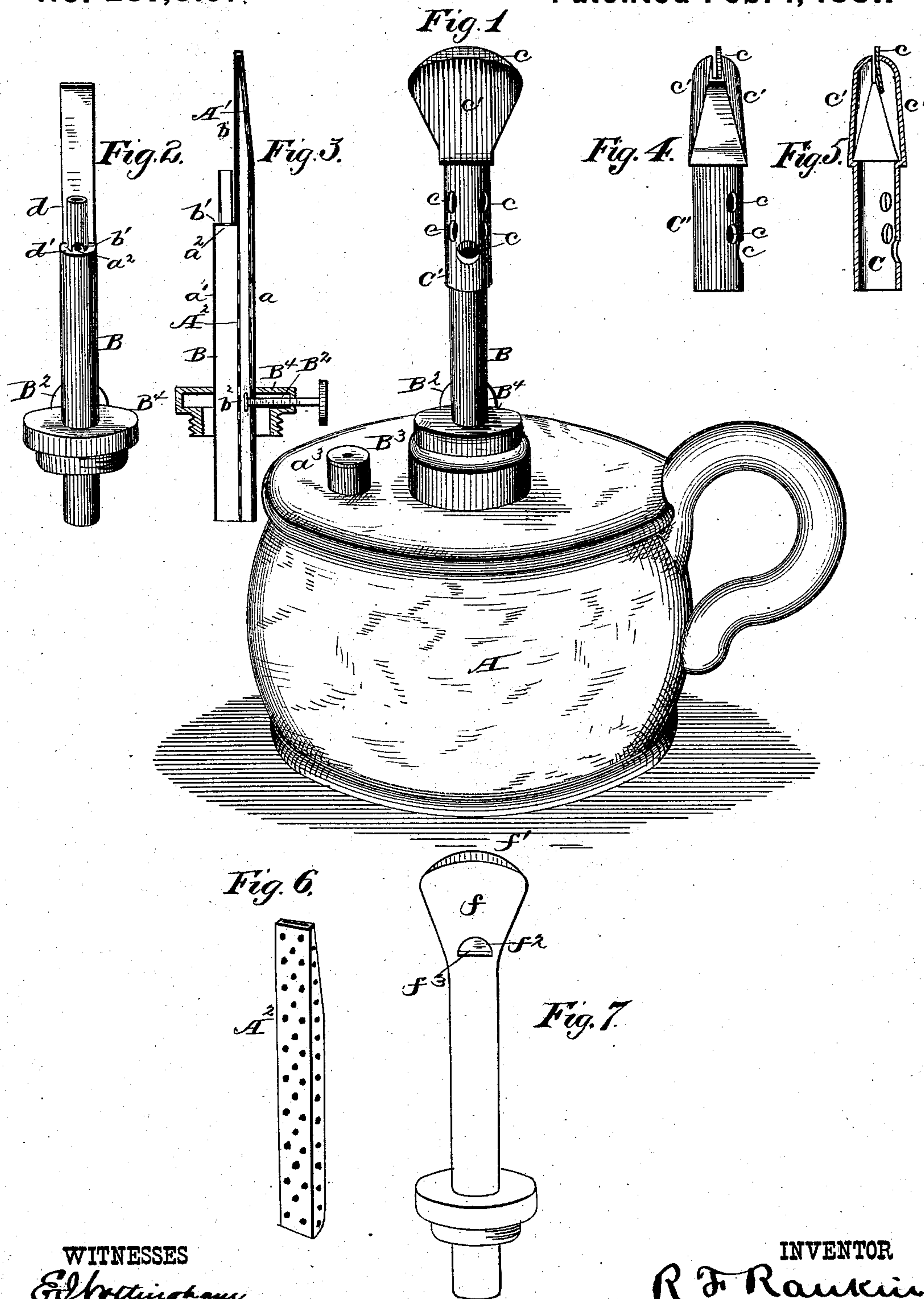


(No Model.)

R. F. RANKIN.
Vapor Burner.

No. 237,319.

Patented Feb. 1, 1881.



WITNESSES

Edw. Cunningham

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RANSOM F. RANKIN, OF COLUMBUS, OHIO, ASSIGNOR OF TWO-THIRDS TO JOHN W. BAKER, CHESTER MINOT, AND EBEN P. SARGENT, OF SAME PLACE.

VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 237,319, dated February 1, 1881.

Application filed November 12, 1880. (No model.)

To all whom it may concern:

Be it known that I, RANSOM F. RANKIN, of Columbus, in the county of Franklin and State of Ohio, 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to an improvement in vapor-burners, and is designed to provide an apparatus for vaporizing liquid hydrocarbons and burning the vapor so generated, which shall be of simple construction, composed of few parts, easily operated, insuring perfect combustion of the vapor, and one which may be manufactured and supplied to the trade at a comparatively light cost.

With these ends in view my invention consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of a vapor-burner constructed in accordance with my invention, and in connection with an oil-receptacle. Fig. 2 is a view of the wick-tube and gas-chamber, with the combustion-chamber removed. Fig. 3 is a view in vertical section of the said wick-tube and gas-chamber. Fig. 4 is a side view of the combustion-chamber. Fig. 5 is a view in vertical section of the same. Fig. 6 is a view of the wick-holder; and Fig. 7 is a perspective view of a modification of a combined wick-tube, gasometer, and combustion-chamber.

Let A represent an oil-receptacle, and B a combined wick-tube and gasometer attached thereto, after the same fashion that ordinary wick-burners are secured to the oil-reservoir from which their flame is supported. The wick and gas tube B, which is preferably constructed of thin metal in order that it may be easily heated to vaporize the hydrocarbon held in suspension in the wicking inserted in the projecting arm and the rear portion of the

tube, is formed of two semi-cylindrical parts or sections, $a\ a'$, brazed or soldered together, and constituting a perfect cylinder, the upper portion of which is vertically bisected, and then transversely cut half through by a line meeting the bisecting line. The semi-cylindrical portion so cut out is then removed, and a very thin metallic plate, b , is brazed or soldered to the projecting arm A' of the tube B, said plate forming the wall or back of the combustion-chamber. Another thin plate, b' , is then secured in a similar manner over the opening formed by transversely cutting the section a' of the tube B. Plate b' thus formed, and constituting the upper covering of the gas-chamber, is designated the "gas-chamber step," and is provided with a minute aperture, a^2 , through which the vapor generated in the gas-chamber thereunder is admitted into the combustion-chamber, to be hereinafter described. The wick and gas-tube, as it now stands, consists in a tube, B, hollow projecting arm A' , having a thin wall-plate, b , and a gas-chamber step, b' , having a minute perforation, a^2 . The rear portion of the gas-tube B and its projecting arm A' , or the whole of the half a of the tube B, is filled with any suitable wicking, the front portion of the tube under the gas-chamber step b' being left empty to form a chamber for the gas or vapor, which for the most part is generated in the projecting arm A' of the tube B. In short tubes and those of small diameter the wicking will be retained in the tubes and their projecting arms without auxiliary support; but in large tubes the weight of the saturated wick will be liable to cause its withdrawal from the projecting arm of the tube, and hence stop the generation of gas therein. To obviate this difficulty the wick may be incased in a semi-cylindrical perforated receptacle, A^2 . (Shown in the drawings in Fig. 6.) This device will hold the wick in place, and in no way interfere with the vaporization of the oil suspended in the wick packed therein. An annular rim, B^4 , formed at the lower end of the tube provides bearing for a regulating device, consisting of a screw, B^2 , provided at its inner end with a small disk or plate, b^2 , which may be manipulated through the screw to compress the wick, as desired,

and thus regulate the amount of oil drawn up into the wick within the tube B. It is also advisable to pack the extreme lower end of the tube B, together with its annular rim B⁴, tightly with wicking, in order that the gas may be prevented from forcing itself into the oil receptacle or vessel A. To further provide against a possible explosion from gases generated in the receptacle A, arising from a super-heating of the tube B, the filling-cap B³ is perforated at *a*³, thus allowing all gases to escape in case they should be generated.

The combustion-chamber C, which is seen in Fig. 1 of the drawings, consists of a cylindrical sleeve, C', having two fan-shaped concave spreaders, *c' c'*, attached to its upper end. One of the said spreaders is provided at its upper edge with a flange of some character, formed either by bending the edge of the spreader or of brazing a thin sheet of metal thereto, as shown at *c* in the drawings. The design of this flange is to spread the flame and control the amount of gas burned at this point. The spreader-plates being of thin metal, they can be bent to form a wide or narrow opening at their upper extremities. In most instances, however, when a thin and lambent flame is desired, the spreaders should be nearly closed. The combustion-chamber proper, consisting of the cylindrical sleeve C', is adapted to fit over the projecting arm A', and over the upper end of the gasometer and wick-tube B. A semi-cylindrical tube, *d*, is secured to the gas-chamber step, the lower outer edge of the said tube being perforated at *d'*, to admit air to the stream of vapor as it is projected from the perforation in the gas-chamber step. The design and operation of this device is to thoroughly mix the vapor with air before it is ignited, thus insuring a better flame. The front half of the combustion-chamber is also perforated at *c c c c*, to admit a full supply of air to the flame, that it may never smoke; for that there is not a sufficient quantity of oxygen to support combustion.

It will be seen that the construction of the combustion-chamber is such that it may be easily adjusted and adapted to be easily removed to be cleaned when desired.

It is also apparent that any suitable or desirable spreading device may be attached to the upper end of the combustion-chamber proper without departing from the spirit of my invention.

Having thus described the component parts of my improved vapor-burner, I will now proceed to briefly describe its manner of operation.

The first thing to be accomplished is the conversion of a portion of the oil suspended in the wick within the wick-tube to vapor to start the illuminating-flame, which, after having been once obtained, will fill the twofold function of lighting and supplying the vapor necessary to its own life. This is done by applying a burning taper to the wick-tube, or preferably to the projecting arm thereof, which, as before described, is of very thin

sheet metal, and may be heated sufficiently to vaporize enough oil to start a fine stream of vapor flowing through the perforated step by the momentary application of any burning substance, a match sufficing therefor. The vapor being ignited, it will burn in the combustion-chamber, and also a thin lambent flame will issue from the top and sides of the spreader.

It will be understood that the vapor burns within the combustion-chamber, and therefore heats the thin wall of the projecting arm of the wick-tube, which in turn heats and vaporizes the oil suspended in the wick contained therein.

Instead of constructing the combustion-chamber separate from the wick-tube and gasometer, I may combine them all in one piece, as shown in Fig. 7 of the drawings. In this modified construction, after vertically bisecting a tube formed of two semi-cylindrical pieces, with flaring or fan-shaped upper ends, *f f'*, and brazing on pieces of metal *f² f³*, corresponding to the thin wall-plate *b* and gas-chamber step *b'* of the first-described construction, that piece which was cut from the upper end, *f*, of the front half of the tube is brazed on in its original place. This latter piece is perforated for the admission of air thereto, and the combustion of the vapor in this modified burner takes place between the wall-plate *f²* and the inner concave face of the piece *f*.

I would have it understood that I do not limit myself to the exact construction shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a vapor-burner, the combination, with a combined wick-tube and gas-chamber consisting of a cylindrical tube having a projecting arm, of a combustion-chamber consisting of a perforated cylindrical sleeve having fan-shaped spreaders attached to its upper end, substantially as set forth.

2. In a vapor-burner, the combination, with a combined wick-tube and gas-chamber consisting of a cylindrical tube having a projecting arm, of a combustion-chamber consisting of a perforated cylindrical sleeve having fan-shaped arms attached to its upper end and a flange to divert the flame formed integral with or attached to the upper edge of either or both of the said fan-shaped spreaders, substantially as set forth.

3. In a vapor-burner, a combined wick-tube and gas-chamber, consisting, essentially, in a cylindrical tube having a projecting wick-containing arm, the side and top respectively of the wick-tube and gas-chamber being formed by thin metallic plates, substantially as set forth.

4. In a vapor-burner, the combination, with

a combined wick-tube and gas-chamber, consisting, essentially, in a cylindrical tube having a projecting arm, the side and top respectively of the wick-tube and gas-chamber being formed
5 by thin metallic plates, the plate forming the top of the gas-chamber being perforated, of a semi-cylindrical tube having a perforation in its lower outer edge, and mounted on the top
10 of the gas-chamber, with its convex face outward, substantially as set forth.

5. In a vapor-burner, the combination, with a wick-tube and gas-chamber consisting in a cylindrical tube having a projecting arm, of a semi-cylindrical perforated wick-holder adapted
15 to be received in the wick-tube, and the projecting arm thereof to hold the wick against displacement therein, substantially as set forth.

6. In a vapor-burner, the combination, with a combined wick-tube and gas-chamber, of a semi-cylindrical wick-tube adapted to be received in the wick-tube, and projecting arm
20 thereof to hold the wick against displacement therein, and devices to regulate the amount of oil drawn up into the wick, consisting, essentially, of a plate located within the wick-holding tube and attached to a screw operated
25 from the exterior thereof, whereby the plate may be operated to compress or not, as desired, the wicking in the tube, substantially
30 as set forth.

7. In a vapor-burner, the combination, with a wick-tube and gas-chamber consisting of a cylindrical tube having a projecting arm, of a combustion-chamber consisting of a perforated
cylindrical sleeve and a pair of fan-shaped
35 spreaders attached to the upper end of the said sleeve, substantially as set forth.

8. In a vapor-burner, the combination, with a wick-tube and gas-chamber consisting of a cylindrical tube having a projecting arm, of a
wick-holder, a semi-cylindrical tube mounted
40 on the gas-chamber step, a screw-and-plate device for regulating the amount of oil drawn into the tube, and a combustion-chamber consisting of a perforated cylindrical sleeve, a pair
45 of fan-shaped spreaders attached to the upper end of the said sleeve, and a flange to divert the flame attached to or formed at the upper inner edge of either of the flame-spreaders,
50 substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 11th day of September, 1880.

RANSOM F. RANKIN.

Witnesses:

ELLIOTT B. BLISS,
MARIEL W. BLISS.