

(No Model.)

2 Sheets—Sheet 1.

H. S. BELDEN.

VAPOR BURNER.

No. 354,300.

Patented Dec. 14, 1886.

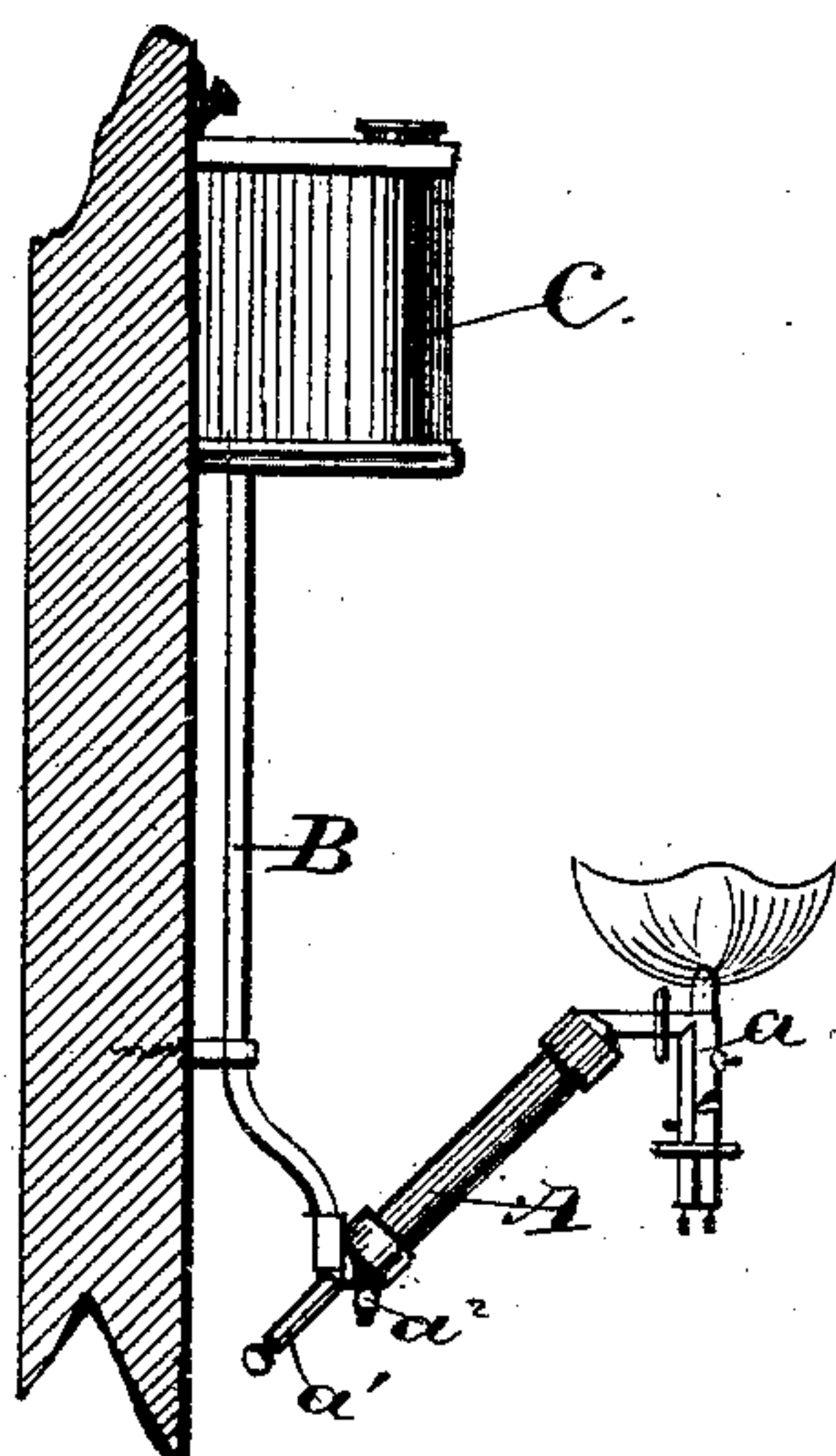


Fig. 1

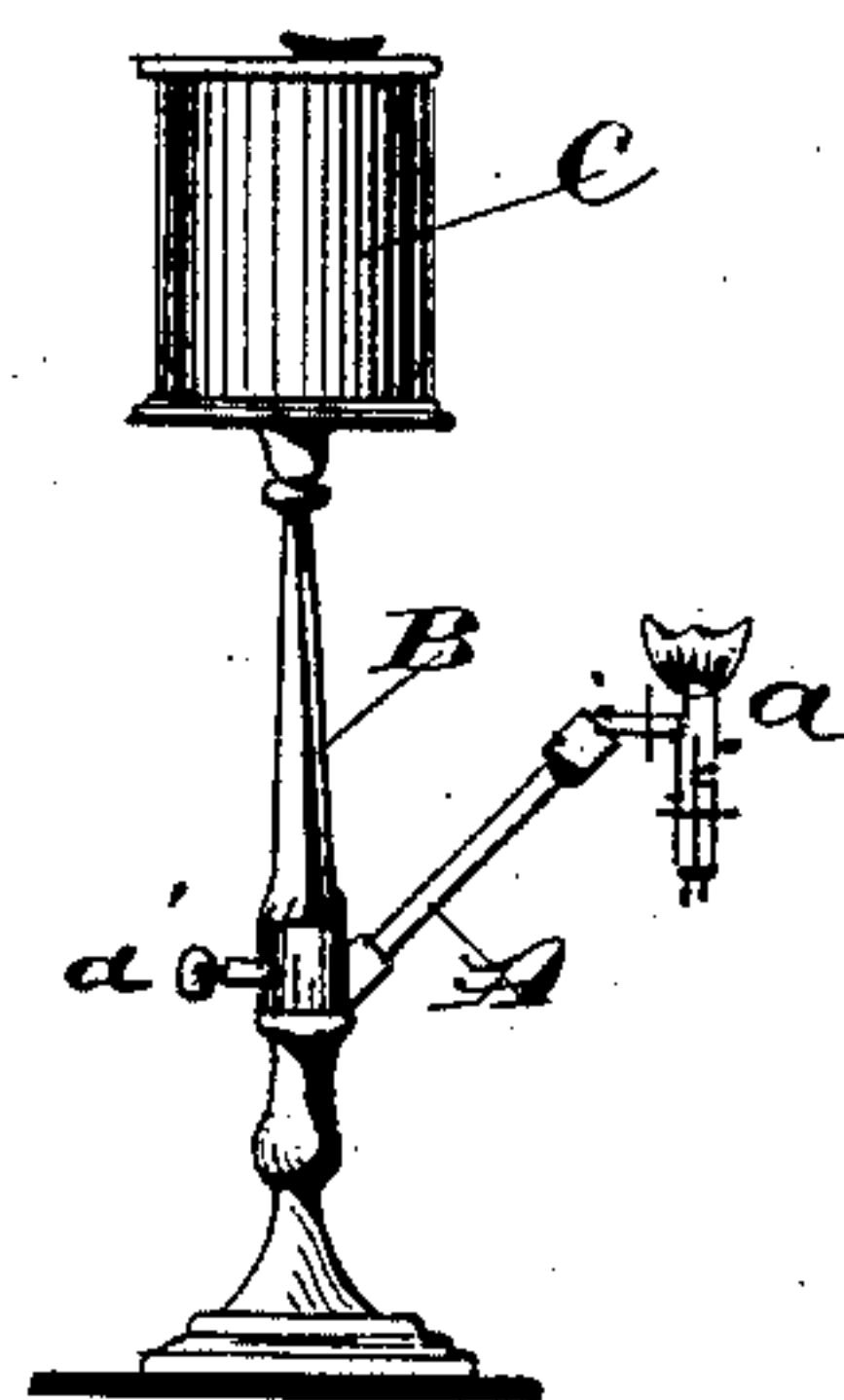


Fig. 2.

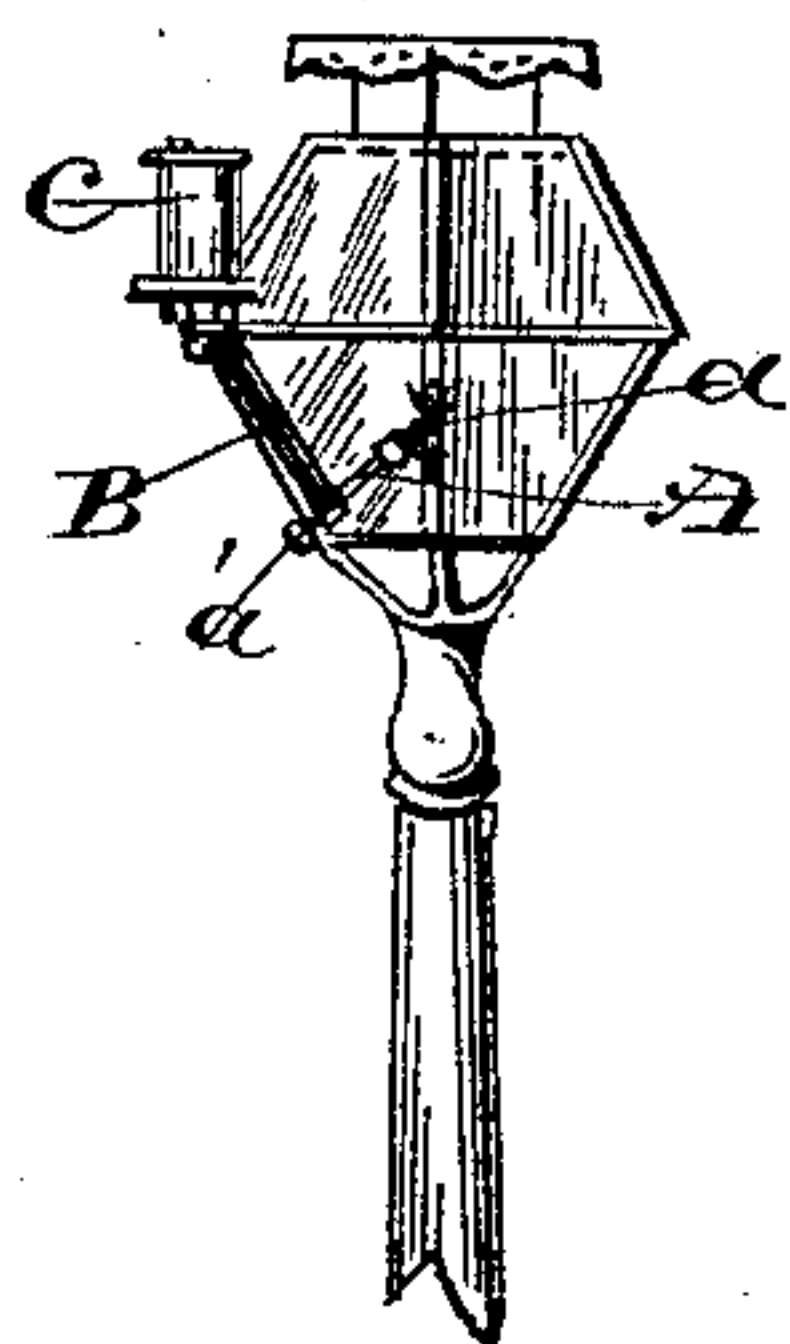


Fig. 3.

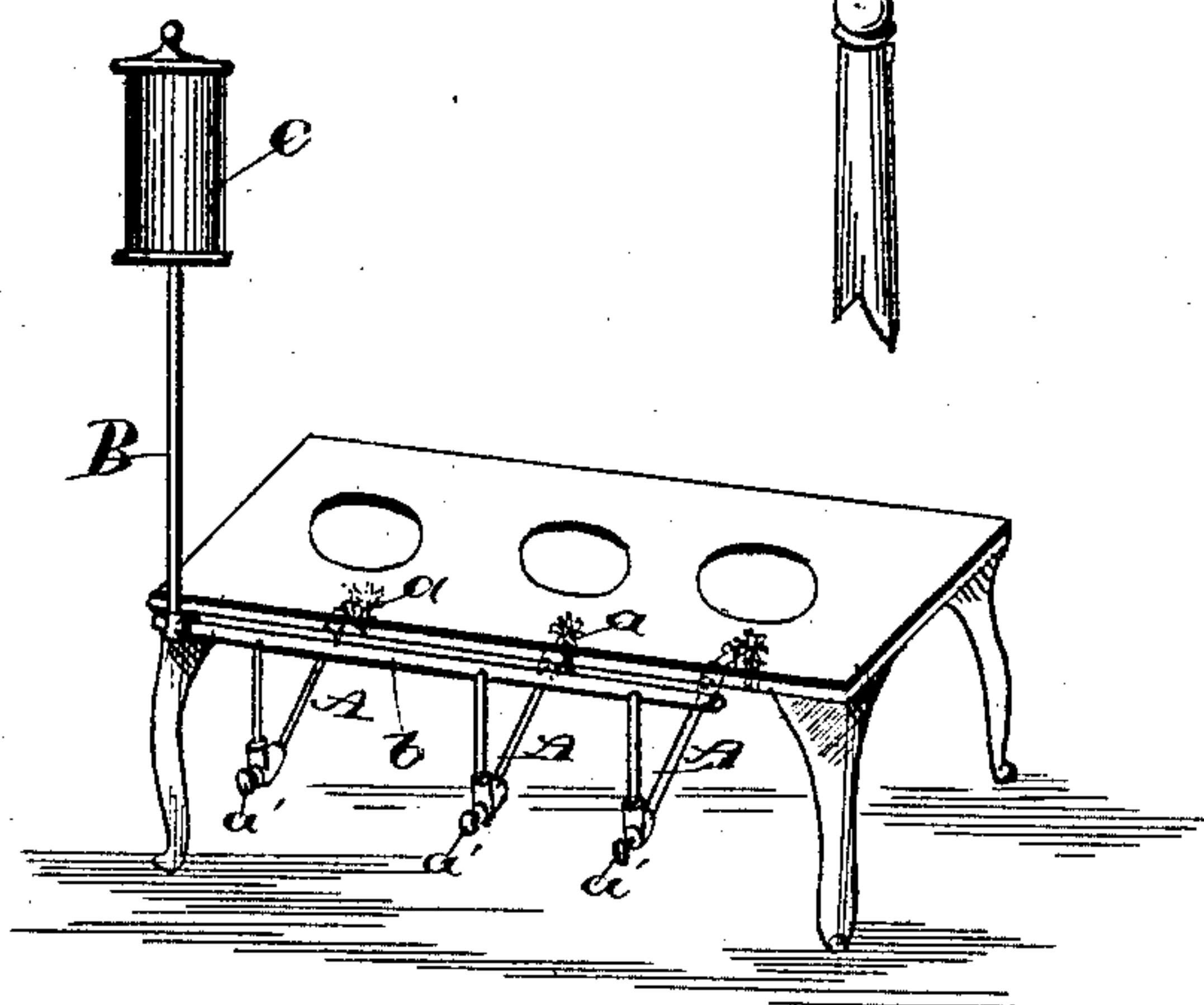


Fig. 4.

WITNESSES

Wm M. Monroe,

Geo W. King

Henry S. Belden INVENTOR

by

Leggett and Leggett ATTORNEYS

(No Model.)

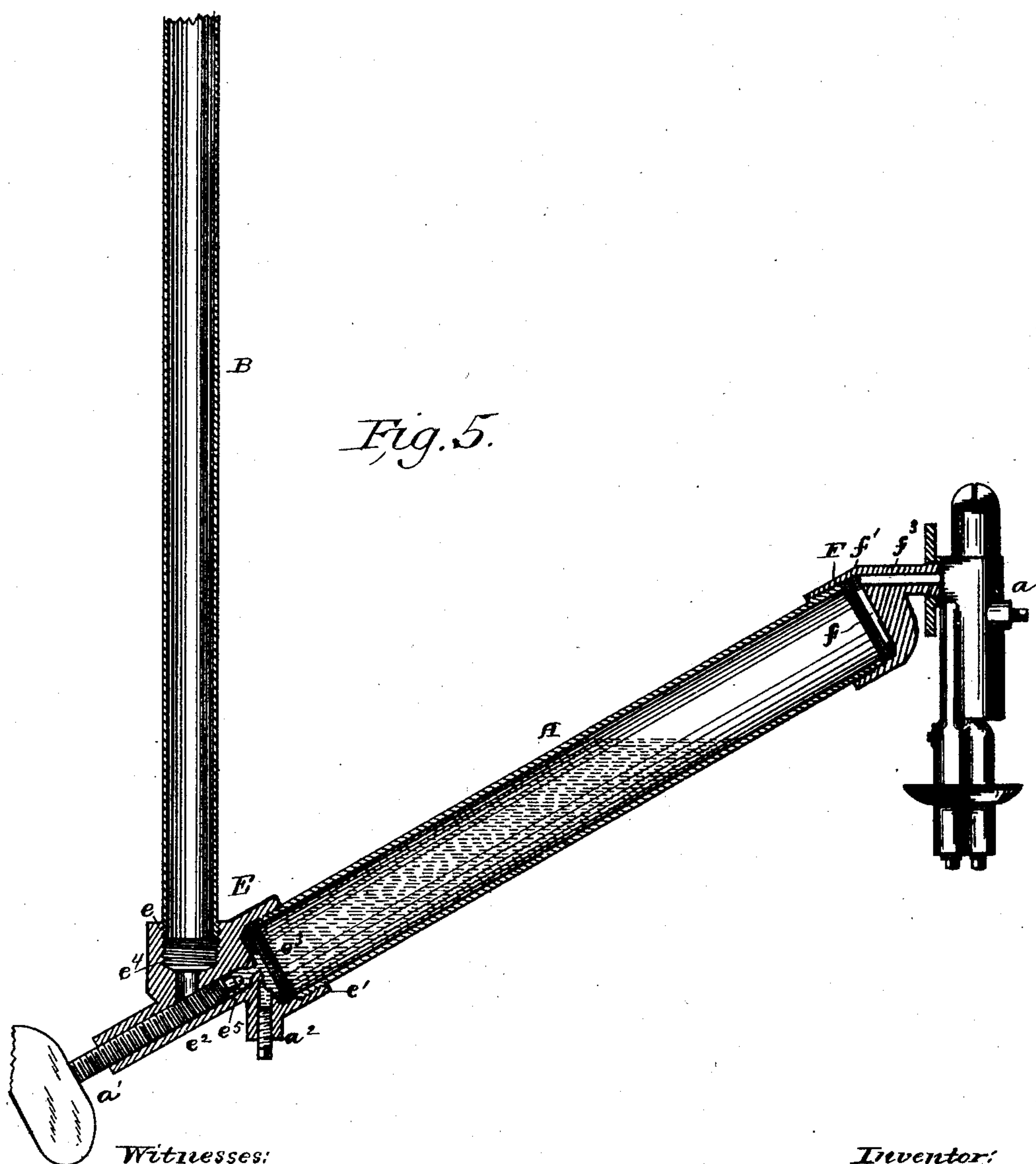
2 Sheets—Sheet 2.

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Patented Dec. 14, 1886.



Witnesses:

J. C. Turner  
B. W. Sommers

Inventor:

Henry S. Belden  
by Doubleday & Blair attys



# UNITED STATES PATENT OFFICE.

HENRY S. BELDEN, OF CANTON, OHIO.

## VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 354,300, dated December 14, 1886.

Application filed January 18, 1884. Serial No. 117,988. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY S. BELDEN, of Canton, in the county of Stark and State of Ohio, have invented certain new and useful  
5 Improvements in Vapor-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

10 My invention relates to improvements in vaporizing-chambers for vapor-burners for lighting or heating; and it consists, generally, in a certain construction having a large inclined vaporizing-chamber with the supply-  
15 pipe attached to the lower end and a burner attached to the upper end.

With this object in view my invention consists in certain features of construction and in combination of parts hereinafter described,  
20 and pointed out in the claims.

In the accompanying drawings, Figures 1, 2, and 3 are elevations—the first of a bracket-lamp, the second of a standard-lamp, and the  
25 third of a street-lamp, and with my improved vaporizing-tube attached to each. Fig. 4 is a view in perspective of a vapor-stove with my improved vaporizing-tube attached. Fig. 5 is a vertical section of my improved retort, it showing also the supply-pipe, the burner, and  
30 the several connecting devices.

A represents an inclined tube of considerable size containing the vaporizing-chamber, and to the upper end of which is attached the burner *a*, as shown.

35 The burner is one of those which I have commonly used, and which is shown in the Ballard patent, No. 186,579, January 23, 1877. The attachment is, in the construction shown, effected by means of the connection indicated  
40 by F, it being formed separately from both the burner and the retort.

*f* represents a socket to receive the retort.

*f*<sup>3</sup> is a passage-way communicating with the interior of the part *f*, and situated at an angle  
45 to the axis of said part. This passage *f*<sup>3</sup> is formed in a tube, *f*<sup>1</sup>, preferably integral with the socket-piece *f*. The burner is secured to this part *f*<sup>1</sup>.

It will be seen that it is not necessary to  
50 bend the retort-tube (as has been the case here-

tofore) in order to have the burner situated vertically when attached.

In my construction, although the retort is inclined, the burner-tip is in such position as to form a vertical flame—that is, the axis of  
55 said tip is vertical.

The lower end of the retort A is united to the supply-pipe by a connection having a holder for the supply-pipe and a holder for the  
60 retort.

E represents generally such a connecting means, and *e* and *e*<sup>1</sup> the holders, the former having a socket, *e*<sup>1</sup>, and the latter a socket, *e*<sup>2</sup>. In order to have the retort-tube of uniform di-  
65 ameter from end to end, the socket *e*<sup>2</sup> should be larger than that at *e*<sup>1</sup>, and in order to hold the retort at an acute angle to the supply-pipe the axis of one socket should be inclined to that of the other correspondingly.

*a*<sup>1</sup> is a valve-screw mounted in the passage  
70 *e*<sup>2</sup>, formed in the part *e*<sup>2</sup>, there being a valve-seat at substantially the usual construction for the end of the screw.

In my construction the valve which controls the flow of oil lies entirely outside of and is  
75 supported independently of the retort-tube, so that the latter is entirely free of obstruction, the whole interior chamber being utilized for oil and vapor. At *a*<sup>2</sup> there is an orifice for the withdrawal of sediment, refuse, &c., it having a plug adapted to be removed.  
80

It will be seen that the burner-tip is arranged vertically, so as to throw the flame in an advantageous manner in producing the light,  
85 and also that the valve which regulates the flame is below the upper end of the retort-tube and directly below the burner, so that it can be easily manipulated at all times.

B is the supply-pipe leading to the supply-tank C. With the lamp it will be seen that the  
90 supply-pipes connect direct with the vaporizing-tube and without an elbow, and would also be the arrangement in a stove of but one burner. When more than one burner is used, a pipe, *b*, along the front side of the stove is  
95 used to connect with the different vaporizing-tubes.

It will be seen, as in case of the lamps, there are no elbows, and that there is less pipe and fewer joints than with the vertical vaporizer  
100



and ordinary construction; also, the position of the valve is such that there is no liability of the operator being burned. With the stove the valves are in full view, so that they are  
 5 convenient and may be quickly operated, while the hand of the operator does not come in close proximity with the heated parts, and is in no danger from the overflow or from the culinary operation on the stove above. With  
 10 the inclined vaporizing-chamber, by reason of the surface of the contained fluid being oblique to the axis of the tube, a greater vaporizing-surface is exposed, and consequently a larger area, over which is distributed any recoil  
 15 caused by a sudden and rapid generation of gas within the chamber, and hence lessens the pressure at a given point—such, for instance, as on the area of the supply-pipe—and thus lessening the back-pressure on the same.  
 20 In a patent previously granted to me, No. 203,237, May 7, 1878, there is shown a small retort-pipe at right angles to the supply-pipe, the retort in that case having the same diameter as that of the supply-pipe. In the burner  
 25 there shown use was made of an emery packing in the retort, and hence there was no necessity of an enlarged chamber—that is, a chamber of such large cross diameter that the oil should act by gravity to prevent recoil,  
 30 inasmuch as the emery packing was the means depended on to prevent the recoil; but I have found the use of packing to be very objectionable, as the interstices soon become clogged with sediment, and the cleaning and repack-  
 35 ing has been found to require so much care and trouble that there has grown up great dissatisfaction with packed burners. I have succeeded in overcoming these difficulties by the devices above described. A retort-pipe simi-  
 40 lar to the supply-pipe will not answer, as it is necessary to have a large body of oil in the retort, first, so that its weight shall act as a barrier to the vapor, and, second, so that when inclined it shall present a large surface for the  
 45 evolving of vapor.

It will be seen that the duct  $e^5$ , between the retort and the reservoir, and the duct at  $f^3$ , between the reservoir and the burner, are so small in comparison to the cross area of oil  
 50 that an equilibrium is attained, the pressure of the vapor and that of the oil being equal, as the duct at  $e^5$  prevents the oil from flowing in either direction with sufficient freedom to produce rapid variations.

55 The walls of the retort-chamber are tight at all points between the inlet-orifice at E and the outlet-orifice at F, so that the pressure

produced by the vapor generated back of the exit shall remain constant, there being no vent by which this pressure can be decreased. 60

I am aware that it is not new to employ horizontal and vertical vaporizing-tubes in connection with vapor-burners, and also that it is not new to employ an inclined supply-pipe in connection with an oil-burner, and  
 65 hence I make no claim thereto; but

What I claim is—

1. In a vapor-burner, the combination of a downward-extending supply-pipe, a burner, and a tubular retort interposed between the  
 70 supply-pipe and the burner, and inclined to the horizon, substantially as set forth, to have the plane of the oil-surface intersect the lateral walls on both sides of the retort, said retort being of a diameter larger than that of  
 75 the supply-pipe and having its interior chamber unobstructed, whereby the whole of said chamber can be utilized for oil and vapor, substantially as set forth.

2. In a vapor-burner, the combination of  
 80 the downward-extending supply-pipe, a burner, a tubular retort between the supply-pipe and the burner of larger diameter than the supply-pipe and inclined to the horizon, substantially as set forth, to have the plane of the  
 85 oil-surface intersect the lateral walls of the retort on both sides, and having its interior unobstructed, a contracted passage-way between said retort and the supply-pipe, and a contracted passage-way between the retort  
 90 and the burner, the walls between the said passage-way being tight at all points, substantially as set forth.

3. The combination of the downwardly-extending supply-pipe, a tubular retort of larger  
 95 diameter than and connected to the supply-pipe, said retort being unobstructed throughout and inclined to the horizon, substantially as set forth, the connecting piece at the upper end of the retort having two sockets inclined  
 100 to each other, the burner secured to one of the said sockets and arranged, substantially as set forth, to have the flame-tip situated vertically, and the regulating valve below the  
 105 upper end of the retort, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this  
 10th day of January, 1884.

HENRY S. BELDEN.

Witnesses:

NAT. G. WORTH,  
 B. C. GOODWILL.