

No. 625,775.

Patented May 30, 1899.

A. KITSON.
VAPOR BURNING APPARATUS.

(Application filed Mar. 21, 1898.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 5.

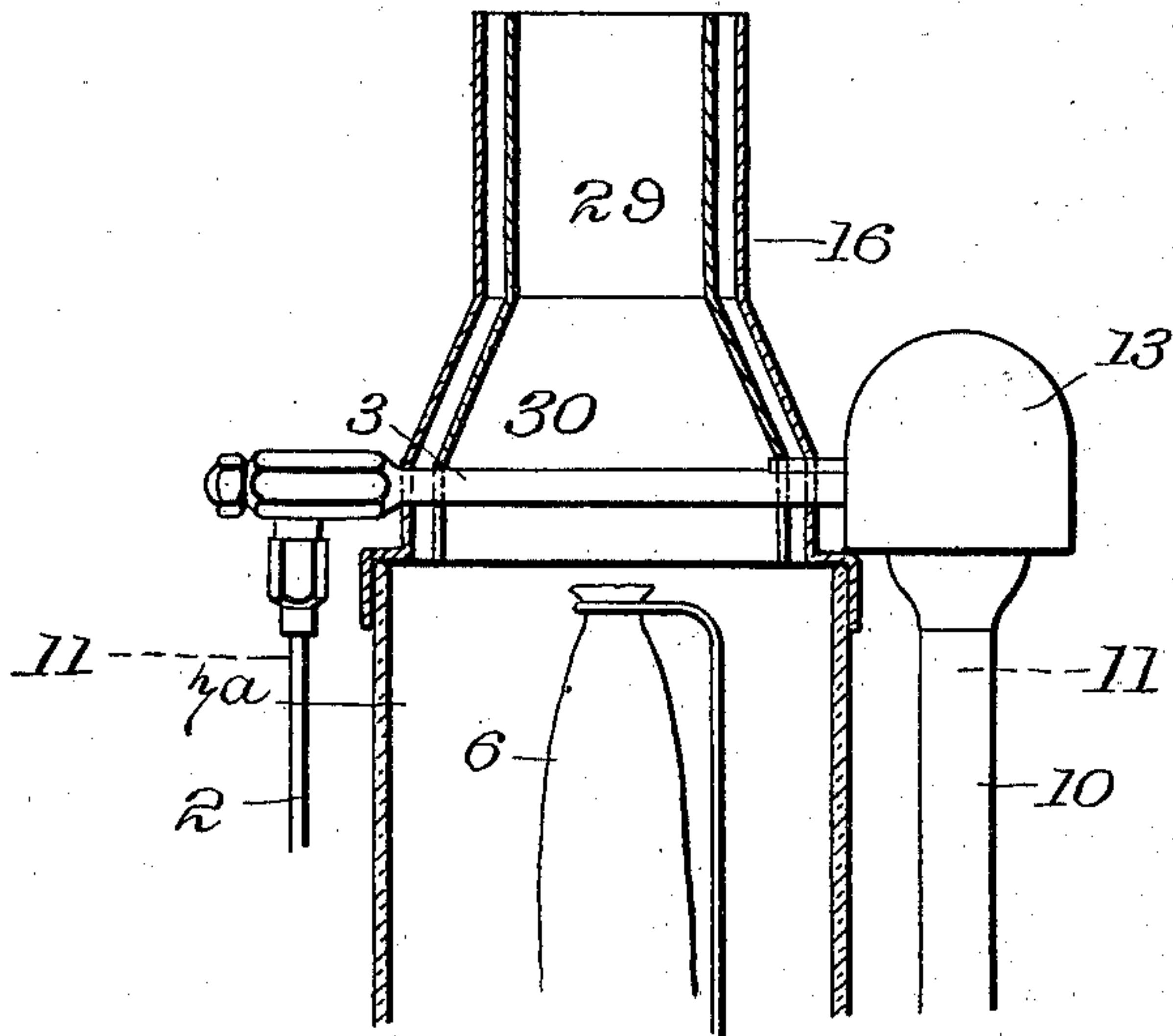
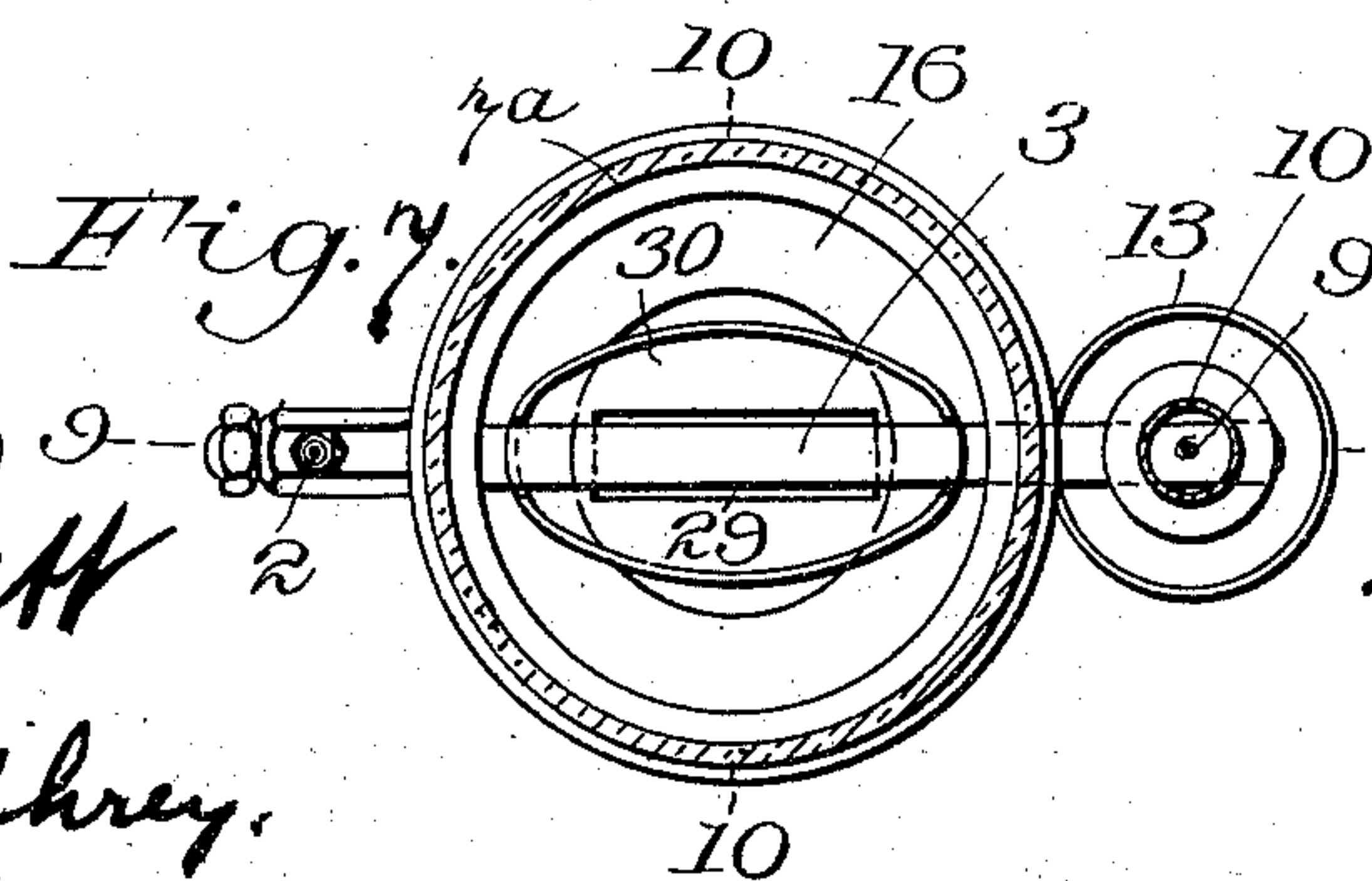
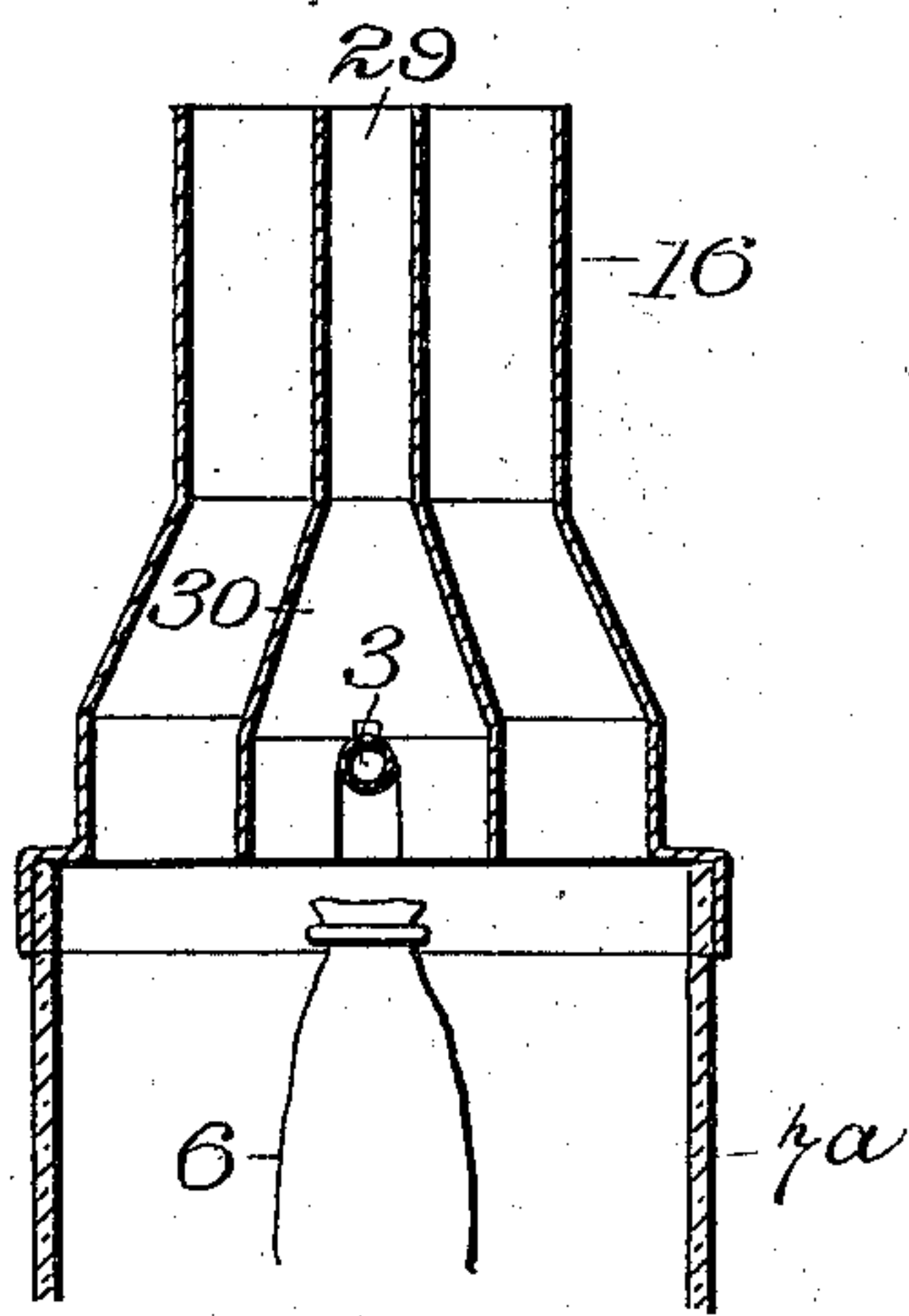


Fig. 6



WITNESSES:

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VAPOR-BURNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 625,775, dated May 30, 1899.

Application filed March 21, 1898. Serial No. 674,573. (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 that class of appa-
10 ratus in which kerosene or other fluid hydro-
carbon is vaporized and burned to produce
light or heat, and more specifically is de-
signed to produce certain improved forms of
construction which may be applied to that
15 type of vapor-burning lamp which is illus-
trated and described in Letters Patent of the
United States granted to me March 15, 1898,
and numbered 600,792.

The objects of my invention are, first, to
20 produce a perfect and regular vaporization of
the oil and delivery of the same to the burner
without the use of the needle-valve hereto-
fore used; second, the more complete sup-
pression of the hissing noise sometimes pro-
25 duced by the jet of vapor during the opera-
tion of the lamp; third, to produce a conven-
ient means for feeding just the right amount
of alcohol to the lamp for the purpose of
starting the same; fourth, the concentration
30 of the alcohol-flame on the vaporizing-tube;
fifth, the production of currents of cold air
next to the glass globe surrounding the bur-
ner for the purpose of protecting the same
from breaking by heat.

35 The preferred form of my apparatus is
illustrated in the accompanying two sheets
of drawings, in which—

Figure 1 is a side elevation of a lamp with
my improvement embodied therein, parts be-
40 ing broken away. Fig. 2 is a modified form
of muffler for the mixing-tube. Fig. 3 is a
section of the feeding-funnel. Fig. 4 is a
longitudinal section of the preferred form of
vaporizing-tube.

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

1 represents the body of the reservoir of the
lamp, containing kerosene or other liquid hy-
drocarbon under pressure sufficient to force it

up through the oil-supply tube 2 to the vapo- 50
rizing-tube 3, the flow being controlled by the
valve 4. The oil in the vaporizing-tube is vapo-
rized by the heat given off from the vapor-
burner 5, within whose heating zone said vapo-
rizing-tube is located. The burner is prefer- 55
ably provided with a mantle of refractory
material 6, capable of being raised to high
incandescence by the heat of the burner.
Preferably the well-known incandescent man-
tle known as the "Welsbach" mantle is em- 60
ployed.

7 represents a circular flange or frame sup-
porting the glass globe 7^a, which surrounds
the burner, and 8 is a small alcohol-cup
which may be formed integral with the flange 65
7 and surrounds the lower portion of the
burner 5.

9 is the discharge-opening in the vaporiz-
ing-tube, and 10 the air and vapor mixing
tube through which the mixture of vapor and 70
entrained air is delivered to the burner 5.
This tube 10 I may make wholly of asbestos
millboard or other material which is less
resonant than the sheet-iron out of which it
is ordinarily made, or it may be merely lined 75
with such substance as, for instance, lead.
Either of these constructions reduces the
hissing noise otherwise made by the jet of
vapor discharged into said mixing-tube from
the vaporizing-tube. 80

10^a represents a drip-cock for drawing off
any oil which may be deposited at the lower
end of the mixing-tube.

11 is a perforated top or cover for the open
end of the mixing-tube. 85

12 represents a lining for said mixing-tube
of some non-resonant material, preferably as-
bestos cloth or millboard.

13 represents a cap placed over the open
end of the mixing-tube and operating as a 90
muffler to muffle or destroy the hissing sound
otherwise produced by the jet of vapor. This
muffler is lined with non-resonant material,
preferably asbestos cloth or millboard, (shown
at 14;) but said muffler may be entirely com- 95
posed of such non-resonant material, such as
lead or asbestos millboard. In either case
the muffler or tube so constructed is devoid of

resonance and the hissing noise of the jet is not magnified. The muffler, made in the shape shown in Fig. 1 or Fig. 2, is supported by a series of studs or projections 15, so as to be maintained at the proper distance from the open end of the mixing-tube.

16 represents a combination flange and chimney placed on top of the glass globe 7^a, in the lower part of which the vaporizing-tube 3 is mounted.

17 represents a small cup-shaped receptacle, preferably in the form of a funnel, holding just the requisite amount of alcohol for starting the lamp, and connected with the alcohol-cup 8 by the tube 18.

19 is a plunger designed to close the discharge-orifice at the bottom of the feeding-funnel 17, and 20 is a spring-clip for holding said plunger 19 in the position of closure, as shown in Figs. 1 and 3.

The vaporizing-tube 3 is provided with means for producing a complete vaporization of the oil and an even flow of the vapor therefrom, which consists, broadly stated, of a body of material arranged parallel to the axis of the tube and occupying a considerable portion of the interior thereof, but not extending throughout the entire length of the tube. This may be composed of a large solid core or closed tube, as shown in Fig. 4. In this form and in other modifications which might be made of my broad idea the function of the construction is to cause the body of oil and vapor passing through the tube to be broken up into a thin film compelled to travel along the surface of the vaporizing-tube instead of passing through the same in a solid body.

In the form shown in Fig. 4 the internal body of material is in the shape of a solid core 29 or tube closed at both ends, which is preferably supported by wire-gauze washers 27 and 28, concentric with the main vaporizing-tube 3 and nearly filling the same. The discharge-orifice 9 of the main vaporizing-tube may be inside of the head 23^a in the side of the tube, as shown, or it might be through said head itself. The controlling-valve may be located at 4^a. In the modified form of mixing-tube muffler shown in Fig. 2 the end of said mixing-tube is left open without any means for breaking up the intruding current of air into a number of separate streams, such as the strainer 11, (shown in Fig. 1,) and the muffler 13^a is shown in cylindrical instead of hemispherical shape. It is, however, lined with non-resonant material 14^a, similar to that shown in Fig. 1.

I have shown in Figs. 5, 6, and 7 a special arrangement of inner chimney 21, which I prefer to make of oblong cross-section and provide with a lower flaring skirt 30, which will have an elliptical or circular form at the base, as shown in Fig. 7. The vaporizing-tube 3 should coincide with the major axis of this oblong cross-section, so that the greatest possible amount of its length can be included in said inner chimney.

31 is a shield of wire-gauze which surrounds the alcohol-cup 8 and extends up to or slightly above the base of the incandescent mantle 6.

The method of operating my invention is as follows: The cup 8 being filled with a quantity of asbestos wicking, as shown in my patent above referred to, and the plunger 19 being in the position shown in Fig. 3, the operator pours enough alcohol into the feeding-funnel 17 to fill the same. The plunger 19 is then lifted and the contents of the feeding-funnel run down through the pipe 18 to the cup 8, just filling the same. The alcohol vapors are then ignited by a match and the flame, concentrated by the shield 31, heats the vaporizing-tube 3 in the familiar way, but more quickly, to the temperature necessary to vaporize the oil in it. This concentration of the alcohol-flame prevents smoking and preserves the globe 7^a from being cracked by a wavering flame. The oil-supply valve 4 or 4^a is then opened and oil admitted to the vaporizing-tube, where it is compelled to pass through the wire-gauze strainer 27 and along the central core 29 in the shape of a thin film and in immediate contact with the surface of the main vaporizing-tube. The oil and vapor is brought into more immediate contact with the hot vaporizing-tube 3 than has been the case with the old form of vaporizing-tube, and its passage through said tube has been impeded and the period of contact prolonged. The result of this is a more complete and perfect vaporization of the oil. Another advantage is that the compelling of the oil to pass through a tortuous series of passage-ways and impeding its progress through the tube tends to overcome any pulsations or other inequalities of flow which have heretofore at times rendered the operation of the lamp irregular. Another advantage arises from the fact that the internally-arranged tube or other bodies are in metallic connection with the main vaporizing-tube and become intensely heated therefrom, and thus present a large heating-surface to the passing current of oil and vapor and a large heat-carrying body of material which will be less effected by the inrush of an unusual quantity of cold oil, and thus, again, the even action of the vaporizing apparatus is preserved. Still another advantage is that these internally-arranged bodies of metal, although heated, as above stated, are still of a lower temperature than the main vaporizing-tube itself and any particles of carbonized material in suspension in the vapor will consequently deposit on them rather than on the tube itself or in the discharge-opening 9. In this way the flow of vapor will not be seriously impeded and at intervals the internal tubes or cores can be removed and clean ones substituted. This obviates the great difficulty which has been encountered with the old form of needle-valve when certain kinds of oil are burned. In such cases the deposits of carbon in a few hours on the needle-valve has proved sufficient to com-

pletely choke that valve and completely disable the lamp.

When the modification shown in Figs. 5 to 7 is employed, the upward current of hot gases is concentrated on the vaporizing-tube 3 in the most effective way by the inner chimney 21 and its skirt 30. At the same time the issuance of this stream of gases from the inner chimney induces a current through the annular air-space between the two chimneys. This will act to constantly renew the cylindrical layer of air next to the globe 7^a and keep the same cool, thereby shielding the said globe in part from the intense heat radiated from the mantle 6 and preventing the cracking of said globe.

The discharge of the jet of vapor from the opening 9 of course entrains a quantity of air into the mixing-tube 10 and the mixture is fed to the vapor-burner in the well-known way. The action of the currents of air thus set up tends to produce a disagreeable hissing sound, which, however, is prevented by the employment of the strainer 11 or other means for breaking up the intruding volume of air into a number of separate currents, and, further, by forming the mixing-tube itself and its muffler either partly or wholly of asbestos or other non-resonant material.

It is understood, of course, that various changes could be made in the details of the apparatus embodying my invention without departing from the spirit and scope thereof so long as the relative arrangement of parts shown in the drawings or the principle of operation described in the specification is preserved.

I do not herein claim, broadly, the combination of the vaporizing-tube and the removable internal filler of a diameter slightly less than the internal diameter of the tube, said filler having a smooth cylindrical surface and being closed to the passage of gas therethrough, as the same is shown, described, and claimed in my pending application, Serial No. 689,657, filed August 27, 1898.

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

1. In a vapor-burning apparatus, the combination of the vapor-burner and connections, the vaporizing-tube within the heating zone thereof, the mixing-tube into which the vaporizing-tube discharges, and the muffler formed of non-resonant material placed over the air-inlet to said mixing-tube.

2. In a vapor-burning apparatus, the combination of the vapor-burner and connections, the vaporizing-tube within the heating zone thereof, the mixing-tube into which the vaporizing-tube discharges, and the muffler formed of non-resonant material placed over the air-inlet to said mixing-tube, together with means for breaking up the intruding current of air into a number of separate streams.

3. The combination with a vapor-burning apparatus of an air and vapor mixing tube formed of non-resonant materials.

4. The combination of the feeding-funnel, the loose plunger normally closing the discharge-orifice of said funnel, and the spring-clip on the funnel which holds said plunger in such normal position of closing.

5. A vaporizing-tube which has its oil-inlet at one end and its vapor-discharge at the other end, with an internal core of less diameter parallel to the axis of said vaporizing-tube but not extending the entire length thereof, and wrappings of wire-gauze about either end of said core.

6. In a vapor-burning apparatus the combination of the vapor-burner and connections, the incandescent mantle therefor, the vaporizing-tube above the mantle, the alcohol-cup beside the burner, and the gauze shield which surrounds said cup and the base of the incandescent mantle, and concentrates the flame on the mantle and vaporizing-tube.

7. The combination of burner and connections, the translucent globe surrounding the same, the main chimney mounted thereon, and the inner chimney which is located centrally over the burner and leaves an air-space between it and the main chimney, said inner chimney being flattened in cross-section, together with the oil-vaporizing tube and connections to the burner, said vaporizing-tube extending across the inner chimney and coinciding with the major axis of the cross-section of said inner chimney.

Signed by me, at New York city, this 17th day of March, 1898.

ARTHUR KITSON.

Witnesses:

A. PARKER SMITH,
L. H. FOSTER.