F. C. HESSE.

Hot-Air Furnace.

No. 66,083. Patented June 25, 1867.

Fig. 1.

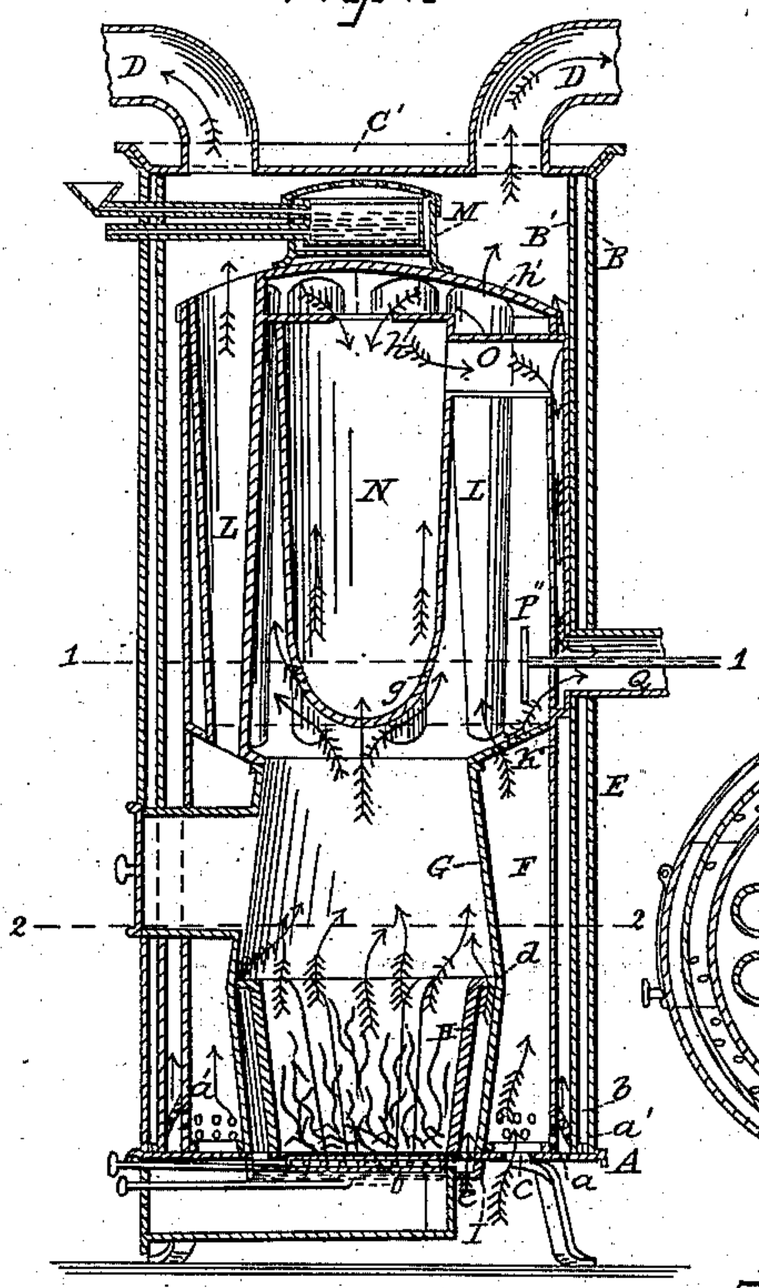


Fig. 2.

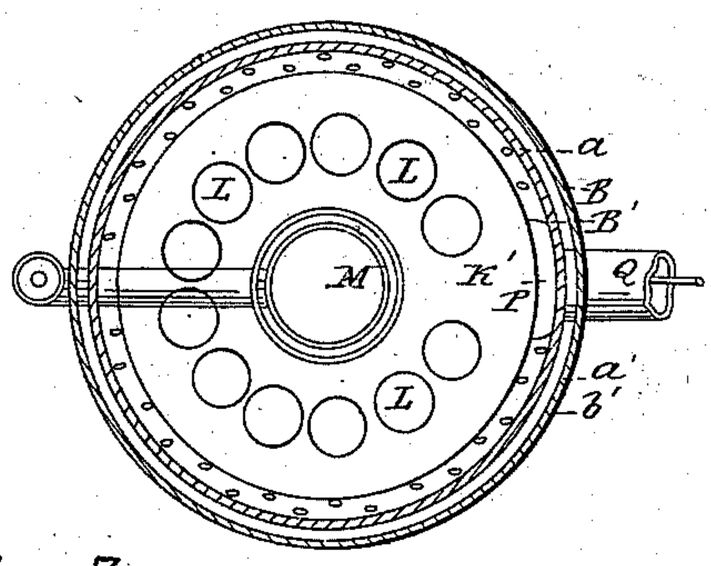


Fig. 3.

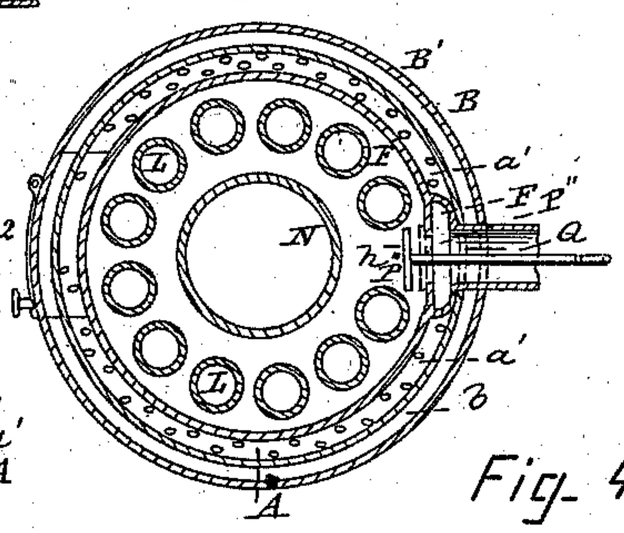


Fig. 4.

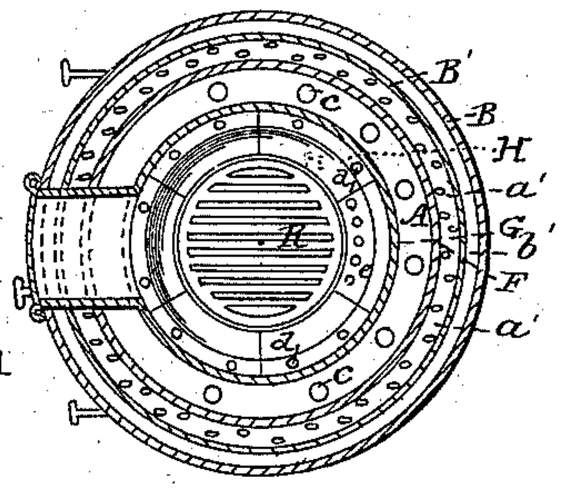
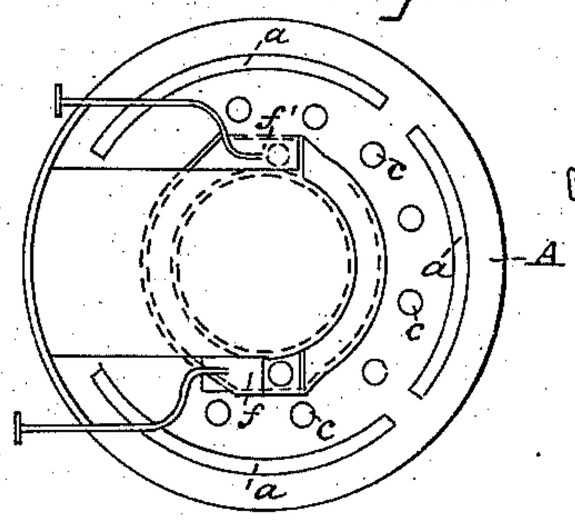


Fig. 5.



WITNESSES.

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Letters Patent No. 66,083, *dated June* 25, 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, F. C. HESSE, of Cincinnati, Hamilton county, and State of Ohio, have invented a new and useful Improvement in Hot-Air Furnaces, of which the following is a full and clear description, reference being had to the accompanying drawings, making part of this specification.

My improvement in furnaces relates to the construction of the fire-place, which is chambered in its lower section, the inner shell being perforated at the top for the admission of air from an annular chamber on the under side of the bed-plate, the annular chamber being provided with dampers for regulating the influx of air; also to a series of warm-air tubes, conical in form, and extending from a diaphragm which connects the upper edge of the fire-place with the inner casing of the middle air-chamber and a concave diaphragm near the top of the furnace; and to a hot-air reservoir, suspended immediately over the fire-place, and beneath the concave diaphragm.

Figure 1 is a vertical section of the furnace taken through the centre, and exhibits the improvements herein referred to.

Figure 2 is a plan of the furnace, the top plate being removed.

Figure 3 is a transverse section of the same taken in the plane of line 1 1 in fig. 1, through the smoke discharge pipe, the warm-air flues, and hot-air reservoir.

Figure 4 is a transverse section taken through the fire-place, directly above the perforations in the inner shell, in the plane of line 2 2 in fig. 1.

Figure 5 is a plan of the bottom or base-plate of the furnace, showing the dampers and annular chamber through which passes air to the perforation in the inner shell of the fire-place.

A is the base-plate, from near the circumference of which rise the outer and inner walls B B′ of the dead-air chamber. The top plate C encloses the furnace above. Two warm-air pipes D, connected with the top plate C, are provided to carry off the warm air. An air-chamber, E, is enclosed by the inner wall B′ of the dead-air chamber, and the casing F. Perforations *a*, in the base-plate A, give access of air to the chamber E. The lower end of the casing F has a series of perforations, *a′*, as has also the incline plate *b*, secured to the casing F above the perforations *a′*, and flaring downward till it is in contact with the base of the inner wall of the dead-air chamber. In the base-plate A is another series of perforations, *c*, located between the casing F and the fire-pot G. A fire-back, H, arranged in sections within the fire-pot, and having an altitude of one-half, more or less, of the fire-pot, is perforated in its upper curved face at *d*, which admits air into the fire-place above the ignited fuel. The air has access to the chamber formed by the fire-pot G and fire-back H, through perforations *e* in the base-plate A, and from the annular supply-chamber I, which is secured to the under side of the base-plate A, and is provided with two dampers, *f f′*, diametrically opposite each other, as exhibited in fig. 5. A diaphragm, K, covers the space between the upper edge of the fire-pot G and the casing F. Warm-air tubes L extend from the diaphragm K to the concave diaphragm K′, near the top of the furnace. This upper diaphragm is secured to the upper edge of the casing F, and is surmounted with the evaporating-pan M, in two compartments, the inner one of which contains the bulk of water to impart, by its evaporation, humidity to the atmosphere in the rooms to which it is admitted. The hot-air reservoir N is suspended directly over the fire-pot G. Its lower end is closed by a thick metallic plate, *g*, which presents a convex surface downward. Above the plate *g* the walls of the reservoir flare upward, terminating a little below the upper diaphragm K′. It is covered with the perforated cap *h*, through which the hot air and smoke pass in their exit. In the side of the reservoir N, near the top, is the opening into the inner smoke pipe O, having a horizontal direction, and terminating in the upper end of the vertical smoke stack P. The smoke has final exit into the outer smoke pipe Q, through an aperture in the lower end of the smoke stack P. Opposite this aperture or entrance to the outer smoke stack or pipe Q, is an opening, P′, which is closed when desirable by operating the damper P″. The grate-bars R are hollow, and are perforated on the sides for the admission of air within them.

When the fire is started in the furnace the damper P″ is moved in from over the opening in the lower end of the smoke stack P, at the same time the dampers *f f′* are closed, in order that a more rapid combustion of the fuel may be secured by giving a direct and rapid draught through the fire-place and out the shortest way through the smoke pipe Q. Should the fire burn to one side in the fire-place, but one of the dampers *f f′* should

be opened, otherwise too large a body of air will be admitted through the perforations *e* in the base-plate A and the perforations *d* in the curved face of the fire-back H into the space above the dead coals, whereas it should only be admitted when the intensely heated and inflammable gases are passing rapidly upward, and, by their affinity for the inflowing oxygen of the atmosphere, induce, by their combustion, a large amount of heat. The damper P″ is now closed, and the hot air from the fire-place heats the series of warm-air pipes or tubes L, and also the casing F, rarefying the air in them, which ascends and passes out of the warm-air pipes D, as indicated by the blue arrows. The hot air from the fire-place ascends between the warm-air tubes and the hot-air reservoir N, over the top of which it passes through the perforated cap *h*, thence down the smoke pipe P, and out through the pipe Q. The reservoir N not only radiates a large amount of heat in the direction of the warm-air tubes, thereby increasing measurably their temperature, but intensely heats the air contained within it, causing ascending currents from its curved bottom, which tend to check the draught and consequent rapid escape of heat out through the smoke pipes.

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

1. The annular supply-chamber I, provided with the dampers *f f′*, when secured to the bed-plate A, or its equivalent, having the perforations *e*, substantially as and for the purpose specified.

2. The casing F, having perforations *a′*, the incline perforated plate *b* attached thereto, and the diaphragm K′, all in combination with the base-plate A, with perforations *a*, the inner wall B′ of the dead-air chamber, and the top plate C, substantially as described.

3. The base-plate A, walls B B′, and top plate C, in combination with the fire-pot G, perforated fire-back H, diaphragms K K′, warm-air tubes L, casing F, hot-air reservoir N, smoke pipes O and Q, smoke stack P, and damper P″, constructed and arranged substantially as and for the purpose specified.

4. The hot-air reservoir N, smoke pipe O, smoke stack P, having an opening, P′, near its bottom, and the damper P″, for closing the same, in combination with the smoke pipe Q, substantially as described.

F. C. HESSE.

Witnesses:

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S. R. RUSSELL.