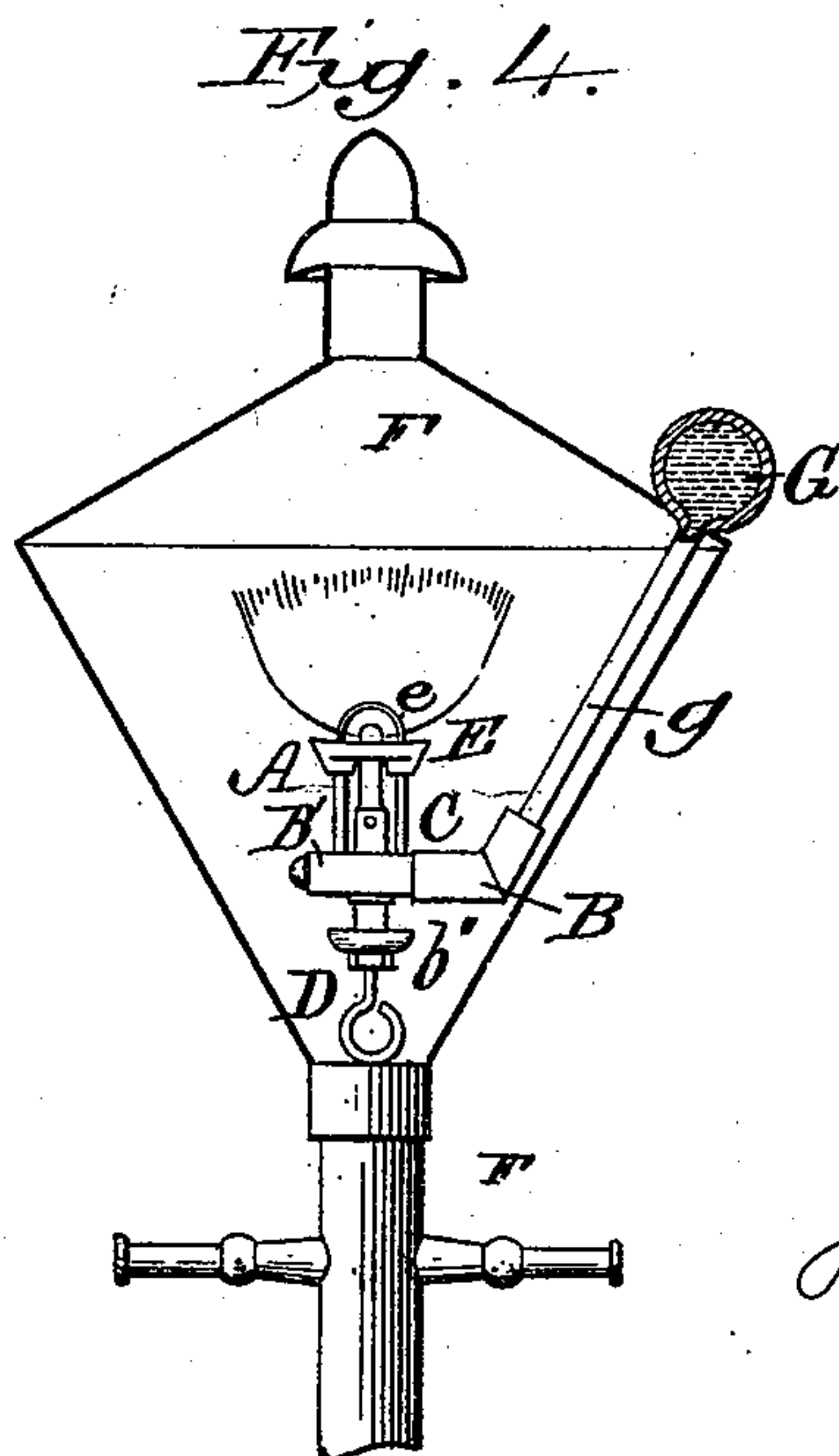
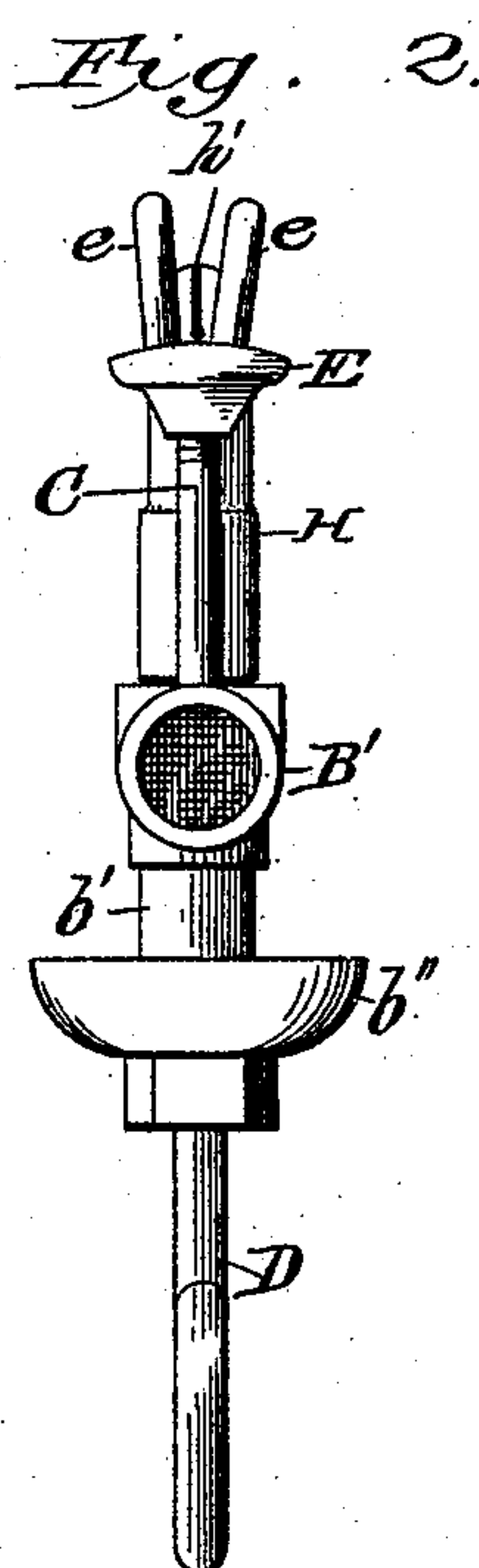
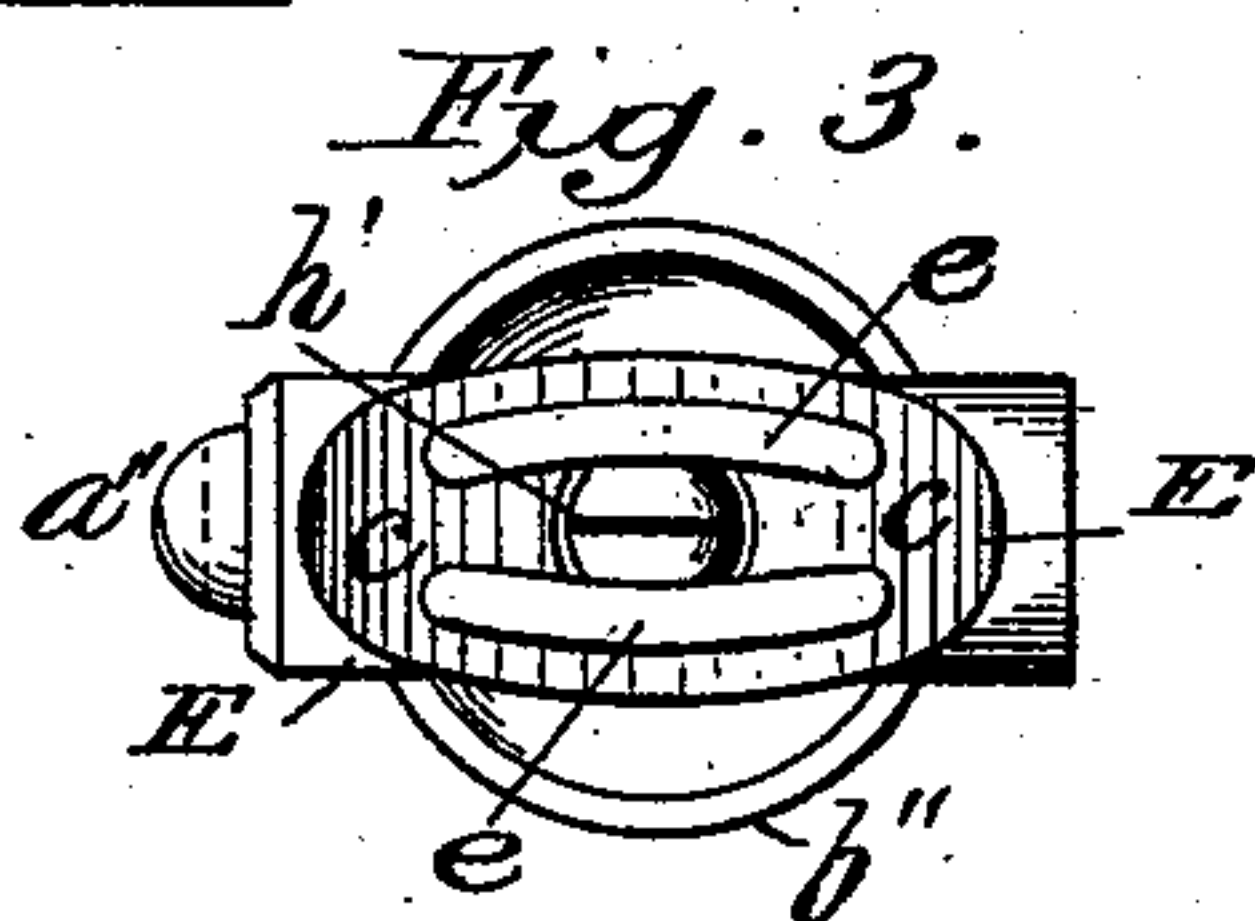
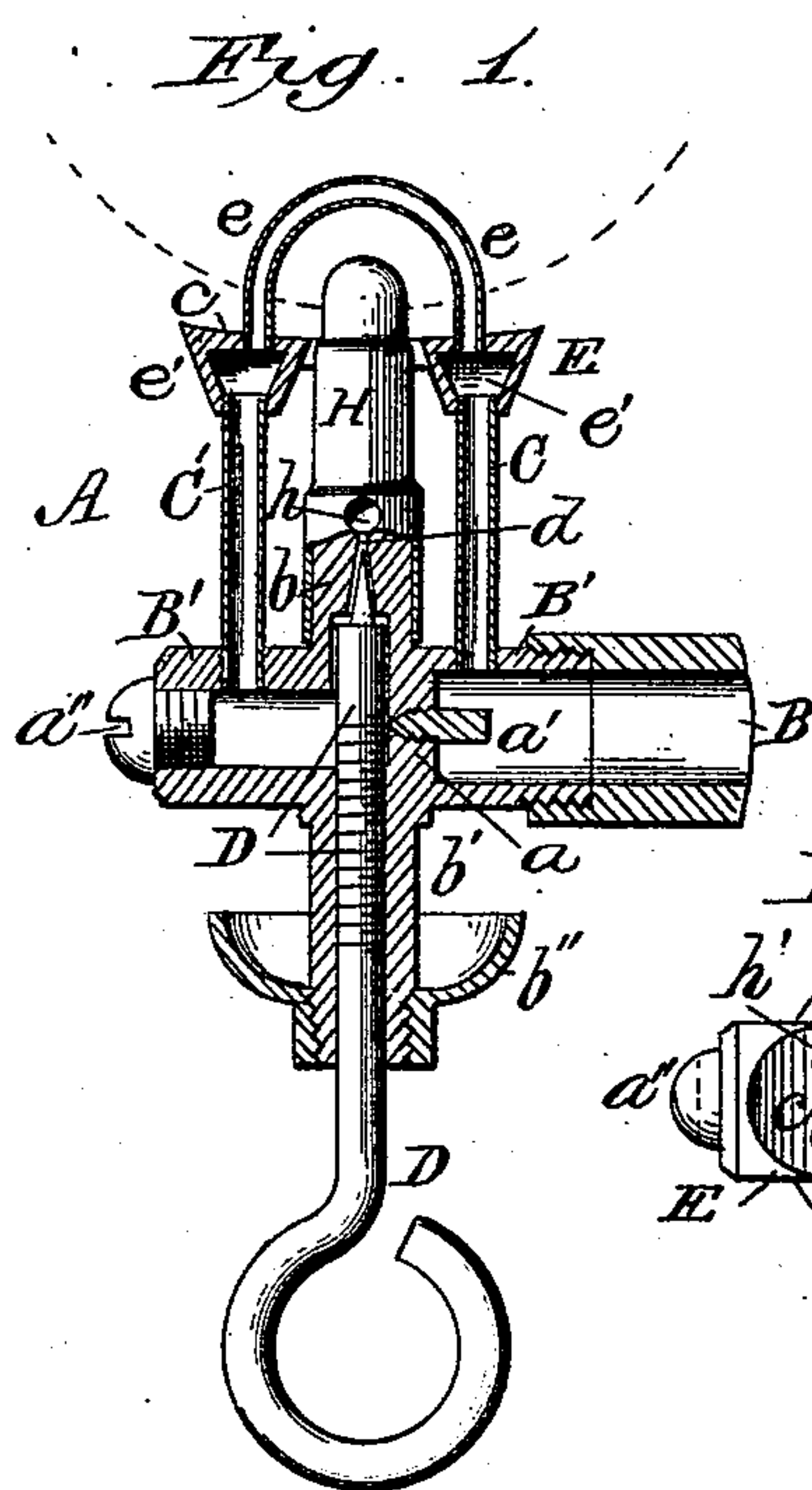


(No Model.)

J. S. WOOD.
VAPOR BURNER.

No. 483,885.

Patented Oct. 4, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

JOSEPH S. WOOD, OF PHILADELPHIA, PENNSYLVANIA.

VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 483,885, dated October 4, 1892.

Application filed May 17, 1892. Serial No. 433,332. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH S. WOOD, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful 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 appertains to make and use the same.

This invention relates to an improved burner adapted for vaporizing light hydrocarbon liquid and burning the resulting vapor, so as to produce an illuminating-flame of the desired candle-power and a steady brilliant light.

My burner is more particularly adapted for use in street-lamps, but may be advantageously used in other places and under other conditions for lighting and heating.

My burner is so constructed as to form a small vapor-generator which can be readily started and lighted and in which the size of the flame is regulated by means of a needle-valve which may be opened to supply the orifice of the burner with vapor or be closed to shut off the supply of vapor from said orifice. In practice, however, I do not entirely close the needle-valve; but instead of entirely extinguishing the flame when it is desired to turn down the light I leave a minute opening at the needle-valve, so that a small stream of vapor shall flow to the burner-orifice and produce a small flame, just sufficient to keep the burner warm or hot, so that the full supply of vapor may at any time be turned on and a bright flame instantly produced. My vapor generating and burning device is thus made as convenient and effective in use as gas for illuminating purposes and is especially advantageous for street-lamps. A suitable hydrocarbon liquid is supplied under pressure to the burner from a reservoir at the upper part of the lamp when the burner is applied to an ordinary street-lamp. Evidently the hydrocarbon liquid may be supplied to the burner from any conveniently-elevated oil tank or reservoir, or the oil could be forced up to the burner from a tank below it by means of air-pressure in a well-known manner.

The improvements constituting my invention will be defined in the claims.

I will now describe my burner in detail by reference to the accompanying drawings, in which—

Figure 1 represents a vertical section of the burner device through the heating and vaporizing pipes. Fig. 2 represents an end elevation. Fig. 3 represents a top plan view. Fig. 4 represents the burner device applied to a street-lamp provided with an oil-reservoir.

The body of the vaporizing device in my burner may consist of a metallic casting composed of the horizontal tube B', provided with an upwardly-extending boss *b* and a downwardly-extending boss or stud *b'*, which is screw-threaded at its lower end and has applied to it the alcohol-cup *b''*. The boss *b* is made hollow and is provided with a narrow conical orifice *d*, which forms an escape-passage for the hydrocarbon vapor and a seat for the needle-valve D. The burner-tip H is supported by the boss *b*, and such tip is provided with the lateral air-port *h*, just at the mouth of the conical orifice *d*, and with an end slot *h'*. By means of the lateral ports *h* air is drawn in by the jet of vapor escaping through orifice *d* and mixed with such vapor as it flows to the burner-opening of slot *h'*. The boss or stud *b'* is made hollow and is internally screw-threaded for receiving the screw-threaded shaft of the needle-valve D. The horizontal tube B' of the vaporizer is provided at about its middle portion with a transverse partition *a*, which may be perforated and provided with a short conical valve-plug *a'*, and the outer end of said tube B' is closed by the screw *a''*. On each side of the partition *a* I set into the tube B' the vertical tubes or columns C C', and connect with the upper ends of said columns the hollow flame-spreader and heater E. The vertical tubes C C' may be screw-threaded at both ends and screwed at the bottom into tube B' and at the top into the flame-spreader E, or they may be secured to such parts in any other convenient manner. The flame-spreader E is preferably made elliptical in shape, as shown in Fig. 3, and has a dished or concaved upper surface *c* for spreading the flame and effectively conducting the heat therefrom to the vaporizing-tubes

C C' and *e e*. It is provided with a central opening for the passage of the burner-tip H, and is made hollow at its ends, so as to form vapor-chambers *e' e'*.

5 Into the top of the flame-spreader and vapor-heater E are set the two bow-shaped tubes *e e*, corresponding in shape very nearly to the rounded end of the burner-tip and connecting on opposite sides with the chambers *e' e'*.
 10 These tubular bows *e* form superheating-passages for the vapor which passes up through tube C and is thence conducted down through tube C'. They also serve for heat-conductors, since they are arranged close to the hottest
 15 part of the flame and connect with the flame-spreader and heater E, which latter effectively conducts the heat to the vertical tubes C C'. Since the tubular bows *e* are short, as shown in the drawings, and are rigidly con-
 20 nected to the heater E, they are not liable to be bent out of place and disarranged, as has been the case with certain yoke-shaped tubes heretofore proposed in vapor-burners.

My tubular bows *e* have given quite satis-
 25 factory results in practice, whereas the long yoke-shaped tubes heretofore tried in my vapor-burner were frequently bent out of place by the workmen and rendered the burner device defective and inoperative.

30 My vaporizing-burner may be readily placed in a street-lamp F, which is provided at the top with an oil-reservoir G, and such reservoir connects by a pipe *g* with the elbow-coupling B, which connects with the horizontal
 35 tube B' of the vaporizer, as shown in Fig. 4. In practice the oil-supply tube *g* is preferably placed in one corner of the lamp, and the burner is arranged centrally in the lamp and
 40 securely connected to the supply-tube *g* in proper position for conveniently turning its needle-valve D. The lamp F is secured to the top of the post T in a well-known manner.

In order to start the vaporizing and burning device, a small quantity of alcohol is
 45 burned in cup E for the purpose of heating up the horizontal tube B' and tubular columns C C', &c. This preliminary heating of the device vaporizes the oil which is supplied through tubes *g* and B, so that the burner
 50 may now be supplied with hydrocarbon vapor. The needle-valve D is now opened, permitting the vapor to flow up tube C through chamber *e'*, thence through the superheating-bows *e*, and thence down through the other chamber
 55 *e'* and tube C' to the conical orifice *d*, through which it escapes in a jet, which acts as an injector to draw in a suitable proportion of air through the port *h*. The mixture of hydrocarbon vapor and air then escapes through the slot

h' of the burner-tip, where it is ignited, producing a large brilliant flame. The flame passes in contact with the concave surface of the spreader E, highly heating the same, and also heats the tubular bows *e*, and these parts conduct heat to the tubular vaporizing-columns
 65 C C', by means of which the hydrocarbon liquid is thoroughly converted into a vapor or fixed gas. The flame lies upon the concave face of the spreader E, and is thereby prevented from flickering, so that a steady light
 70 is produced.

When it is desired to generate a vapor or fixed gas, as above described, the screw *a'* in partition *a* is closed; but should it be desired to feed a small supply of oil directly to the
 75 burner-tip the screw *a'* may be opened, and the oil thus supplied to the device will be wholly or partially vaporized before flowing to the orifice *d* of the burner-tip.

By reason of the effective heating qualities
 80 of this device I can use naphtha of 70°.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In combination with the body of the va-
 85 porizing device provided with a jet-orifice and needle-valve and also having a transverse partition, the tubular columns, one on each side of said partition, and the hollow closed flame-spreader and gas-heater connecting
 90 with the upper ends of said columns, substantially as described.

2. The body of the vaporizer provided with a jet-orifice, a needle-valve, and a transverse
 95 partition, in combination with tubular columns, the hollow flame-spreader and heater connecting with such columns, the tubular bows connecting with said spreader, and the burner-tip, substantially as described.

3. In a vapor-burner, the short tubular
 100 bows, in combination with a hollow flame-spreader and gas-heater and suitable hollow connections with the body of the vaporizer, substantially as described.

4. The body of the vaporizer provided with
 105 a jet-orifice, a needle-valve, and a transverse partition, said partition having an opening, in combination with screw *a'* and tubular heating columns and bows connecting on each side of the said partition, substantially as de-
 110 scribed.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH S. WOOD.

Witnesses:

JOHN H. REFORD,
 GEORGE W. SELTZER.