

No. 606,752.

Patented July 5, 1898.

H. L. WINGERT.  
HOT AIR FURNACE.

(Application filed Oct. 7, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 2.

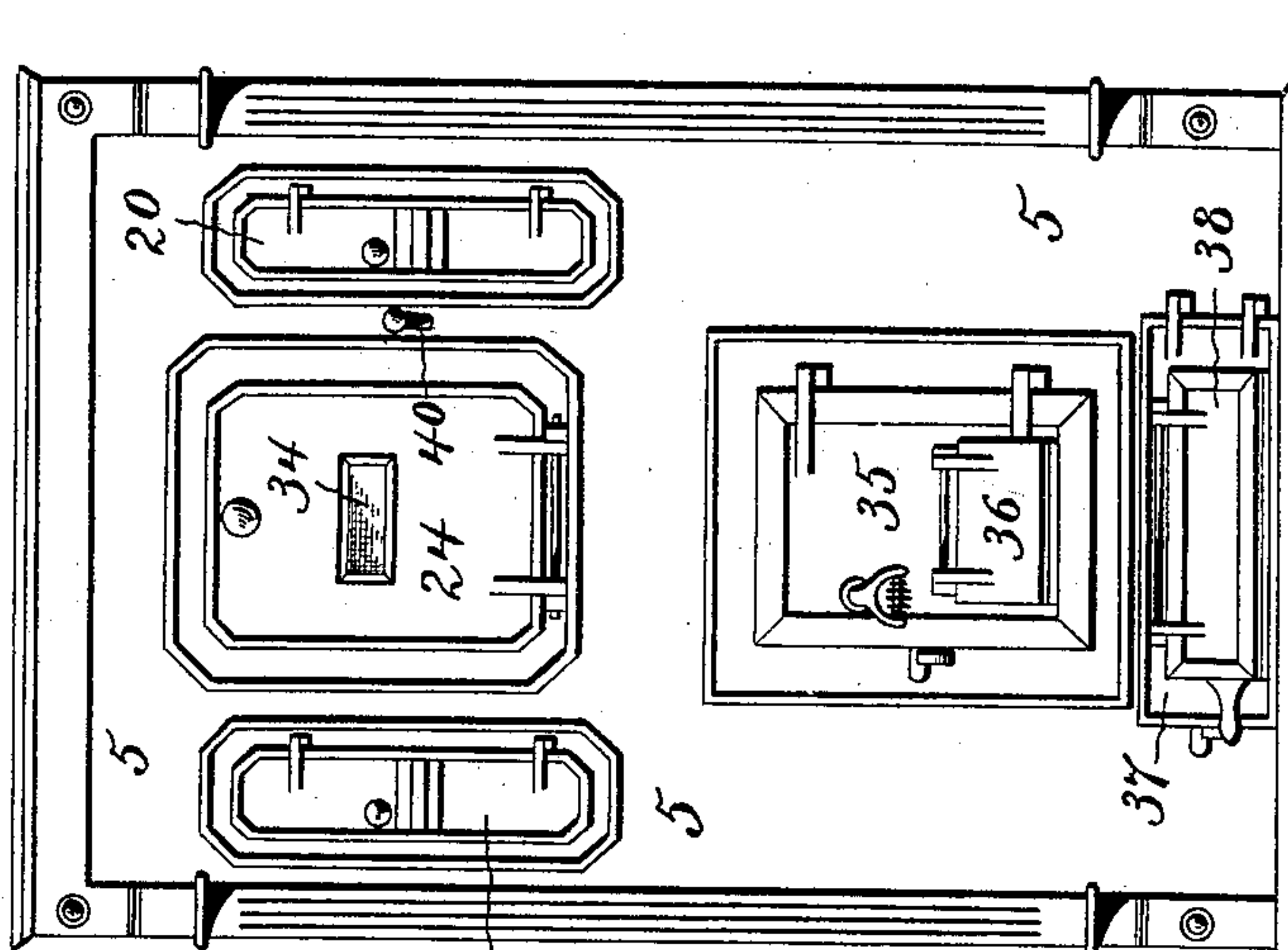
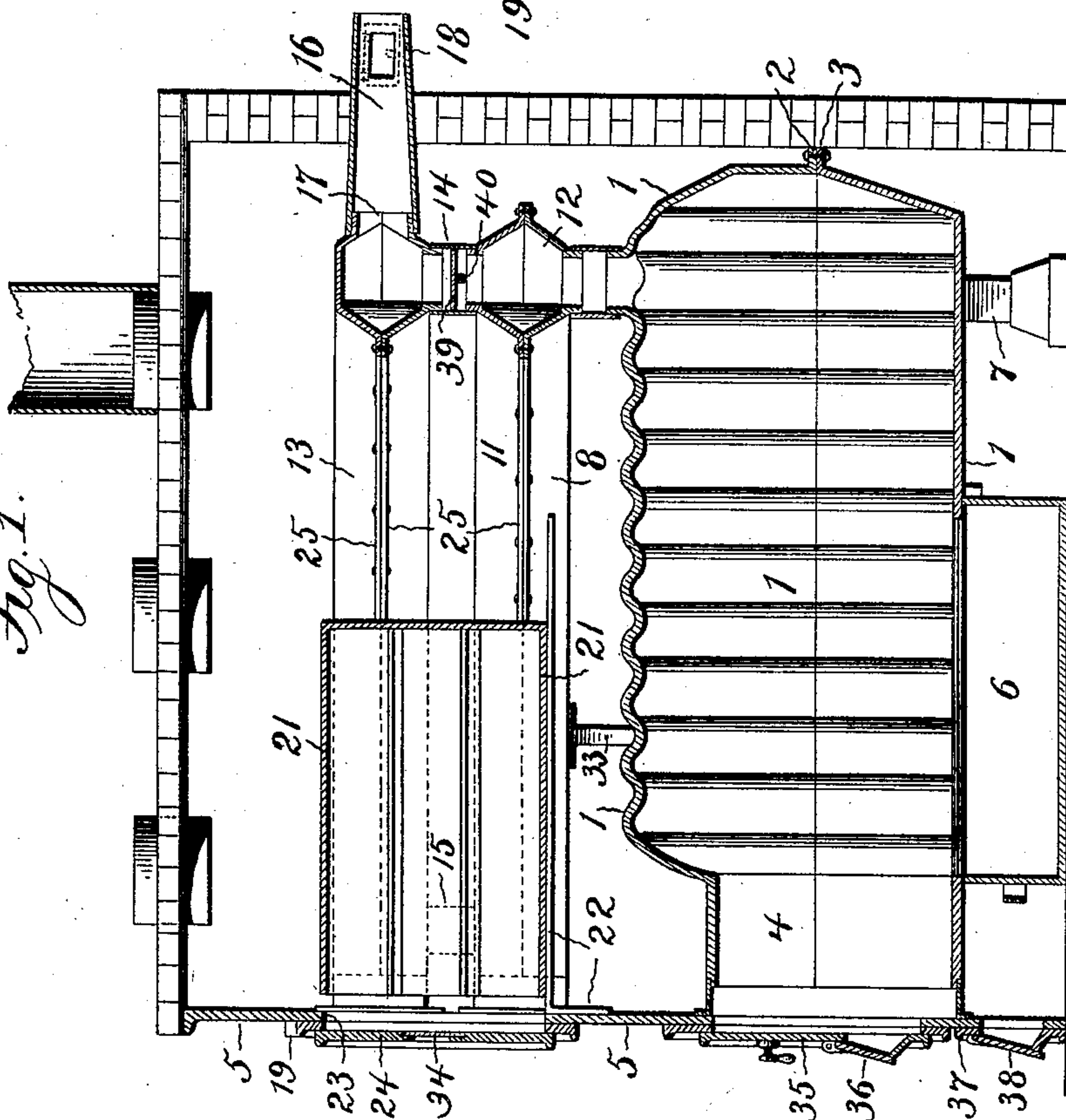


Fig. 1.



WITNESSES

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Fig. 3.

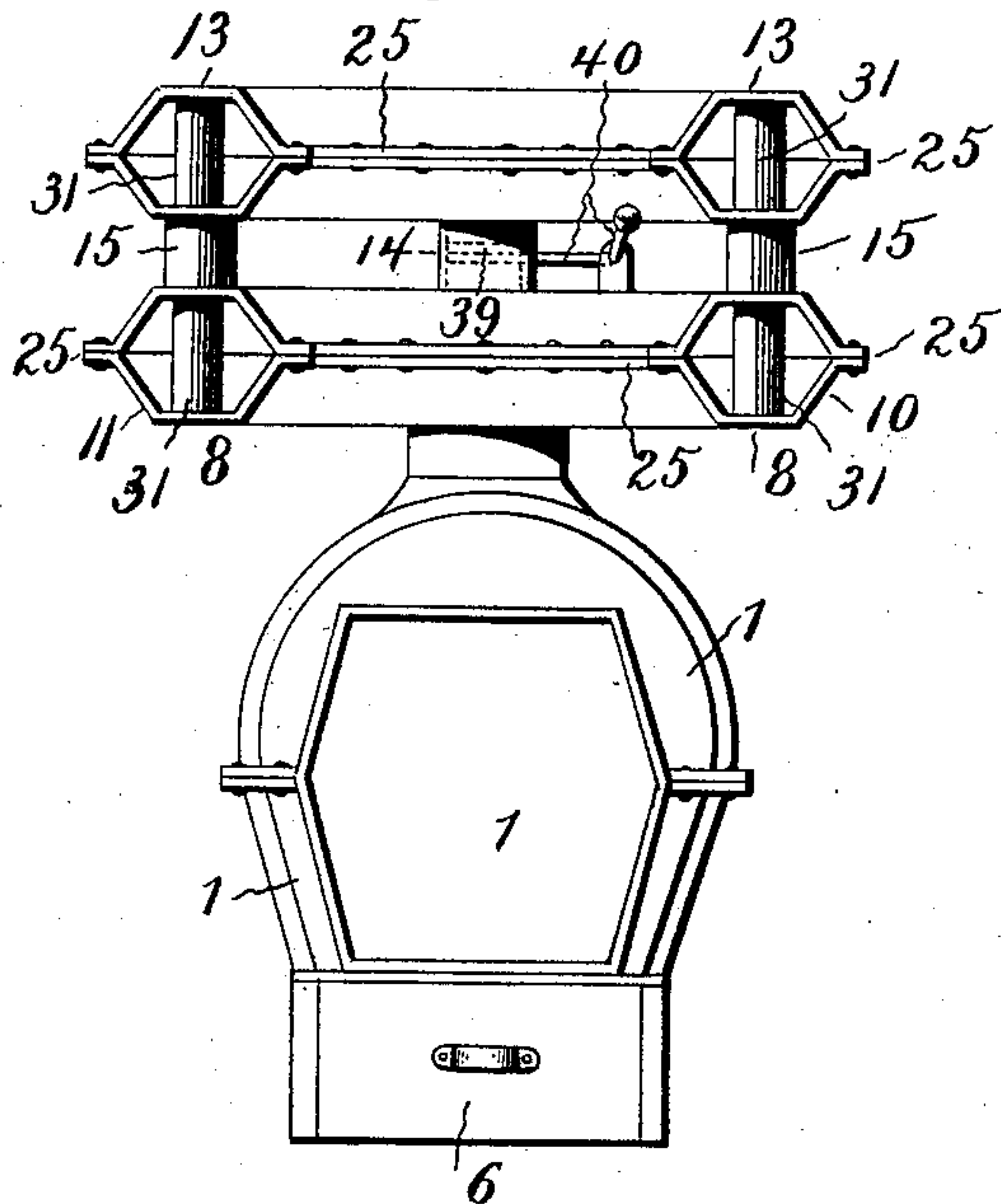


Fig. 4.

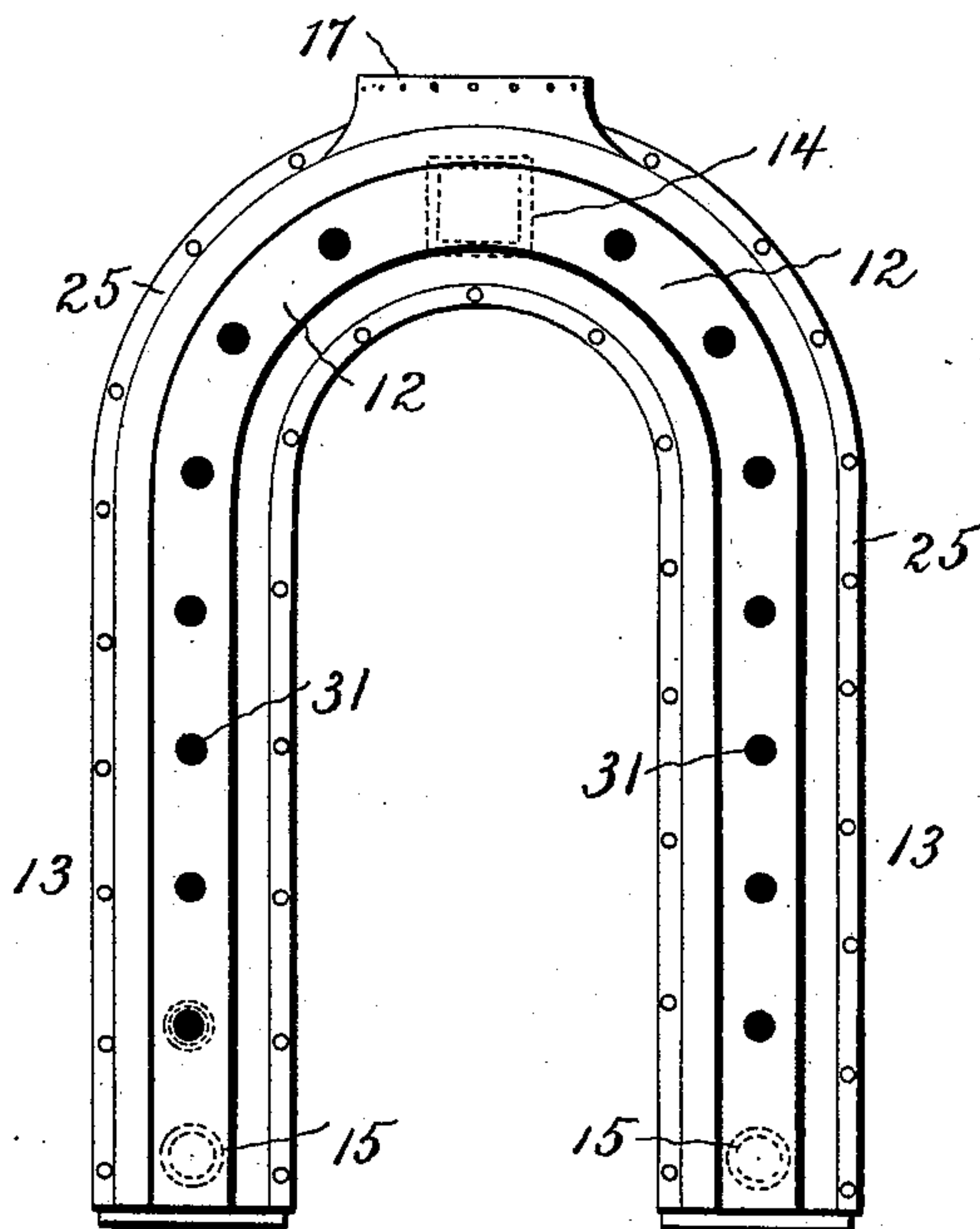


Fig. 5.

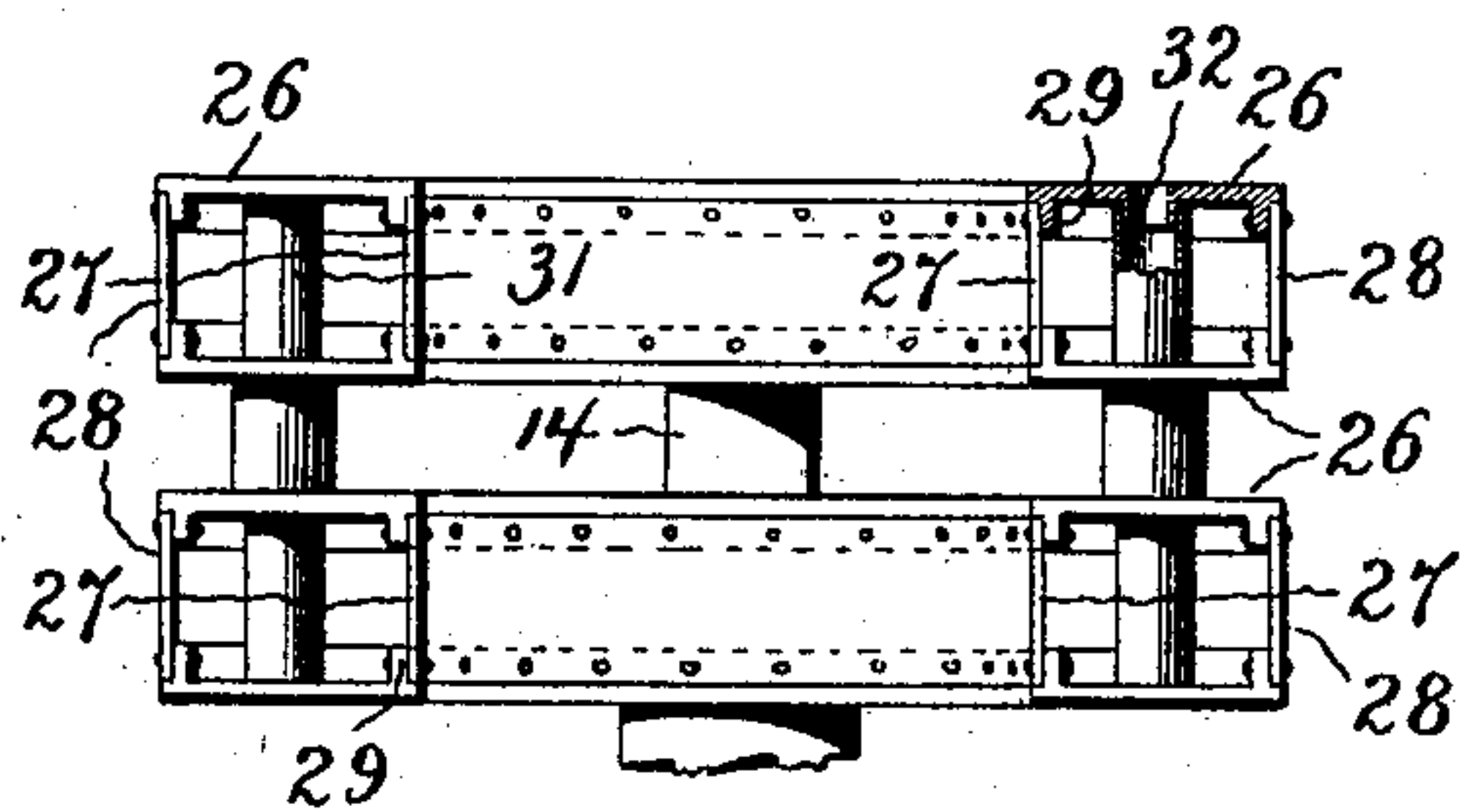
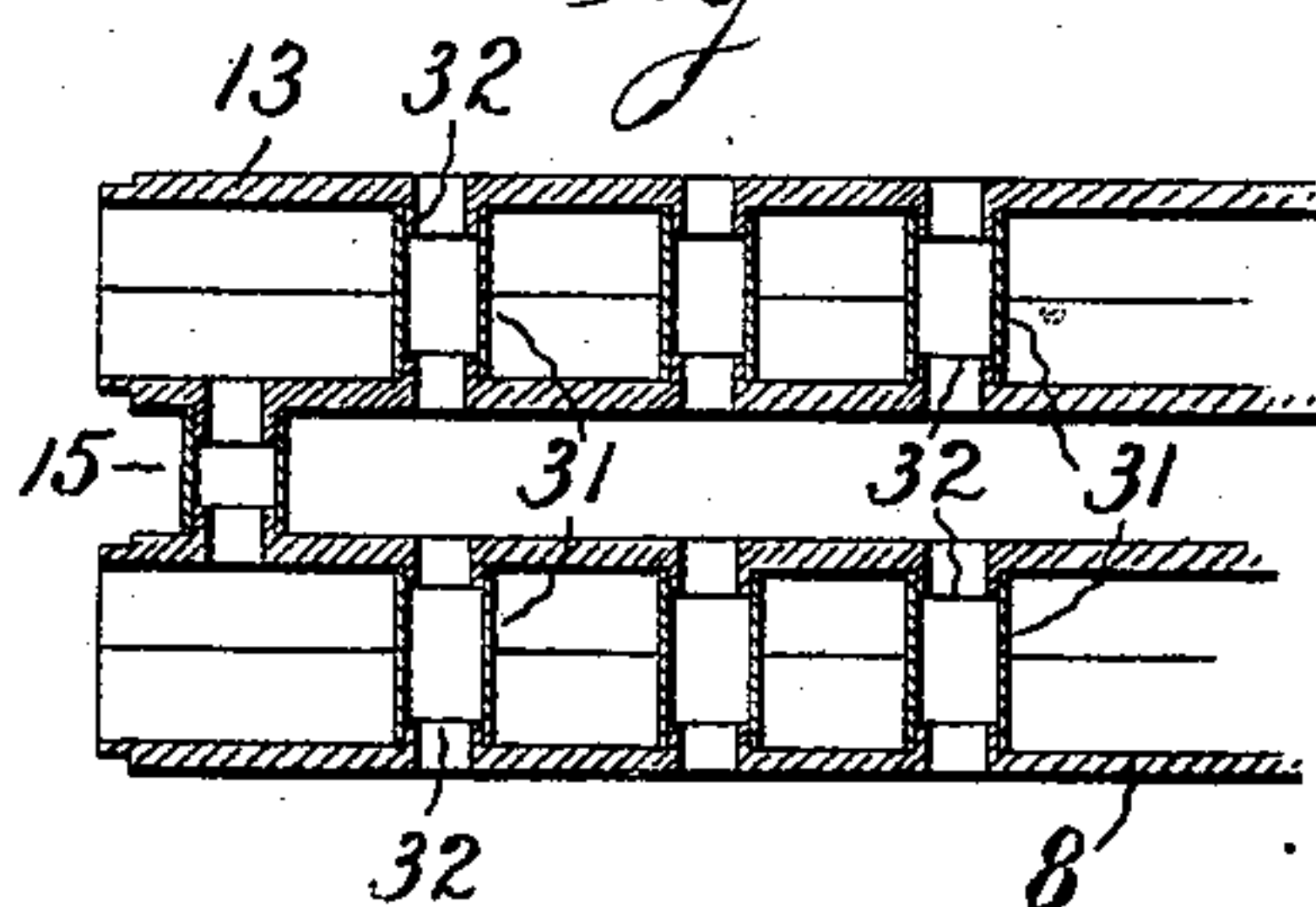


Fig. 6.



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# UNITED STATES PATENT OFFICE.

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## HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 606,752, dated July 5, 1898.

Application filed October 7, 1897. Serial No. 654,461. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY L. WINGERT, a citizen of the United States, residing at Montpelier, in the county of Williams and State of Ohio, have invented certain new and useful Improvements in Hot-Air Furnaces; and I do 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 the figures of reference marked thereon, which form a part of this specification.

My invention relates to hot-air furnaces; and it has for its object to provide an improved construction and arrangement of radiators in connection with the fire-pot, the radiator being arranged so as to have the clean-out doors located at the front of the furnace, the radiators for such purpose having their forward ends separated.

It has also for its object to provide an improved construction of radiators in which one radiator will communicate with the other at their forward ends and at opposite points, thus causing the products of combustion received at the rear of the lower radiator to traverse the opposite sides or arms of the lower radiator until it reaches the forward ends thereof, from whence it will pass through distinct and separate pipes into the opposite forward ends of the upper radiator and thence along the separate sides or arms of said upper radiator to its rear, from whence it will pass through the smoke-escape flue. This affords a better distribution and circulation of the smoke through the radiators and enables more heat to be thrown off from the radiators, at the same time leaving the forward ends of the radiators separated, so that the space between the radiators can be utilized for a removable baking or roasting oven.

It has, further, for its object to so construct and arrange the radiators that the same may permit the utilization of the space between the radiators for the reception of an oven, which may be portable and can be readily inserted and withdrawn through the front of the furnace, the opening through which it is inserted and withdrawn being provided with a drop-door, which when lowered will form a shelf for the portable oven.

It has, further, for its object to generally improve the construction and arrangement of the several parts, whereby a large radiating surface is afforded and the heat from the fire-pot and from the products of combustion may be utilized to the greatest extent with the least consumption of fuel.

To the accomplishment of the foregoing and such other objects as may hereinafter appear the invention consists in the construction and the combination and arrangement of parts hereinafter particularly described, and then sought to be specifically defined by the claims, reference being had to the accompanying drawings, forming a part hereof, and in which—

Figure 1 is a side view, partly in section, of the furnace. Fig. 2 is a front view. Fig. 3 is a front view with casing removed. Fig. 4 is a plan view of the top radiator. Fig. 5 is a front end view of radiators, and Fig. 6 is a vertical section through radiators.

In the drawings the numeral 1 designates the fire-pot, which is cast in two horizontal sections, both sections being transversely corrugated, so that not only the sides, but also the top, will be corrugated, thereby affording a much greater radiating-surface, the two sections along their meeting edges being provided with lateral flanges 2 and 3, through which bolts will pass to secure the sections together, and the front of the fire-pot has a neck 4 to receive one end of a sheet-metal collar or pipe, the other end of which will be secured to the front piece or plate 5 of the furnace, so that the connection between the front of the fire-pot and the front plate of the furnace will be more or less flexible or yielding, thus avoiding the cracking of the front plate of the furnace in the event of settling of any part of the furnace. Beneath the forward portion of the fire-pot is the ash-pit 6, and the rear of the pot is supported by a suitable leg or post 7. The top will be provided with a grate suitable for burning either wood or coal.

Above the fire-pot 1 is arranged a radiator 8, which connects at its rear end with the rear of the fire-pot by means of a suitable pipe connection, so as to receive the products of combustion from the fire-pot. This radiator is made U shape in form, so as to comprise



the two opposite sides 10 and 11, united at their rear by the neck portion 12, their forward ends being separated from each other, so as to afford an elongated U-shaped space 5 between the inner walls of the radiator. This radiator is substantially the length of the fire-pot and substantially as wide as the fire-pot, thereby covering a large area over the fire-pot and at the same time leaving a large 10 space between the inner walls of the radiator, thereby obtaining a greater radiating-surface and enabling easy access to both the inner and outer walls of the radiator in case that repairs or examination is needed and obtaining a better disposition of the parts for the 15 better utilization of heat. The front ends of this radiator will be connected with the front plate 5 of the furnace by means of sheet-metal boxes or collars, so as to prevent injury to the front plate in the event of settling of the furnace, the connection of the boxes or collars to the front ends of the radiator and to the front plate of the furnace being 20 such as to prevent the escape of smoke from the radiator into the hot-air space of the furnace.

Above the radiator 8 is placed a second radiator 13, which will be constructed similarly to the radiator 8 and which communicates 30 with the radiator 8 at its rear end by means of a suitable pipe connection 14. The forward ends of the radiator 13 communicate with the forward ends of the radiator 8 by means of the separate pipes or flues 15, so as 35 to receive the products of combustion from the forward ends of the opposite members of the radiator 8, which products will then travel through the radiator 13 to its rear portion, from whence they will pass out to the chimney through a smoke-pipe 16, which will be 40 connected to a collar 17 at the rear of the upper radiator, the smoke-flue 16 being provided with a damper 18 for the purpose of regulating the draft.

By forming and arranging the radiators 8 and 13 as described the products of combustion are caused to traverse the two members of the lower radiating members of the lower radiator from rear to front, and thence pass 50 through separate flues or pipes into the forward ends of the side members of the upper radiator, and thence rearwardly to the smoke-escape flue, thus insuring a better distribution of the products of combustion through 55 the two radiators, which will afford a better utilization of the heat and avoid any checking or choking at the points where the products of combustion pass from the lower to the upper radiator, which is liable to occur 60 to a greater or less extent where the products of combustion are delivered through a single pipe from the lower radiator into the upper radiator at the points where the two members of each radiator join each other. The 65 construction which I have devised permits a free and unobstructed circulation from one radiator to the other where the two are con-

nected together. The front ends of the two side members of the upper radiator will be connected to the front plate of the furnace 70 in a similar manner to connecting the front ends of the lower radiator thereto, and in the front plate 5 of the furnace, opposite to the forward open ends of the two radiators, are placed the clean-out doors 19 and 20, each of 75 which permits access to the front ends of the radiators when the radiators are to be cleaned out. The form and arrangement of radiators described enables access to be had to both sides of the radiators from the front of the 80 furnace without the inconvenience of being obliged to bend or turn around a corner in order to get access to the longitudinal members of the radiators, and one door serves to close the front ends of the two radiators on 85 one side of the radiator, the other door likewise operating on the other side of the radiator. This greatly facilitates the cleaning of the radiators when necessary.

By forming the radiators as described with 90 their forward ends separated from each other a large unobstructed space is formed between the radiators, open at its forward end next to the front-plate 5 of the furnace, so as to admit of the location in said space of a roasting or baking oven 21, which will be placed 95 in said space between the opposite members of the radiators and be supported therein in any suitable manner—for instance, by brackets 22. This oven is preferably made portable, so that it can be slid out of the space 100 when desired. The front plate 5 of the furnace is formed with an opening 23 for the insertion and withdrawal of the oven, and this opening is closed by the drop-door 24, which 105 when lowered will serve as a support for the oven in withdrawing the same or for utensils to be temporarily set upon the shelf preparatory to being placed in the oven. If for any reason it should be desirable to let some of 110 the air escape from the furnace because of excessive heat or otherwise, it can be done by simply opening this door to the space occupied by the oven.

Each of the radiators may be formed of cast- 115 iron, in which case they will be cast in two horizontal sections, the meeting edges of the sections being formed with flanges 25, through which bolts will pass to secure the sections together; but, if desired, they may be formed 120 of cast-metal top and bottom members 26, as illustrated, the inner and outer walls 27 and 28 in such case being formed of sheet-steel, fitted between the top and bottom plates 26, and united to flanges 29 and 30, formed on 125 the top and bottom plates. Each radiator will be provided with a series of vertical tubes 31, extending through the radiator, so as to permit air to pass up through said tubes and be heated by the products of combustion passing 130 through the radiators. These tubes are preferably formed of steel and are secured in place by fitting their ends over collars 32, extending inwardly from the top and bottom



plates of the radiators. The lower radiator 8 will have its forward portion supported from the fire-pot by means of suitable brackets 33, which will take the weight of the radiators from off of the front plate to the furnace, and thus avoid cracking or other injury to the front plates in case of settling of the furnace.

It may here be stated that the door 24 to the space occupied by the portable oven will be provided with a glass or other transparent covered inspection-opening 34 for inspection of the contents of the oven to determine the condition of the articles being baked or roasted. The front plate to the furnace has a fuel-opening for the fire-box, closed by a door 35, which is provided with a draft-door 36 for admission of sufficient air to the fire-pot for combustion purposes in case that wood is employed in the furnace. The door 37 to the ash-pit is also provided with a draft-damper 38, which is for use in case that coal is being burned in the furnace. The pipe connection between the upper and lower radiators is provided with a damper 39, which is operated by means of a rod 40, extending to the front of the furnace, so that when a direct draft is required the damper is opened, thus causing a direct draft in the fire-pot into the lower radiator, and thence through the pipe connection into the upper radiator, and thence out through the smoke-flue, and after the fire has been well started this damper is closed, so that the products of combustion will circulate from the fire-pot into the lower radiator, and thence to the forward end of the same and into the upper radiator and out through the smoke-flue.

The fire-pot and radiator-flues will be inclosed in a brick casement which will be formed with a cold-air duct, as usual, so as to admit the cold air at the bottom of the furnace and beneath the fire-pot, from whence the air will pass upward around the corrugated sides and top of the fire-pot and thence upwardly through the tubes in the radiators and also through the open space between the sides of the radiators and out through suitable pipe connections at the top of the furnace, from whence the heated air will be conducted through suitable hot-air flues to the points desired. The interior of the brick casement may be lined with steel and so may be the under face of the top of the brick casement, and the front plate to the furnace will

be fitted flush with the front wall of the casing.

I have illustrated and described with particularity the preferred details of construction and arrangement of the several parts; but it is obvious that changes can be made in the details of some of the parts without departing from the essential features of the invention.

Having described my invention and set forth its merits, what I claim is—

1. In a hot-air furnace, the combination of the fire-box, the two radiators located above the same, the lower radiator being in communication with the rear of the fire-box and the upper radiator in communication with the rear and the front of the lower radiator, said radiators having their forward ends separated from each other to leave a space to which access can be had from the front of the furnace, an oven located in said space between the radiators, and a front to the furnace provided with a door for access to the fire-pot, with separate doors for access to the front ends of the radiators, and a door between the radiator-doors for access to the oven between the radiators, substantially as and for the purposes described.

2. The hot-air furnace consisting of the fire-box having corrugated sides and top, the U-shaped radiator in communication with the rear of the fire-box and supported at its forward portion upon the fire-box; the second U-shaped radiator located above and in communication with the rear of the lower radiator and also with both forward ends of the same radiator and having an exit-flue, the forward ends of each radiator being separated from each other and open next to the front of the furnace, air-tubes passing vertically through each radiator, and a front plate to the furnace formed with doors for access to the separate forward ends of the radiators, a door for access to the space between the radiators, a door to the fire-pot and a door to the ash-pit, all substantially as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY L. WINGERT.

Witnesses:

J. D. HILL,

J. W. WILLIAMS.