

No. 612,369.

Patented Oct. 11, 1898.

T. WALKER.
HOT AIR FURNACE.

(Application filed July 13, 1895.)

(No Model.)

2 Sheets—Sheet 1.

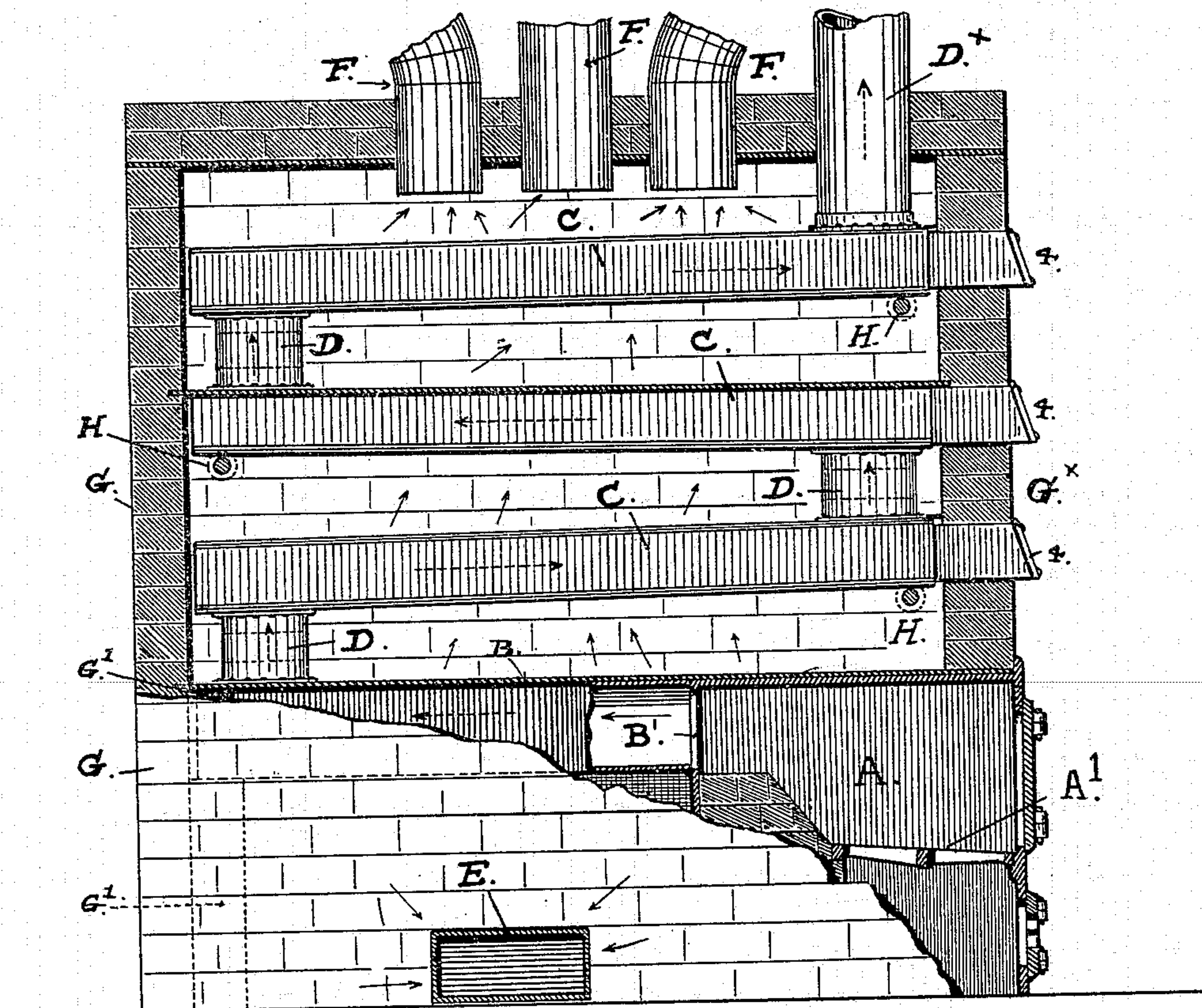


Fig. 1.

Fig. 2a

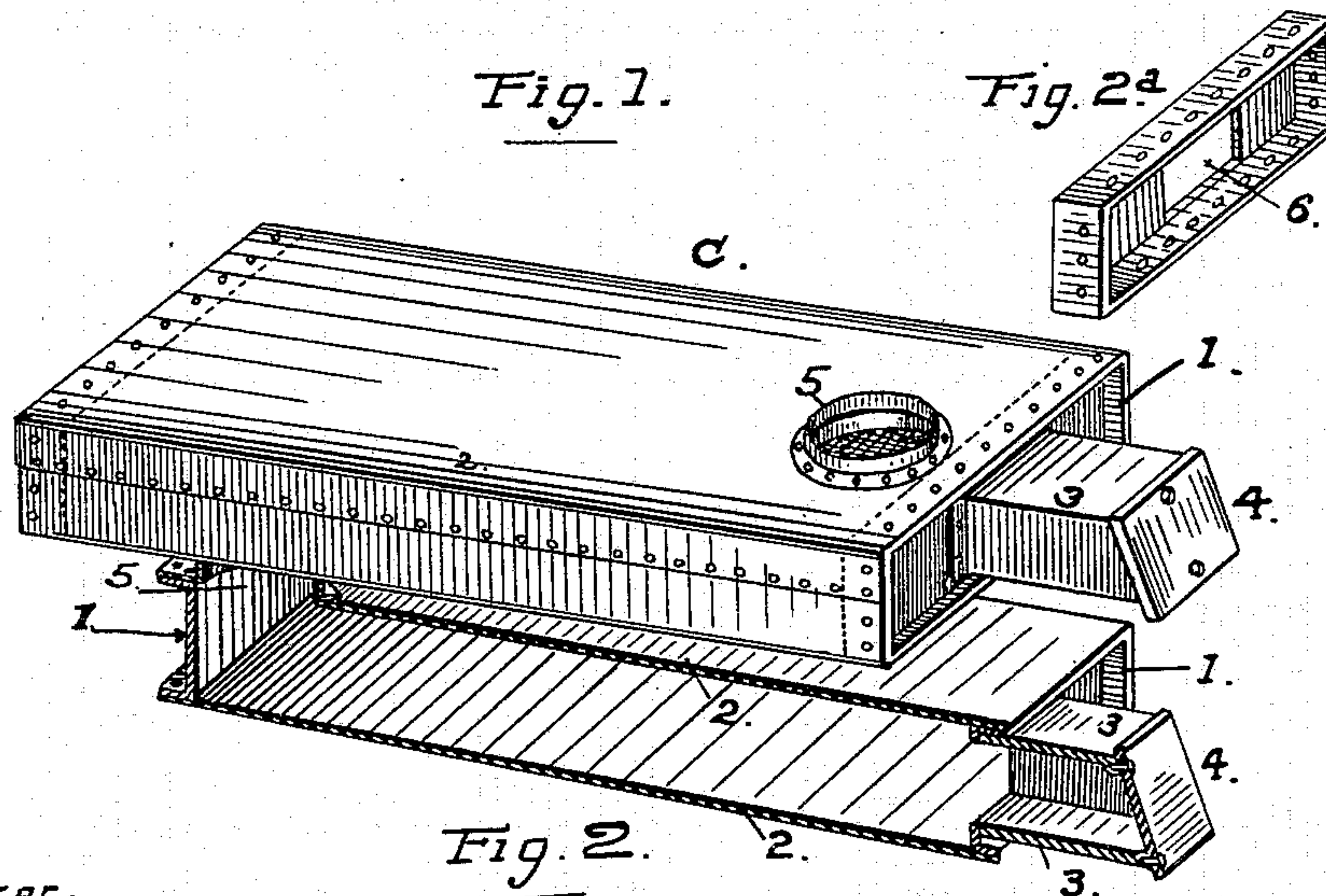


Fig. 2.

Witnesses:

Marcus S. Levi.

Attest.

Inventor:
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2 Sheets—Sheet 2.

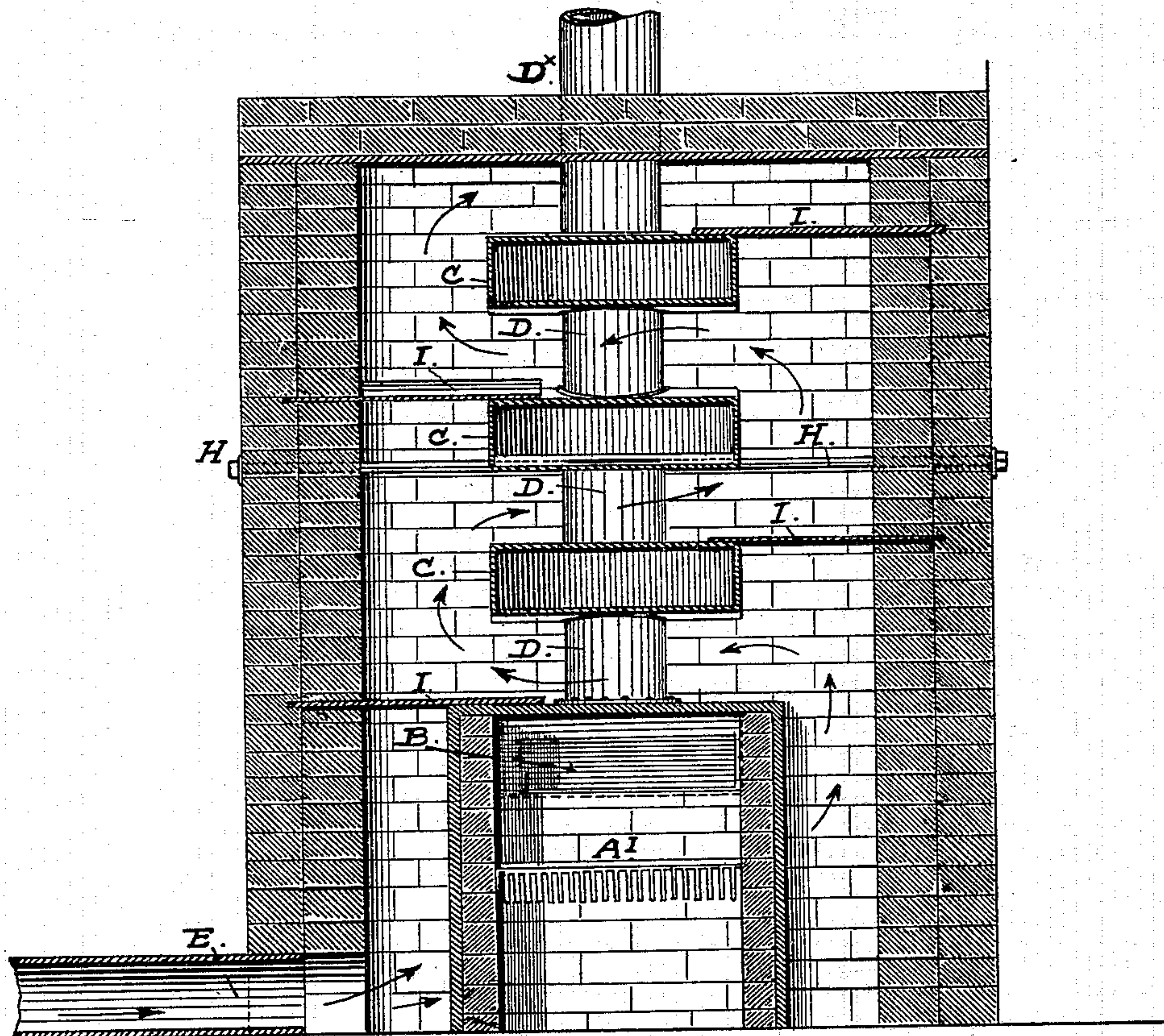


Fig. 3.

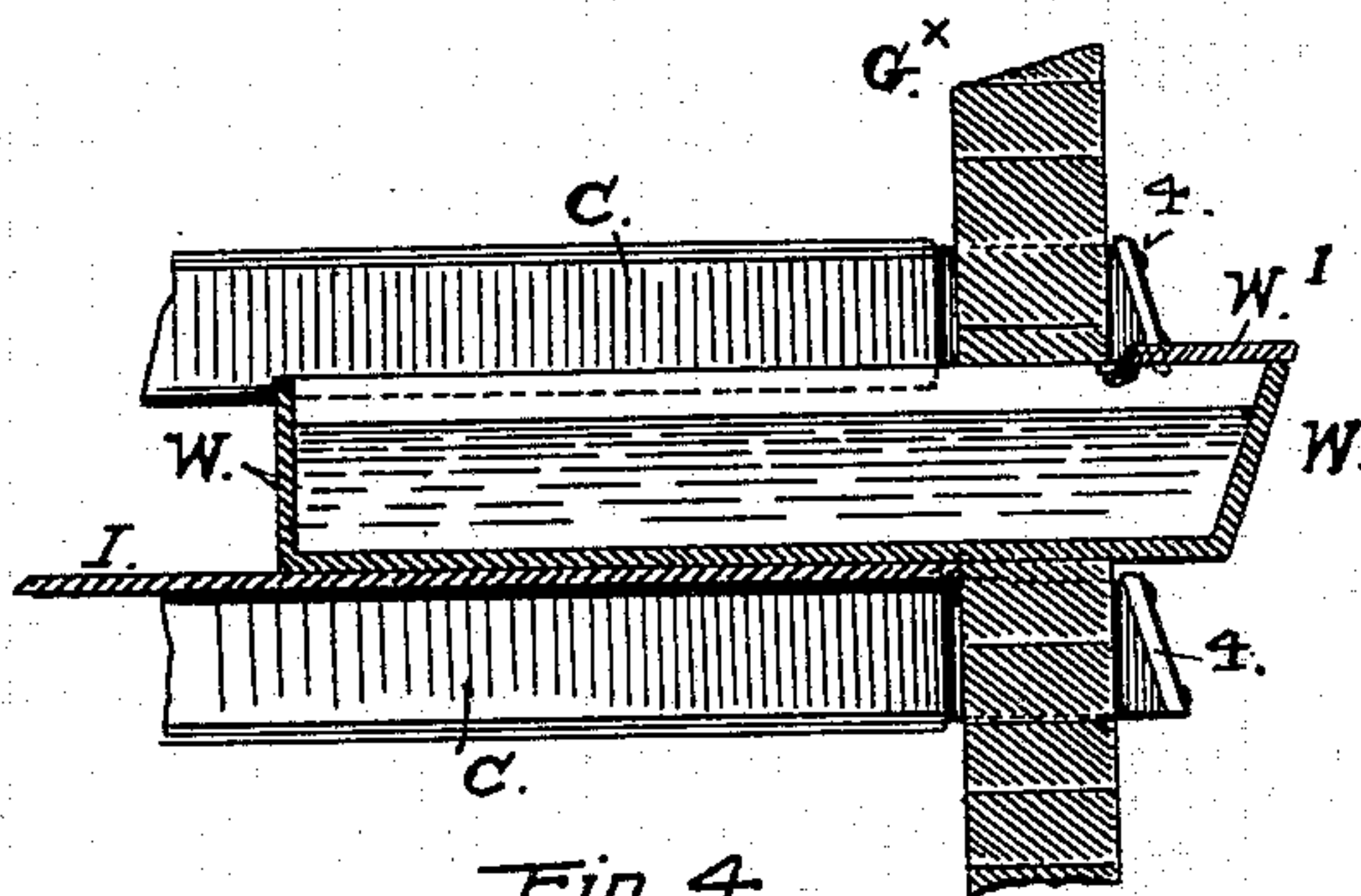


Fig. 4.

Witness:

Marcus S. Lane

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Attys.

UNITED STATES PATENT OFFICE.

THOMAS WALKER, OF OAKLAND, CALIFORNIA.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 612,369, dated October 11, 1898.

Application filed July 13, 1895. Serial No. 555,929. (No model.)

To all whom it may concern:

Be it known that I, THOMAS WALKER, a subject of the Queen of Great Britain, residing in the city of Oakland, county of Alameda, and State of California, have invented certain new and useful Improvements in Hot-Air Furnaces, of which the following is a specification.

My invention relates to improvements made in hot-air furnaces for dwellings; and the same consists in the described construction and combination of parts producing a furnace or heater in which simplicity and cheapness of construction are combined with efficiency in operation and great economy in the use of fuel.

The following description explains at length the nature of my said improvements and the manner in which I proceed to produce, apply, and carry out the same, reference being had to the accompanying drawings, forming part of this specification.

In the said drawings, Figure 1 is a side elevation of a furnace embodying my said improvements, the brickwork being broken away on the side and shown in section at the front and back to expose the parts within. Fig. 2 is a perspective view in detail of two of the fire-flues, the lower one in the figure being in longitudinal section. Fig. 2^a is a view in perspective of one of the cast-iron heads that form the ends of these box-flues. Fig. 3 is a vertical section taken transversely through the furnace about midway between the front and rear ends. Fig. 4 is a longitudinal section in detail showing in position a water-trough for moistening the air during the heating operation.

The fire-box A has a cast-iron front A', in which are the necessary fuel and ash-pit openings, provided with doors for closing them, and the sides and top of the box are of sheet-iron, with an inner lining of fire-brick.

B is a flat box-flue with square corners extending backward from the opening B' of corresponding shape in the back of the fire-box and with a slight upward inclination to the rear wall of the surrounding brickwork of the furnace, at which part the end of the flue B is supported on a brick pier G'.

C C indicate box-flues extending longitudinally from the front wall to the rear wall of the exterior brickwork of the furnace and

placed one over another, with a clear interval of space between them, and also a clear space of about equal measurement between the side of the flue and the exterior brickwork wall on each side, so that each box-flue is surrounded on all sides by a clear space for passage and circulation of air around and in contact with all sides of each and every flue.

D D are short upright pipes connecting the rear ends of the first and third flues C with the corresponding end of the flue next below at the rear and the front end of the same flues with the front ends of the similar flues next above, thus connecting together the whole set of box-flues in a zigzag manner and in a continuous flue from the fire-box to the top of the furnace. Each box or longitudinal section of this flue is set with a slight upward slant, and the topmost box, at the front end, is connected with the chimney outside by an upright pipe D^x.

The manner of constructing the boxes or sections C of the fire-flue will be understood from Figs. 2 and 2^a. Cast-iron heads 1 1, with outwardly-turned flanges, form the ends of the box, and to these flanges are riveted the galvanized sheet-iron box-bodies 2, each in one piece, properly bent around the heads 1 to form straight perpendicular sides and the flat top and bottom of the box, the sheet-iron body-piece being united at one side by an overlapped and riveted joint. A circular opening is cut in the top near the front end and in the bottom near the rear end, and around each opening is riveted a flanged collar with short standing rim 5, over which is tightly fitted the section of short upright pipes D, that couple one box C with the other next above and next below or the chimney-pipe D^x. The rear cast-iron head 1 is solid, but in the front one is made a rectangular opening 6, over which is riveted a rectangular neck or extension 3 of such length that it extends through the perpendicular front wall G^x to the outside, and on this projecting front end is a removable plate or cover 4, so that access to the interior of the box C is afforded from the outside for the purpose of cleaning out the flue from time to time. There is one of these passages accessible from the outside at every box or section of the fire-flue. The brickwork sides, ends, and top inclose the

air heating and conducting space around the fire-flues on all sides, and such space is divided by the longitudinally-set baffle-plates I I in such manner that the air entering at the bottom of the furnace through the cold-air trunk E is compelled to take a circuitous course from side to side across and around the boxes or sections of the fire-flue and an upward direction also to the top of the furnace. These plates I I are set and fixed, as shown in Fig. 3, between the side walls and the sides of the boxes C and in such manner that they cut off the direct perpendicular ascent of the air and cause it to pass from side to side between one box and the next above, thus coming in contact with all the heating-surfaces in its passage from the inlet at the bottom to the conductors F F at the top. These last-mentioned pipes are carried from the top of the furnace through the building and distribute the hot air in the usual way to the different apartments.

H H are rods fixed in the brickwork and extending across the furnace under the ends of the flue-sections to support the same.

W is a trough or receptacle holding water for supplying moisture to the air by evaporation. The trough projects partially through the wall of the furnace at the front end, and the outer portion is closed by a lid or cover W', which can be raised or removed for filling the trough; but its top, inside the furnace, is open to expose the water to the heated air-currents. Proper support for the trough is provided by any one of the baffle-plates I on which it may be set, as shown in Fig. 4.

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

1. In a furnace, the combination with the casing, the fire-box, the box-sections, and the

upright pipes connecting said sections in alternate pairs so as to form a serpentine fire-flue extending from the fire-box forward and backward within the casing and upward to the chimney; of baffle-plates extending from the sides of the casing inward to the tops of alternate box-sections so as to form a serpentine air-passage leading from an inlet at the bottom across within the casing to the conductors at the top, and a water-receptacle inserted through the front wall of the casing into the space between two of said box-sections with its top within the casing open and its top without the casing closed by a removable cover, as and for the purpose set forth.

2. In a furnace, the combination with a casing, the fire-box, the chimney, a series of box-sections located within the casing and extending from its front to its rear walls, alternate sections inclining in opposite directions, and a series of upright pipes connecting the box-sections in a serpentine fire-flue leading from the fire-box to the chimney; of necks or extensions on the front ends of the sections projecting through the forward wall of the casing, covers removably closing their outer ends, an air-inlet at the bottom, air-conductors at the top, and a transverse serpentine air-passage from the inlet to the conductors around the several box-sections, each of said upright pipes connecting the lower end of one box-section with the higher end of that box-section next below, as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

THOMAS WALKER. [L. S.]

Witnesses:

C. W. M. SMITH,
CHAS. E. KELLY.