

No. 683,355.

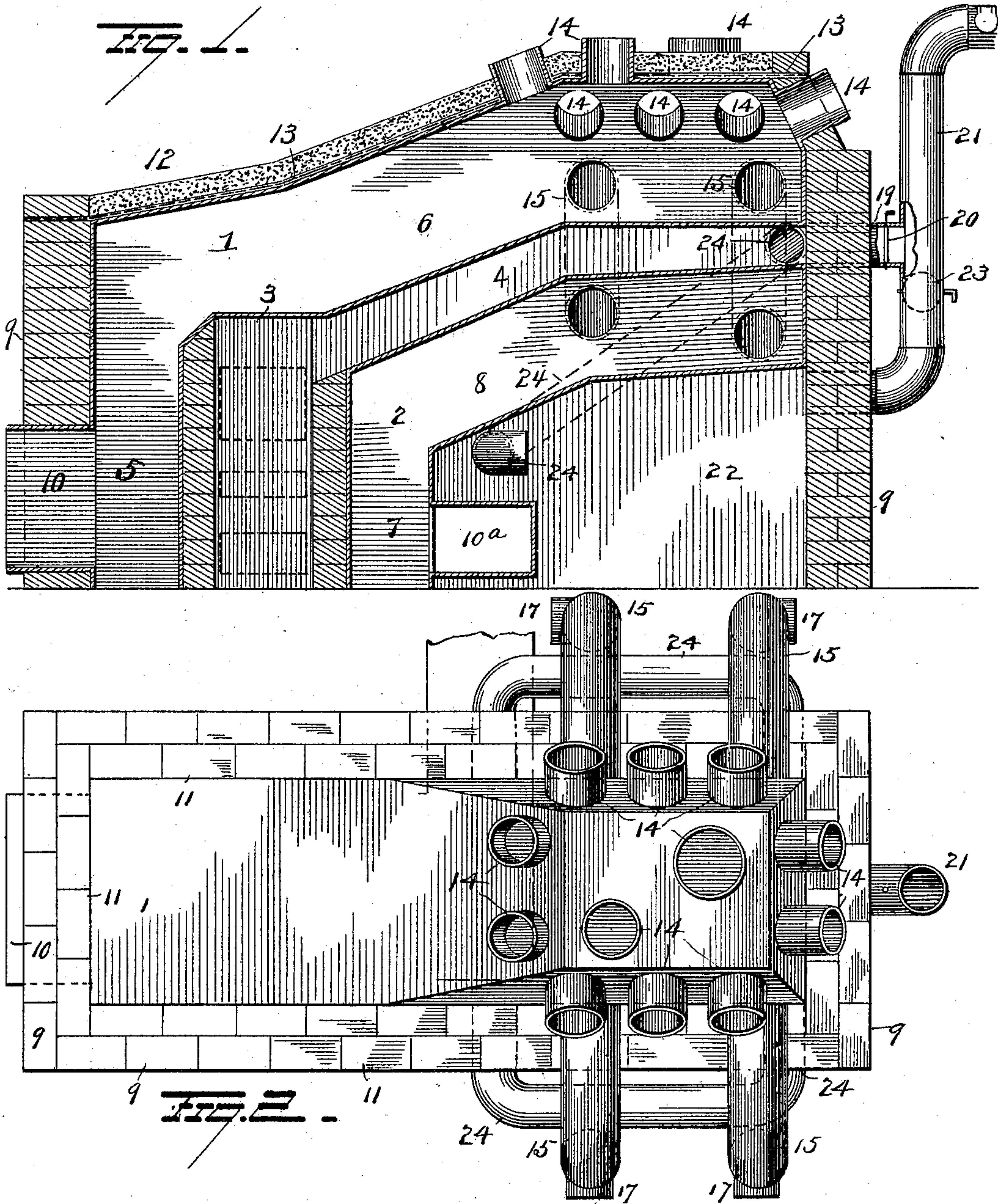
Patented Sept. 24, 1901.

J. TIMMS.
HOT AIR FURNACE.

(Application filed Mar. 28, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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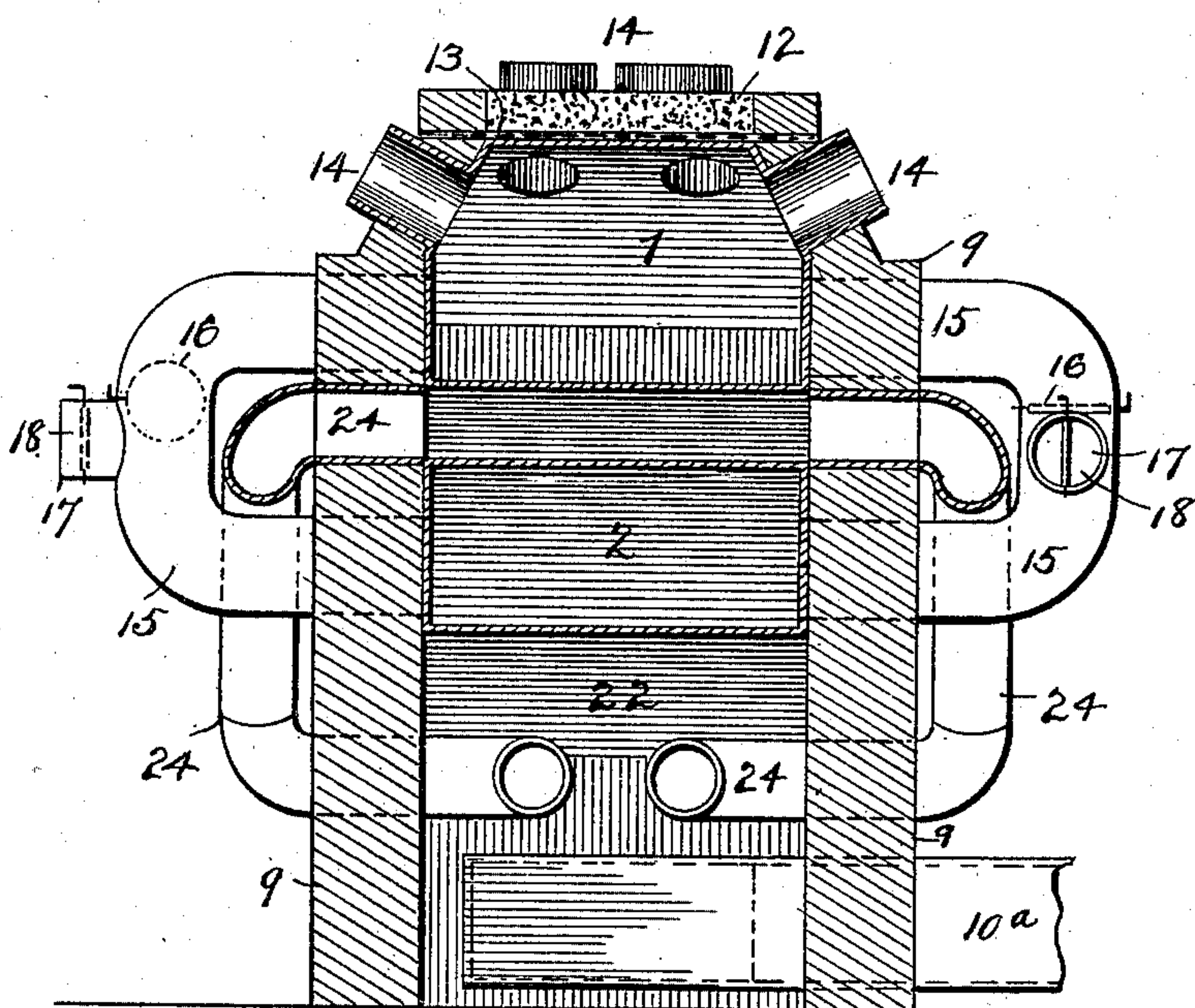
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Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES TIMMS, OF COLUMBUS, OHIO.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 683,355, dated September 24, 1901.

Application filed March 28, 1901. Serial No. 53,210. (No model.)

To all whom it may concern:

Be it known that I, JAMES TIMMS, of Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful
5 Improvements in Hot-Air Furnaces; 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.

10 My invention relates to an improvement in hot-air furnaces, the object of the invention being to so construct a furnace as to utilize the heat of the products of combustion to the fullest extent for heating air and to provide
15 simple and efficient means for controlling the exit of heated air from the furnace.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of
20 parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of the furnace. Fig. 2 is a plan view. Fig. 3 is a transverse
25 sectional view of the furnace.

In constructing my improved furnace I employ two sheet-metal boxes 1 2 to form air-flues, and these boxes are spaced apart to form a furnace-chamber 3 and a flue 4 for products of combustion. The box or flue 1 is made
30 with a vertical portion 5 and an outwardly-inclined portion 6, and the box or flue 2 is constructed with a vertical portion 7, parallel with the part 5 of box 1, and with an outwardly-inclined portion 8, approximately parallel
35 with the part 6 of the box 1. Between the inner walls of the vertical portions 5 7 of the respective boxes or flues the brick furnace-chamber is built, and the smoke-outlet of the furnace communicates with the intermediate
40 flue 4. The boxes 1 2 are inclosed by a wall 9, of brickwork, through the inner end of which an air-inlet flue 10 passes and communicates with the vertical portion 5 of the box or flue 1.
45 An air-inlet pipe 10^a communicates with the vertical portion of the box or flue 2. The wall 9, of brickwork or masonry, is made to overlap the top of the box 1, as shown at 11, Fig. 2, and the top of said box or flue 1 within
50 the border 11, of brick, is covered with sand 12. I prefer, however, to place between the sand and the box or flue a layer 13 of asbestos.

The forward or upper end of the box or flue

1 is provided with any desired number of outlets 14, with which suitable pipes or flues may
55 be connected for conveying hot air to different parts of a building. Heated air will be conveyed from the lower flue 2 to the upper flue 1 through U-shaped pipes 15 15, each of which is disposed outside the furnace struc-
60 ture and communicates at its respective ends with said flues. Each U-shaped pipe 15 is provided with a valve or damper 16, by means of which the passage of heated air from the flue 2 to the flue 1 can be controlled. In this
65 way the amount and temperature of the heated air flowing through the pipes communicating with the flue and leading to various parts of a building can be easily regulated. If desired, hot-air flues may be connected with
70 thimbles 17 on the U-shaped pipes 15, and in each of these thimbles a valve 18 is located.

The forward end of the smoke-flue 4 communicates, by means of a short pipe 19, having a valve 20, with the stack 21, and the
75 lower end of the latter communicates with the space or chamber 22 under the box or flue 2. A valve or damper 23 is located in the stack for controlling the draft. The forward end of the smoke-flue 4 also commu-
80 nicates, by means of two externally-located pipes 24, with the space or chamber 22 at or near the inner end of the latter for the purpose of conveying products of combustion from the flue 4 to the space under the
85 flue 2 to heat the lower wall of said flue 2, and from said space or chamber 22 the products of combustion will enter the stack.

By means of the construction and arrangement of parts hereinbefore described the
90 products of combustion passing through the intermediate flue 4 will heat the air in both flues 1 and 2 and the furnace *per se* will heat the air in the vertical portions of said flues. The hot products of combustion after having
95 heated the air in both flues 1 2 will enter the space 22 through the pipes 24 and move along the bottom of the flue 2, thus further heating the air therein, and will escape from the space 22 to the stack, as before explained.
100

When the furnace is first started and a direct draft is desired, the valve or damper 20 will be opened and the valve or damper 23 closed, so as to cause the products of combustion to pass directly to the stack from the
105 intermediate flue 4.

It is evident that with the structure herein described the products of combustion are very fully utilized to heat the air leaving the furnace with a minimum consumption of fuel. The heat of the products of combustion is absorbed by the air in the two flues 1 2 while said products are passing through the intermediate flue 4, and the air in the lower flue 2 absorbs heat remaining in the products of combustion when the latter pass through the space under said lower flue, so that when the products of combustion reach the stack they will be comparatively cool. As the heated air from the lower flue 2 flows into the upper flue the air leaving the latter, having its heat increased by the hot air from the flue 2, will possess a high degree of temperature and its volume will approximate the carrying capacity of the flues leading to the various parts of the building to be heated. If a less amount of heat is desired than can be thus supplied, communication between the flues 1 2 can be closed and the heated air from the flue 2 can, if desired, be conveyed directly to parts of the building. The temperature of the air leaving the furnace might also be reduced, causing the products of combustion to enter the stack without passing through the space under the flue 2.

Slight changes might be made in the details of construction of my invention without departing from the spirit thereof or limiting its scope, and hence I do not wish to limit myself to the precise details herein set forth.

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

1. In a hot-air furnace, the combination with a fire-chamber and two air-flues having inlets at one end and outlets at the other end, of means for passing products of combustion successively between said air-flues and under the bottom air-flue.

2. In a hot-air furnace, the combination of a fire-chamber two air-flues, a smoke-flue communicating with the furnace-chamber and passing between the air-flues, pipes for conveying products of combustion from said smoke-flue into a space under the lower air-flue and a stack communicating with said space.

3. In a hot-air furnace, the combination of a fire-chamber approximately parallel air-flues spaced apart and forming a smoke-flue between them, pipes connected at their respective ends to said air-flues, means for controlling the passage of air through said pipes, and means for permitting the escape of hot air from the upper air-chamber.

4. In a hot-air furnace, the combination of a fire-chamber approximately parallel air-flues spaced apart and forming a smoke-flue between them, the upper air-flue having outlets for hot air, external pipes connected at their respective ends with the respective air-chambers, means for controlling the passage of air through said pipes, and means for con-

trolling the passage of air from intermediate portions of said pipes.

5. In a hot-air furnace, the combination of two boxes or air-flues spaced apart and having a fire-chamber and a smoke-flue between them, said air-flues extending laterally from the fire-chamber and disposed so as to leave a space below the lower flue, pipes connecting the outer end of said smoke-flue with the inner end of the space under the lower air-flue, and a stack communicating with said space.

6. In a hot-air furnace, the combination of a fire-chamber, two air-flues spaced apart and having a fire-chamber and a smoke-flue between them, the lower air-flue disposed so as to have a space below it, a stack communicating with the space under the lower air-flue and having a valved connection with the outer end of said smoke-flue, and pipes connecting the outer end of said smoke-flue with the inner end of the space under the lower air-flue.

7. In a hot-air furnace, the combination with a structure comprising an upright portion having a fire-chamber therein, and a hollow elongated extension projecting upwardly and outwardly from said upright portion, of a smoke-flue communicating with the fire-chamber and extending through the hollow extension of the casing, said smoke-flue made elongated in cross-section and extending from one side wall to the other of said hollow extension so as to divide the same into two chambers one above and the other below the smoke-flue, means for supplying said chambers with cold air, and means for conveying the heated air from the lower to the upper air-chamber and means for conducting heated air from the latter.

8. In a hot-air furnace, the combination with a structure comprising an upright portion having a fire-chamber therein and a hollow elongated extension projecting upwardly and outwardly from said upright portion, of a smoke-flue communicating with the fire-chamber and projecting longitudinally through the center of the same and extending from side to side thereof forming air-chambers above and below the smoke-flue, an inlet at the base of the upright structure in front of the fire-box to supply cold air to the chamber above the smoke-flue, a cold-air inlet-pipe communicating with the upright structure in rear of the fire-box for supplying cold air to the hot-air chamber below smoke-flue, hot-air outlet-pipes communicating with the upper end of the upper air-chambers in the elongated extension of the casing, and pipes connecting the lower with the upper air-chamber.

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

JAMES TIMMS.

Witnesses:

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W. A. MARSH.