

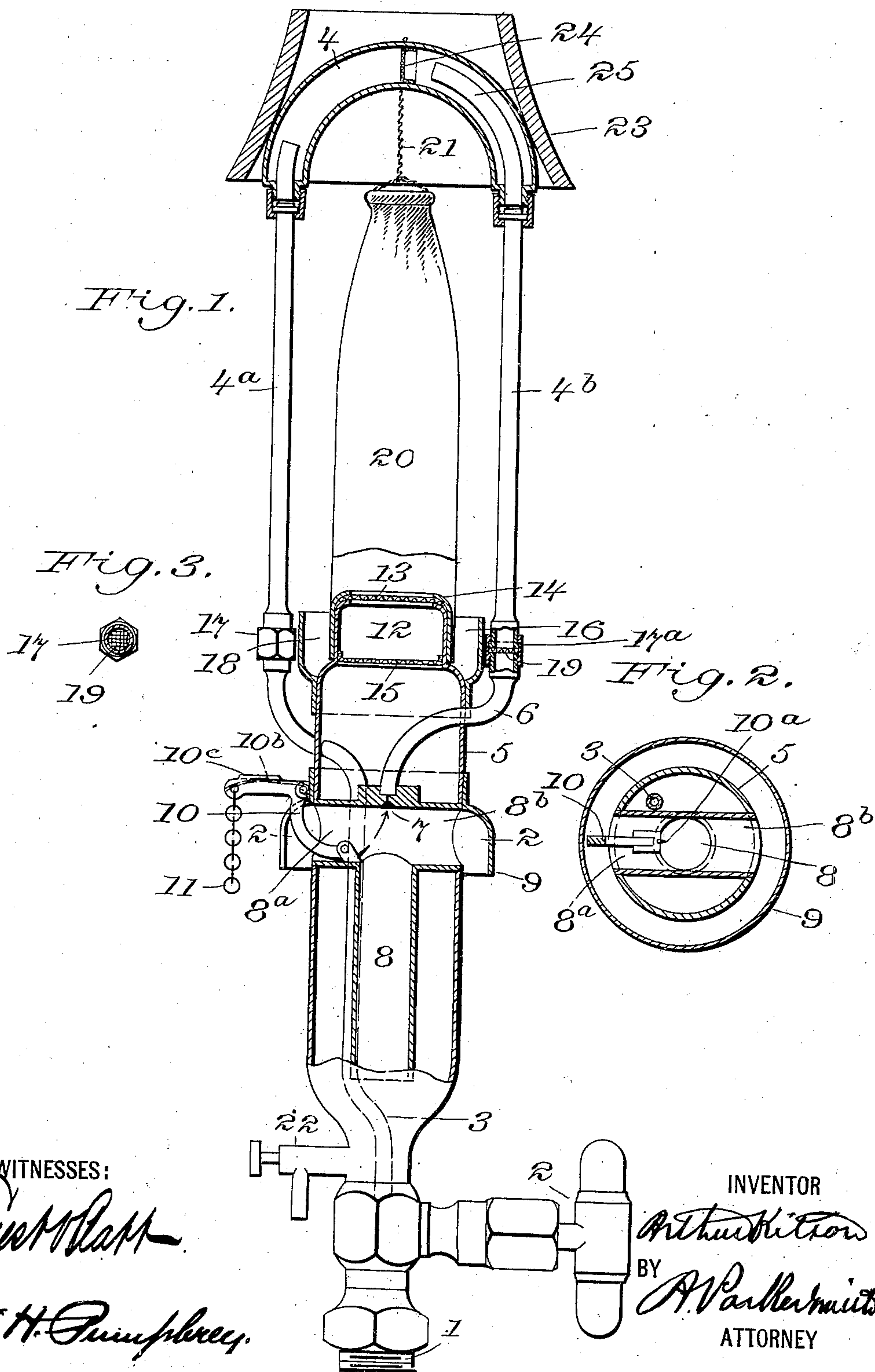
No. 663,678.

Patented Dec. 11, 1900.

A. KITSON.  
VAPOR BURNING APPARATUS.

(Application filed Apr. 29, 1899.)

(No Model.)



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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KITSON HYDROCARBON HEATING AND INCANDESCENT LIGHTING COM-  
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## VAPOR-BURNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 663,678, dated December 11, 1900.

Application filed April 29, 1899. Serial No. 714,982. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR KITSON, a sub-  
ject of the Queen of Great Britain, and a resi-  
dent of Philadelphia, county of Philadelphia,  
5 State of Pennsylvania, have invented certain  
new and useful Improvements in Vapor-Burn-  
ing Apparatus, of which the following is a  
specification.

My invention relates to vapor-burning ap-  
10 paratus, and is more specifically designed to  
produce an improved form of single-burner  
apparatus for burning the vapor of kerosene  
or other fluid hydrocarbon mixed with air un-  
der the ordinary form of incandescent mantle.

15 The preferred form of my apparatus is illus-  
trated in the accompanying sheet of drawings,  
in which—

Figure 1 is an elevation and partial section  
of my apparatus. Fig. 2 is a cross-section on  
20 line 2 2 of Fig. 1. Fig. 3 is a cross-section  
through the oil-supply tube and union, show-  
ing the wire-gauze diaphragm located at the  
junction of the vaporizing-tube with its con-  
necting-tubes.

25 Throughout the drawings like reference-  
figures refer to like parts.

The lamp is preferably mounted on a res-  
ervoir or bowl (not shown) containing oil and  
compressed air, it being screwed into said  
30 bowl by the threaded nipple 1. A valve 2 con-  
trols the flow of oil from the bowl through the  
oil-supply tube 3 to the vaporizing-tube 4,  
which is preferably made in the shape of a  
U or horseshoe, so as to extend up alongside  
35 of and across the top of the incandescent  
mantle 20, said incandescent mantle being  
supported from the vaporizing-tube by the  
wire 21 or other convenient means.

23 is a short chimney mounted on the up-  
40 per portion of the vaporizing-tube, and 22 is  
a drip-valve in the lower part of the burner  
apparatus. This burner and air-mixing ap-  
paratus is all mounted on or within the up-  
right tube 5. The vapor is carried from the  
45 end of the vaporizing-tube by the vapor-dis-  
charge tube 6 into the tube 5 and discharged  
through the outwardly-flaring opening 7 into  
the upper end of the mixing-tube 8. This  
mixing-tube is of less diameter and length

than the upright tube and is located, pref- 50  
erably, concentric therewith.

Air-conduits 8<sup>a</sup> 8<sup>b</sup> extend in through the  
walls of the upright tube 5 and lead to the up-  
per end of the mixing-tube 8. A bell-shaped  
muffler 9 overhangs the openings to these 55  
air-conduits, and on said muffler or on other  
pivotal bearing supported by the upright  
tube 5 is pivoted the vibrating arm 10, which  
carries the needle 10<sup>a</sup> at its inner end,  
adapted to enter the discharge-opening 7 for 60  
cleaning the same of accumulated material  
whenever the arm 10 is vibrated by pulling  
on the chain 11, connected to its outer end.

The spring 10<sup>b</sup> is mounted on the support-  
ing-frame work and engages the lever 10 by 65  
means of the lug 10<sup>c</sup> thereon or equivalent  
arrangement and operates to normally hold  
the said swinging lever in position shown in  
Figs. 1 and 2, so as to withdraw the needle  
from the discharge-orifice and also to one side 70  
of the line of discharge.

12 represents the burner proper, which is  
formed by contracting the upper end of the  
main tube 5 or by inserting a thimble there-  
in. The gauze 13 is placed over the burner- 75  
opening and held in place by the annular cap  
14. A second lower gauze 15 may be insert-  
ed in the burner. A metal collar is placed  
on the upper end of the tube 5 and surrounds  
the burner 12, leaving an annular space be- 80  
tween the two. This collar, as shown, is in  
metallic contact with the tube 5, and the par-  
ticular construction shown might be varied  
so long as any construction was employed  
which gave free conduction of heat from the 85  
collar 16 to the body of the tube 5. The  
metal collar 16, in conjunction with the  
upper portion of the tube 5 and burner  
formed thereon, constitutes a convenient an-  
nular receptacle 18 for alcohol to be used in 90  
starting the lamp into operation. The U-  
shaped vaporizing-tube 4 is connected to the  
oil-supply tube 3 and the vapor-discharge  
tube 6, which are located on opposite sides of  
the burner, by means of the unions 17 17<sup>a</sup>, 95  
and between the abutting ends of the tubes  
I preferably introduce gauze diaphragms 19,  
as shown.



The method of operating my invention is as follows: The vaporizing-tube 4 being heated by the flame of alcohol or gasolene in the annular alcohol-cup 18, the valve 2 is opened and oil is forced up through the supply-pipe 3 into the left-hand side of the vaporizing-tube 4<sup>a</sup>. Here it is partly vaporized by the radiated heat of the flame and mantle and then passes onto the central section 4 of the vaporizing-tube of greater diameter, where it is also subjected to the heat of the hot gases concentrated by the chimney 23. Vapor passing through the gauze diaphragm 24 passes into the mouth 25 of the inwardly-projecting portion of the part 4<sup>b</sup> of the vaporizing apparatus and passes down through said part 4<sup>b</sup>, being further superheated by the radiated heat from the mantle and burner. It is then delivered to the discharge-tube 6 and passes out of the discharge-opening 7 in the form of a jet. This jet passes down the mixing-tube 8, drawing in the necessary quantity of air through the air-conduits 8<sup>a</sup> 8<sup>b</sup>. The noise of the jet is partly muffled and suppressed by the muffler 9. The mixture of air and vapor passing out of the lower end of the mixing-tube 8 strikes the closed lower end of the upright tube 5 and is then compelled to change its direction and pass up through said tube 5 to the burner 12, where it is burned under the mantle 20, giving off heat sufficient to maintain the vaporizing-tube 4 at the necessary temperature. By pulling on the chain 11 the needle 10<sup>a</sup> can be projected up through the opening 7 when the same has become clogged by the accumulation of carbon, cleanses the opening, and enables the lamp to continue in operation. The spring 10<sup>b</sup> normally holds the needle-carrying lever in the position shown in the drawings, but yields to a pull on the chain 11 sufficiently to permit the operation above described.

The advantages of my invention consist in its simple and compact form and in the fact that the mixing operation is all done within the short tube 5, which is kept hot by the fact of its metallic connection with the burner 12 and the surrounding collar 16. The lower skirts of the mantle 20 are of course kept hot by conduction from the upper portions, which are in the immediate vicinity of the flame, and heat radiated from this lower skirt of the mantle is intercepted by the metallic collar 16. The oil-supply tube is also carried up through this upright tube 5 and bathed in the current of hot vapor and air within the same. A further advantage is that the oil and vapor delivered to the central section 4

of the vaporizing apparatus accumulates there in quantity on account of the larger diameter of this central section and furnishes a means of producing an even supply to the portion 4<sup>b</sup> of the vaporizing apparatus and discharge-tube 6. Moreover, the projecting portion 25 of the portion 4<sup>b</sup> entering the central section 4, as shown, forms a sort of trap in the shape of an annular recess around the part 25, in which any unvaporized oil or solid matter will be deposited instead of passing on through section 4<sup>b</sup> to clog up the discharge-orifice 7. The inlet portion of the vaporizing apparatus projecting into the central section also forms a trap to prevent the backward flow of any deposited impurities to the said inlet-section.

It is evident, of course, that various changes could be made in the details of construction illustrated without departing from the spirit and scope of my invention so long as the relative arrangement of parts shown in the drawings or the principle of operation set out in the specification is preserved.

The form, construction, and connections of, for example, the vaporizing-tube, the chimney supported thereby, the upright tube, the burner, the muffler, &c., herein shown and described are not claimed, for the reason that these parts constitute the subject-matter of other applications now pending.

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

In a vapor-burning apparatus the combination of the upright tube adapted to be screwed into the top of an oil-reservoir but closed at its lower end, the burner on the upper end of the upright tube, the mixing-tube of less length and diameter than the upright tube and located within the same, the vaporizing-tube located within the heating zone of the burner and discharging into the upper end of the mixing-tube, and the air-conduits through the walls of the upright tube leading to the upper end of the mixing-tube, together with the needle hole-cleaner pivoted to the upright tube and extending in through the air-conduit, and the spring normally acting to withdraw the needle out of the line of discharge from the vapor-discharge opening.

Signed by me at New York city, New York, this 26th day of April, 1899.

ARTHUR KITSON.

Witnesses:

A. PARKER-SMITH,  
LILIAN FOSTER.