

J. M. GRAFF.
Hot Air Furnace.

No. 210,418.

Patented Dec. 3, 1878.

Fig. 1.

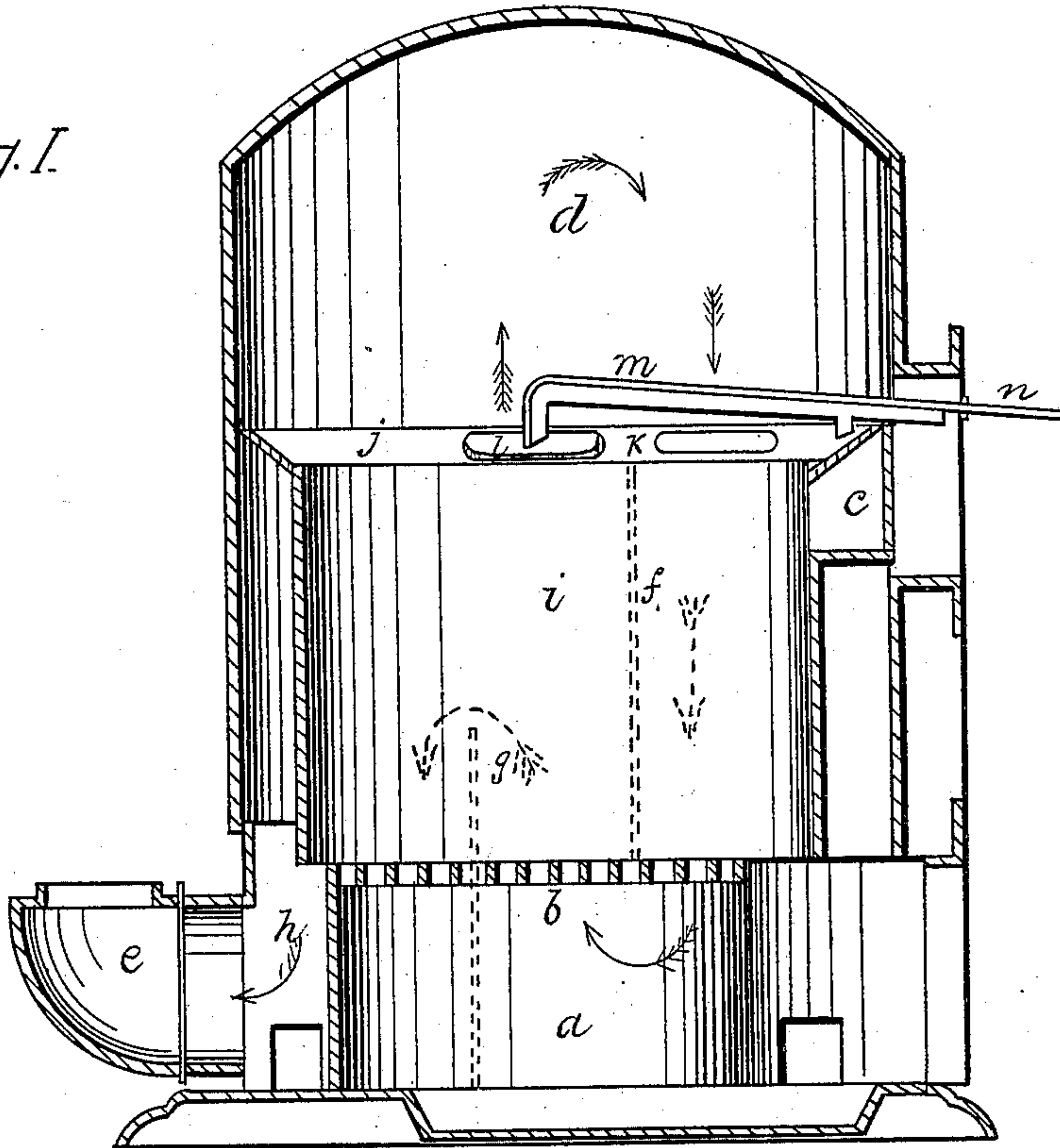
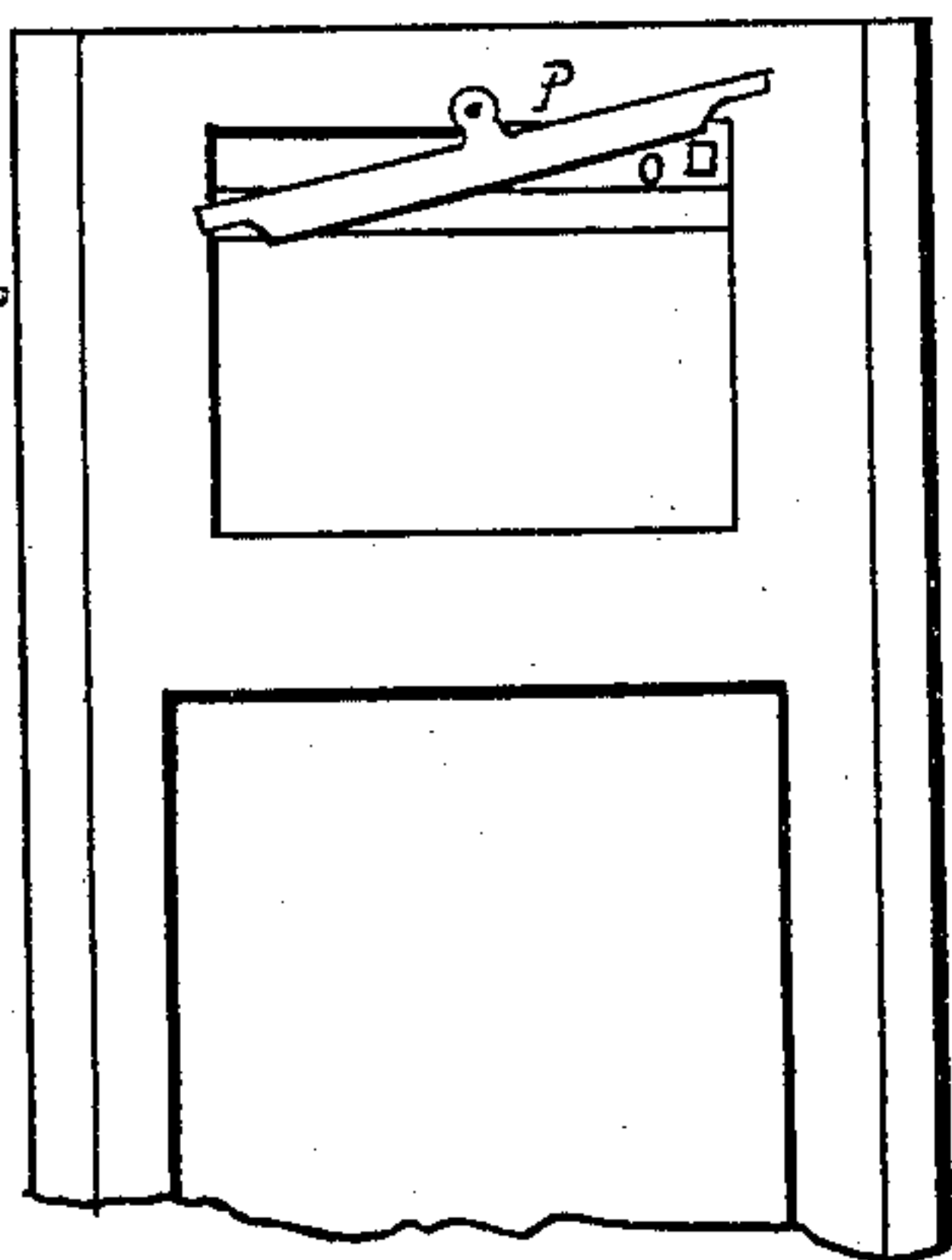
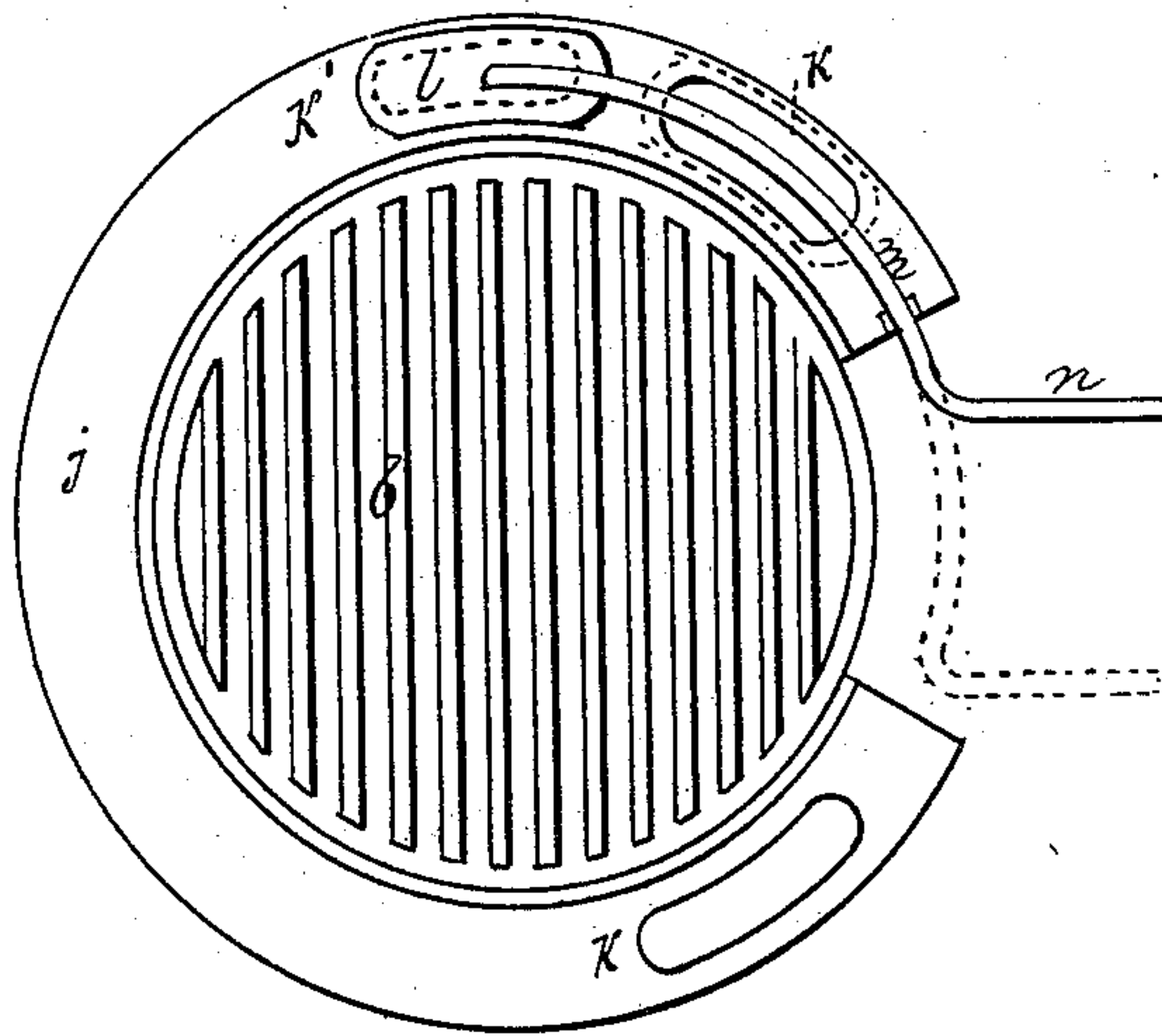


Fig. 2.



Witnesses:
Eugene Freadwell
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Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN M. GRAFF, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **210,418**, dated December 3, 1878; application filed April 26, 1878.

To all whom it may concern:

Be it known that I, JOHN M. GRAFF, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Hot-Air Furnaces, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

My improvement has for its object the construction of a hot-air furnace in such a manner that a continuous direct draft can be obtained through the fire-chamber, and the heated gases and products of combustion will be compelled to pass downward to the base of the radiator before escaping through the exit-flue, thereby greatly increasing the effective heating capacity of the radiator; and it consists in combining with the fire-pot a flanged portion extending from its top to the inner wall of the radiator, and providing such flange with passages or outlets which are opened and closed by means of a damper operated by a lever-arm extending through the coal-chute above the feed-door, the space between the fire-pot and wall being divided by vertical partial partitions, as hereinafter more particularly described.

In the accompanying drawings, Figure 1 is a vertical section of my improved furnace. Fig. 2 is a front view of the feed-opening; and Fig. 3 is a plan detail view of the flange, with its outlets and damper.

a is the ash-pit; *b*, the grate, and *c* the coal-chute, which are similar in construction to such parts in ordinary furnaces. *d* is a dome-shaped radiating-cylinder, and *e* the smoke-pipe through which the gases and products of combustion are conducted. Flue-strips *f f* and *g g* are arranged vertically within the radiator, the strips *f f* extending downward from the flanged portion on the upper part of the fire-pot to the top of the base-chamber *h*, and the strips *g g* extending from the center of the fire-pot to the bottom of the base-chamber, forming return-flues.

Upon the upper periphery of the fire-pot *i* is set a flange, *j*, slightly inclined from its outer edge inward, which surrounds the fire-pot, but is open in front to correspond to the coal-receiving opening. This flange reaches to the inner surface of the radiator, and is

provided with outlets *K K K'*, which lead into the flues and base-chamber *h*. The outlets *K K* are so arranged that they open a passage in front of the flue-strips *f f* and the outlet *K'* behind the said flue-strips. The opening and closing of these outlets in the circular flange are controlled by a damper, *l*, riding on such flanged portion, and having a curved arm, *m*, operated by a lever-arm, *n*, inside of the chute, the lever-arm extending out through the opening *o*, which is covered by the pivoted plate *p*, the traverse of the arm operating the plate.

When the outlet *K* in front of the flue-strip *f* is open, a revertible draft is caused to the base of the furnace, and the hot gases and products of combustion arising from the body of the heater are compelled to move in the direction shown by the curved arrows in Fig. 1. The heated currents traverse the combustion-chamber, pass through the open outlet in the flange, into and through the flue on one side of the flue-strip *f* to the base of the furnace, thence around and up into the other flue, into the rear of the flue-chamber, and thence escape through the smoke-pipe *e*. When the outlet *K'* behind the flue-strip *f* is open, a direct draft is created in and through the chamber.

By my improvement a complete and perfect combustion is attained, and the necessity of perforating the casing, which has heretofore existed in order to obtain a direct draft, is entirely obviated.

I claim—

The vertical flue-strips *f g*, arranged in the space between the fire-pot *i* and outer casing of the furnace, in combination with the inclined ring *j* on the upper part of the fire-pot, constructed with openings *K K'* on opposite sides of the flue-strip *f*, and the sliding damper *l*, having a curvilinear operating-arm projecting through the feed-chute *c* of the furnace, whereby the damper can be moved to open or close the openings *K K'* in front or rear of the flue-strip *f*, substantially as and for the purpose described.

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Witnesses:

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