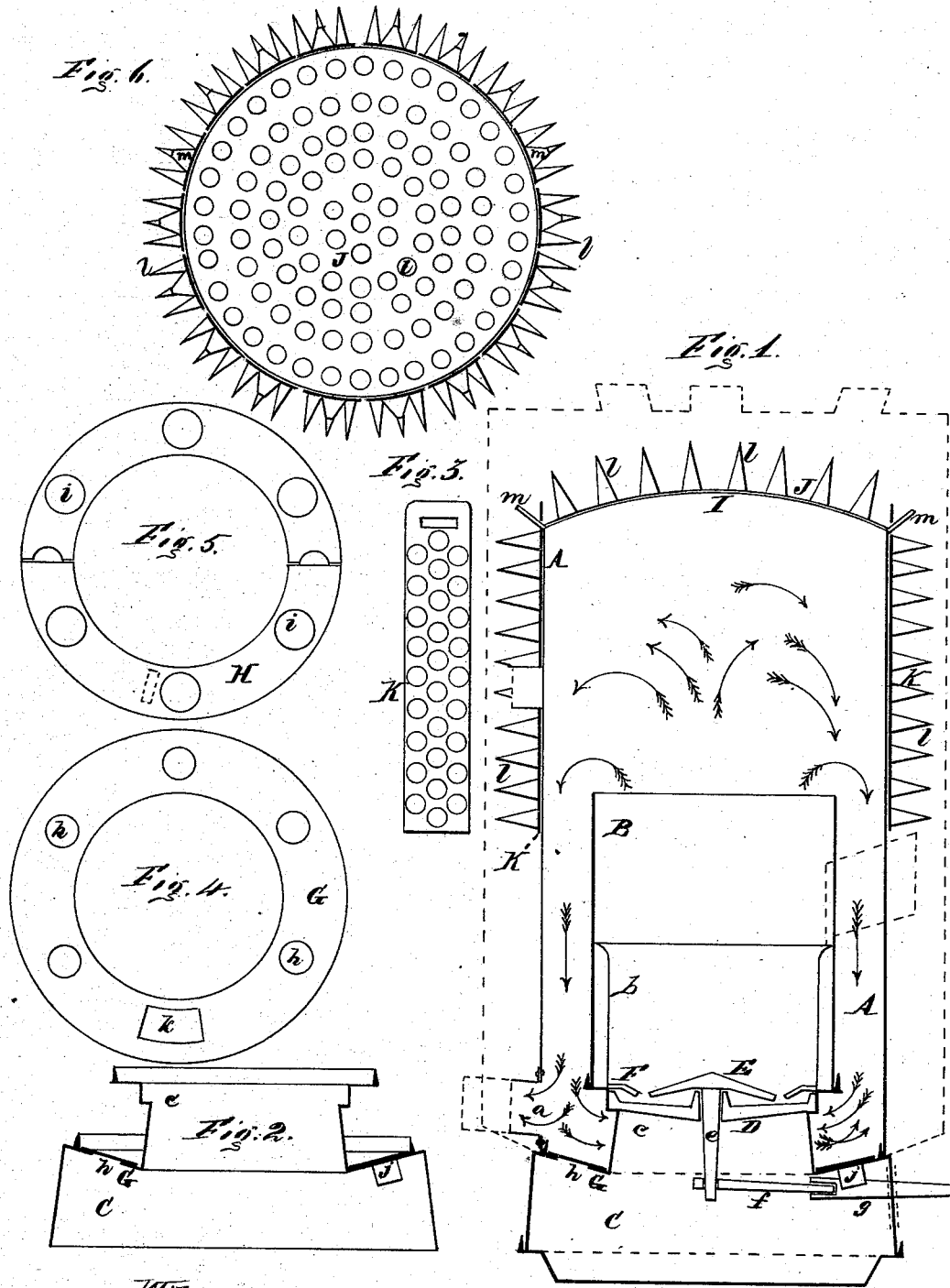


S. J. GOLD.  
Hot-Air Furnace.

No. 163,009.

Patented May 11, 1875.



Witnesses  
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Att'y

# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 163,009, dated May 11, 1875; application filed September 10, 1874.

*To all whom it may concern:*

Be it known that I, STEPHEN J. GOLD, of Cornwall, in the county of Litchfield and State of Connecticut, have invented certain Improvements in Hot-Air Furnaces, of which the following is a specification:

The principal objects of this invention are, first, cheapness of construction combined with efficient radiation of the heat; second, increased efficiency of the grate and facility in clearing it from ashes and clinkers; third, facility in cleaning the smoke-chambers and flues from ashes, dust, and soot.

For the accomplishment of these purposes one part of the said invention consists in the combination, with the shell of a furnace, of a covering parallel therewith, and composed of a series of radiating plates separable therefrom and studded with projections, as hereinafter described.

Another part of the said invention consists in the combination, with the ash-pit and with a stationary perforated bottom to the smoke-chamber or smoke-flues, of a movable and correspondingly-perforated plate placed upon or in close proximity to the said bottom, whereby the ashes, &c., in the smoke-chamber or smoke-flues may be discharged therefrom through the said corresponding openings into the ash-pit by a sliding or vibratory movement of the said movable plate, as hereinafter more fully set forth.

Another part of the said invention consists in the combination of the said movable plate and the shaking apparatus of the grate, whereby the discharge of the ashes, &c., in the smoke-chamber or smoke-flues is insured by the shaking of the grate.

Figure 1 is a vertical central section from front to back of my improved hot-air furnace. Fig. 2 is a vertical central section of the ash-pit on the same plane. Fig. 3 is an outside elevation of one of the radiating-plates to be attached to the outside of the upper portion of the furnace. Fig. 4 is a plan of the perforated plate, which forms the bottom of the smoke-chamber or smoke-flues. Fig. 5 is a plan of the correspondingly-perforated plate placed upon the plate shown in Fig. 4. Fig. 6 is a top view of my improved furnace.

A represents the outer shell of the furnace,

which may be made of sheet-iron and of any proper thickness. B is an inner cylinder, which rests on the top of the ash-pit, and is designed to form, with the shell A, a smoke-chamber or smoke-flue or flues between the two, and, in conjunction with the said shell, to cause a descending draft to the exit flue or pipe *a*. The cylinder B may be made of cast-iron and lined with fire-brick *b*. The fire-door and coal-chute for supplying fuel are indicated by the dotted lines just above the fire-brick, and should extend into or through the wall surrounding the furnace. C is the ash-pit. It is so constructed that the lower portion of it underlies the smoke chamber or flue to receive the ashes, soot, &c., which may collect in said chamber or flue, and the upper part of said ash-pit is made smaller, as shown at *c*, to receive and support the cross-bar D, which supports the inner grate E, and on which cross-bar said inner grate may be tilted to dump it and discharge the contents of the fire-box. This grate is made conical in form, descending from the center to the outside, as shown in Fig. 1, and a small space is left between it and the outer grate F, which latter is inclined inwardly downward, as shown in the same figure, which construction very much facilitates the discharge of the ashes and clinkers from the fire by giving them a tendency to slide downward to the space between the inner and outer grates, and there be discharged when the inner grate is agitated. The form of the inner grate also has a tendency to give a partially-outward direction to the air entering the fire, thereby promoting combustion in the outer portions near the fire-brick. *e* is a stem or shaft, cast with the inner grate E, and extending downward through the cross-bar D to a convenient position for the attachment of the rod or lever *f*, which is used for shaking the grate, an extension-piece, *g*, removable at will being attached, if necessary, to facilitate its operation. G is the plate, before alluded to, which forms the permanent bottom of the smoke-chamber, and also forms a part of the ash-pit. An inspection of Fig. 4 shows a series of holes, *h h*, through this plate, to allow the soot and ashes from the smoke chamber or flues to fall into the lower part of the ash-pit. This plate G is covered

by another annular plate, H, which also has holes *i i* through it to coincide, when necessary, with the holes *h h*. This plate H is made in halves, as shown, to allow it to be placed in position. This plate H has a fork or lip, *j*, (shown in dotted lines in Fig. 5.) attached to or cast with it, which fork or loop extends down through the hole *k* in the plate G, and astride the lever *f* or its extension *g*, so that when the lever *f* is vibrated to shake the grate, the plate H will be turned so as to bring its holes *i i* into and out of coincidence with the holes *h h* in the plate G, by which the ashes and soot in the smoke-chamber will necessarily be efficiently discharged therefrom. After the shaking of the grate has been accomplished, the lever should be left turned into such a position as to close the openings through these plates G and H from the smoke-chamber to the ash-pit by leaving the holes *h h* and *i i* out of coincidence with each other. The top I of the furnace may also, as well as the shell A, be made of sheet-iron of proper thickness. This top I is covered with a removable plate, J, of the same form and fitting closely to it, which plate J is provided with projections *l l* for radiating the heat into the surrounding atmosphere. The sides of the furnace down to a little below the top of the cylinder B are also covered with removable plates K, made concavo-convex to fit the sides of the shell A, and having projections *l l* to radiate the heat into the surrounding atmosphere. These plates K are shown in the drawings as being hung upon projections *m m* at the top of the furnace.

The brick-work in which the furnace is designed to be inclosed, when used for warming rooms through pipes and registers, is indicated by dotted lines in Fig. 1.

The operation and most of the advantages

resulting from the construction herein described and shown have already been sufficiently set forth; but it will be observed that in the construction herein described and shown, the outside case may be cheaply made of sheet-iron, and yet will be sufficiently protected from the destructive effects of the heat, partly by the inner cylinder B and partly by the radiating plates J and K, provided with their projections for the rapid radiation of heat into the surrounding atmosphere, by which the heat is so rapidly taken from the sheet-iron casing as to prevent its being readily injured by overheating.

I am aware that removable flanges placed with their edges upon the casing of a furnace are not new, and these I do not claim; nor do I claim projections from the sides of a furnace for radiating heat, as these are old and well known.

I claim as my invention—

1. The combination, with the shell of the furnace, of radiating plates, the flat surfaces of which are parallel to and in contact therewith, and studded with projections, substantially as hereinbefore set forth.

2. The combination, with the ash-pit and with a perforated bottom to the smoke-chamber or smoke-flues, of the plate H, whereby the ashes in said smoke-chamber or smoke-flues are dumped directly into the ash-pit, substantially as hereinbefore set forth.

3. The combination, with the plate H, of the grate E, projection *j*, and lever *f g*, or its equivalent, substantially as hereinbefore set forth.

STEPHEN J. GOLD.

Witnesses:

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