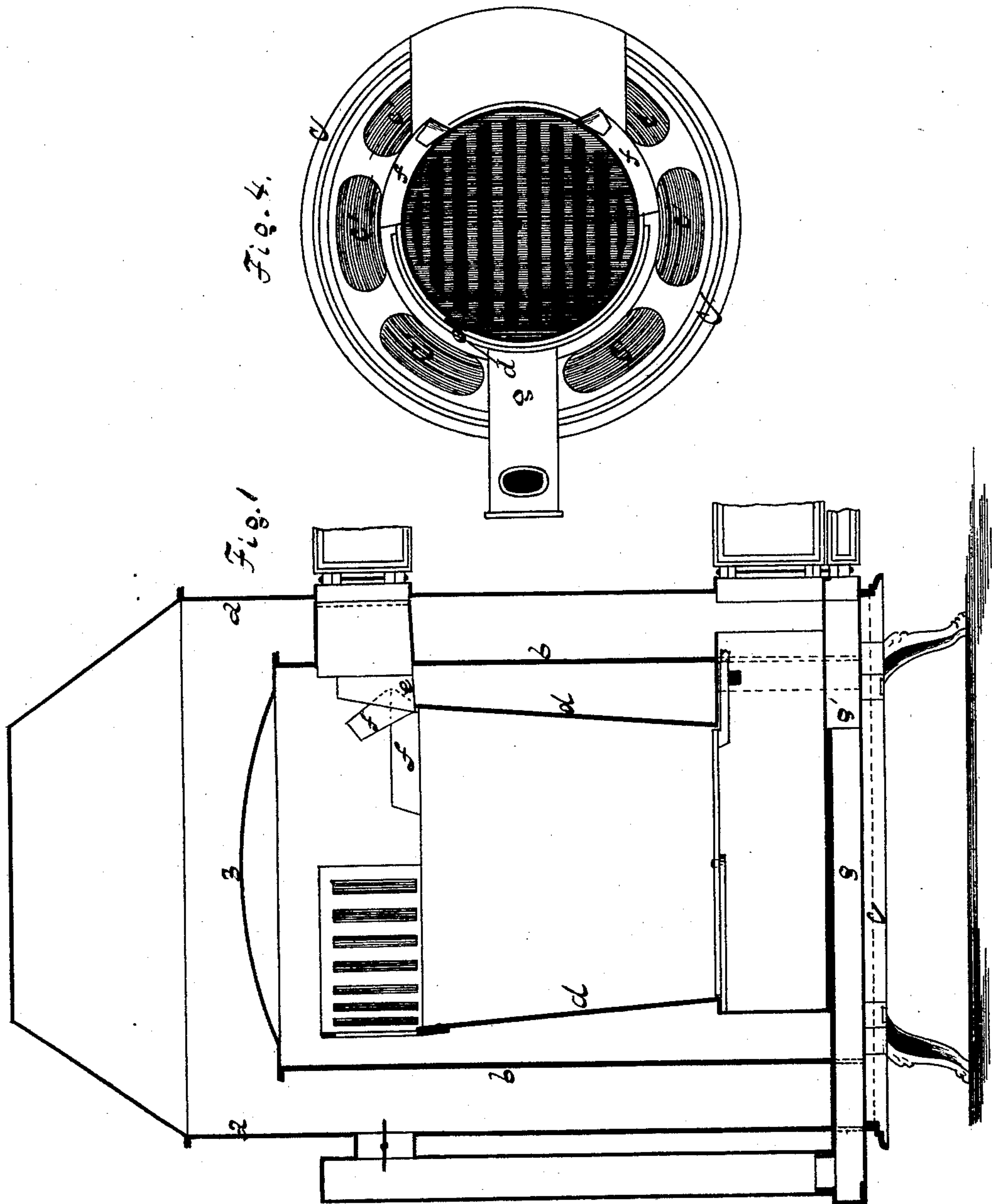


C. L. WILLARD.
Hot-Air Furnaces.

No. 156,111.

Patented Oct. 20, 1874.



Witnesses.
John Pollard
John Henry Brockway.

Inventor.
Charles L. Willard
By Wm. E. Simonds
his attorney.

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Fig. 3.

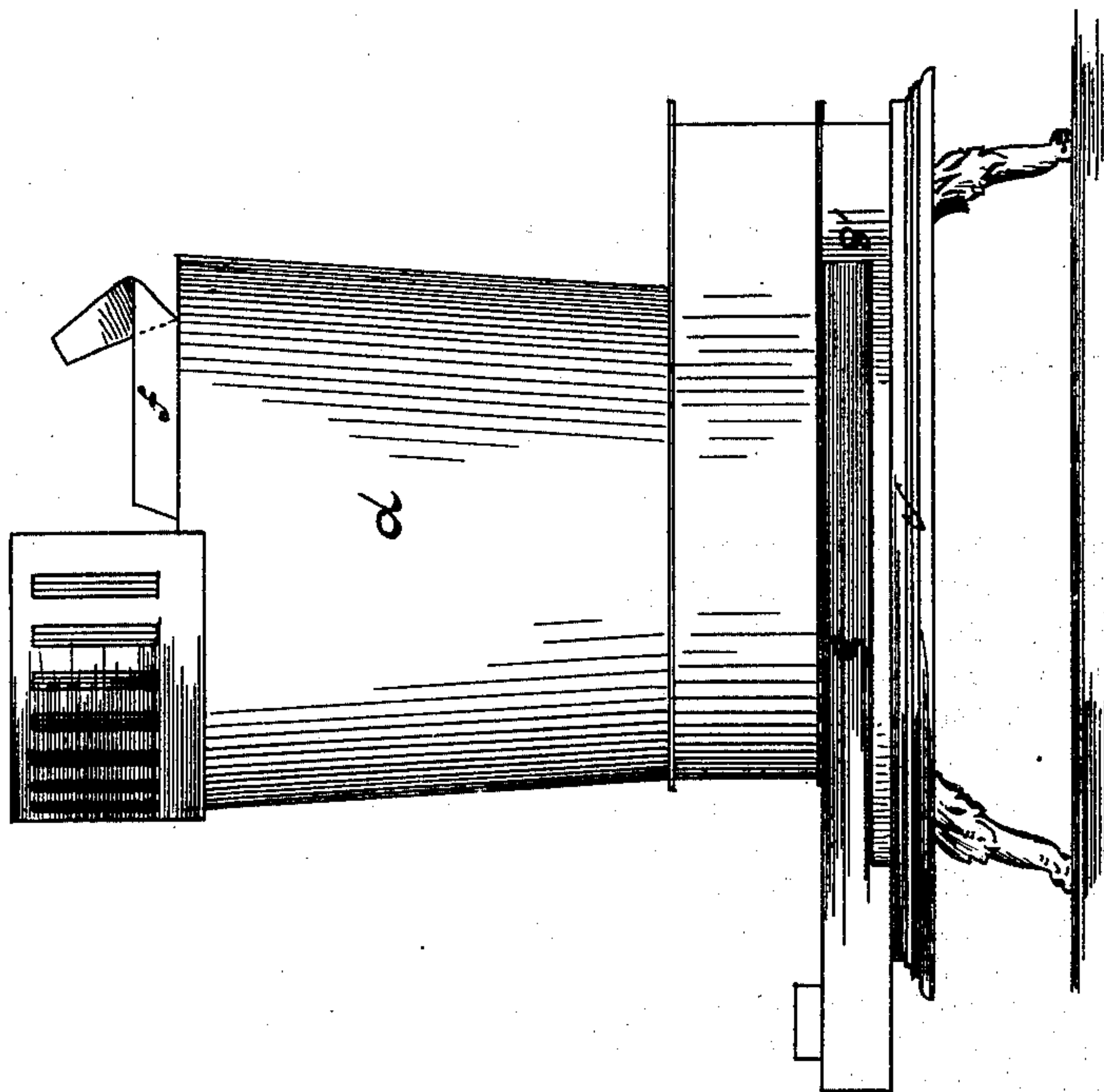
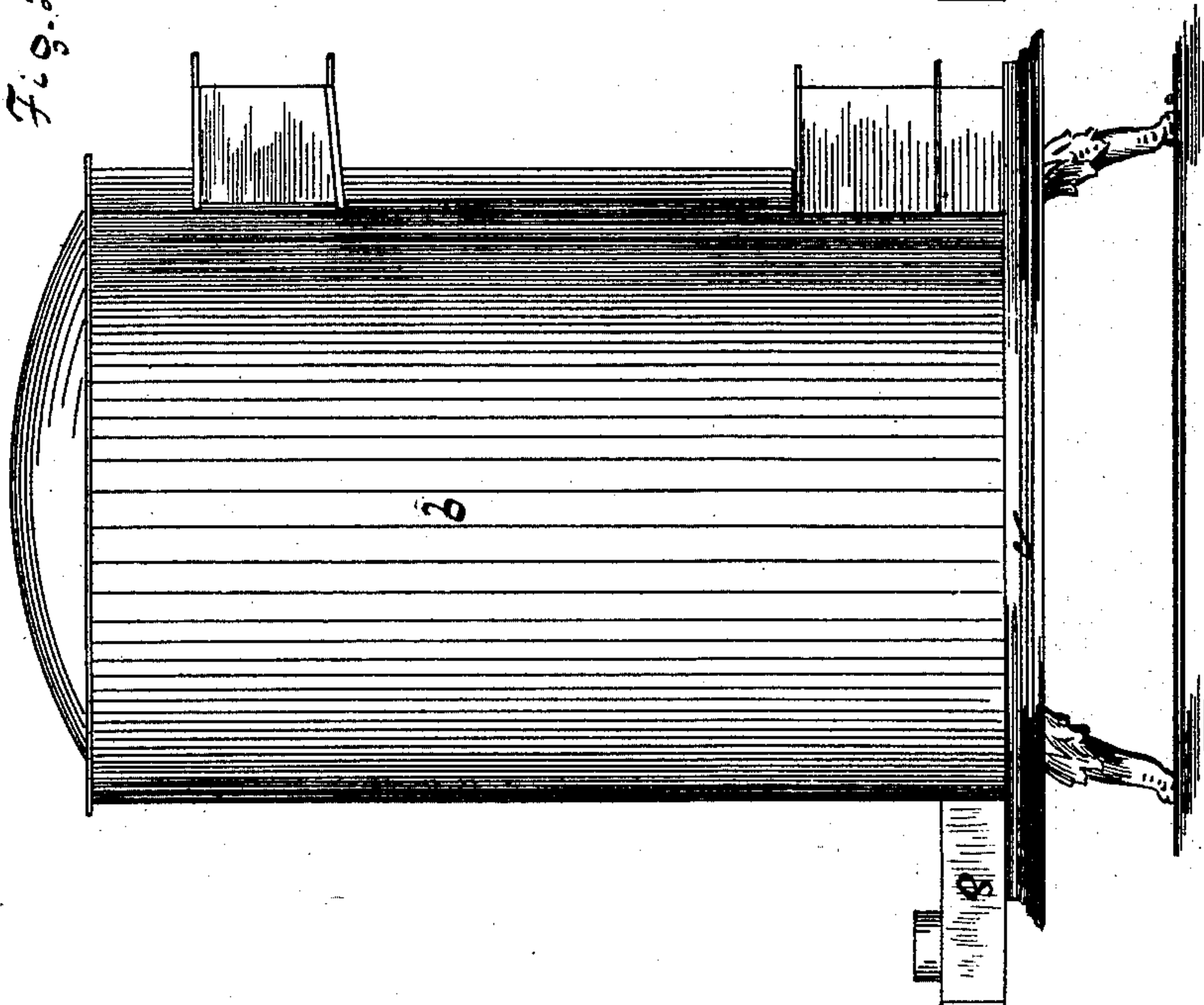


Fig. 2.



Witnesses.
John Pollitt
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UNITED STATES PATENT OFFICE.

CHARLES L. WILLARD, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **156,111**, dated October 20, 1874; application filed May 12, 1874.

To all whom it may concern:

Be it known that I, CHARLES L. WILLARD, of Hartford, in the county of Hartford and State of Connecticut, have invented certain Improvements in Hot-Air Furnaces, of which the following is a specification, reference being had to the accompanying drawings, where—

Figure 1 is a view of the whole furnace in central vertical section. Fig. 2 is a side elevation of the furnace with the outer casing removed, showing the fire-case. Fig. 3 is a side elevation with the fire-case removed, showing the fire-pot. Fig. 4 is a top view of the parts shown in Fig. 3.

My invention is a combination of parts which throws the heat and smoke backward and downward as they leave the fire-pot, and then causes them to come forward of the vertical center of the furnace before they can enter the smoke-flue, thus causing the heat to better exert its heating power on the fire-case, and upon the air outside the fire-case, before it can start upward, than has heretofore been accomplished.

The letter *a* indicates the exterior case of a portable hot-air furnace; *b*, the fire-case inside this. The cold air comes through the holes *c'* in the bottom plate *c*, and passes up between the cases *a* and *b*, in order to be warmed or heated. The letter *d* indicates the fire-pot. The space between the fire-pot and the fire-case is spanned or bridged at the front by the shelf *e*, which is a common thing. To the fire-pot I affix the two wings *f f*, meeting the shelf *e* at one end, and extending back till one-half the space between the fire-pot and fire-case is bridged by these wings (and the shelf *e*.) thus

preventing the heat and smoke from the fire from passing down outside the fire-pot at the front half of the furnace, and causing such heat and smoke to pass down the rear half. This heat and smoke have to come forward of the vertical center of the furnace before they can enter the mouth of the smoke-flue *g* at *g'*, which is extended forward of the center for this purpose.

The object of this improvement is to so improve and modify the common construction of hot-air furnaces that the heat, smoke, and fire escaping from the fire-pot shall not be permitted to escape at the front of the same, but shall be compelled to escape from the rear, and, passing down, shall be compelled to come to the front before entering the mouth of the escape-flue, thus giving the heat a longer course of travel, and compelling it to act more advantageously and thoroughly on the air contained between the fire-case and the outer casing of the furnace; and

I claim as my improvement—

The combination of the outer case *a*, the fire-case *b*, the fire-pot *d*, provided with the front wings *f*, and the exit-flue *g*, its mouth brought forward of the center of the fire-pot, whereby the heat and smoke are caused to escape at the rear of the fire-pot, and then brought forward to the front before entering the exit-flue, all substantially as shown and described.

CHARLES L. WILLARD.

Witnesses:

WM. E. SIMONDS,
JOHN POLLITT.