

S. H. La RUE.

STOVE.

No. 170,746.

Patented Dec. 7, 1875.

Fig. 1.

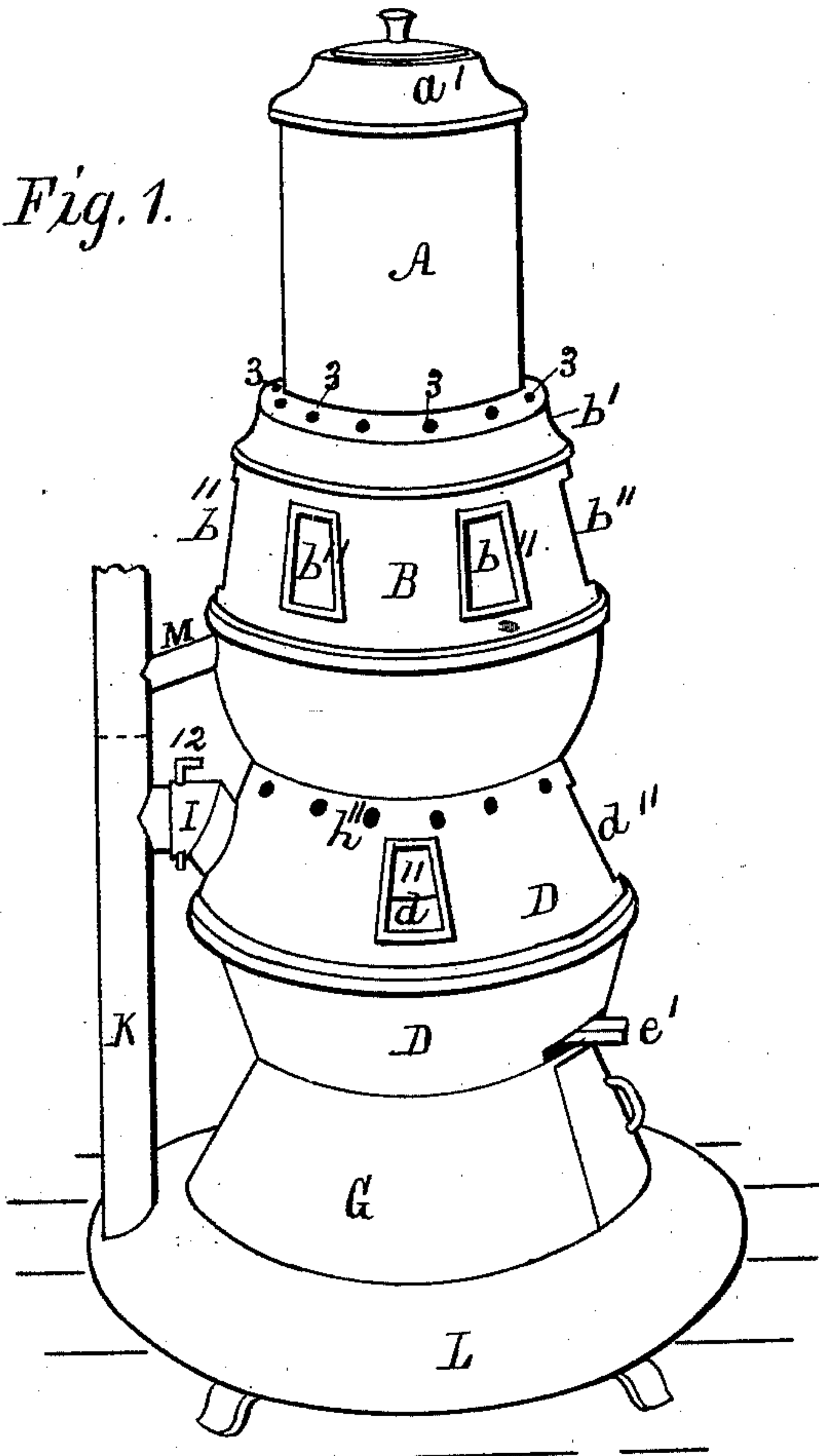


Fig. 2.

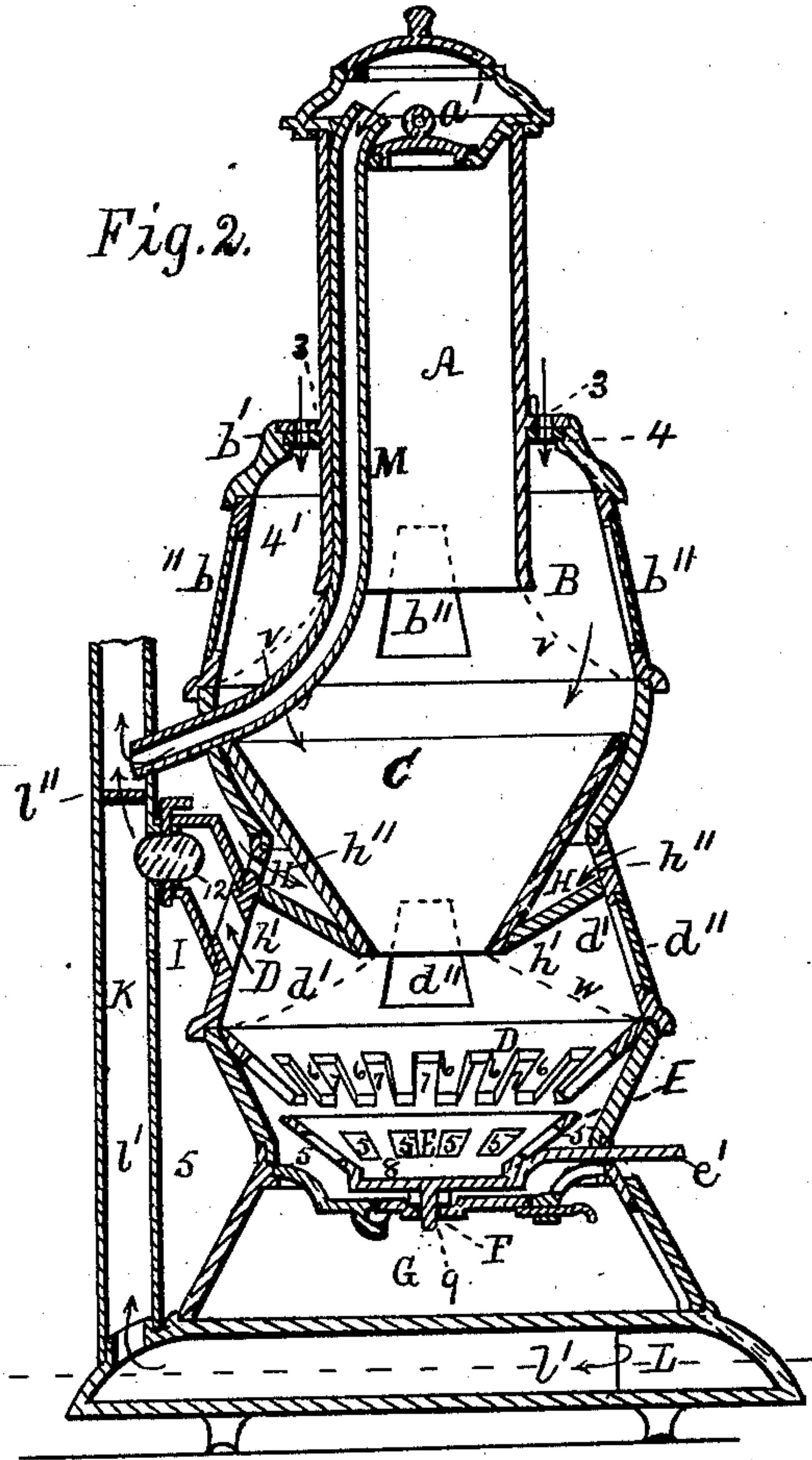


Fig. 4.

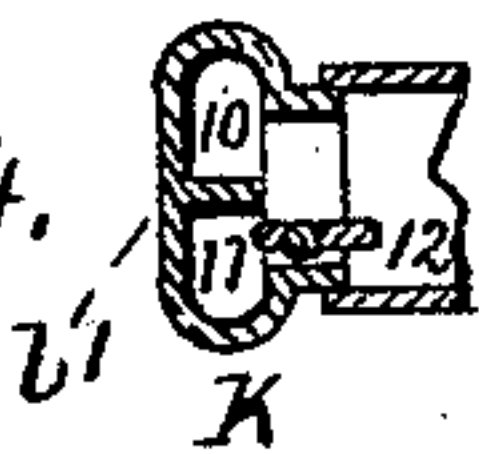
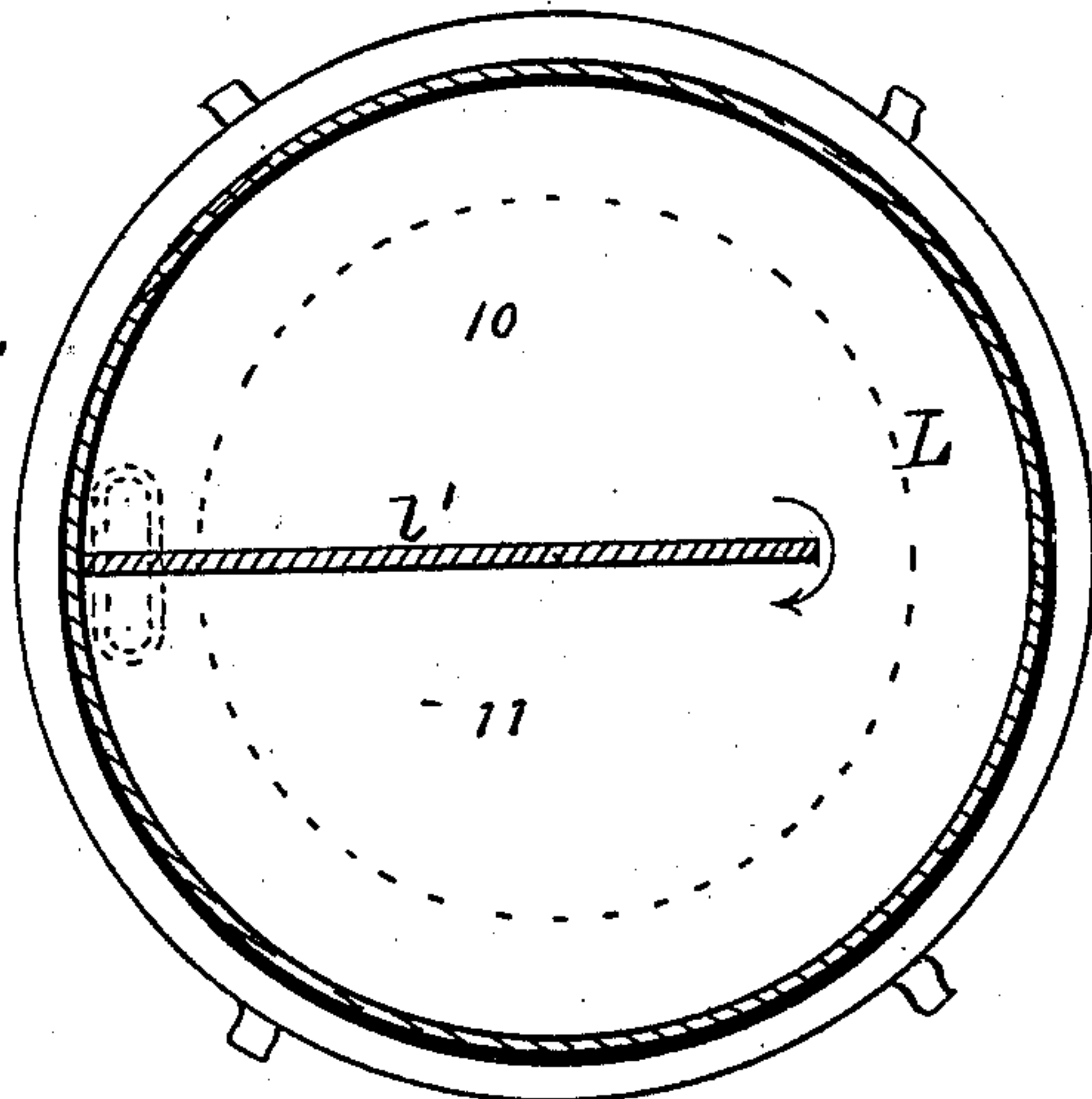


Fig. 3.



Witnesses:
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his atty of record

UNITED STATES PATENT OFFICE

SILAS H. LA RUE, OF FRENCHTOWN, NEW JERSEY.

IMPROVEMENT IN STOVES.

Specification forming part of Letters Patent No. **170,746**, dated December 7, 1875; application filed October 12, 1875.

To all whom it may concern:

Be it known that I, SILAS H. LA RUE, of Frenchtown, in the county of Hunterdon and State of New Jersey, have invented an Improved Stove for Soft Coal, of which the following is a specification:

The objects of my invention are to produce a magazine-stove for the combustion of soft coal by a downward draft through the combustion portions of the stove, provided with an upper and a lower series of illuminating-windows and sloping sides, so constructed and arranged in relation to each other that the coal will always be prevented from coming into contact with the windows, and at the same time, and by the deflected and the reflected heat of its combustion, and by the deflected ingress-draft, carry away or burn off all carboniferous deposits, (which might at times obscure the said windows,) and thus continue to produce both heat and light in the most perfect and economical manner, and without the liability (to which most of the magazine-stoves are subject) of permitting the outward escape of gas from the stove into the room in which it may be located; to secure the more perfect combustion of all gases and smoke; to prevent, in a more reliable and perfect manner, the tendency of the ignited soft coal to become cemented together into a mass impervious to the air-draft, and at the same time a more durably-constructed stove, no plate having fire on two sides of it; and, also, to enable the attendant or operator, at will and with ready facility, if desirable, to turn the direct course of the draft to the chimney down around and through the base of the stove, below the ash-receptacle, before it reaches the chimney-flue, and thus make the said base serve also as a heat-radiator, and without lessening the heat-radiating function of the body of the stove, as will hereinafter be fully and clearly described and explained with reference to the accompanying drawing, in which—

Figure 1 is a perspective view of the stove; Fig. 2, a vertical diametrical section of Fig. 1; Fig. 3, a horizontal section of the base of the stove; and Fig. 4, a transverse section of the exit-flue and valve of the stove embodying my invention.

The fuel-magazine A is a hollow cylinder,

provided with a gas-chamber, *a'*, and openings and removable lids, for the introduction of the soft-coal fuel at the upper end, and flared outwardly at its lower end, which is secured so as to project down about half the depth of the upper illuminating-chamber B, while its upper end extends vertically upward about two-thirds of the whole length of said magazine, and without any outside casing, or so that it will be exposed directly to the open air, and thus remain always cool, as represented in Figs. 1 and 2. The top of the illuminating-chamber B forms a collar, *b'*, which rests upon the upper edge of the sloping sides of B, which are provided with a plurality of mica windows, *b'' b''*. The flat upper portion of the collar *b'* has a series of air-holes, 3 3, through which the atmospheric air enters to support the combustion of the fuel or soft coal supplied by the magazine, and carries away the smoke from the adjacent mica windows and through the fire. The said series of holes 3 3 communicate with a corresponding series in an annular plate, 4, which can be oscillated, so as to vary the areas for the entrance of the draft-air, or cut it off entirely, as may be desired or required.

As the fuel leaves the magazine A it spreads, as indicated by the dotted line *v v*, Fig. 2, after filling the fire-pot C, and producing, also, a conical heap of fuel in the wider portion of the combustion-chamber D, the lower portion of which is contracted, and opens just above the grate E, which consists of a dished ring, with numerous holes, 5 5, corresponding with alternate projections 6 6 and recesses 7 7 in the bottom edge of the combustion-chamber D. The open center of the annular grate E has a fixed bar, 8, with a pivot, 9, and the latter enters a drop-plate, F, which corresponds in diameter with the central opening in the grate, and is held in place by its two opposite journals and a removable sliding bolt, so that the ashes and clinkers may be forced sidewise off of the plate, or by withdrawing the bolt the said plate F will swing downward, and let the ashes, which will accumulate upon it and the annular grate E, drop down into the ash-chamber G; but when the plate F is in its horizontal fixed position, as shown in Fig. 2, the pivot of the

grate E turns in a corresponding hole in said plate or arm extending across it, and allows the grate to be oscillated by means of the projecting handle *e'* and the pivoted bar 8, at the same time forcing the ashes and clinkers off sidewise from the imperforated plate, and between the grated surface and said imperforated plate, into the ash-pit below.

The ashes are intended to accumulate upon the grate and drop-plate, generally up as high as the wider part of the combustion-chamber D, and thus prevent the destruction of the grate by heat, and close off, partially, the upward draft through the grate or openings 7 7, thus equalizing the two drafts, until, by increased accumulation of the ashes, it becomes necessary to oscillate the grate to discharge the ashes, by means of the bar, laterally into the ash-chamber G, as described.

The sides of the fire-pot C slope toward its center at the bottom, and thus a contracted opening is produced, which causes the incandescent fuel to be deposited in a conical heap, as indicated by the dotted lines *ww* in Fig. 2, and, consequently, leaving an open annular place, *d'*, between it and the series of mica windows *d'' d''*. This shape of fire-pot effects also such a concentration of the ingress air as to burn away the coke or coal at the outer and lower edge of the mass next to the fire-pot, thereby not only bringing about more perfect combustion of the coal, but, at the same time, allowing the core to fall and crowd the narrow passage, thus securing its gradual and perfect consumption, which could not be done in any other way; thus also avoiding the feeding of the fuel from the magazine, which is a matter of the greatest importance in the construction of a soft-coal burner.

As the lower portion of the fire-pot C would be subject to a high degree of heat from the incandescent fuel in the lower combustion-chamber D, an air-space, H, is provided around beneath it by the addition of an auxiliary plate, *h'*, and a series of fresh-air holes, *h''*, whereby an annular stratum of cool air is maintained between D and the sides of C.

The outlet-flue for the downward draft (indicated in direction by the arrows) consists of a short elbow-pipe of a flat oval section, I, which leads from the lower combustion-chamber D upward, and out through the one side of D into the vertical outside chimney-flue K, the lower end of which latter opens into the hollow base L. A partition, *V'*, extends diametrically across the base L (see Figs. 2 and 3) about three-fourths of its diameter, and is continued up through the flue K, across its shortest diameter, (see Fig. 4,) to a short distance above the pipe I, thus dividing the base L and the flue K each into two like parts, 10 10 and 11 11. The upper end of the part 10 is permanently closed by a plate, *V''*, (see Fig. 2,) and the side of the other part is fitted with a valve, 12, by means of which its communication with the pipe I can be cut off, and thus the draft of the stove be compelled to pass down

through the part 10 of K, and along around the part 10 of the base L, to and along its part 11, and finally upward and out through part 11 of K, thus making the base L serve also as a heat-radiator.

By opening the valve 12 a direct draft is produced, through I, upward through that portion of K which is above the former; but, in either case, the reflected heat of the incandescent fuel in the combustion-chamber D will burn off any carboniferous deposits which may at any time become deposited upon the mica windows *d'' d''*, and thus maintain their transparency for illumination.

For the purpose of preventing any escape of gas which may reach the top chamber *a'*, a slender tube, M, open at both ends, is fixed to extend from the chamber *a'*, down through A, and out through one side of the outer wall of the stove into the exit-flue K, at a short distance above the partition *V''*. (See Figs. 1 and 2.)

The sides of the fire-pot C may be corrugated for the purpose of rendering it more durable, and allowing the down draft to burn away the fuel on the outer edge first, thereby giving room for the coked mass in C to expand and fall, facilitating the descent of the fuel, also, from the magazine; or it may be lined with fire-brick for the same purpose.

If found desirable, a hot-air pipe may be attached to the chamber H, and extended into a room above for warming or heating purposes. A damper may be inserted in the exit-pipe, just below the point where the gas-conduit from *a'* enters it, and the combustion-chamber thereby shut off tight, and the gas forced past the cover of the magazine and into chamber *a'*, and then out of the conduit.

The operation of this improved stove for soft or bituminous coal is as follows: After a fire has been started by the ignition of a sufficient quantity of the soft coal and kindling materials upon the drop-plate and grate, and more coal added until a sufficiently substantial ignition is produced by the upward draft through the grate to the exit-flue K, then the fire-pot C and magazine A may be filled, and the downward air-draft-valve holes 3 3 opened, thus providing for a continuous ignition and combustion of the fuel from the magazine by a downward draft exclusively, or a double draft, which, as indicated by the arrows, passes down through the illuminating-chamber B, the fuel in the fire-pot C, and in the combustion-chamber D to the ashes on the grate and drop-plate, and thence upward, through pipe I, to the exit-flue K, and, if the valve 12 be open, out through the portion of the flue K which is above the said valve; but if the said valve be closed, then the draft will pass down through the part 10, into and around the base L, and upward through the part 11 of K, and onward to the chimney of the building, the reflection of the incandescent fuel illuminating the windows of B and D, and the reflected heat and the direction of the draft keeping

the mica plates of the windows free from obscuration, and the whole outer surface of the stove, from the base of the magazine to the bottom of the base of the stove, radiating heat into the room in which the stove may be located, and when too much ashes have accumulated upon the drop-plate and grate it can be readily reduced by simply oscillating the grate, or entirely removed into the ash-chamber by letting the drop-plate down for the purpose.

I claim as my invention—

1. In a downward-draft magazine-stove for soft coal, the combination, substantially as shown and described, of the adjustable fresh-air openings 3 3, the illuminating-chamber B, coking-chamber or fire-pot C, and the combustion-chamber D, provided with the mica windows $d'' d''$, the said parts being arranged in relation to each other substantially as and for the purposes described.

2. The combination, in a downward-draft magazine-stove for soft coal, substantially as described, of the magazine A and the illuminating-chamber B, constructed and arranged so that the walls of that portion of the magazine which projects above the top of the illuminating-chamber shall form the external wall of that part of the stove, while the lower

end of said magazine extends down into the said illuminating-chamber, as shown and described, with the adjustable fresh-air openings or holes 3 3 in the upper portion or top of the said illuminating-chamber, the illuminating combustion-chamber D, and the exit-pipe I, leading from the combustion-chamber D into the flue K, constructed and arranged substantially as and for the purposes shown and described.

3. In a downward-draft magazine-stove for soft coal, the combination, substantially as described, of the fresh cool-air chamber H, provided with the entrance and exit openings $h'' h''$, with the coking or fire chamber C, and the combustion-chamber D, all constructed and arranged substantially as and for the purpose specified.

4. In a downward-draft magazine-stove for soft coal, the combination of the adjustable fresh-air openings 3 3, the coking or fire chamber C, the combustion-chamber D, the exit-pipe I, and the grate E, substantially as and for the purposes described.

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Witnesses:

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WILLIAM T. SROPE.