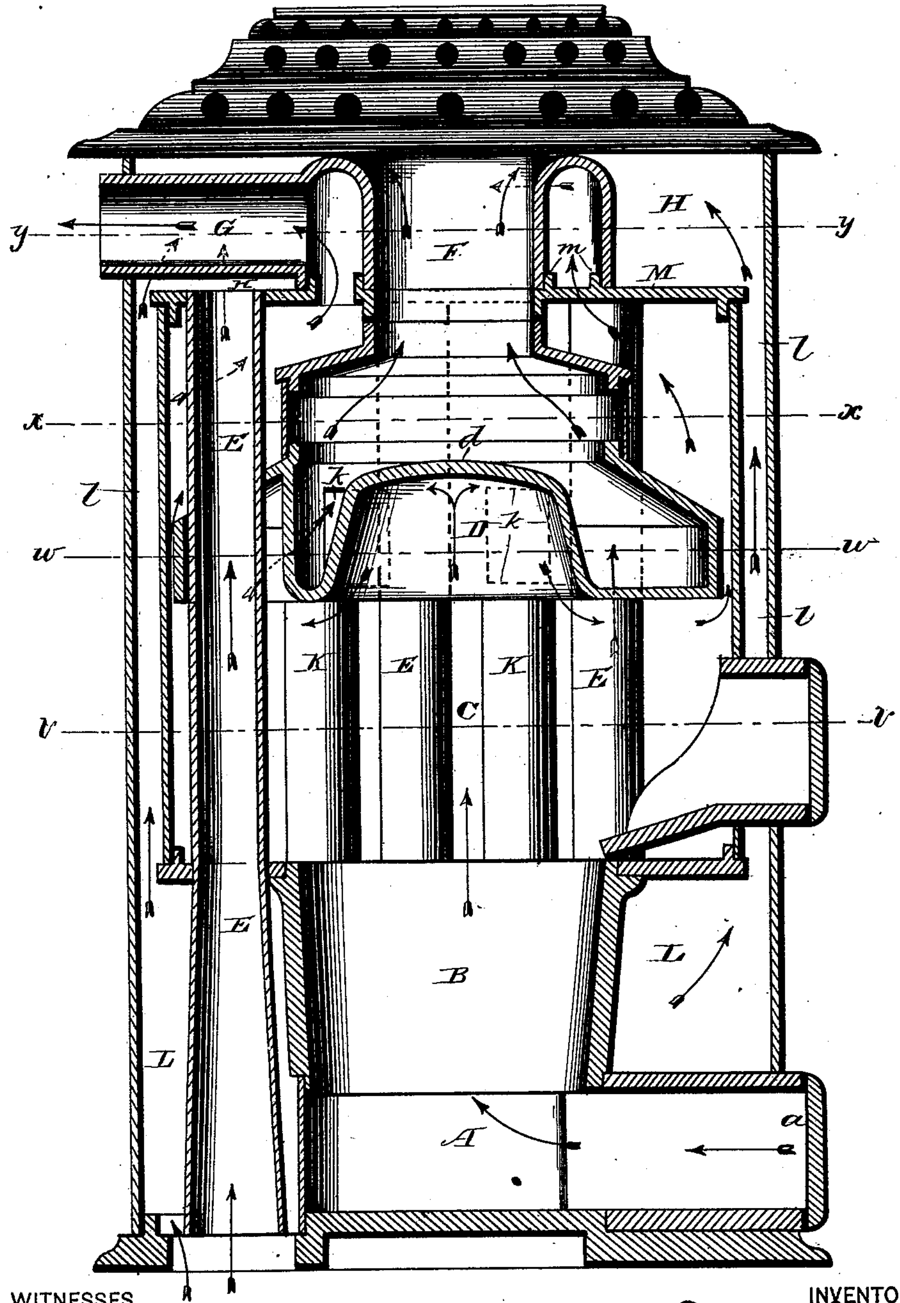
3 Sheets—Sheet 1.

H. M. CHITTENDEN.

Hot-Air Furnace.

No. 215,097. Patented May 6, 1879.

Fig. 1.



WITNESSES
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3 Sheets—Sheet 2.

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Fig. 2.

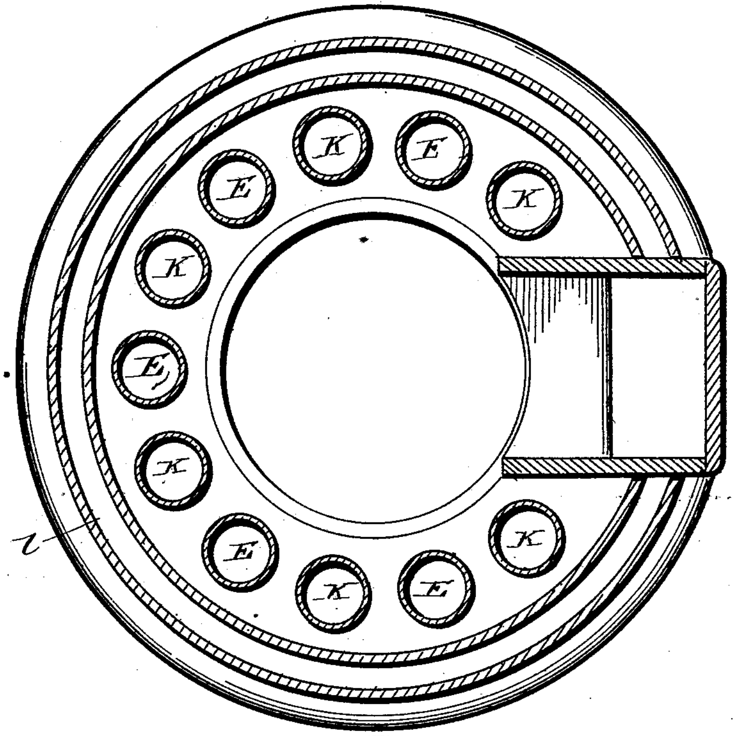

Fig. 3.

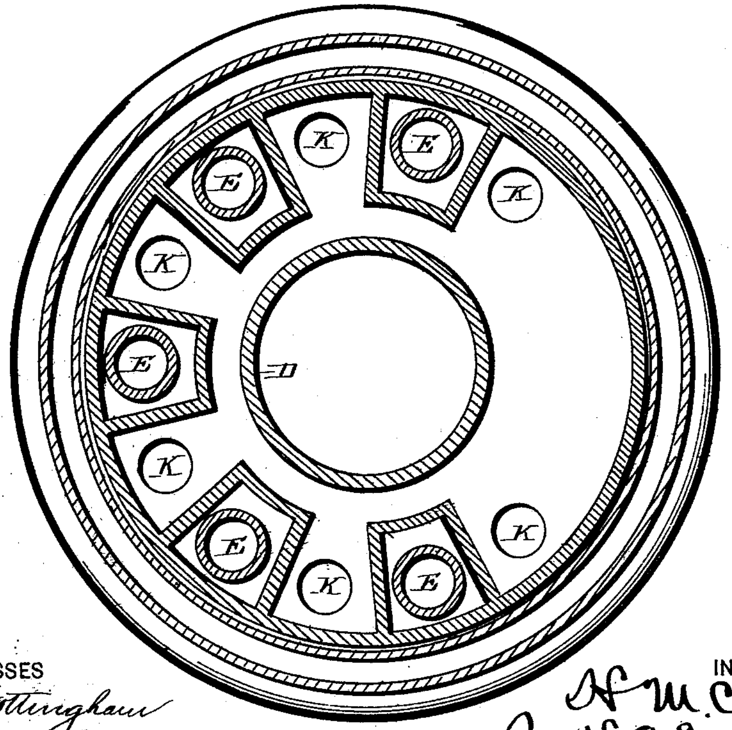

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Fig. 4.

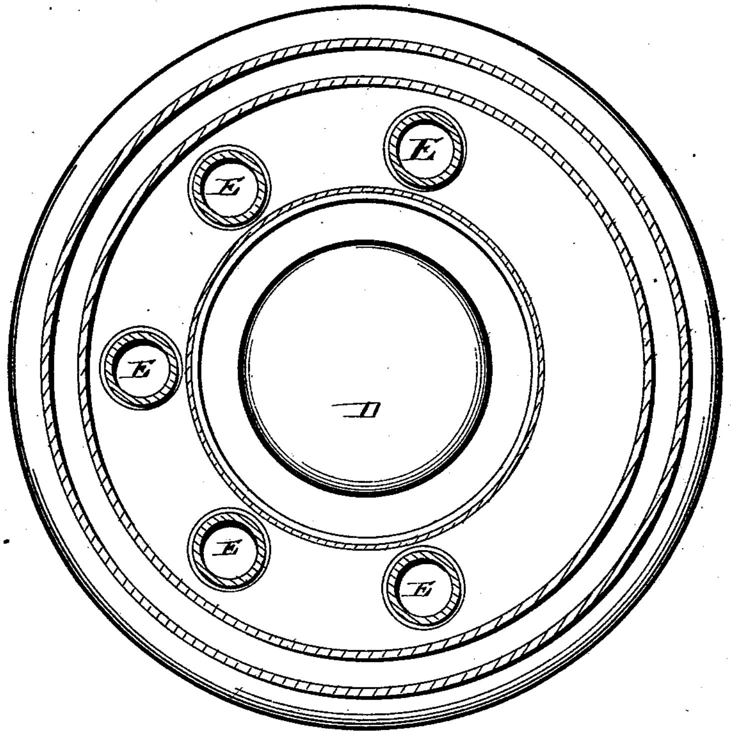
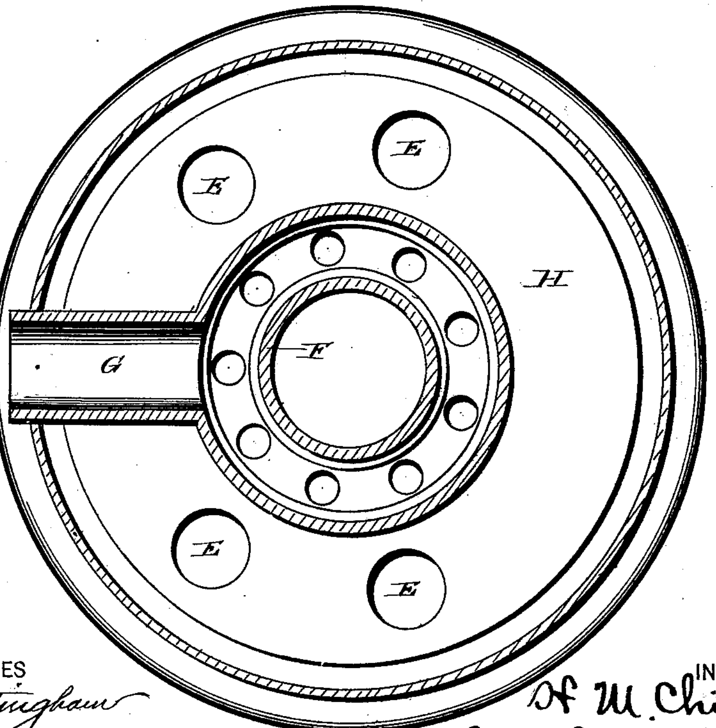


Fig. 5.



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UNITED STATES PATENT OFFICE.

HARVEY M. CHITTENDEN, OF DANBURY, CONNECTICUT, ASSIGNOR OF ONE-HALF HIS RIGHT TO GEORGE F. LARKIN, OF SAME PLACE.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **215,097**, dated May 6, 1879; application filed February 7, 1879.

To all whom it may concern:

Be it known that I, HARVEY M. CHITTENDEN, of Danbury, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Stoves or 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates more particularly to that class of stoves or hot-air furnaces which are formed with close-bodied radiators located within the same and above the combustion-chamber.

The improvement consists, first, in the combination, with an inner radiator formed with a close body, and having its bottom provided with a central raised formation, of air-pipes connecting therewith through lateral openings formed in the outer vertical wall of said radiator, and in the same horizontal plane with said central raised formation; second, in the combination, with a close-bodied inner radiator located immediately over the combustion-chamber, and whose bottom is made with a central raised formation, of cold-air pipes passing through the combustion-chamber, and communicating with said inner radiator through lateral openings formed in the outer wall of the same opposite said central formation; third, in the combination, with an inner close-bodied radiator, having its top made with a central air-exit, of a smoke-ring whose vertical central opening communicates therewith, said ring being in the same piece with the smoke-exit flue, and adapted to be adjusted in rotating movement; fourth, in the combination of a smoke-ring having central air-passage and a smoke-exit flue, the two being together made in single piece, and adapted to be adjusted horizontally; fifth, in the combination, with a plate having openings which provide communication with the combustion-chamber, and formed with annular ledges, of a smoke-ring adapted to be adjusted horizontally thereon and maintained in position by said ledges; sixth, in the combination, with an air-passage formed about the fire-pot and merging into a side space, whence it passes to a top chamber, of vertical air-pipes, which extend from the base of the stove or furnace, up through the combustion-chamber, into said top chamber, together with vertical air-pipes which extend from the base up through the combustion-chamber, and communicate with the close-bodied radiator through lateral openings opposite the central raised formation in the bottom of said radiator.

Referring to the drawings, Figure 1 is a vertical transverse sectional view illustrating the invention. Fig. 2 is a horizontal transverse section taken through line *v v* of Fig. 1. Fig. 3 is a similar section taken through line *w w* of Fig. 1. Fig. 4 is a similar section through line *x x* of Fig. 1. Fig. 5 is a similar section through line *y y* of Fig. 1.

The ash-pit A is provided with a suitable door-opening, *a*, through which the air-draft passes up into the fire-pot B and the fire-chamber C.

The products of combustion impinge against the lower side of the central formation, *d*, of the inner radiator, D, and are then divided, part of the same being deflected downward beneath one side of the radiator, thence upwardly through their respective spaces, in which the hot-air pipes E are severally located, and then into the inclosed annular portion of the smoke-ring F, from which they pass out through smoke-exit pipe G.

The remaining portions of the products of combustion are deflected downward beneath and then upwardly about the side of the radiator, between the latter and outer wall of the stove or furnace, thence upward through suitable apertures in the top plate and into the inclosed annular portion of the smoke-ring, where they commingle with the products discharged into the latter, as previously described, and together with the same pass out through the smoke-exit pipe.

The air to be heated by the stove or furnace enters and passes through the latter by three independent sets of passages, one set consisting of one or more pipes, E, extending vertically from the base up to a point beyond or approximate to the upper portion of the inner radiator, and then communicating with a chamber, H. A second set, consisting of one or more pipes, K, passes from the base of the stove or furnace up about the side of the inner radiator, and communicate with the latter, thus supplying said inner radiator with a draft of air, which passes thence up through the open vertical central portion of the smoke-ring and into the chamber H. The third set of passages is formed preferably as a single way or communication, L, extending from the base of the stove or furnace upwardly about the fire-pot, and thence merging into an annular space, *l*, which constitutes the outer casing of said stove or furnace. The two first-mentioned sets of pipes, E and K, pass through the combustion-chamber, and are directly exposed to the action of the heat thereof for such a portion of their lengths, thus causing the air contained therein to be thoroughly heated and driven upward to make room for the fresh incoming currents.

All three of said different styles of heating-passages are well adapted to accomplish the end sought, and are designed to cause the production of heat at as little expense as possible.

The position of the inner radiator causes it to receive the direct impact of the products of combustion, inasmuch as it is situated immediately over the fire-chamber, and also is subjected to the heating influence of the smoke as the latter ascends about its side. It is apparent that it is peculiarly fitted to heat the air which passes through it, and thus materially aid in accomplishing the general object of the stove or furnace.

It will be observed that the pipes K communicate with the inner radiator through respective openings *k*, which latter are opposite the vertical inner side of the raised central portion of said radiator, thereby causing the air which issues from said pipes and openings to be subjected to the heating action of said raised portion.

The smoke-ring, previously referred to, rests loosely upon the horizontal plate M, which latter is provided with annular ledges *m*, adapted to prevent said ring from displacement, while at the same time said ring is allowed to have free rotary movement.

It will be observed that this smoke-ring and the smoke-exit flue are together made in a single piece. This construction permits the smoke-exit pipe to be turned in various directions, thus causing the fire-draft together with the discharge of the products of combustion to be changed at any desired angle to the vertical plane which passes transversely through the fire-chamber door, using the invention in a stove, as, in contradistinction to a hot-air furnace, I especially intend the same for parlor-stoves; but to such use I am not restricted.

The drawings represent any ordinary parlor-stove; hence the top of the stove is formed with openings which communicate directly with the room in which the stove is situated, thus passing the heated air out therein, as is apparent. In instance of using the invention in a hot-air furnace there would be suitable hot-air pipes connecting with a close-bodied top of the furnace, thus adapting the latter to conduct the heated air to the several apartments, as may be desired.

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

1. The combination, with an inner radiator formed with a close body, and having its bottom provided with a central raised formation, of air-pipes connecting therewith through lateral openings formed in the outer vertical wall of said radiator, and in the same horizontal plane with said central raised formation, substantially as set forth.

2. The combination, with a close-bodied inner radiator located immediately over the combustion-chamber, and whose bottom is made with a central raised formation, of cold-air pipes passing through the combustion-chamber, and communicating with said inner radiator through lateral openings formed in the outer wall of the same opposite said central formation, substantially as set forth.

3. The combination, with an inner close-bodied radiator having its top made with a central air-exit, of a smoke-ring whose vertical central opening communicates therewith, said ring being in the same piece with the smoke-exit flue, and adapted to be adjusted in rotating movement, substantially as set forth.

4. The combination of a smoke-ring having a central air-passage and a smoke-exit flue, the two being together made in a single piece, and adapted to be adjusted horizontally, substantially as set forth.

5. The combination, with a plate having openings which provide communication with the combustion-chamber and formed with annular ledges, of a smoke-ring adapted to be adjusted horizontally thereon, and to be maintained in position by said ledges, substantially as set forth.

6. The combination, with an air-passage formed about the fire-pot and merging into a side space, whence it passes to a top chamber, of vertical air-pipes which extend from the base of the stove or furnace, up through the combustion-chamber, into said top chamber, together with vertical air-pipes which extend from the base up through the combustion-chamber, and communicate with the close-bodied radiator through lateral openings opposite the central raised formation in the bottom of said radiator, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 30th day of January, 1879.

HARVEY M. CHITTENDEN.

Witnesses:
GEORGE F. LARKIN,
WILLIAM A. ELY.

2,000 wds