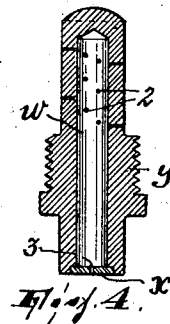
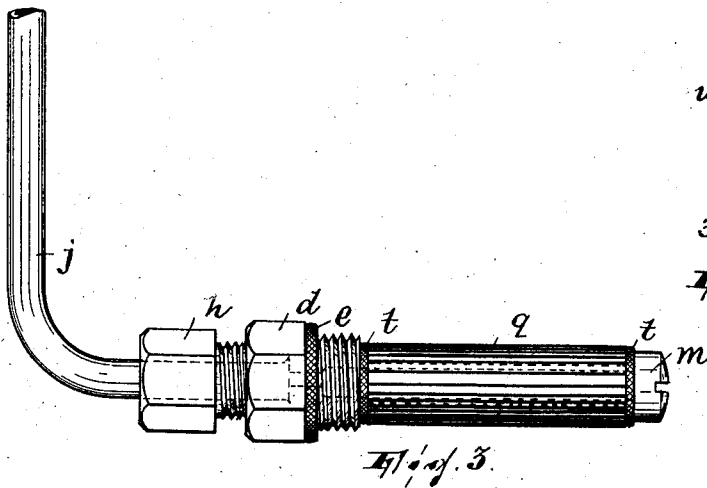
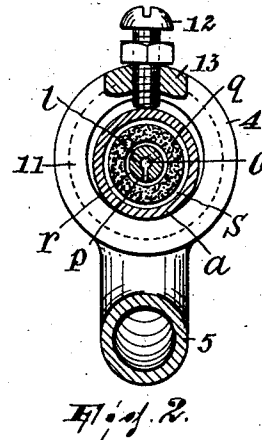
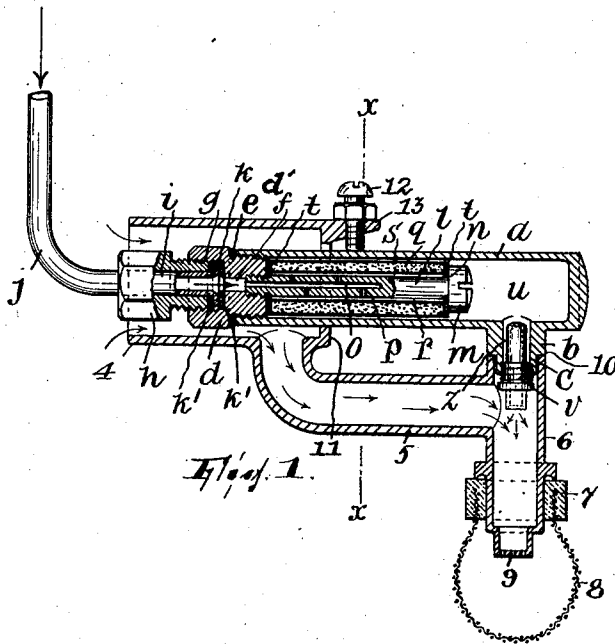


C. COMES:
VAPOR LAMP.
APPLICATION FILED AUG. 8, 1912.

1,057,120.

Patented Mar. 25, 1913.
2 SHEETS—SHEET 1.



WITNESSES
Wm. Drell.
Archibald Sumner.

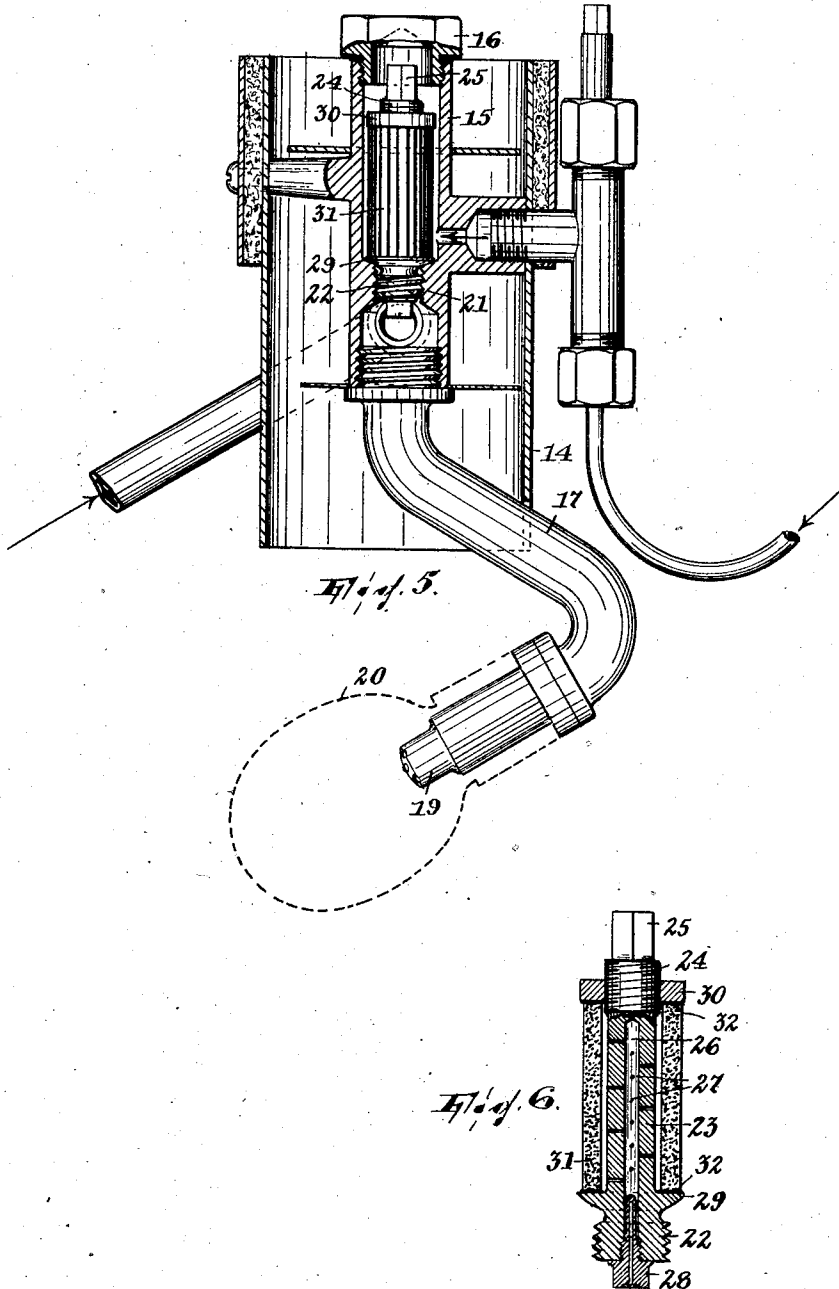
INVENTOR,
Charles Comes,
BY *John Edward.*
ATTORNEY.

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UNITED STATES PATENT OFFICE.

CHARLES COMES, OF JERSEY CITY, NEW JERSEY.

VAPOR-LAMP.

1,057,120.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed August 8, 1912. Serial No. 714,029.

To all whom it may concern:

Be it known that I, CHARLES COMES, a citizen of the United States, residing at Greenville, Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Vapor-Lamps, of which the following is a specification.

This invention relates to lamps and other apparatus for burning liquids of a volatile character, such as alcohol.

In devising the present invention I have had certain principal objects in view briefly outlined as follows: Generally, my object is to provide an apparatus of the kind indicated which may be successfully used in various adaptations and particularly, as in high power lamps, where the combustion should proceed in a steady manner, at high temperature, and with a uniform character of light. Specifically, and in furtherance of the said general object, my objects are to provide for a localization of the volatilizing or vaporizing process and such isolation of that part of the fuel which has been vaporized and is ready for combustion from that which is not so far advanced, that, given suitable pressure means for forcing the fuel forward from the supply therefor, back-pressure, due to expansion of the vapor or otherwise, cannot be effective to balance and perhaps overbalance the supply-pressure and so produce an intermittent, surging or other non-constant condition of flow toward the combustion point and a consequent fluctuating or flickering condition in the light so common in this character of lamps heretofore devised; to provide for so governing the flow of the fuel that not only will flooding be prevented but the necessity of resorting to or depending upon delicate adjustment of the flow of the fuel by a valve or otherwise in order to attain just that quantity of fuel which produces the most perfect combustion-condition will be eliminated; to provide for thoroughly filtering the fuel and thus clearing it of matter calculated to impoverish the vapor or interfere with the efficiency of the apparatus by forming deposits thereon; and to provide a vaporizing means which shall be simple, compact and inexpensive in character and at the same time highly efficient in the function of heating and simultaneously atomizing the fuel.

Other objects will appear hereinafter or be apparent to those skilled in this art.

The invention will be found fully illustrated in the accompanying drawings, wherein,

Figure 1 is a longitudinal sectional view of the preferred form of the improved apparatus; Fig. 2 is a transverse sectional view on line *x-x* of Fig. 1; Fig. 3 shows the carbon body *g* and certain accessories in side elevation; Fig. 4 is a sectional view of the vapor outlet-tip; Fig. 5 is a vertical sectional view of a modification of the invention; and, Fig. 6 shows the carbon body of Fig. 5 and certain of its accessories partly in longitudinal section and partly in side elevations.

Referring, first, to Figs. 1 to 4: *a* is a tubular member formed of some metal which is a good conductor of heat, the same being closed at one end and open and internally screw-threaded at the other and also provided, near its closed end, with an outwardly projecting nipple *b* having a reduced extremity *c* which is internally threaded. Into the threaded end of the member *a* is screwed the plug *d*, the projecting part of which is preferably faceted as shown to adapt it to a suitable tool for manipulating it and which may be set up tight against a suitable packing gasket *e* so as hermetically to close the joint between the parts *a* and *d*. The plug has an axial passage *f* therethrough which, at the outer end of the plug, is formed enlarged as a socket *g*, internally screw-threaded. Into this socket is screwed the faceted bushing *h* through the axial bore *i* of which is passed the tube *j* which may extend from a suitable tank (not shown) in which the alcohol or other liquid fuel is stored under pressure, the end of said tube being upset, as at *k*, and jammed between the ends of the bushing and socket. The parts *d* and *h* and a certain stem *l* to be described are all preferably composed of some material which is a poor conductor of heat, the purpose of which will appear hereinafter; and in order to pack the joint formed by the parts *d*, *h*, and *j* I provide between the upset end of the tube and the bushing, on the one hand, and the plug *d*, on the other, packing *k'*, of some material which is preferably a poor conductor of heat. The relatively inner end of the plug *d* is internally screw-threaded, and into

the same is screwed the stem *l* having a screw-head *m* affording a square shoulder at *n*. This stem is provided with a bore *o* which extends from its supporting end (thus affording a continuation of the passages of the tube and the plug *d*) a suitable distance toward but not to its free or head-
 5 end; it also has a series of radial apertures *p* extending from its bore outwardly to its outer surface. The said stem secures
 10 in place the cylindrical body *q*, which is penetrated by the stem and is held thereby clamped between the opposite faces *n* and *d'*, respectively, of the head of the stem and the plug *d*. The interior diameter of the
 15 body *q* is but slightly greater than the diameter of the stem, and its exterior diameter but slightly less than the interior diameter of the member *a*, so that interiorly and exter-
 20 riorly thereof there exists the relatively thin cylindrical spaces *r* and *s*, respectively. As will appear, the body *q* is formed of a porous substance which the fuel, fed to the interior thereof from the tube through the
 25 plug and stem and issuing from the latter by way of its radial apertures, permeates, and in order that the fuel may be discharged from the body *q* only in this manner I prefer to pack the joints between its ends and
 30 the head of the stem and the plug with water-glass or other refractory sealing substance *t*. The body *q* is preferably formed of carbon molded into a hard, brittle state; any other refractory substance, however,
 35 having as fine and uniform porosity as carbon will serve as well. The fuel, penetrating the carbon and issuing therefrom into the cylindrical space *s*, finds its way to the space *u* which exists between the free end of
 40 the stem *l* and the closed end of the member *a*, from which it is withdrawn through the nipple *b* and the tip *v* shown in Figs. 1 and 4. This tip is a plug into which from one
 45 end a passage *w* has been bored nearly to its other end, the outer end of the passage being covered by a thin disk *x* of platinum. The plug has an enlarged externally thread-
 50 ed portion *y* whereby it is mounted in the internally threaded reduced extremity *c* of the nipple *b*, leaving a slight space *z* around the inner end of the plug as shown in Fig. 1. The said inner end of the plug is provided with a number of fine apertures 2
 55 drilled radially into the same to the passage *w*; the disk *x* has a single central aperture 3 slightly larger than each of the apertures 2. My purpose in using platinum for the disk *x* and in forming the apertures 2 smaller than the aperture 3 in the disk is
 60 to prevent the discharge aperture (3) of the tip from becoming clogged, the apertures 2 preventing solid particles from reaching the aperture 3 (and thus serving somewhat as a filter) and the character of
 65 the metal (platinum) of the disk being, as

is well known, such that carbonizing is not encouraged. 4 is a sleeve of appreciably larger diameter than the parts *a*, *d* and *h*. It has a tubular branch 5 which extends be-
 70 yond one end of the sleeve 4 with its axis parallel with that of said sleeve, the said branch terminating in a tubular vertical chamber 6 which is open at its upper end and has its lower end formed, as at 7, to re-
 75 ceive and hold in place an incandescent mantle 8 and whose free end is a suitable orificed nozzle 9. In the claims I designate the nozzle-including portion of the apparatus by the term "burner," it being obvious
 80 that in the broad aspect of the invention any of the details above described in connection with the said portion are immaterial. The assembled structure comprising
 85 the parts *a*, *d* and *h*, with the tube *j* attached, is passed through the sleeve 4, and the reduced extremity *c* of the nipple *b* entered into the upper end of the chamber 6 of branch 5, the shoulder 10 on the nipple
 90 bearing squarely against said upper end of chamber 6. In addition to being thus supported by chamber 6, member *a* rests against the internal flange 11 formed on the sleeve 4, being held rigidly, though removably, in
 95 place, by a set-screw 12 tapped into a lug 13 projecting from the sleeve. It will be understood that the sleeve 4 and its branch 5 afford an intake for air which enters the chamber 6 and there mixes with the gas or vapor issuing from the tip *v*.

The working position of the parts is that shown in Fig. 1.

Operation: When the lamp is started the fuel first comes as a liquid to the nozzle, flowing through parts *d*, *a*, *v* and 6, permeating the carbon body after issuing
 105 from the stem *l*. On ignition of the fuel at the mantle the various parts of the apparatus become highly heated. At once, therefore, volatilization is set up, and the fuel, converted to vapor, issues from the
 110 tip *v* into chamber 6 whence, drawing in through the sleeve 4 and its branch tube 5 the required air, it discharges, mixed with the air, at the nozzle 9, after the manner of the ordinary Bunsen burner.

To the employment of the permeable body *q* in the way herein described is due the fulfilment of those objects of invention which have been hereinbefore alluded to. Thus: it serves as a filter for the fuel, clearing the same of such foreign solid matter
 120 as might reduce the efficiency of the apparatus; when its serviceability becomes impaired it may be discarded and a new one substituted without appreciable cost. It
 125 acts to atomize or highly divide the liquid fuel and thereupon discharge the thus-atomized fuel against the closely contiguous highly heated cylindrical wall of member *a*, so that the fuel is at once volatilized. It
 130

so governs the flow of the fuel that, on the one hand, the point of change of the fuel from the liquid to the gaseous state being localized or substantially confined to the carbon body, the fuel does not pass beyond the carbon body as liquid and thus result in what is known as "flooding", and, on the other hand, it makes unnecessary the employment of a valve for adjusting the flow of the fuel so that it will be neither faster nor slower than the process of volatilization. Again, it prevents surging or other conditions making the light unsteady or intermittent in character, in that any back-pressure, as of fuel which has passed through it and expands, is ineffective to disturb the regular and uniform permeating process of the parts of the fuel then absorbed by it.

By forming the parts *d*, *h* and *l* of material that is a poor heat-conductor I avoid heating the fuel within the carbon body to such an extent that back-pressure, due to its expansion, might occur and so interfere with the uniform forward progress of the fuel necessary to produce a steady light.

The chamber *u* is designed to serve as a means in which to store the vapor and so contribute toward the regular feeding thereof to the burner, it being so proportioned as properly to subserve this function and not hold so large a quantity of vapor that there can occur any appreciable back pressure thereof upon the carbon body.

In the modification of my invention shown in Figs. 5 and 6, the fuel is fed to the carbon body at the exterior thereof, and, permeating the same, is discharged from the interior thereof as a vapor. 14 is a suitable support in which is secured a tubular member 15 standing vertically, and closed at its upper end by a screw plug 16 and having a goose-neck 17 screwed into its lower end and terminating in a nozzle 19 to which may be attached the incandescent mantle shown by dotted outline and designated 20. (The parts 19 and 20 may constitute the "burner" in this instance.) The parts 15 to 19 are all preferably of metal. The member 15 has an internally reduced and threaded portion 21 into which is screwed the threaded head 22 of a metallic stem 23, the upper end of which is threaded, as at 24, and has a square head 25 to receive a tool whereby it may be secured in or removed from the member 15, having first removed the plug 16. The stem 15 has a longitudinal bore 26 extending from its lower end toward but not to its upper end; it also has a series of radial apertures 27 drilled into its bore from the exterior. Into its lower end is screwed a tip 28 substantially identical with the tip *v* already described. Between a shoulder 29 near the lower end of the stem

and a nut 30 screwed onto the threaded portion 24 of the stem is held the carbon body 31, 32 being a suitable refractory plastic substance sealing the joints between the body 31 and shoulder 29 and nut 30. The operation of this form of the apparatus is substantially the same as that first described, as will be obvious, excepting that, the heat being not less at the intake (in this case the exterior) side of the carbon body than it is at the discharge (in this case the interior) side thereof this embodiment of the invention does not possess an advantage already alluded to in connection with the embodiment first described, where greater heat prevails at the discharge side of the carbon, than at the intake side thereof.

It is peculiar to my device, so far as I am aware, that the rigid integral porous body is held clamped by and between opposed walls of the passage of the means for conducting the fuel to the burner and in that part of said means which is heated from the burner, such walls in Fig. 1 being the surfaces *d'* and *n* of the plug *d* and head *m* of stem *l* and in Fig. 5 being the adjacent faces of the shoulder 29 and nut 30.

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

1. In combination, a burner, passaged means for conducting the fuel to the burner, and a rigid integral porous refractory body arranged in, and held clamped by and between opposite walls of, the passage of said means, the part of said means containing said body being heated from the burner, substantially as described.

2. In combination, a burner, means, having a part thereof heated from the burner, for conducting the fuel to the burner, and a body of permeable carbon arranged in said part and intercepting the course of the fuel therethrough, substantially as described.

3. In combination, a refractory body permeable by the fuel to be vaporized and having extended opposite surfaces, means for conducting the fuel against one surface, and, after permeating, away from the other surface, of said body, and a burner into which said means discharges, said means having a part heated from the burner and disposed face to face and relatively close to but spaced from said first-named surface, substantially as described.

4. In combination, means for conducting the fuel, a porous body permeable by the fuel arranged in said means and intercepting the course of the fuel therethrough and having its intake and discharge sides forming the broadest surfaces of said body, and means for heating that portion of said conducting means which contains said body, said conducting means having interior surfaces thereof close to but spaced from both

the intake and discharge sides of said body, substantially as described.

5. In a vaporizer for a combustion apparatus, a unitary vaporizing device comprising a cylindrical permeable body and a support therefor extending axially through said body, said support having a longitudinal bore and being orificed from the bore outwardly and covering the ends of said body, substantially as described.

6. A vaporizer for a combustion apparatus including, in combination, a tubular fuel-conducting structure having an outlet and inlet, a stem inclosed in said structure and mounted at one end in one end thereof, said stem having a bore communicating with the inlet and being orificed from the bore radially to its outer surface, a cylindrical permeable body also inclosed in said structure and penetrated longitudinally by the stem, said stem having a head at its free end and said head and said end of said structure fixedly holding said body and covering the ends thereof, said body having its cylindrical outer surface spaced from said structure, substantially as described.

7. In combination, a tubular structure having an outlet and plug screwed into one end of said structure and having an axial inlet, a cylindrical refractory body abutting at one end against said plug and inclosed in said structure, and a stem penetrating said body and having one end screwed into the plug and a head at the other end thereof bearing against said body and holding the

same endwise against the plug, said stem having a bore communicating with the inlet and being orificed radially outwardly from the bore, substantially as described.

8. In combination, a sleeve having a branch extending parallel with the axis of the sleeve and a tubular head at the end of said branch, said head having its axis at right angles to that of the sleeve, a vaporizer including a tubular exterior structure extending into the sleeve and having a nipple seating on the adjoining end of said head, and means, engaging the sleeve and said structure, for holding the latter against the branch-side of said sleeve and the nipple against the head, substantially as described.

9. In combination, means for conducting the fuel, a porous body permeable by the fuel arranged in said means and intercepting the course of the fuel therethrough, and means for heating that portion of said conducting means containing said body, said conducting means having parts thereof close to the intake and discharge sides of said body and the latter part a better conductor of heat than the former, substantially as described.

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

CHARLES COMES.

Witnesses:

EDWARD J. MITCHELL,
JOHN J. CLERKIN.