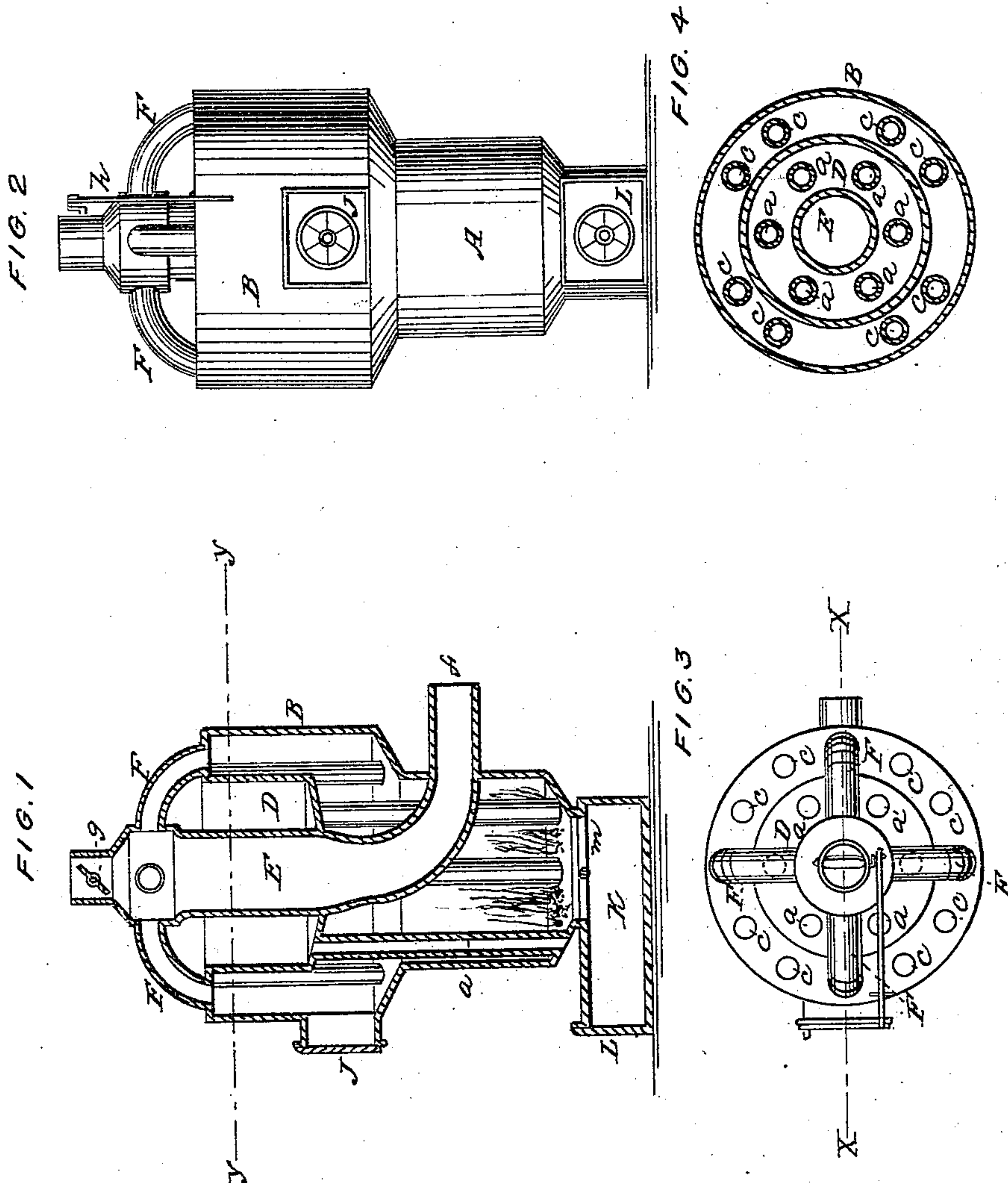


E. H. CAMP.
Hot-Air Furnace.

No. 64,485.

Patented May 7, 1867.



WITNESSES:
Theo. Busche
Wm. Trewin

INVENTOR:
E. H. Camp
Per *Wm. Trewin*
Attorney

United States Patent Office.

EDWIN H. CAMP, OF JACKSON, MICHIGAN.

Letters Patent No. 64,485, dated May 7, 1867.

HOT-AIR FURNACE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, EDWIN H. CAMP, of Jackson, in the county of Jackson, and State of Michigan, have invented a new and improved Hot-Air Furnace; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to the manner in which the heat-radiating surface of the furnace is increased, and to the manner in which the products of combustion are made to return through the fire-box in a flue; and the invention consists in constructing the furnace in a peculiar form, whereby I am enabled to place in it a large number of vertical air-tubes, and also in providing a diving-flue for the products of combustion, and in the arrangement of plates and dampers by which the smoke and products of combustion are controlled in their passage to and from the furnace.

Figure 1 represents a vertical central section of the furnace through the line *x x* of fig. 3.

Figure 2 is a side elevation of the furnace as when ready for use.

Figure 3 is a plan or top view.

Figure 4 is a horizontal section through the line *y y* of fig. 1.

Similar letters of reference indicate like parts.

The design of this arrangement is to heat air for warming buildings.

A represents the furnace or fire-box. This fire-box extends up about one-half the height of the furnace, with a series of air-tubes surrounding it, (seen in figs. 1 and 4, marked *a*.) B represents an annular section of the furnace, placed above the fire-box, and through which there passes a series of air-tubes, as seen in the drawing, marked C. D is the space within the annular section B. The smoke and products of combustion pass up from the fire-box through the section B into the flue E by the bent tubes F. From the point of intersection between E and F the smoke and heated gases may pass directly into the chimney, when the damper *g* is open, but E drops down through the annular space D and into the fire-box, out of the side of which it passes, as seen at *f*, and when the damper is closed the smoke is forced to descend through this flue E. It will be noticed that the inclined plates at the bottom of the space D deflect the heated products of combustion, compelling them to pass among the outer tier of tubes *c*. The damper *g* is operated by a rod, (seen in fig. 2 at *h*.) J represents the furnace door; K is the ash-pit, and L is the ash-pit door. *m* is the grate. Air, being of itself a bad conductor of heat, it is necessary that each particle should come in contact with a heated surface in order to heat it sufficiently for warming purposes. In this way currents of air are set in motion, the heated air is expanded and rises from the heated metallic surface, and gives place to other particles until all the air in the apartment is thus heated and is ready to be distributed through the building. The same operation is performed by all the air that enters the apartment. It must all pass in contact with heated metallic or other surfaces. It is therefore of the first importance, in order to economize fuel and utilize the heat generated, that the heating surface should be as much extended and large as possible.

The advantages of this arrangement in respect to the increased surface afforded by the tubes must be obvious to all who are acquainted with the subject. It will be seen that the air-tubes are so placed that they are at all times surrounded by the fire and heated products of combustion, and where the heat can best be utilized.

What I claim as new, and desire to secure by Letters Patent, is—

The two tiers of tubes marked *a* and *c* in combination with the space D, substantially as described for the purposes specified, and in combination with the furnace.

I claim the diving-flue E and the bent tubes F, arranged substantially as described, in combination with a hot-air furnace.

E. H. CAMP.

Witnesses:

E. M. ALDRICH,

D. C. DE LAMATER.