

J. CALKINS.  
AIR HEATING APPARATUS.

No. 26,649.

Patented Jan. 3, 1860.

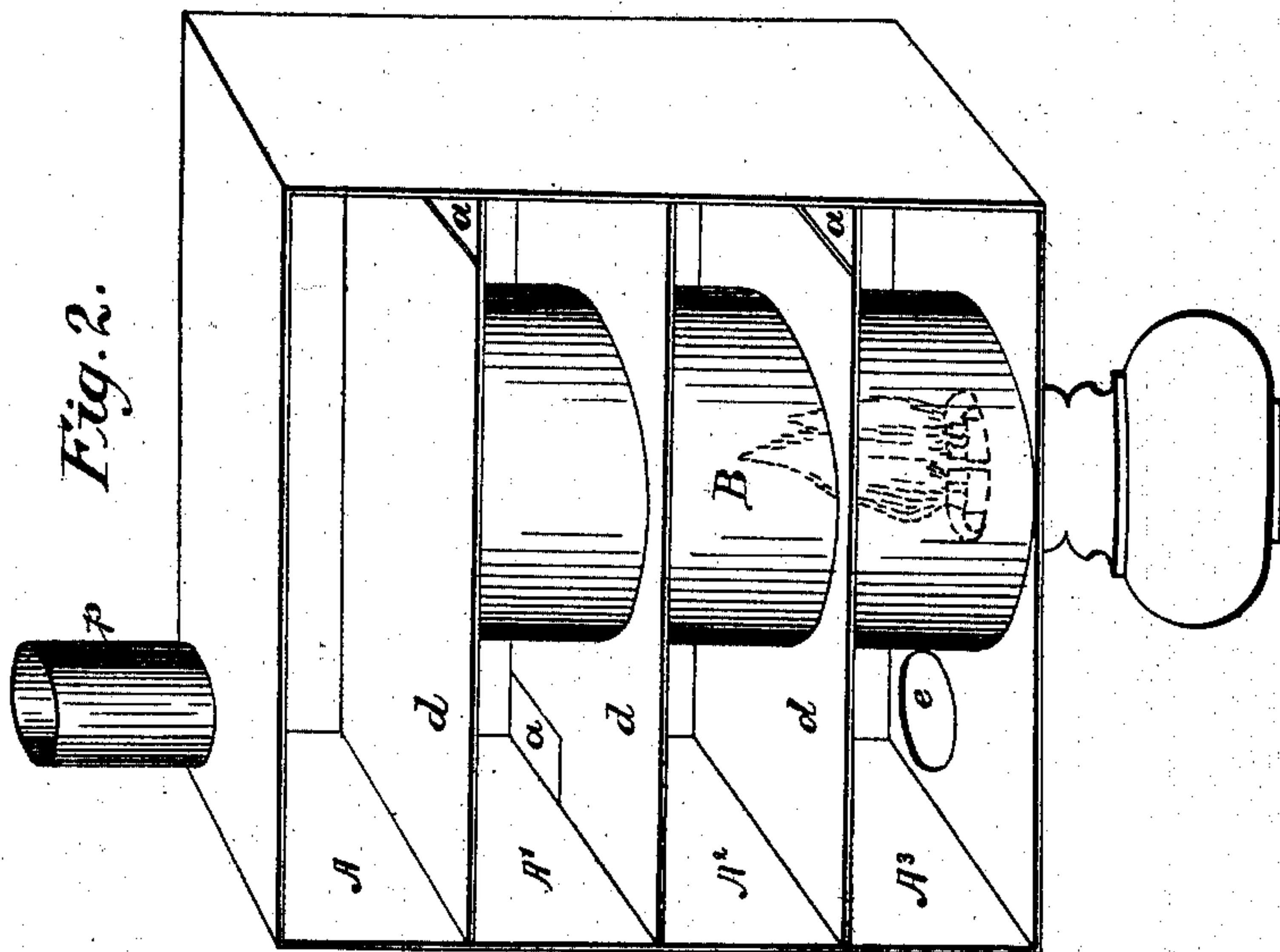
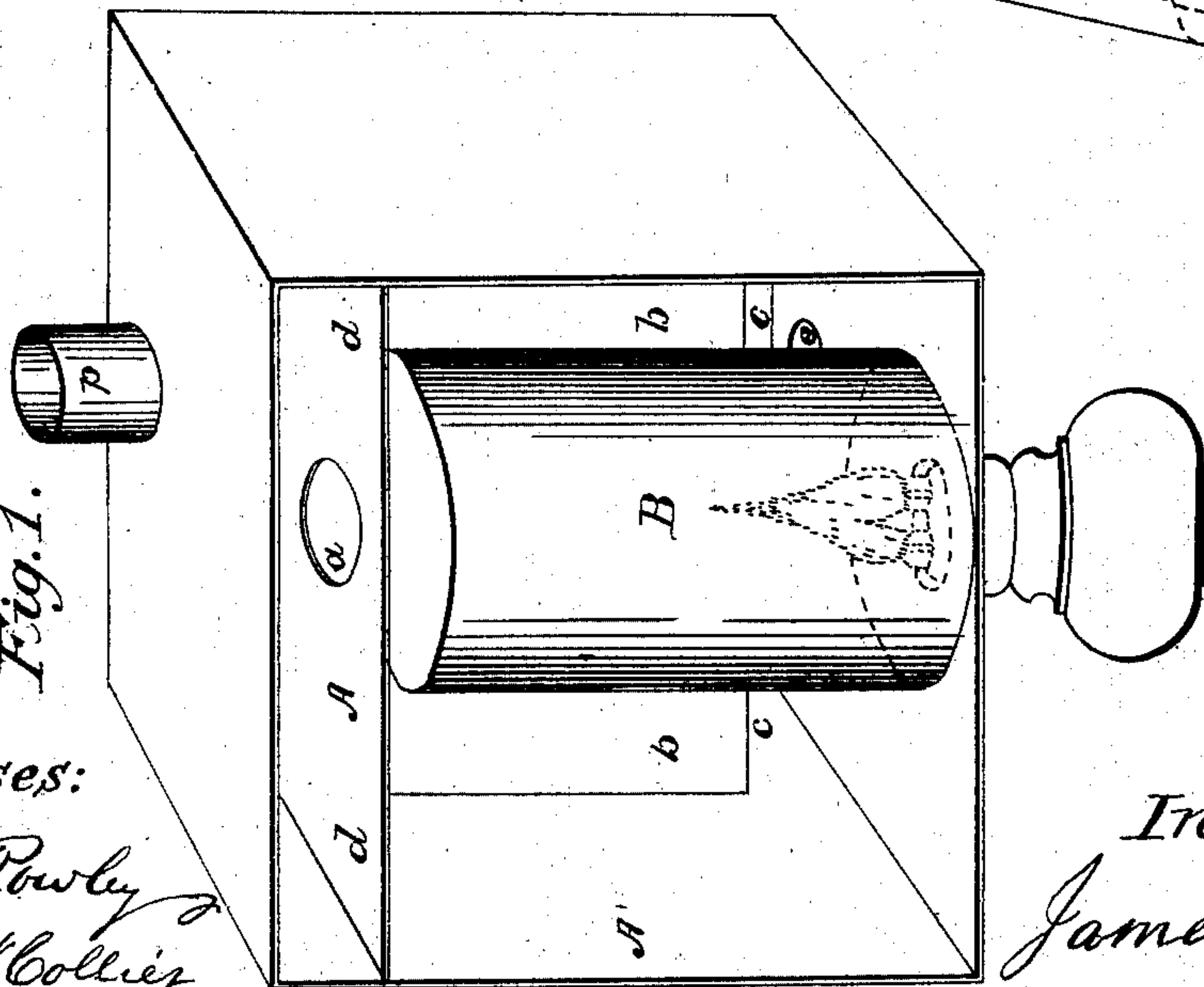
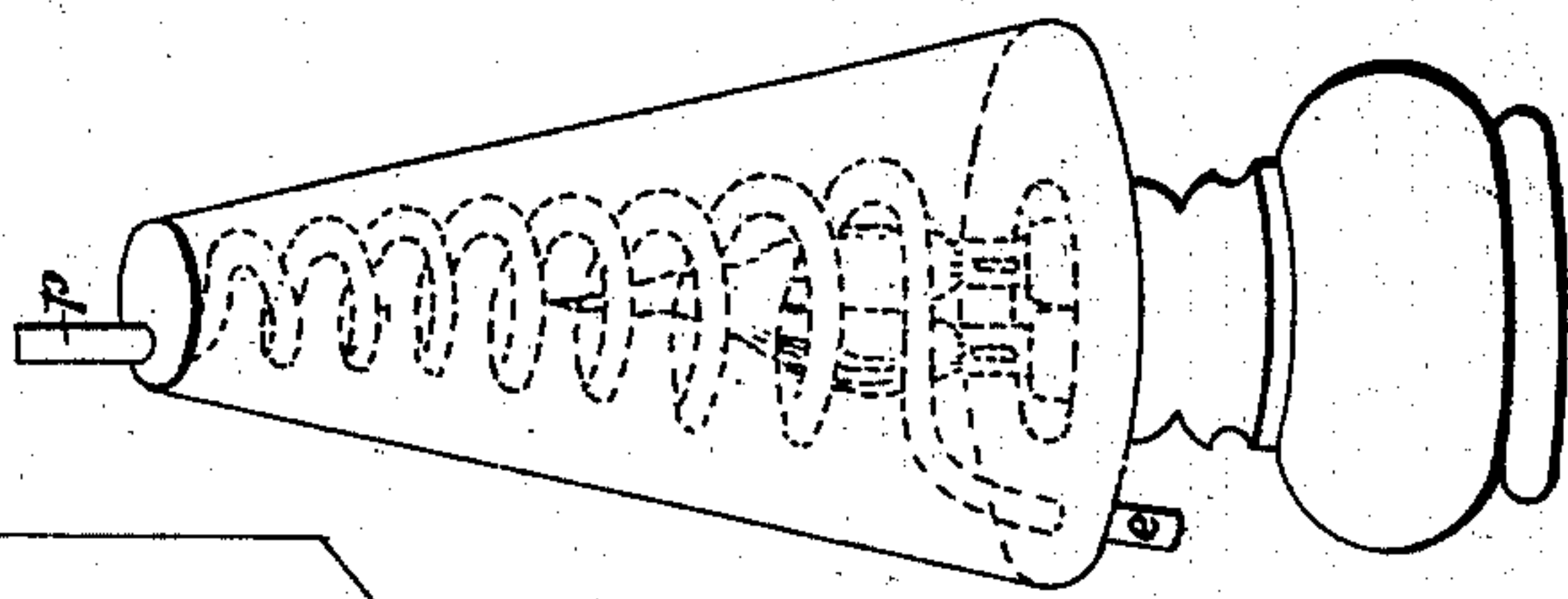


Fig. 3.



Witnesses:  
Alex. S. Rowley  
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# UNITED STATES PATENT OFFICE.

JAMES CALKINS, OF HUDSON, NEW YORK.

## MANUFACTURE OF HYDROCARBON GAS.

Specification of Letters Patent No. 26,649, dated January 3, 1860.

*To all whom it may concern:*

Be it known that I, JAMES CALKINS, of the city of Hudson, in the county of Columbia and State of New York, have invented a new and improved mode of elevating and sustaining the temperature of gases and vapors evolved from volatile fluids or chemical compounds of any kind when employed for the production of light or heat; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

Figure 1, is a perspective view of an apparatus for heating the air, having one side removed. Fig. 2, is also a perspective view of a similar apparatus for the same purpose, one side removed. Fig. 3, is still another apparatus for the same purpose.

Letters A A A A, in Figs. 1 and 2, are chambers for heating the air. Letters B B represent the metallic fire-box through which the heat is imparted to the air in the surrounding chambers. Letters *a a a* &c. are apertures for the air to pass from one chamber to another. Letters *b b* is a vertical partition in apparatus Fig. 1. Letters *c c* indicate the space beneath this partition. Letters *d d d*, &c., are horizontal partitions Figs. 1 and 2. Letters *e e* the induction pipe leading the heated air into the generator or vessel containing the fluid or compound. Letters *p p* the induction pipe leading the air from the bellows or air-chamber of the blower into the heating apparatus herein described.

The nature of my invention consists in providing the induction pipe or conduit through which the air is forced into the generator or vessel containing the volatile fluid or compound (*vide* hydrocarbon blowers) with chambers, pipes or flues at any point between the bellows or air chamber and the fluid or compound contained in the generator, so that by applying heat to such chambers, pipes or flues, the air within becomes heated in its passage to and before it enters the generator, or before it combines with the gas within, and thereby on coming in contact with it and with the fluid or compound from which it is evolved, elevates its temperature, increases its volatility and prevents condensation.

To enable others skilled in the art to make and use my invention I will proceed to

describe some of the modes in which I propose to heat the air and thereby to effect these important objects.

Fig. 1 represents one of these modes and may be described as follows: I construct a metallic chamber of any convenient form, into which, at the top, the air is forced from the bellows or air-chamber. Extending across it and half or three fourths of an inch below the top is a horizontal partition *d, d*. Through this, directly over the fire-box B, is an aperture of the same size as the air pipe *a*, through which aperture the air passes into the chamber A', where it is heated by coming in contact with the fire-box B. From this chamber it passes beneath the vertical partition *b, b*, through a space of about half an inch in width, indicated by letters *c, c*, and thence into the pipe, *e*, and the generator or vessel containing the volatile fluid or compound. The fire box B is a cylindrical pipe or chamber closed at top and open at the bottom to admit the flame of a spirit lamp or any other heating process, whereby the air coming in contact with this pipe or chamber B, is heated before it passes over or combines with the fluid or compound aforesaid.

Fig. 2 represents another mode and may be described as follows: A square, circular, or other convenient shaped metallic chamber, having three or more horizontal partitions, forming between them distinct chambers or apartments A A' A<sup>2</sup> A<sup>3</sup>, each opening into or communicating with the other at alternate and opposite sides or corners through the apertures *a, a, a*, the fire box B extending through the center of all from the bottom to the upper partition. The air is introduced through the pipe *p*, at the top, of ordinary temperature, and discharged through *e* at the bottom, heated, and thence into the generator elevating the temperature of the gas within to any degree required.

Fig. 3 represents still another device for effecting the same object, which may be described thus: I coil the air pipe *p*, into a conical form and then inclose it in a conical metallic case a little larger than the cone of pipe, having an aperture at the bottom to admit the heating flame. The air in passing through the coil becomes heated the same as in the chambers before described and represented in Figs. 1 and 2. The air may be admitted either at the bottom, top



or sides of these chambers, so that the current shall pass upward downward or horizontally through them; but in all cases the point of discharge should be as near to the generator as possible, so that none of its heat shall be lost before reaching the fluid or compound within.

It is not any particular form of apparatus or mode of heating the air that I would claim, for it can be done in a great variety of ways in addition to those I have described, and all equally effectual; but

What I claim as my invention, and desire

to secure by Letters Patent of the United States, is—

Attaching to the eduction pipe of hydrocarbon blowers, chambers, pipes or flues for the purpose of heating the air after it leaves the blower or air-chamber and before it comes in contact with the hydrocarbon employed to produce light or heat.

JAMES CALKINS.

Witnesses:

ALEX. S. ROWLEY,  
ISAAC N. COLLIER.