serve to hold the said heater-sections together by means of the nuts 14; but these bolts may be disposed elsewhere and any form of securing means may be used. Secured to the bottom of the overhang and resting on the top of the base 1 are the plates 15, which are placed on the sides of the heater and are brought together at the rear of the heater by means of the flues 16 to connect with the smoke-pipe 17. The rear section of the heater is provided, preferably, with an opening 18, which connects with the smoke-pipe 17 by means of the pipe 19, and the said pipe 19 is provided with a damper 19^a, the use of which will be described hereinafter. The front section is provided with the usual fire-door 20, and both the front and rear sections are devoid of any bridge portion. The water-space reaches

from the top to the bottom for the full width, and the sections thereby completely inclose the fire-box.

The three front sections of the heater are shown in Fig. 2 as being provided with the openings 21, which form a magazine for the fuel that is supplied to the heater. The pocket 22 is secured to the front of the heater by means of a nut on the bolt 13 and increases the capacity of the magazine and allows of its being filled. The pocket 22 is provided with a lid 23, which has secured thereto a chain or similar medium 24 to connect it with the damper 19^a by means of the pulleys 25, which may be attached to the heater, as shown, or to the ceiling overhead. When the door 23 is opened for inspection or the filling of the magazine, the chain releases the damper 19^a and causes a direct draft to be established from the fire-box to the smoke-pipe and no gases will escape into the house, and when the door is closed the damper will again be closed, as will be evident from Fig. 1.

The usual form of draft-door and check-valve regulator is shown in connection with the heater, and the water or steam gages are of the usual form of construction.

The connecting portion 16 of the smoke-chamber is inclined upwardly and inwardly to the center of the rear section and is connected to the smoke-pipe 17, which is preferably cast in one piece with the pipe 19 and is braced at the top by means of the brace 26, secured to the bolt 13, as will be understood.

The smoke-chamber plates 15 are preferably made in one piece to fit a small-sized boiler, and if a larger-sized boiler is required a plate to fit the width of the section inserted is attached, as shown in Figs. 1 and 8, and so if a heater is to be reduced the plate attached to the removed section can be withdrawn with it and the remaining sections drawn together. In like manner the side pieces of the base can be sectionally constructed to admit of its enlargement or contraction, or the sides of the base and the smoke-chamber inclosure can be entirely constructed of small plates, as desired. In the bottom of the smoke-chamber plates can be placed the openings 27, which are provided with the lids 28, said openings allowing the cleaning of the flues 7^a, and clean-out doors at the ends of the smoke-chamber insure the easy cleaning of its interior.

The outlet-pipe 29 and inlet-pipe 30 can be suitably placed, but are preferably placed as shown, the rear section being bulged to allow of a quicker distribution of water. The discharge-cock 31 may be placed in the inlet-pipe or any other convenient point of the heater.

In square heaters as previously made the sections after being assembled have formed horizontal flues which carry the heat back and forth and also cause interruptions in the circulation of the water. The horizontal flues catch the soot and ashes on the lower

side, and in a short time the layer of these products of combustion becomes partly an insulation from the heat, and coupled with the fact that the heat naturally clings to the upper side of such flues the bottom of the flues is contributing no heating-surface. Therefore they require constant cleaning. In the present construction the flues being vertical the products of combustion have little chance of attaching themselves, the inside of the heater—i. e., between the bridge portions—practically cleaning itself, as soot, &c., will fall from them in the fire and be consumed. The flues 7^a are also not apt to become very dirty, but are easily cleaned through the holes in the smoke-chamber, as will be evident. The steeple-point on the leg portion prevents the lodging of soot at that point. I have thus devised a cheap simple heater of the square class with vertical flues and a magazine, which is easily cleaned, a heater that can be enlarged or reduced with sections in duplicate, and one in which the circulation of the water is unobstructed by horizontal interruptions. The sections of the heater are closely jointed all around, with the exception of the flue portions, and the outside surface requires no metallic casing, as the flues communicate only with the smoke-chambers.

That portion of the heater above the smoke-chamber may be covered with asbestos, asbestos-cement, or any other non-heat-conducting material.

Of course I may make minor changes in the details of construction without departing from the limits of my invention, and I may dispense with the magazine and make a surface burner.

Having thus described my invention, what I claim is—

1. A heater, consisting of heater-sections, said sections consisting of a hollow leg portion, a bridge portion, an overhang, and cut-away portions on said sections to form flues between said sections, and a smoke-chamber on each side of said heater under said flues, substantially as described.

2. A heater, consisting of heater-sections, said sections consisting of a hollow leg portion, a bridge portion, an overhang, cut-away portions on said overhang and outside the leg portion to form flues between the sections, and a smoke-chamber on each side and the rear of said heater, the side chambers being under said flues, substantially as described.

3. A heater, consisting of a base, heater-sections on said base, said sections consisting of hollow leg portions inclosing the fire-box, bridge portions between said leg portions, an overhang outside the leg portions, cut-away portions on said overhang, to form flues between said sections, smoke-chambers on either side of said sections under said flues, a smoke-chamber on the back of said heater, connecting said side chambers, and a smoke-pipe on said rear chamber, substantially as described.

4. A heater, consisting of a base, heater-

sections on said base, said sections consisting of hollow leg portions inclosing the fire-box, bridge portions between said leg portions, an overhang outside the leg portions, cut-away portions on said overhang, to form flues between said sections, smoke-chambers on either side of said sections under said flues, a smoke-chamber on the back of said heater connecting said side chambers, the heater-sections on the front portion of said heater being provided with openings to form a magazine, substantially as described.

5. A heater, consisting of a base, heater-sections on said base, said sections consisting of hollow leg portions inclosing the fire-box, bridge portions between said leg portions, an overhang outside the leg portions, cut-away portions on said overhang to form flues between said sections, smoke-chambers on either side of said sections under said flues, a smoke-chamber on the back of said heater connecting said side chambers, the heater-sections on the front portion of said heater being provided with openings to form a magazine, and a pocket on the front section communicating with said magazine, substantially as described.

6. A heater, consisting of a base, heater-sections on said base, said sections consisting of a hollow leg portion, bridge portions between said leg portions, an overhang, cut-away portions on said overhang to form flues between said sections, the front sections being provided with openings forming a magazine, and a pocket on the front section communicating with the magazine, substantially as described.

7. A heater, consisting of a base, heater-sections on said base, said sections consisting of leg portions inclosing the fire-box, bridge portions between said leg portions and of less width, overhangs on each section outside the leg portion, cut-away portions on said over-

hangs to form flues between the sections, a smoke-chamber on either side of said heater, a smoke-chamber on the rear of said heater connecting said side chambers, a smoke-pipe on said rear chamber, and a direct-draft flue through the rear heater-section communicating with said smoke-pipe, a damper in said flue, the front heater-sections being provided with openings to form a magazine, a pocket on the front section communicating with said magazine, a lid on said pocket, and means connected with said lid to operate the damper in the direct-draft flue, substantially as described.

8. A heater consisting of a base, heater-sections on said base, said sections consisting of a leg portion, a bridge portion of less width than the leg portion, an overhang with cut-away portions to form flues between said sections, a smoke-chamber composed of plates, on either side of said sections and under the flues, perforations in said chambers under said flues, lids on said perforations, and a rear smoke-chamber connecting said side chambers, substantially as described.

9. A heater consisting of heater-sections, each section consisting of leg portions, a bridge portion, and an overhang, the bridge portion being of less width than the leg portions, cut-away portions on the overhangs, outside the leg portions, communicating with the faces of the bridge portion, to form vertical flues, smoke-chambers under the flues on either side of the heater, substantially as described.

In testimony that I claim the invention set forth above I have hereunto set my hand this 9th day of November, 1900.

FREDRICK D. STEPHENS.

Witnesses:

WM. H. CAMFIELD, Jr.,
HARRY MARTIN.