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D. H. CARPENTER.
VAPOR LAMP BURNER.

Fig.1.

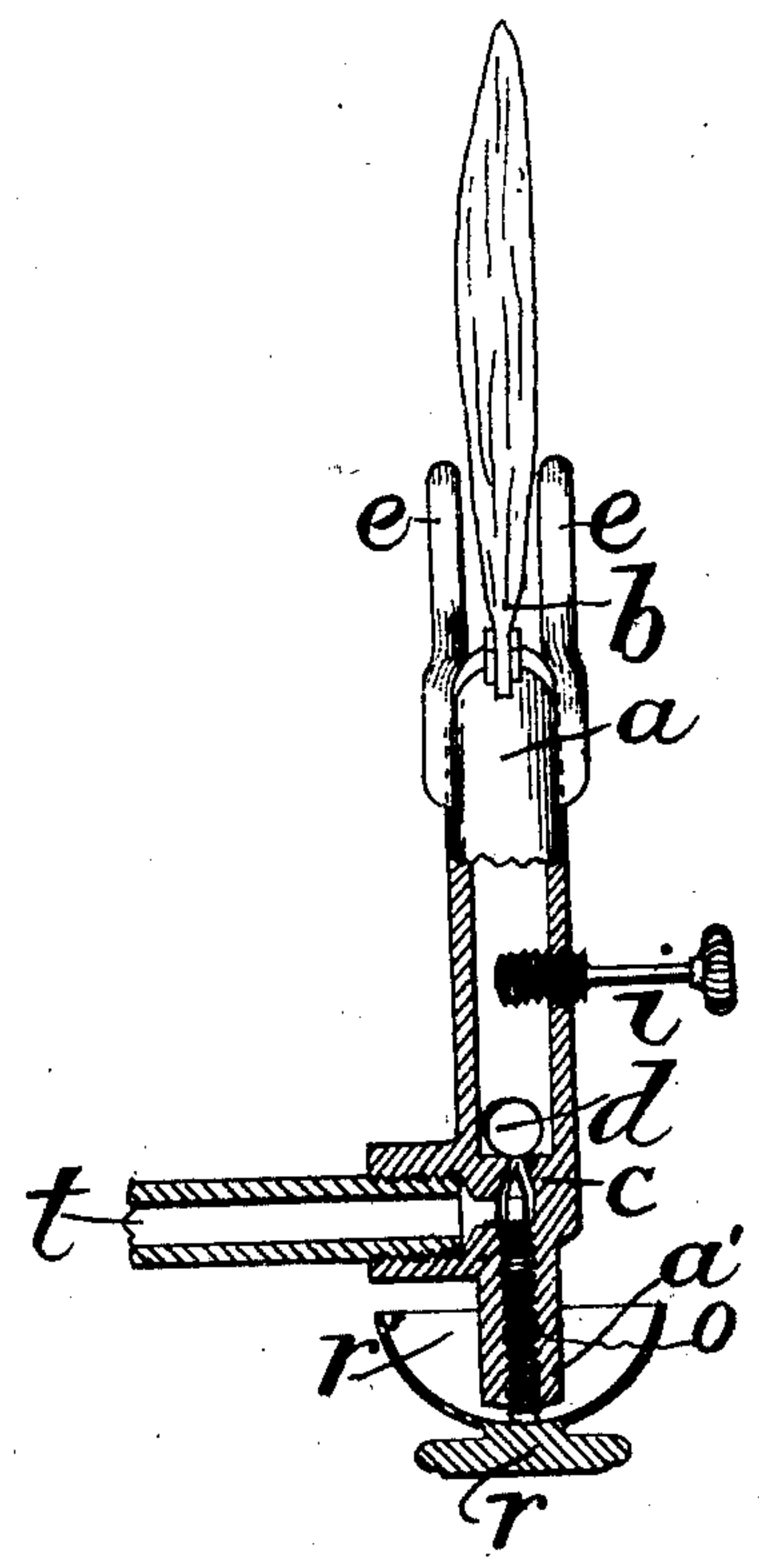
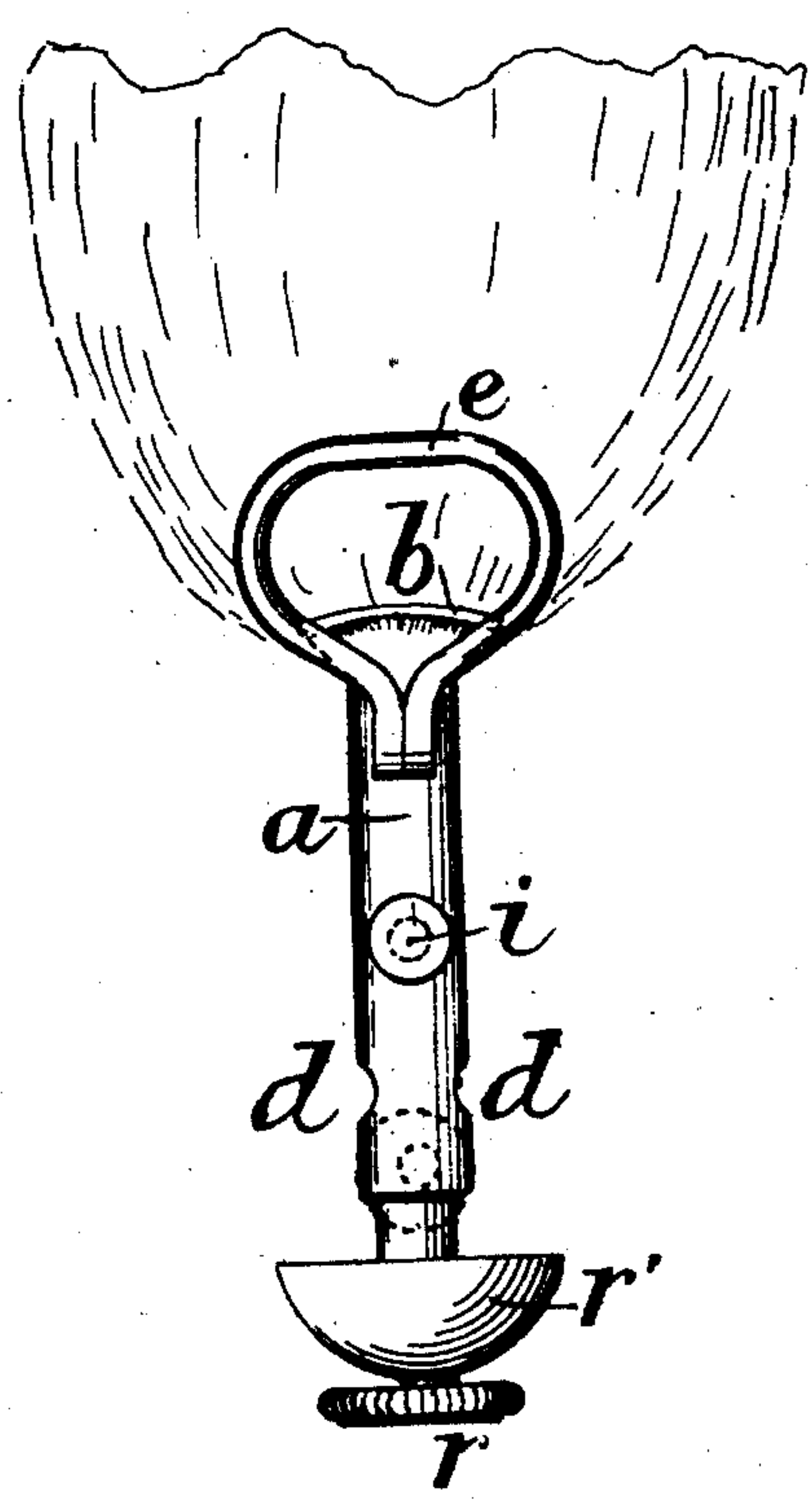


Fig.2.



UNITED STATES PATENT OFFICE.

DANL. H. CARPENTER, OF NEW YORK, N. Y.

VAPOR-LAMP BURNER.

Specification of Letters Patent No. 20,324, dated May 25, 1858.

To all whom it may concern:

Be it known that I, DANIEL H. CARPENTER, of New York, county of New York, and State of New York, have invented certain
5 new and useful Improvements in Vapor-Burners; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the annexed drawing, making a part of this
10 specification, in which—

Figure I is a side elevation partly in section. Fig. II is a front view, and similar letters indicate similar parts in both the figures.

15 This invention is an improved self generating gas burner, and is intended for employing essential oils, such as camphene, naphtha, and like fluids rich in carbon, for producing artificial illumination said burner
20 being intended as an improvement upon that for which Letters Patent No. 17,916 were granted to me; and the first part of my said improvement consists in attaching to the head of the burner two heat conductors
25 which are capable of being adjusted so as to vary and regulate the proper amount of heat to be produced in the burner to maintain the due vaporization of the hydro-carbon fluid without interfering with the
30 flame.

The second part consists in an improved method of regulating the admission of atmospheric air in the mixing tube, whereby the proper diluting of the hydro-carbon
35 vapor is accomplished in a ready manner, near the place of its combustion; thirdly, in an improved construction and working of the valves for regulating the flow of the gas-making material to the burner.

40 The body of the burner consists of a straight tube, as seen at (a), having its upper end flattened and arched over, and otherwise shaped to form a deep slot through which the gas is to issue and be consumed in
45 a flat flame similar to that known as the "batswing" in the coal-gas burners. The comparative size of aperture is however quite different, which difference is rendered necessary by reason of the much larger volume of gas which passes in my kind of
50 burner, the shape of said slot being seen at (b). The bottom of the tube (a) is closed, with the exception of a very small hole for the passage of the vapor generated from
55 the camphene or other fluid used. The bottom forms the seat of the valve for regulat-

ing the flow of said vapor, and has a hole made conical beneath, as seen at (c) Fig. I. At (d) are two air holes, situate at the base of the burner, as shown.

30 My improved heat conductors are shown, by an end and a side view, as at (e). Each consists of a bow of metal (and copper wire is a suitable material from which to make them) having its two ends brought
35 down and bent so as to lie together, thus forming the part for attaching the conductor to the tube of the burner, which attachment may be effected by brazing. A pair of conductors so formed is thus fastened on opposite
40 sides of the orifice, and so that they will stand parallel thereto and above the level of the orifice (b) about two thirds or three quarters of their diameter. The gas
45 when ignited will burn in a thin stratum between the said conductors, although extending out beyond them. It will be seen therefore that they receive heat from both
50 sides of the flame, and conduct the same down upon the tube. The mode of regulating the amount of heat (which in this kind of burner requires nicety of adjustment) is by bending the tops of the bows
55 toward or away from the flame, thereby obtaining more or less according to its contiguity thereto. The mixing of the vapor with air in certain proportions is necessary in order to be able to make the combustion
60 so complete as to prevent the deposit of carbon. This mixing must be in certain proportions, the character of the flame being determined by it.

My improved method consists in the introduction of the screw plug or stop (i) placed in the side of the tube (a), as
65 shown. The screwing in and out of this will regulate the amount of air which may be mixed with the spirit vapor, and which will affect the light, as above stated.

The maintenance of a very small aperture
70 in the bottom (c) is of prime necessity in order to insure correct working, for in no case must these be allowed to pass above a certain quantity of vapor, from which as a
75 maximum the opening must be governed to regulate the various degrees of flow. Two things are requisite; the one is that the opening shall be preserved free from obstructions, to which on account of its small
80 size it is liable, becoming sometimes clogged either with incrustation or dust, or both; and the other is to guard against the seat of
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the screw-valve becoming unduly enlarged. The first of these is accomplished by having the point of the stopper or valve so sharp as to cause it to pass entirely through the hole at each time of closing off the gas, so that on being the next time withdrawn a clear hole shall always be left; but as the valve is liable to be constantly screwed hard on its seat, it must, of necessity, soon wear a larger hole, which would damage the burner. To prevent this is the object of the third feature of my improvement.

At (*o*) is the screw-plug or valve, having a tapering head to fit the conical seat (*c*) as shown in Fig. I. At the bottom the screw is turned by a button (*r*) and cup (*r'*) for holding the igniting fluid (alcohol). The length of the screw is such that so soon as the valve is fairly in its seat its further progress shall be arrested by the bottom of the cup striking against the bottom of the tube at (*a*). Thus the force applied to the screw by a careless operator is harmless being received upon the said end (*a'*).

The operation will be as follows: The burner is to be attached to the pipe (*t*) leading to the reservoir of camphene or other suitable fluid, which reservoir should be elevated a proper distance above the discharge aperture (*e*) to get a due pressure. The tube (*a*) together with the bottom (*c*) and part of (*t*) where it joins must be in the first place heated to the necessary degree to vaporize the fluid. This is readily done by pouring a little alcohol into (*r'*) and setting it on fire; so soon as heat is generated unscrew the valve from (*c*) by the button (*r*) and at the same time apply a light at (*b*) which will ignite the vapor. If (*i*) is screwed entirely in it will leave still a passage for vapor and air, but the proportion of the latter will be too small in that position to prevent smoke. It is therefore to be unscrewed until the color of the flame is as bright as wanted and until the smoke ceases. Several shades of flame may thus be obtained, viz: from a dingy yellow up to a

bright white light, which latter of course indicates complete combustion of all the elements. As the vapor passes through (*c*) in a strong jet it induces an upward current in the tube (*a*) and this is the cause of air entering at (*d*). As the stop (*i*) is closed the force of this upward current is checked, and thus less or more air is made to enter (*d*) according to position of that stop. The amount of light is also dependent upon the quantity of vapor allowed to pass (*c*); the opening of the stop (*o*) is therefore equivalent to the opening of an ordinary gas cock, since it regulates the consumption of the material. The adjustable conductors act to maintain the required heat in the tubes, which must be enough to keep the bottom also so hot as to resolve the oil into vapor as fast but no faster than needed for the maximum light, because an excess of heat deteriorates the materials. The adjustment is nicely obtained by bending the said conductors to or from the flame, as before stated, whereby this result is readily accomplished. By regulating for the maximum amount of light all light less than that may be governed in proportion.

I claim—

1. The device herein described of regulating the quantity of air to be mixed with hydrocarbon vapor consisting of the screw-stop placed in the tube at such distance below the exit aperture as shall leave the requisite space for the mixing of the gases before reaching said aperture.

2. I also claim the herein described improvement in the construction of the valve for the vapor passage, whereby the said passage is kept free at all times, without increasing the size thereof substantially as set forth.

In witness whereof I have hereunto subscribed my name.

DANIEL H. CARPENTER.

In presence of—

I. P. PINNSEN,
S. H. MAYWARD.