

JOHN P. HAYES.

Improvement in Gas Heaters.

No. 119,761.

Patented Oct. 10, 1871.

Fig. 1.

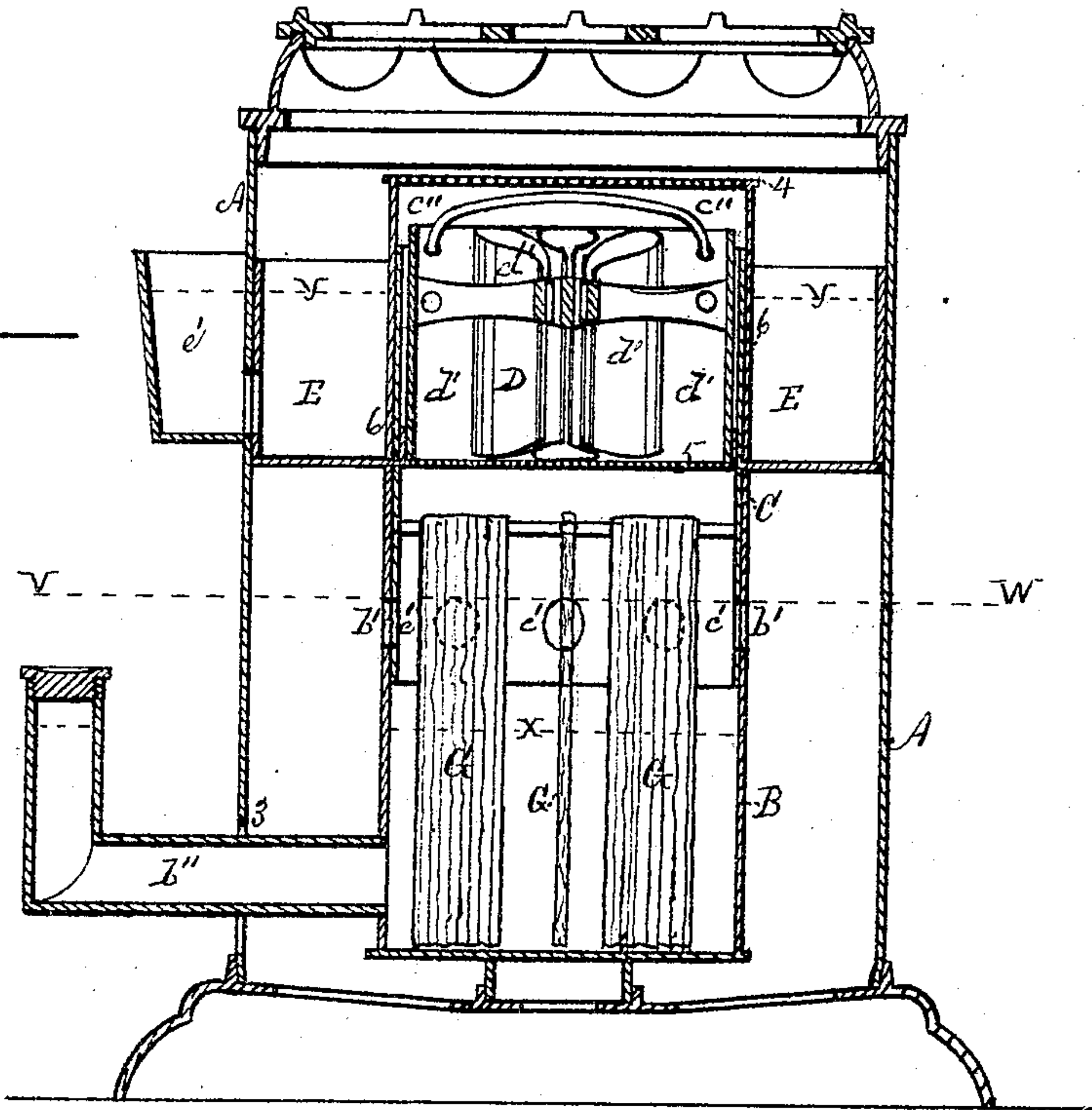


Fig. 2.

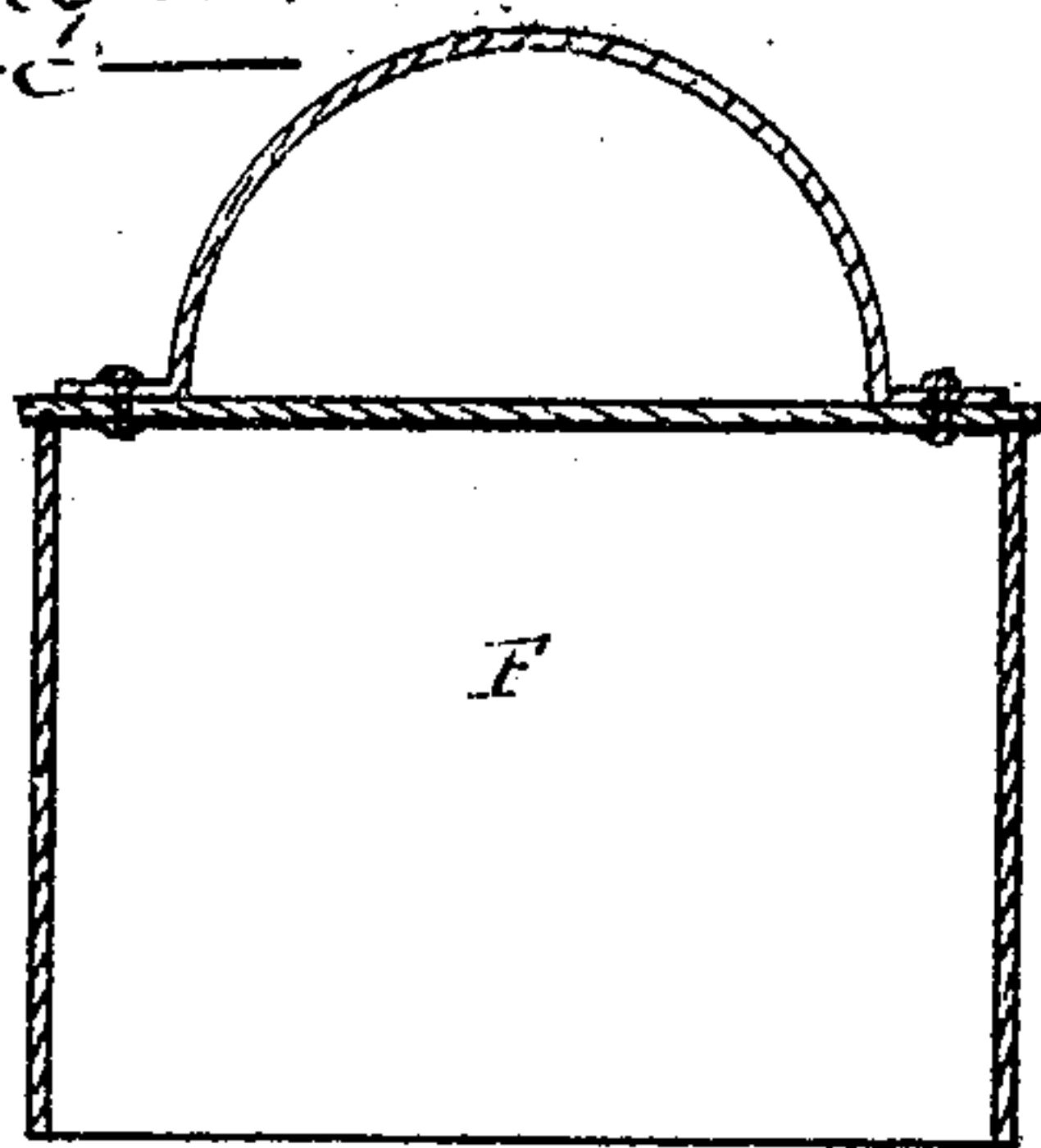


Fig. 3.

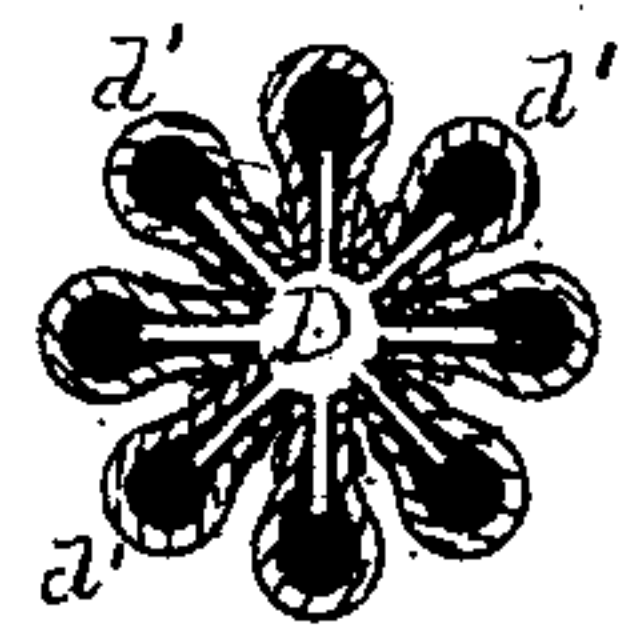
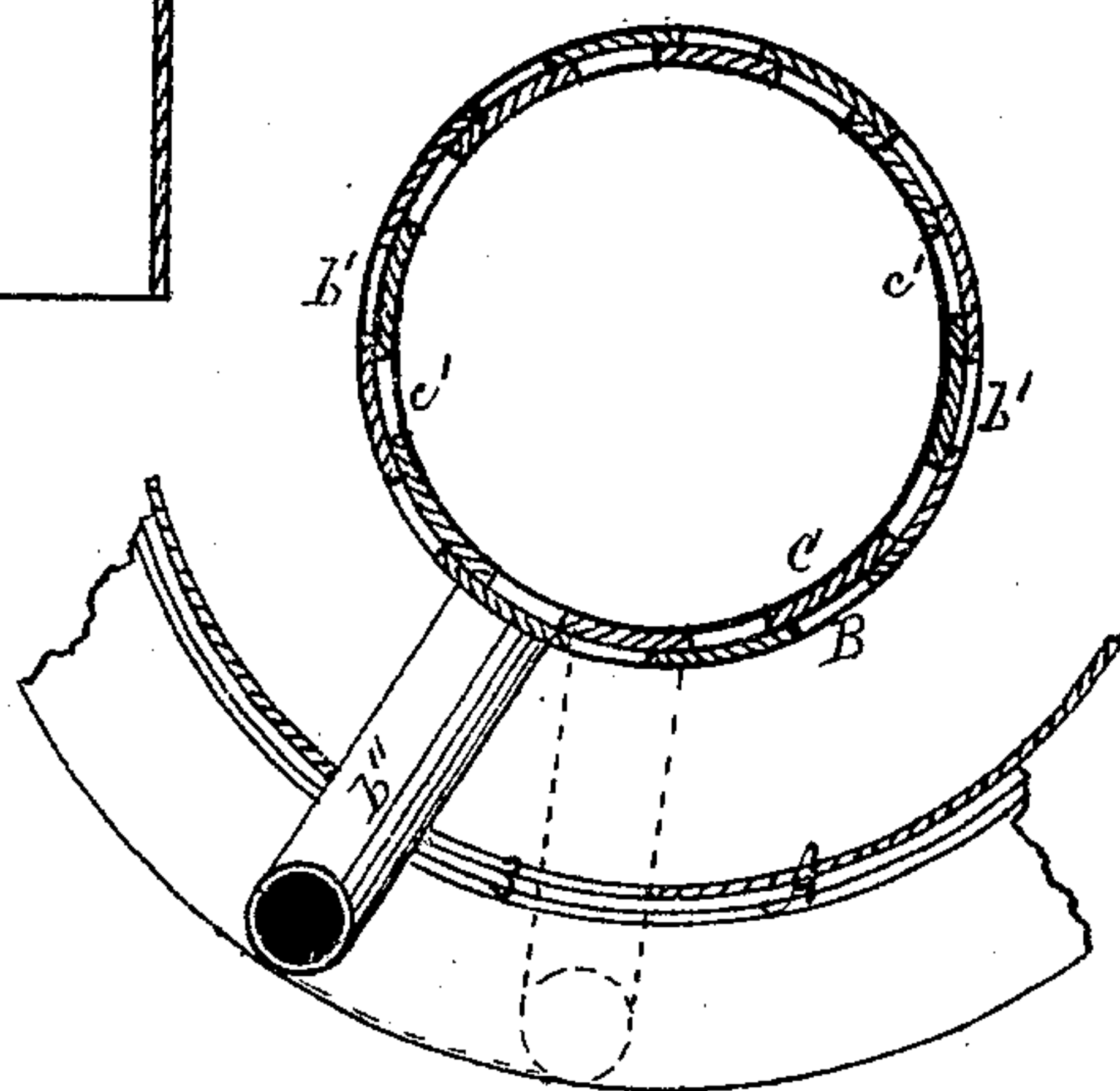


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN P. HAYES, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN GAS-HEATERS.

Specification forming part of Letters Patent No. 119,761, dated October 10, 1871.

To all whom it may concern:

Be it known that I, JOHN P. HAYES, of the city of Philadelphia, in the State of Pennsylvania, have invented certain Improvements in Vapor-Burning Furnaces, of which the following is a specification:

My improvements relate to the furnaces for vaporizing and burning naphtha and other hydrocarbons for the purposes of heating and cooking; and the first part of my invention consists in the combined arrangement of the naphtha-tank with the vaporizing chamber in the external walls or case in such a manner that, by vibrating the tank to the right and left, alternately, a short distance around the vaporizing-chamber, the openings for the entrance of the atmospheric air to support the combustion of the vapor will be opened, closed, or adjusted in area, as may be required; the object of this part of my invention being to afford greater facility and efficiency in adjusting, regulating, and cutting off the draught of air through the vaporizing-chamber. The second part of my invention consists in the combination of a series of pendent strips of felt or other absorptive fabric, suspended from suitable supports attached just below the lower foraminous diaphragm of the vapor or gas-chamber, so as to extend down to or near the bottom of the tank; the object of this part of my invention being to diffuse the naphtha or other liquid hydrocarbon in the tank over the extensively-exposed surface of the absorbent fabric and thus facilitate the vaporization required. The third part of my invention consists in the construction and combined arrangement of the following mechanical devices within the exterior case or walls of a furnace for heating and cooking by the combustion of hydrocarbon fluids vaporized and mixed with atmospheric air, viz.: first, a vaporizing and mixing-chamber, having an upper and a lower diaphragm of foraminous sheet metal or wire-gauze, and containing a removable combination of folds or lap of sheet metal to serve as a heater; secondly, a water-tank surrounding the said vaporizing and mixing-chamber; thirdly, an oil-tank, adjustably connected with the lower part of the vaporizing and mixing-chamber so that atmospheric air can be copiously introduced into said chamber through the sides of the tank or be shut off, as occasion may require; fourthly, strips of felt or other porous fabric suspended

between the heating-chamber and the oil-tanks, with the lower ends of the fabric immersed in the oil of the tank; the object of this part of my invention being the rapid evaporation and vaporization of the oil, and the introduction of such a copious supply of atmospheric air as will keep the oil-tank cool and effect such an intense combustion of the vapor as to wholly consume the carbon and produce an intensely hot flame above the upper diaphragm without smoke. The fourth part of my invention consists in the combination of a removable heater with the apartment formed between the upper and the lower foraminous diaphragms of the vaporizing-chamber; the object of this part of my invention being to enable the operator to put the furnace into immediate effective operation by introducing the heater in a previously-heated condition, and to more rapidly heat the vapor during its passage through the apartment.

Figure 1 is a vertical central section of a portable furnace embodying my invention. Fig. 2 is a vertical central section of the removable cap. Fig. 3 is a horizontal section below the dotted line V W of Fig. 1, a portion only of the outer casing being shown. Fig. 4 is a horizontal section of the removable heater reduced one-third.

The outer case A is cylindrical, open at its lower end, and elevated upon a perforated base or feet, so that air will pass freely upward around the hollow cylindrical tank B, the upper part of which fits, like a sleeve, around the lower part of the hollow cylindrical vaporizing-chamber C. A ring of corresponding or matching holes, *b' c'*, is made through both cylinders B and C, a short distance above the dotted line X of the tank. The oil-supplying tube *b''* extends through an open horizontal slot, 3, near the lower end of the case A, which allows the tank to be vibrated right and left, so as to open, close, or regulate the areas of the rings of holes *b' c'*. The upper part of the vaporizing-chamber C forms a heating-chamber, *c''*, the top and bottom plates 4 5 of which are foraminous, and allow the vapor to pass through them, the upper foraminous plate being fixed to a short hollow cylinder, 6, which slips over the upper end of cylinder C above the lower foraminous plate 5, so that it can be slipped off for the introduction or removal of the heater D, which is a piece of sheet-copper folded into a series of radial loops, *d' d'*. (See Fig. 4.) The

water-tank E, open at top, fits around water-tight in, and closes at, the part of the annular space which is left between the outer case A and the vaporizing-chamber *c*, has its bottom in the same horizontal plane with the lower foraminous plate 5, and has a projecting mouth, *e'*, through which it is kept supplied with water up to the dotted line Y. (See Fig. 1.) The upper end of the outer case A is open at top, and has a loose grate for supporting the articles to be cooked. The removable cap F (see Fig. 2) is a hollow cylinder, open at its bottom, and made to slip over the heating-chamber *c''*, and extends down through the water to the bottom of the water-tank E, and can be readily applied or withdrawn as occasion may require. The strips of felt G G are suspended from wire bars above, so that their lower portions will be immersed in the oil of the tank B (see Fig. 1) and thus, by absorption and capillary attraction, diffuse the oil over their elevated parts.

In the operation of this vapor-burning furnace the naphtha or other hydrocarbons used, being gradually carried up and diffused over the upper portions of the strips of felt G, is conveyed by the atmospheric air entering at the bottom of the outer case A, and passing through the rings of holes *b' c'*, up through the lower foraminous plate 5 into the apartment *c''*, where it is vaporized by the heater D, and passing out through the upper foraminous plate 4 burns, when ignited, in a broad and intensely-hot flame, while the water in the tank E keeps the vaporizing-cylinder C from becoming too strongly heated. The heater D causes the draught up through the furnace, and should be first heated and then placed in the heating-chamber; or, it may be heated in the chamber by taking off the upper foraminous plate 4 and igniting the vapor above the lower foraminous plate 5, and when sufficiently heated shutting off the draught by turning the tank B, by means of the projecting tube *b''*, replacing the plate 4, opening the draught-holes, and reigniting the vapor above the plate 4. On suspending the combustion the cap F should be slipped down over the upper end of the cylinder C into the water in the tank E, and thus all exhalations will be prevented.

I claim as my invention—

1. The combination of the naphtha-tank B with the vaporizing-cylinder C, the said parts being constructed and arranged to operate together substantially as and for the purposes hereinbefore set forth.

2. In combination with the tank B and vaporizing-cylinder C, the suspended strips of felt G G or their equivalent absorbents, arranged to operate substantially as and for the purposes hereinbefore set forth.

3. The vaporizing and mixing-chamber C, heater D, water-tank E, oil-tank B, and the suspended strips of porous fabric G G, the said parts being constructed, arranged, and combined within the exterior case A, substantially as and for the purpose hereinbefore set forth.

4. The removable heater D, in combination with the chamber *c''*, the said heater being constructed and applied substantially as and for the purpose hereinbefore set forth and described.

5. The removable cap F when used in combination with the water-tank E and the upper part of the cylinder C, substantially as and for the purpose hereinbefore set forth.

JOHN P. HAYES.

Witnesses:

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