2 Sheets—Sheet 1.

W. McFARLAND.

HOT-AIR FURNACES.

No. 190,773. Patented May 15, 1877.

FIG. 1

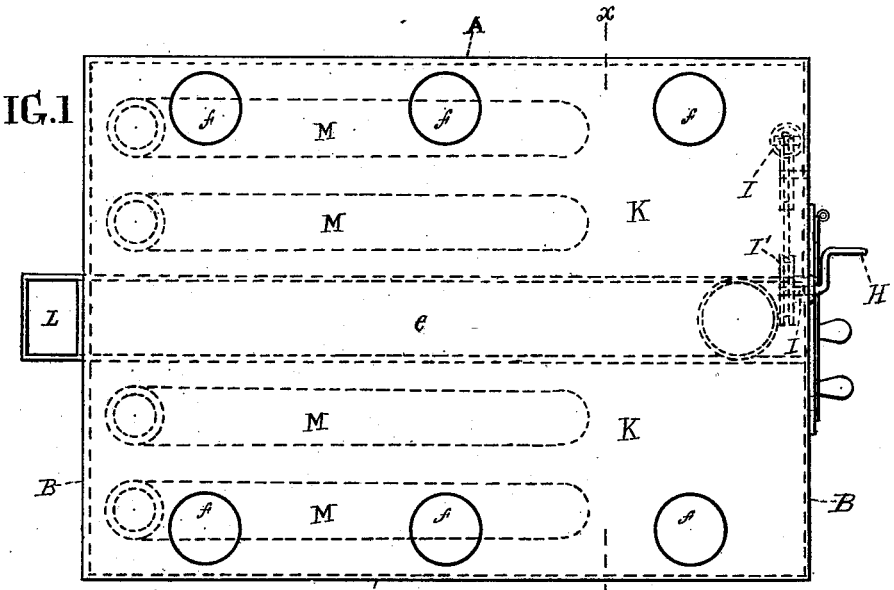
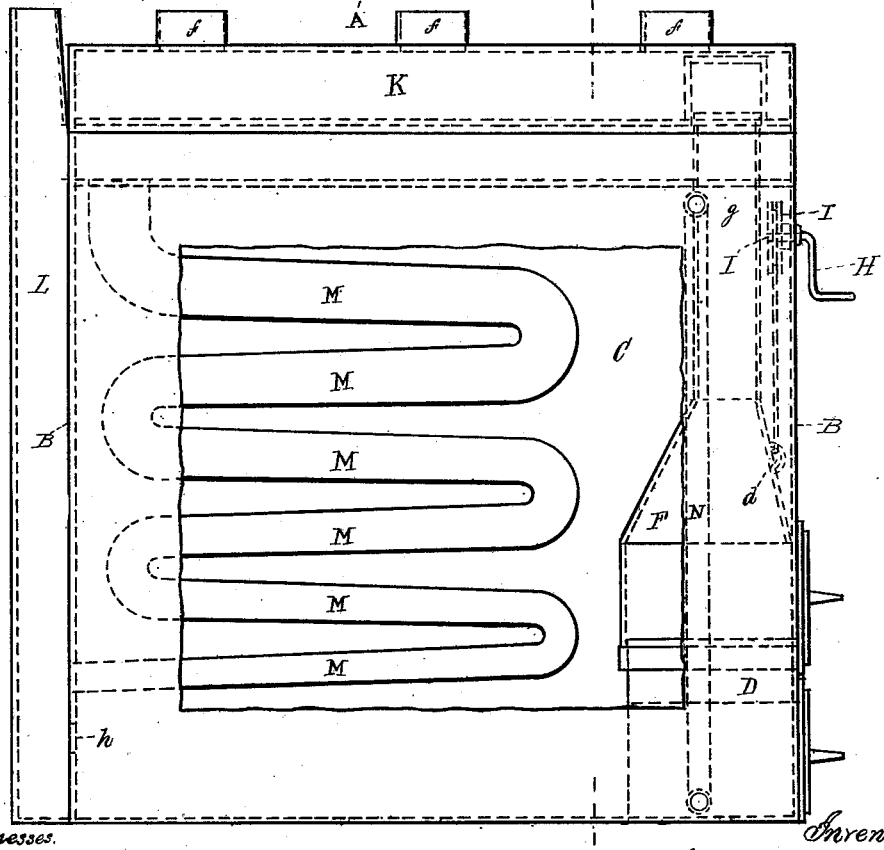


FIG. 2



Witnesses.

Thomas J. Dewey.

George C. Hebel.

Inventor

William McFarland.

Stephen Vorick Atty.

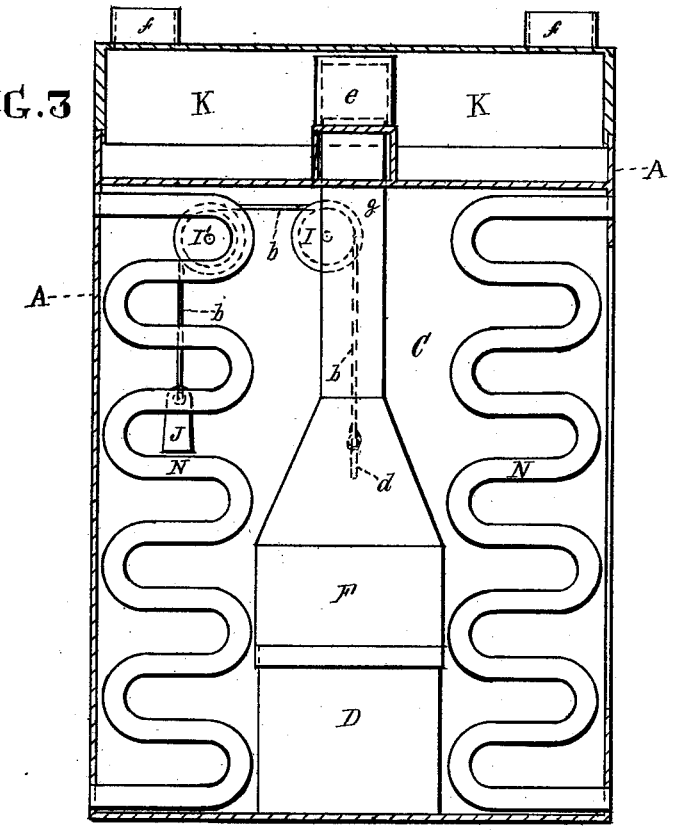
2 Sheets—Sheet 2.

W. McFARLAND.

HOT-AIR FURNACES.

No. 190,773. Patented May 15, 1877.

FIG. 3



Witnesses

Thomas J. Bewley.

George B. Hebel.

Inventor

William McFarland

Stephen Ustick attorney

UNITED STATES PATENT OFFICE.

WILLIAM McFARLAND, OF TRENTON, NEW JERSEY.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **190,773**, dated May 15, 1877; application filed March 2, 1876.

To all whom it may concern:

Be it known that I, WILLIAM McFARLAND, of the city of Trenton, in the county of Mercer, and State of New Jersey, have invented a new and useful Improvement in Hot-Air Furnaces, of which the following is a full and exact description, reference being had to the accompanying drawings.

This is an improvement on my invention for which I received Letters Patent, on the 30th day of March, 1875, No. 161,535; and mainly consists of an air-chamber on top of the hot-air chamber for supplying heated air to the different rooms of the building, the air being conducted into said chamber, as described hereafter. In said air-chamber there is a longitudinal flue for the passage of the products of combustion from the fire-chamber to the chimney, this flue communicating with the fire-chamber by means of a vertical flue provided with a suitable valve or cut-off, as hereinafter fully described.

In the accompanying drawing, Figure 1 is a plan view of my improved furnace. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section at the line *x x* of Figs. 1 and 2.

Like letters of reference in all the figures indicate the same parts.

A A and B B are the vertical sides of the rectangular chamber C for the heating apparatus. D is the fire-place, and F a hood combined therewith in a manner shown in my patent above referred to. The hood is elevated, for the purpose hereinafter mentioned, by means of the crank H on the shaft I, there being connected with the hood a chain or cord, *b*, which is fastened at one end to the staple *d* of the hood, and passes over the pulleys I and I′, having at its overhanging end a weight, J, which counterbalances the weight of the hood. K is an air-chamber at the top of the furnace, in the middle of which is the longitudinal flue *e*, for the passage of the products of combustion as they pass up through the hood, the flue at its rear end communicating with the chimney L. Arranged within the chamber C are air-pipes M, connected at their receiving end with the rear wall of the furnace, and extending to near the fire-place at the front end, and by means of return-bends extending back to the rear end of the furnace, as seen in Fig. 2, where their discharging ends connect with the top wall of the chamber C, for the passage of the heated air into the chamber K, whence it passes through suitable pipes or flues to different rooms of the building.

To give freedom of draft to the air as it expands, as it becomes heated the pipes are enlarged throughout their whole extent of both their bent and straight portions, as represented. The hot air passes from the air-chamber K, through suitable pipes connected with the collars *f* on the top of this air-chamber, to different rooms in the building. At the front end of the chamber C are return-pipes N N, into which water is received at their lower ends, to be heated for supplying a bath-room or for other purposes.

When fuel is renewed in the fire-place, the hood F is brought to its lowest position, as represented in the drawings, whereby the products of combustion are forced to pass up through it into the channel *e*, and thence into the chimney L, thus preventing the escape of smoke and gas into the room, and the access of cold air to the heated pipes. When the fire is fully ignited the hood is elevated by means of the crank H, acting through the cord *b*, whereby the tube *g* passes up across the channel *e* at the top of the furnace, and closes it to prevent the passage of the products of combustion in that direction to the chimney, and thus to cause them to pass over the fire-chamber beneath the bottom of the hood into hot-air chamber *c*, from which they escape into the chimney L through the opening *h* at the lower part of the furnace. By this arrangement the gases are brought into contact with the pipes M at their highest temperature, and remain in the upper part of the furnace until they have parted with the most of their heat before they descend to the exit-opening *h*. Thus a large proportion of heat, which in ordinary furnaces escapes into the chimney, is utilized.

The body of the furnace may be made either of sheet-iron or of brick-work, when it is designed to be stationary; but when it is desired to have it portable, I make it of sheet-iron, as represented in the drawings.

I claim as my invention—

1. The combination and arrangement of air-chambers C and K and air-pipes M, substantially in the manner and for the purpose set forth.

2. In a hot-air furnace, the air-chamber K, having a central flue, *e*, for the passage of the products of combustion, in combination with the chimney L and the fire-place D, having a hood, F, substantially in the manner and for the purpose set forth.

WILLIAM McFARLAND.

Witnesses:
SAMUEL MITCHELL,
W. CREVELING.