

W. O. GROVER.
Hot-Air Furnaces.

No. 139,505.

Patented June 3, 1873.

Fig. 1.

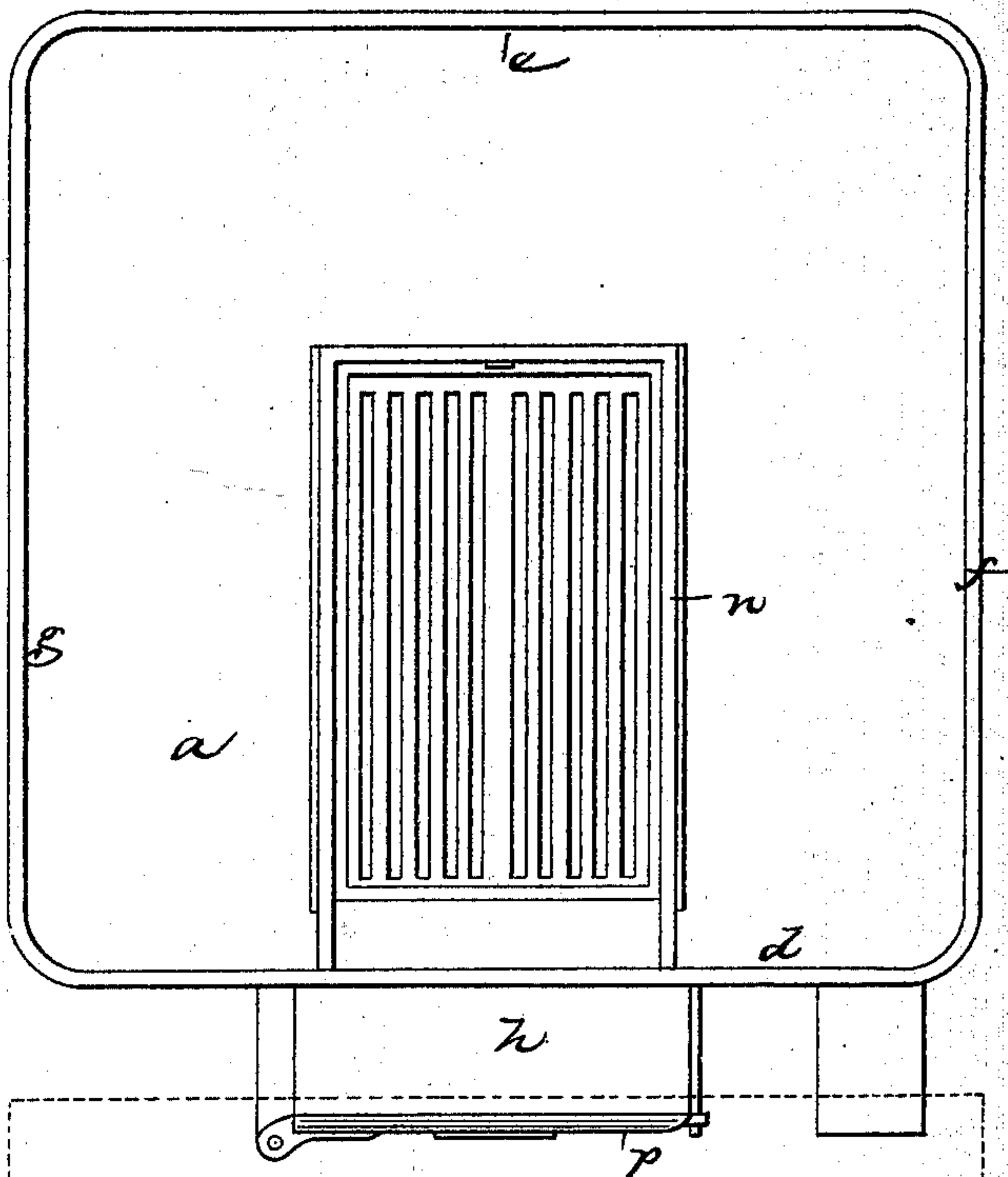
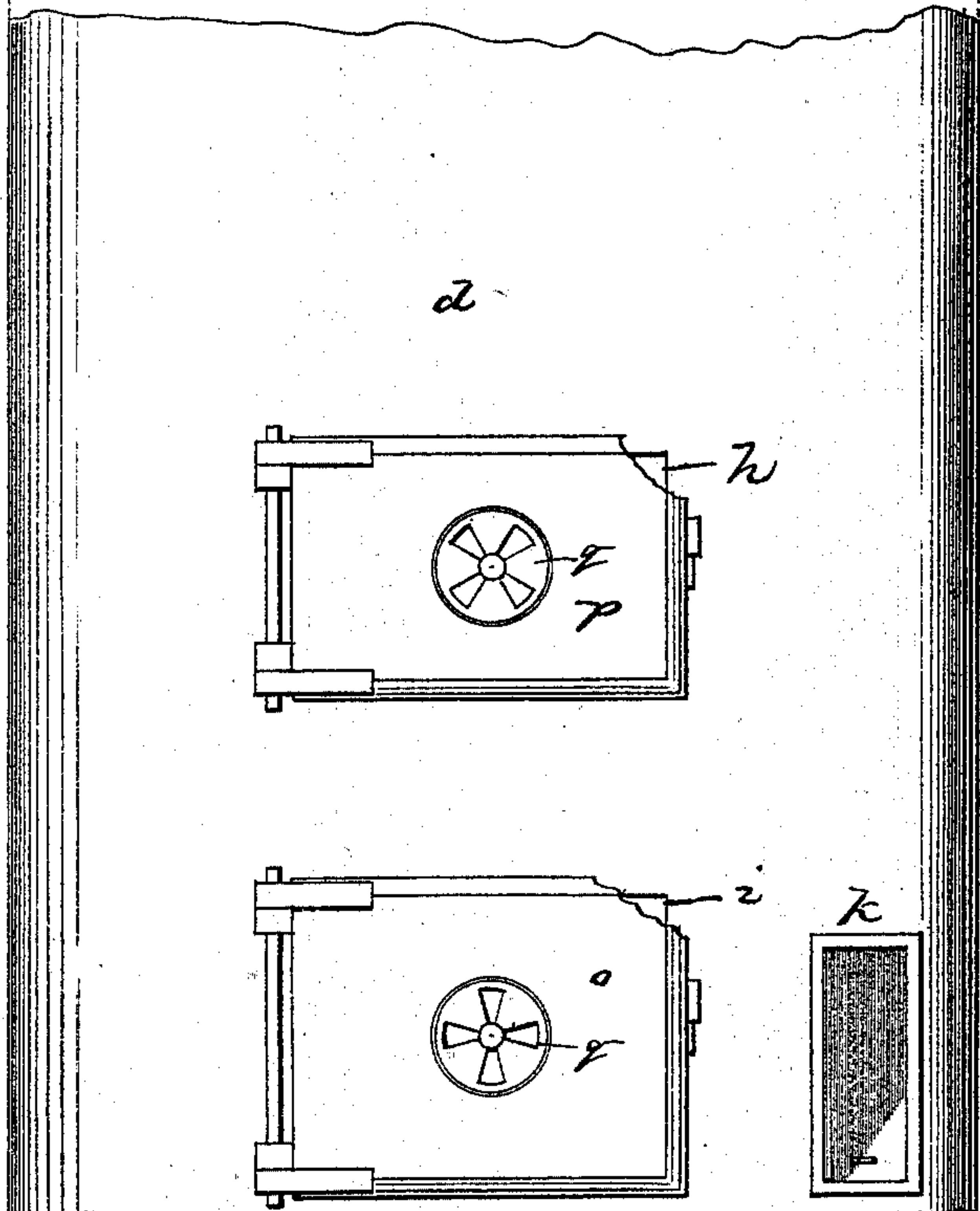


Fig. 2.



Witnesses.
M. W. Frothingham.
L. H. Latimer.

Inventor.
William O. Grover.
By his attys.
Crosby & Gould.

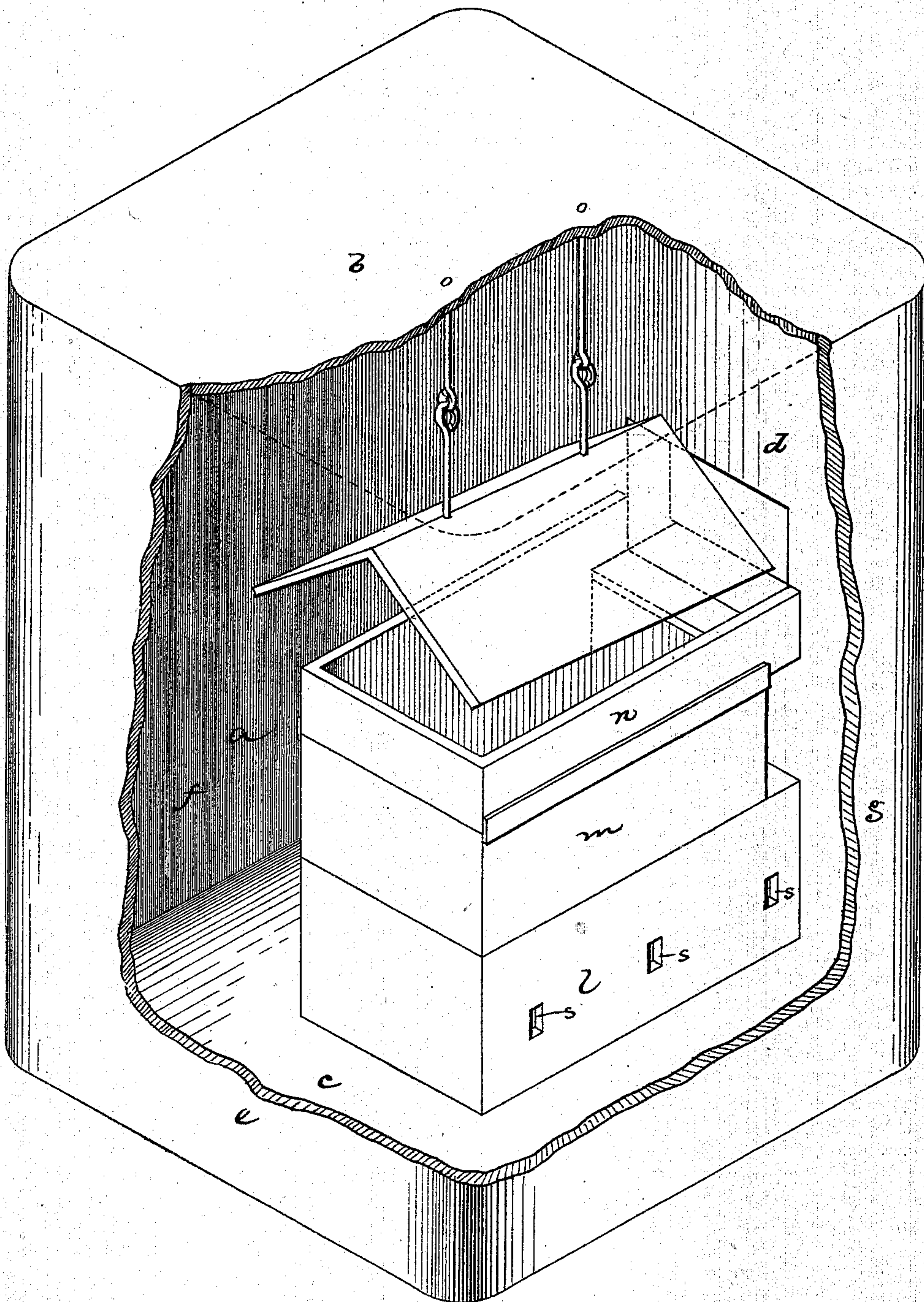
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Fig. 3.



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UNITED STATES PATENT OFFICE

WILLIAM O. GROVER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **139,505**, dated June 3, 1873; application filed February 14, 1873.

To all whom it may concern:

Be it known that I, WILLIAM O. GROVER, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Hot-Air Furnace; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

In almost all, if not all, hot-air furnaces set in brick-work the furnace is constructed of sections formed of cast-iron and erected one upon another to form a columnar structure with radiator pipes and dome through which the flames and smoke pass, the cold air being admitted into the chamber formed by the brick-work and surrounding such structure, and being heated by contact with the radiating surfaces and being disseminated or distributed through suitable hot-air pipes to the rooms to be heated. Not only are these cast-iron plates themselves more or less pervious to passage of carbonic-acid gas directly through them, but the joints between the respective parts are always more or less imperfect, and, notwithstanding all possible precaution, deleterious gas escapes and mingling with the hot air is thrown into the rooms to the injury of all persons who may breathe the air thus contaminated. My invention is designed not only to obviate these objections, but to furnish a construction in which the fire-pot, ash-pit, and grate may be readily dismembered and access had to the smoke and flame chamber. For this purpose I make the furnace in two entirely separate and distinct parts, there being first a fire-pot and ash-pit (relatively separable) and next a large chamber, in the front part of which the fire-pot is placed, the fire-pot opening at top directly into the chamber, and it and the ash-pit into door-spaces in the front wall of the chamber, while the walls of the large smoke and flame chamber surround the fire-pot, and are many times larger, the chamber having a suitable flue-outlet, and the air to support combustion being introduced through suitable registers in the doors of the chamber. The walls of this chamber are formed of rolled or plate iron tightly riveted together, (as boiler-plates are riveted,) and have no

openings of any kind except the escape-flue and the ash-pit and fire-pot openings. This tight box or chamber is to be placed in the compartment in which the air to be heated and distributed is contained, or around it may be built a brick-work chamber, of capacity sufficient to form an air-chamber suitable for heating, by contact with the heat-radiating walls, a full supply of air for warming the rooms to be heated, a constant supply of cold air being introduced to this chamber and distributed therefrom as warmed through the hot-air pipes.

My invention consists in the furnace constructed as described, or made up of the tight box or chamber formed of plate-iron and made tight except at the flue and door openings and entirely surrounding the fire-pot, said fire-pot opening at top directly into the large flame and smoke chamber and standing upon the ash-pit plates, the fire-pot plates and ash-pit plates being readily dismembered and being, preferably, removable through the door-ways of the main chamber for access to the general interior of the chamber.

The drawing represents a furnace embodying my construction.

Figure 1 denotes a horizontal section taken above the fire-pot. Fig. 2 is a front view. Fig. 3 shows the interior of the furnace-chamber and the fire-pot inclosed by it.

a denotes a large chamber-space formed by six wall plates or sides, *b c d e f g*. *b c* denote the top and bottom plates, *d e* the front and rear plates, and *f g* the side plates. Extending from the front plate *d* are shown plates *h* forming the door-way to the fire-pot, and plates *i* forming the door-way to the ash-pit, as well as plates *k*, which form the outlet-flue for escape of the volatile products of combustion, all of these plates *h i k*, as well as the main plates, being formed of plate iron secured together by riveted joints made impervious to passage of gaseous matters. On the bottom plate *c* is placed a cast-iron ash-pit frame, *l*, and upon this frame stands a fire-pot frame, *m*, which may be surmounted by a guard, *n*. The ash-pit frame is open at front and the opening leads directly from the ash-pit door-way, at the front of which is the door *o*. The fire-pot frame *m* opens at

the front into the door-way, at the front of which is the fire-pot door *p*. In each of these doors a register, *q*, is placed for controlling admission of air into or through the fire-pot, and in the ash-pit frame may be placed a slide damper controlling air-passages *s* leading from the ash-pit directly into the chamber *a*. The fire-pot and ash-pit frames *m l* are made detachable, and may stand in place without special bolting; and the grate may be hung by gudgeons at its rear end so as to tip to the front for discharging the fire-pot. The fire-pot occupies the position seen in the drawing, and is entirely surrounded by the close and tight box *a*, into which the flames and volatile products of combustion are forced by the draft that maintains combustion, and from which after heating the main plates such products of combustion escape through the flue. By making a large-size fire-pot and urging combustion by the draft (properly regulating the escape) all the upright and top surfaces of the main plates will be heated, thus making a very large radiating surface for warming a correspondingly large amount of cold air introduced into an air-chamber of which the walls of the chamber form the in-

ner surface and distributed from said air-chamber.

I have found this construction very effective for thoroughly and uniformly warming and keeping warm large houses which it has been found impossible to practically heat by furnaces of ordinary construction.

Instead of making the case *a* with a bottom plate, *c*, forming a fixed part of the structure, it may be made of the other plates *b d e f g*, the bottom edges of the plates *d e f g* being embedded in a cement or other suitable bottom or floor. In the chamber a deflector, *r*, may be suspended over the fire-pot to deflect and aid in circulating the flames and other direct products of combustion arising from the fire-pot.

I claim—

The air-tight chamber, composed of the metal plates riveted together, and having within it the removable fire-pot and ash-pit plates, the whole being constructed and arranged substantially as shown and described.

W. O. GROVER.

Witnesses:

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M. W. FROTHINGHAM.