

W. K. MANNING.  
Hot-Air Furnace.

No. 133,375.

Patented Nov. 26, 1872.

fig. 1,

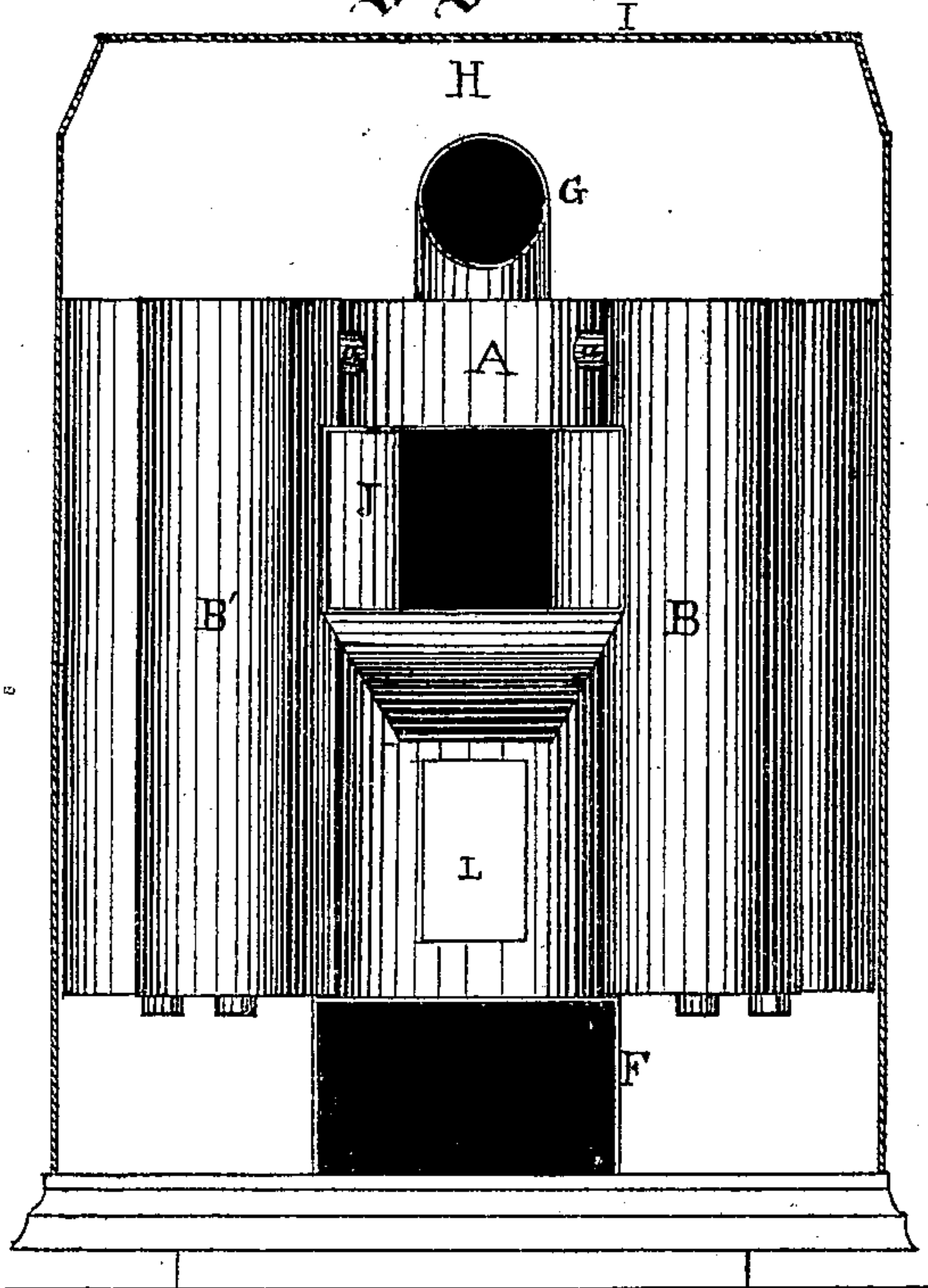


fig. 2,

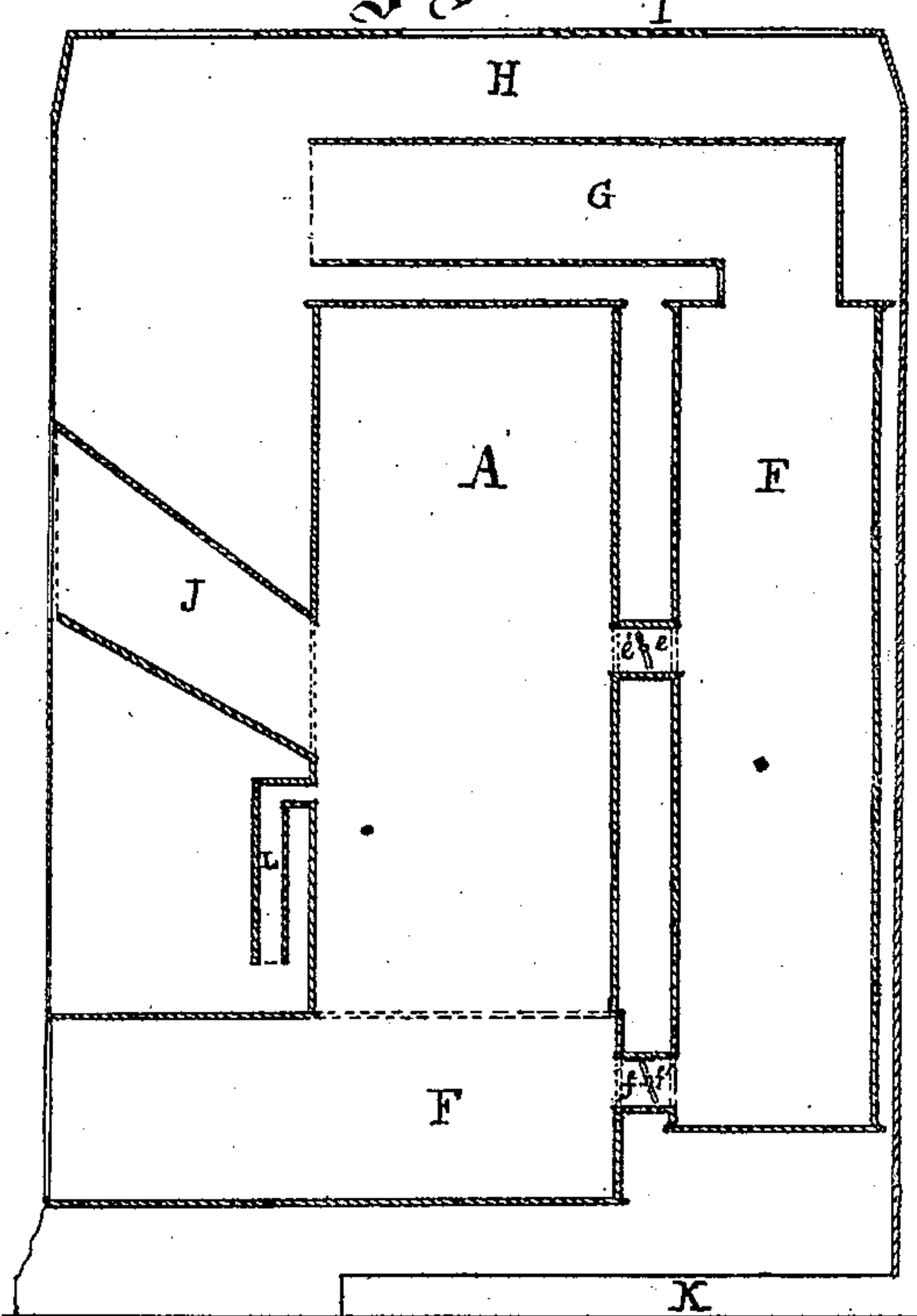


fig. 3,

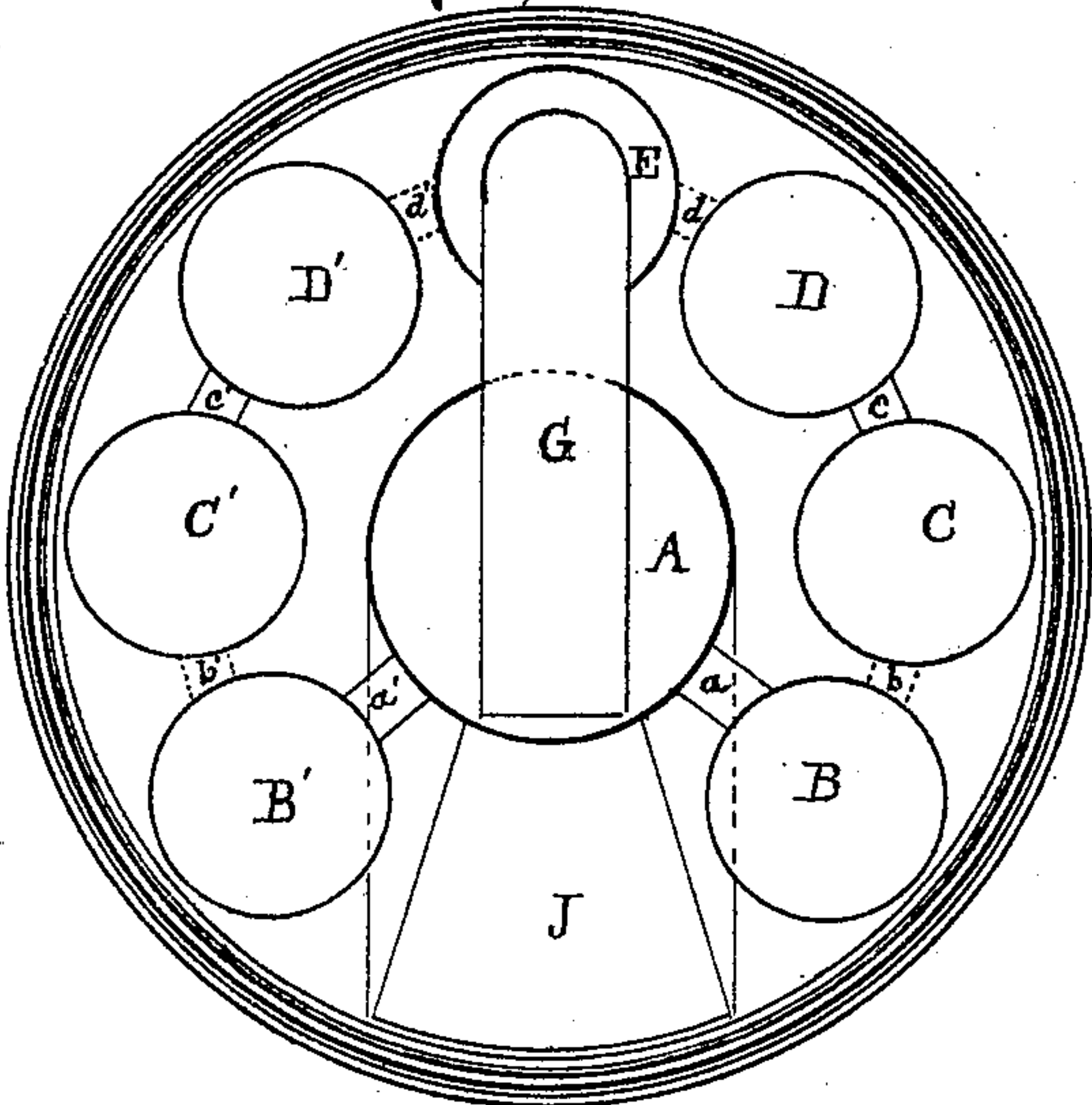
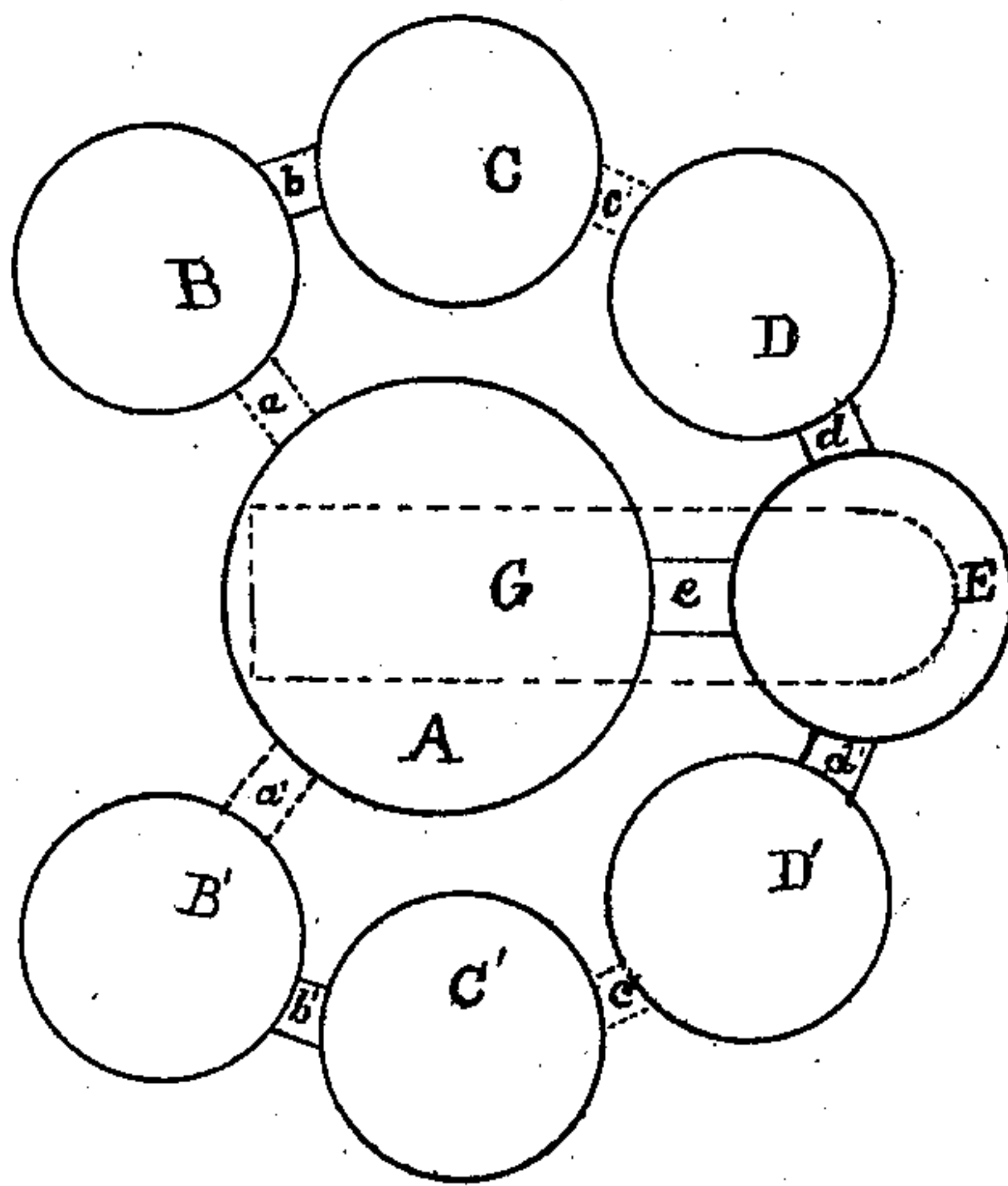


fig. 4,



Attest  
Wm. R. Singleton  
W. H. Thacker

Inventor  
Walter K. Manning  
per Henry Browne  
Atty.



# UNITED STATES PATENT OFFICE.

WALTER K. MANNING, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 133,375, dated November 26, 1872.

*To all whom it may concern:*

Be it known that I, WALTER K. MANNING, of Chicago, county of Cook and State of Illinois, have invented an Improvement in Hot-Air Furnaces, of which the following is a specification:

The object of this improvement is to furnish more heating-surface within a given space than is done in any other furnace, thereby heating a given quantity of air at a less cost than could otherwise be done. This furnace consists essentially of a central drum, which contains the grate, fire-pot, and a "gas-ring" at the upper edge of the fire-pot, to which air properly heated is brought by a feed-tube of six smaller drums, arranged, in two series of three drums each, around the central drum, and connecting, by proper flues, the central drum with a seventh small drum located behind the central drum opposite the feed-door; the whole being contained in a casing that permits cold air to enter at the base of the furnace, and directs it upward between and around the drums to a hot-air chamber, whence it may be distributed by pipes as desired.

In the accompanying drawing, Figure 1 represents a view of a central drum, A, and of the first two in the two series of smaller drums, marked, respectively, B and C and B' and C', and of the flues *a* and *a'*, which connect the two series of smaller drums, respectively, with the central drum. Fig. 2 represents a sectional view of the "feed" J, for supplying the fuel; a feed-pipe, L, that supplies air to the "gas-ring," (which is not shown in the drawing;) of a direct-draft flue, *e*, connecting the central drum A, which contains the fire-pot and grate, (not shown in the drawing,) with a smaller drum, E; of the damper *e'*; of the ash-pit F; flue *f*; damper *f'*; smoke-pipe G; the hot-air chamber H; and the furnace-casing I. Fig. 3 represents a top view of central drum A, the two series of drums B, C, and D, and B', C', and D', the drum E, the flues *a*, *b*, *c*, *d*, *a'*, *b'*, *c'*, and *d'*, and the smoke-pipe G. Fig. 4 represents a bottom view of the same.

Like letters indicate like parts in each figure.

The operation of this furnace is as follows:

The fire-pot having been supplied with fuel and ignited, the poker is passed through the "feed" J, and with it the damper *e'* is opened. This will give a direct draft from the fire-pot in the central drum A through drum E and the smoke-pipe G. When the fuel is fully ignited the damper *e'* is closed, when the products of combustion, passing to the top of the central drum A, are divided into two currents, one passing through the flue *a* down through drum B, through flue *b* into drum C, up through that, through flue *c*, into drum D, down through that, through flue *d*, into drum E, and up through that into smoke-pipe G. The other current passes similarly through flue *a'*, drum B', flue *b'*, drum C', flue *c'*, drum D', and flue *d'*, joining the first current in drum E, thus heating a very large surface, with which the cold air which enters under the base of the furnace at K, Fig. 2, is brought in contact as it passes up between and touching every part of the surfaces of the central drum, the two series of smaller drums, their connecting drum and flues, and the furnace-casing I, entering, in a highly-heated condition, the hot-air chamber H, for distribution through openings in the casing I, for distribution by pipes or otherwise, as desired.

The advantages of this improvement are, that the burning gases or other products of combustion are compelled to pass over a larger amount of heating-surface with which the cold air is brought in contact than has ever before been done in the same space, thereby almost perfectly transferring their entire amount of heat to the upward current of heating air on its way to the hot-air chamber and its distributing-pipes, and preventing any waste of heat through the smoke-pipe, through which so large and extravagantly-wasteful an amount of heat passes off in all other furnaces. Unlike other furnaces, this is made almost entirely of heavy sheet-iron, having no large cast-iron plates to warp and crack, and has its dampers so located and operated as that there are no holes in the casing for the leakage of foul-smelling gases into apartments; and is so constructed that any part can be replaced without taking the whole structure apart; thus

presenting advantages not obtainable in any other furnace.

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

1. The series of drums B, C, and D, in combination with the series B', C', and D', when constructed and operating substantially as described.

2. The said two series of drums combined, as a system, with the furnace-casing I, when constructed and operating substantially as described.

WALTER K. MANNING.

Witnesses:

OTIS H. MANNING,  
FREDERICH F. WEBSTER.