(No Model.) 2 Sheets—Sheet 1.

J. W. YATES.

HEATING APPARATUS.

No. 604,819. Patented May 31, 1898.

Fig. 1.

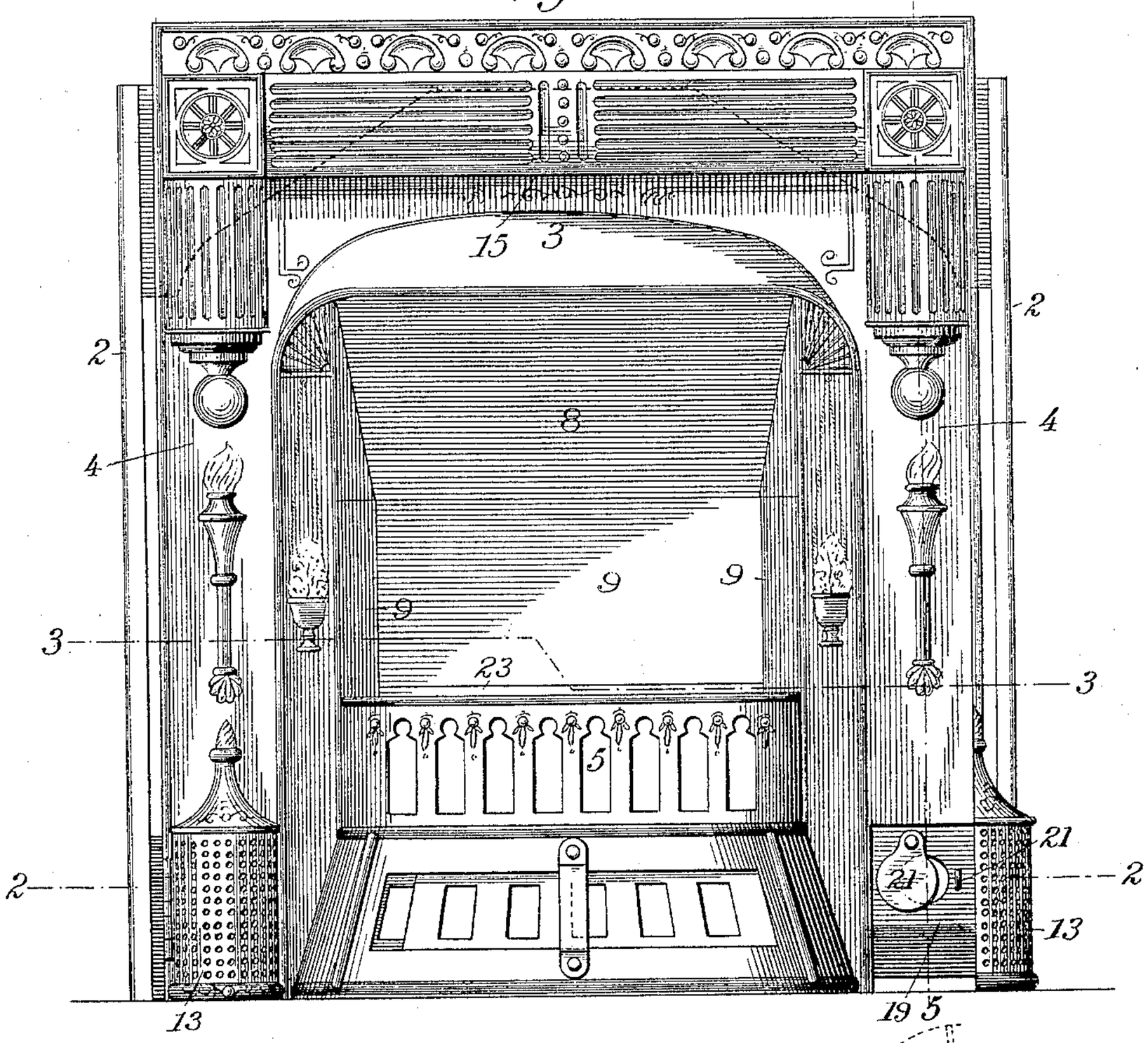
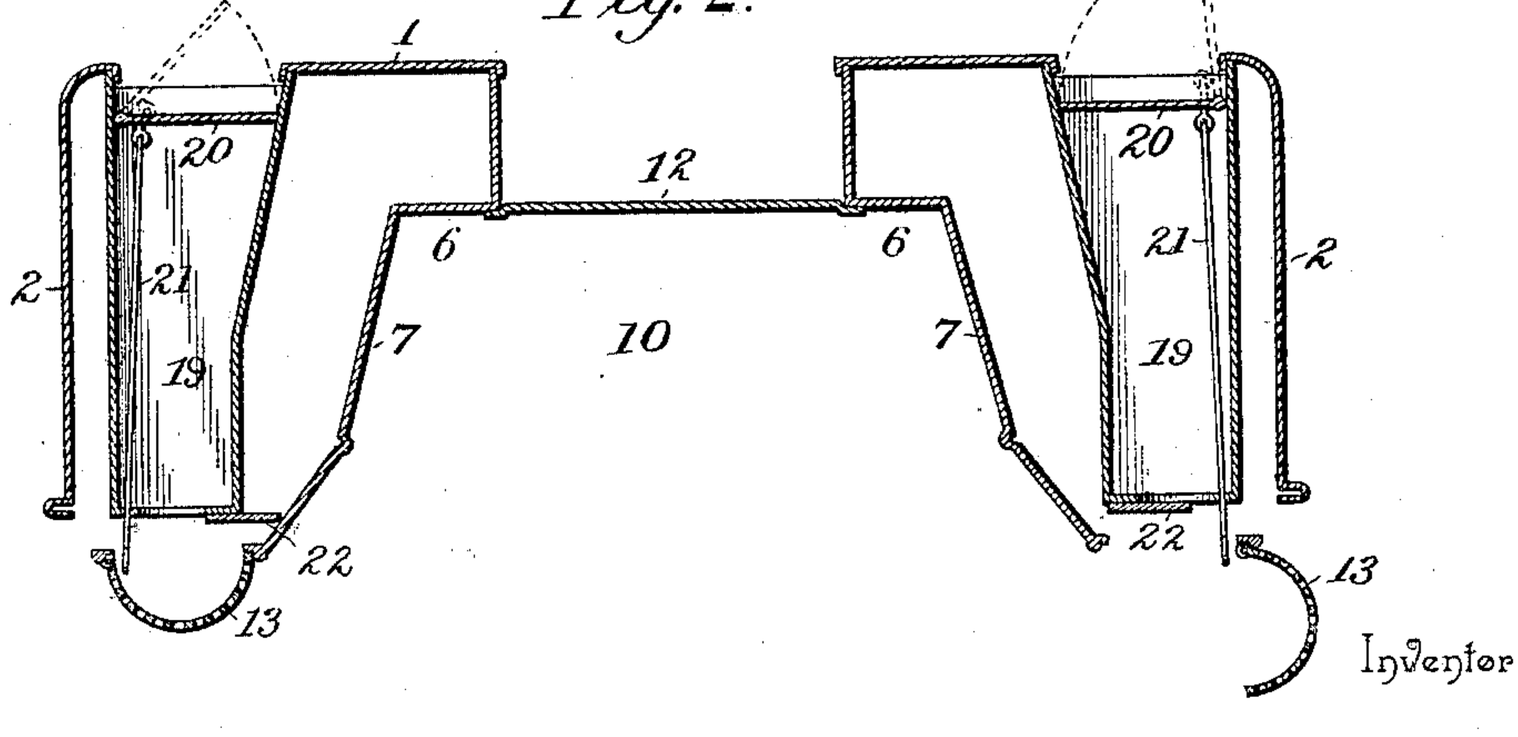


Fig. 2.



Witnesses
Harold H. Simms.

Inventor
J. W. Yates.

By his Attorneys,
A. E. Doyle
Church & Co.

(No Model.) 2 Sheets—Sheet 2.

J. W. YATES.

HEATING APPARATUS.

No. 604,819. Patented May 31, 1898.

Fig. 3.

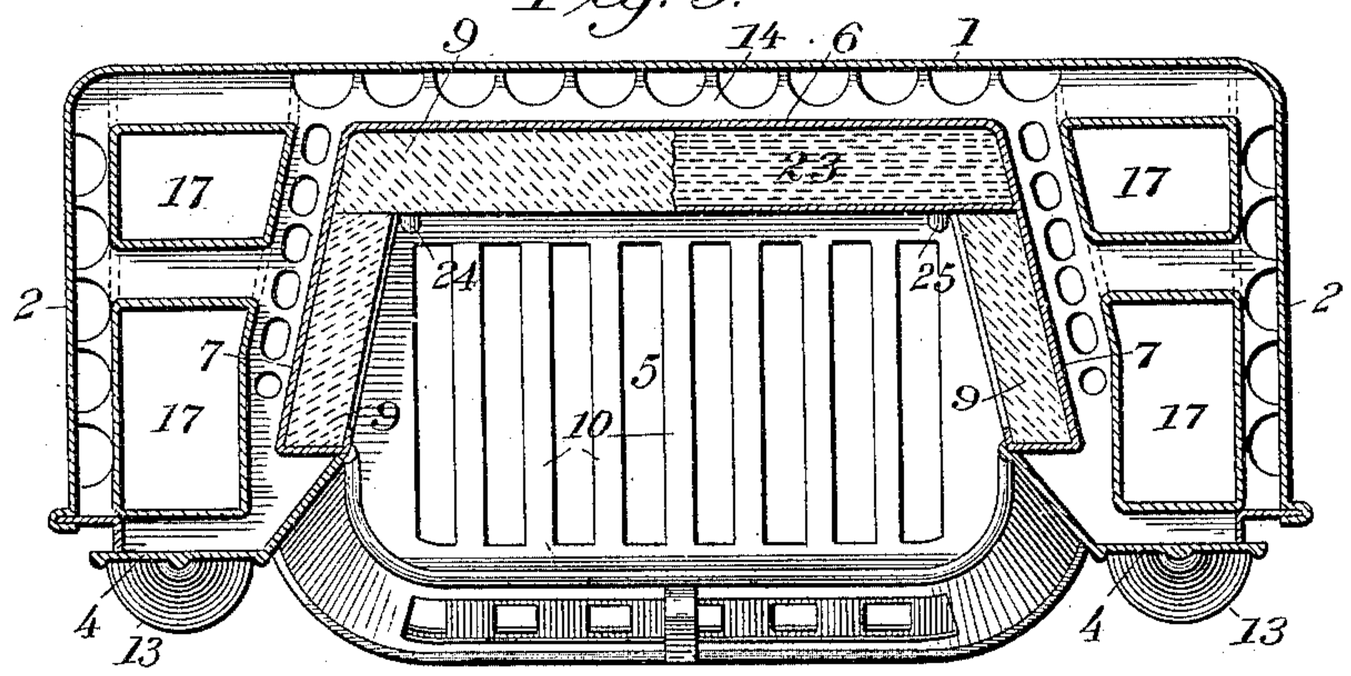


Fig. 4.

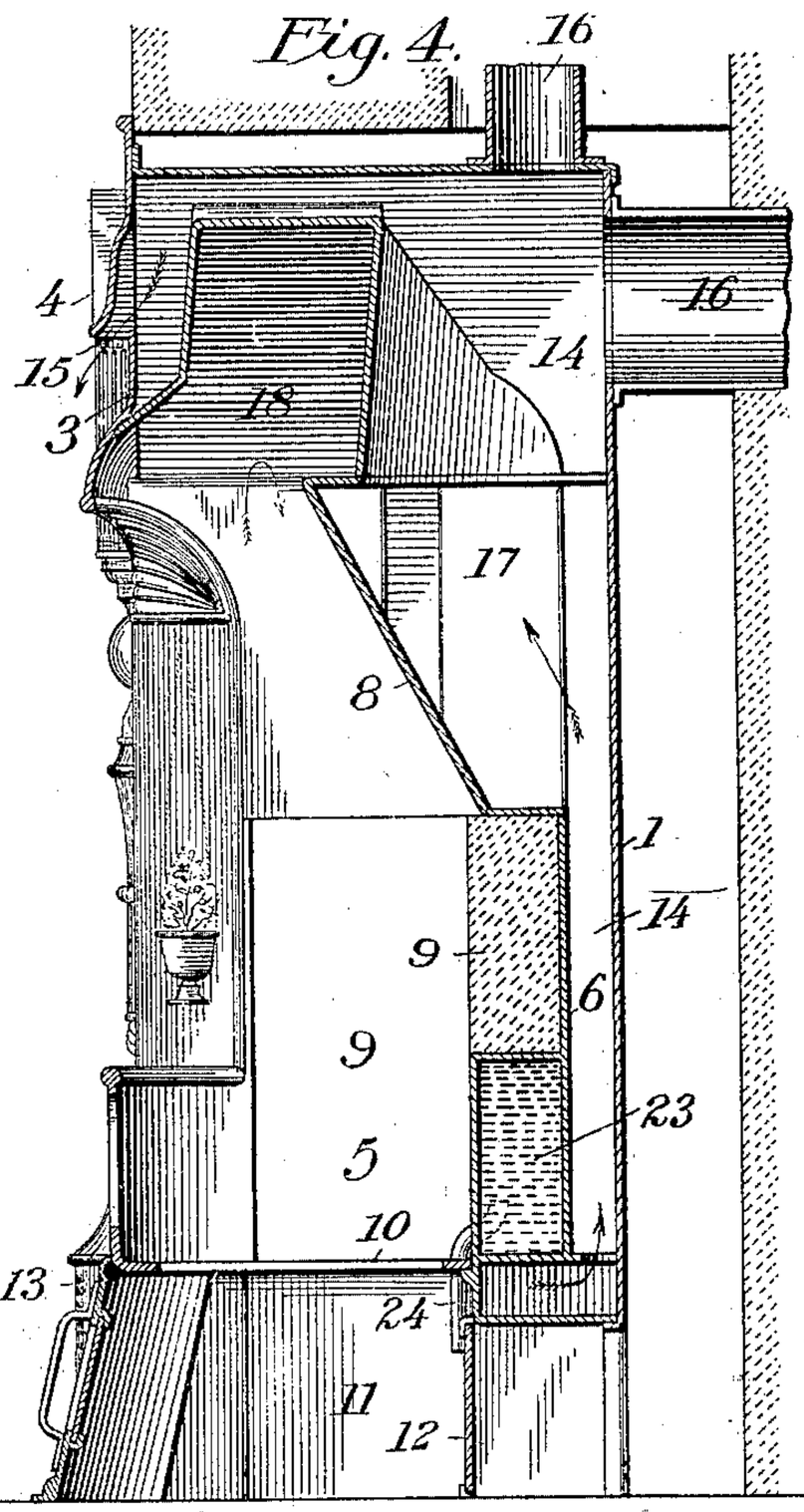
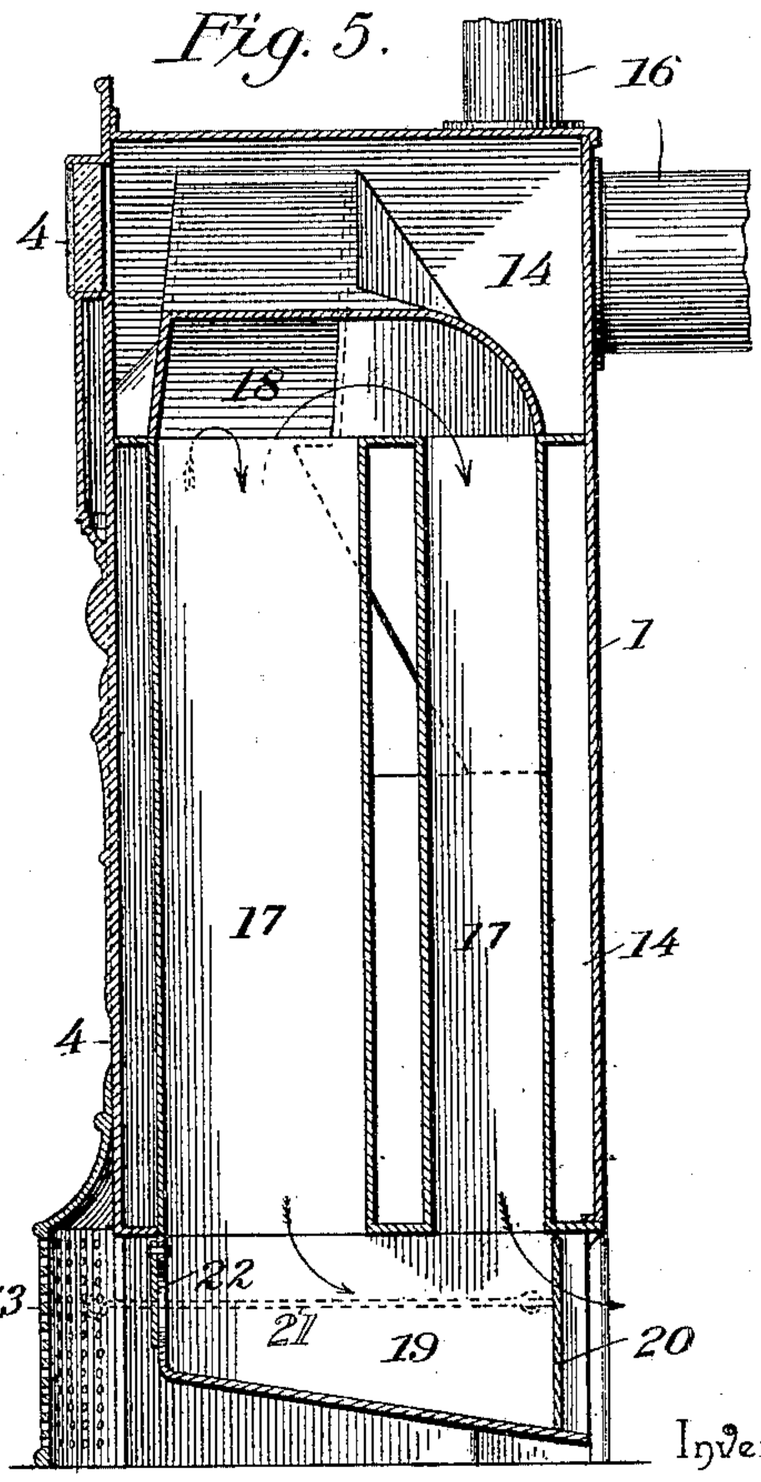


Fig. 5.



Inventor

J. W. Yates.

Witnesses
Harold H. Sumner.
D. E. Boyle

By his Attorneys,

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

JOHN W. YATES, OF NASHVILLE, TENNESSEE.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 604,819, dated May 31, 1898.

Application filed May 15, 1897. Serial No. 636,673. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. YATES, a citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented a new and useful Heating Apparatus, of which the following is a specification.

My invention relates to improvements in heating devices or furnaces, and particularly to that class wherein an open fire-box, constituting a fireplace, is employed; and the object in view is to provide such a construction and arrangement of parts as to economize fuel by exhausting the smoke and other products of combustion at a point below the plane of the grate, and hence reduce to the minimum the conveyance from the device of heated air by the same channels through which the products of combustion are conducted; to provide means whereby cold air is drawn from a point or points contiguous to the floor of the room in which the furnace is arranged, causing the same to traverse heating-surfaces which derive their heat from the products of combustion, and subsequently discharging it into the room at a point above the fireplace-opening; to provide simple and efficient means for controlling the draft and for giving access to the interiors of the flues for cleaning purposes; to provide means in connection with the fireplace for heating water, which may be conducted to any desired point for use, and to provide such an arrangement of means for heating and storing air that other compartments than that in which the furnace is located may be supplied.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a front view of a heating device constructed in accordance with my invention. Fig. 2 is a horizontal section on the plane indicated by the line 2 2 of Fig. 1. Fig. 3 is a similar view on the plane indicated by the line 3 3 of Fig. 1. Fig. 4 is a vertical central section. Fig. 5 is a vertical section taken in the plane of one of the jambs, as indicated by the line 5 5 of Fig. 1.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates the rear and 2 the side walls of a casing which is closed at its front side by a face-plate 3, extended to form the jambs 4. The fire-box 5 is provided with sheet-metal rear and side walls 6 and 7 and a forwardly-inclined top wall or deflector 8, said rear and side walls being offset to form cavities or recesses for the reception of fire-brick linings 9.

The grate 10, as in the ordinary construction, is arranged at an intermediate point of the fireplace-opening to form a subjacent ash-pit 11, and in the rear wall of the ash-pit, which is formed by a portion of the rear wall of the fireplace, is formed an opening fitted with a closure 12, whereby access may be had to the space in rear of the casing to remove accumulations of soot.

Arranged between the side walls of the fireplace and the contiguous side walls of the casing are air-spaces open at the bottoms of the jambs for the admission of air at the plane of the floor, these air-inlet openings being covered by reticulated or foraminous guards 13, which are preferably hinged, as shown, to give access to the air-spaces, and connecting these lateral air-passages is a rear air passage or chamber 14, provided with an outlet 15 in the front plate or face of the furnace above the fireplace-opening. The casing is closed at its top above the plane of said heated-air outlet, and when it is desired to convey heated air to other rooms than that in which the heating device is arranged it may be accomplished by connecting with the rear heating-chamber either a top or rear heat-pipe 16, both of which are illustrated in the drawings.

Located within the jambs and hence in the side air-passages are vertical descending flues 17, which communicate at their upper ends above the plane of the top of the fireplace-opening by means of a transverse smoke-chamber 18 and are connected at their lower ends with rearwardly-extending smoke-conveyers or base-flues 19 to conduct the smoke and other products of combustion to the chimney in rear of the casing. The products of combustion rising from the fireplace are

collected in the smoke-chamber 18, which is arched, as shown by dotted lines in Fig. 1, after which said products pass downwardly through the side smoke-flues 17 and escape by way of the rearwardly-extending base-flues or conveyers 19. These conveyers have their lower sides preferably inclined downwardly toward the rear, and are fitted contiguous to the plane of the rear wall 1 of the casing with valves or draft-controlling devices 20, having operating-rods 21, which extend forwardly to and through the front ends of the conveyers, where they are accessible by displacing the pivotal guards 13. The front ends of the conveyers are also preferably provided with openings fitted with removable closures 22, whereby the conveyers may be relieved of accumulations of soot. In the construction illustrated the smoke-flues 17 are duplicated at each side of the fireplace in order to increase the heating-surface exposed to contact with air admitted by the inlet-openings, which are covered by the guards 13, all of said flues communicating at their upper ends with the common smoke-chamber 18 and at their lower ends with the conveyers 19 and being controlled by the valves 20, which are located in said conveyers.

Fitted in the recess or cavity in the rear wall of the fireplace, preferably below the plane of the rear fire-brick lining, is a water-back 23, with which communicate inlet and outlet pipes 24 and 25, adapted to be connected with the desired supply and delivery pipes. (Not shown.) It will be understood that this water-back may be made of such a size as to completely fill the recess or cavity at the rear of the fireplace, according to the desired capacity.

From the above description it will be seen that the products of combustion are conveyed through flues which communicate with the chimney at a point at or contiguous to the plane of the floor or at a point below the plane of the grate, said flues receiving the products of combustion in the usual way at the top of the fireplace-opening. It will be seen, furthermore, that the column of products of combustion is divided and conveyed through a plurality of flues which are exposed exteriorly to air which is admitted at depressed points, preferably below the plane of the grate, and are discharged at a point above the plane of the fireplace-opening, the air after its admission and before it can reach the outlet-opening being forced to traverse the smoke-flues throughout their lengths.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. A fireplace-heater comprising an external casing, a fire-box casing having its side and rear walls arranged parallel with corresponding walls of the external casing and forming therewith the air-circulating spaces which discharge over the top of the grate through the front plate, a forwardly-inclined deflector within the grate-casing and overhanging the grate therein, a transverse smoke-arch above the deflector of the grate-casing to receive the products of combustion therefrom, horizontal base-flues arranged in the lower part of the air-chamber between the external and grate casings and discharging at their rear ends to a suitable flue, and a plurality of descending flues spaced relatively to each other within the air-chamber at the sides of the grate-casing and communicating with the smoke-arch and the base-flues, whereby the air-chamber is divided by a series of flues through which the products of combustion pass to the exit-flues and the ascending currents of air are divided into strata or columns which are brought successively in contact with smoke-flues and the grate-casing prior to the discharge of the air through the front plate, substantially as described.

2. In a fireplace-heater, the combination with an external casing, and a grate-casing forming between itself and the external casing an air-circulating chamber, of the front plate having the hinged perforated guards at the bottom thereof, the base-flues arranged in the horizontal planes of the hinged guards and having the removable closures 22, the damper within the base-flues and having their operating-rods extending through said flues, the transverse smoke-arch over the grate-casing, and the downdraft smoke-flues situated at the sides of the grate-casing and communicating with the smoke-arch and the base-flues, substantially as described.

3. In a fireplace-heater, the combination with an external casing, of a grate-casing situated within the external casing and having a water-back situated in front of the air-circulating chamber provided between the grate and external casings and also having an inclined overhanging deflector, the base-flues at the sides of the grate-casing, the transverse smoke-arch, and the downdraft smoke-flues communicating with said arch and the base-flues, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN W. YATES.

Witnesses:

JAS. M. QUARLES,

THOMAS A. KERCHERAL.