No. 788,427. PATENTED APR. 25, 1905.

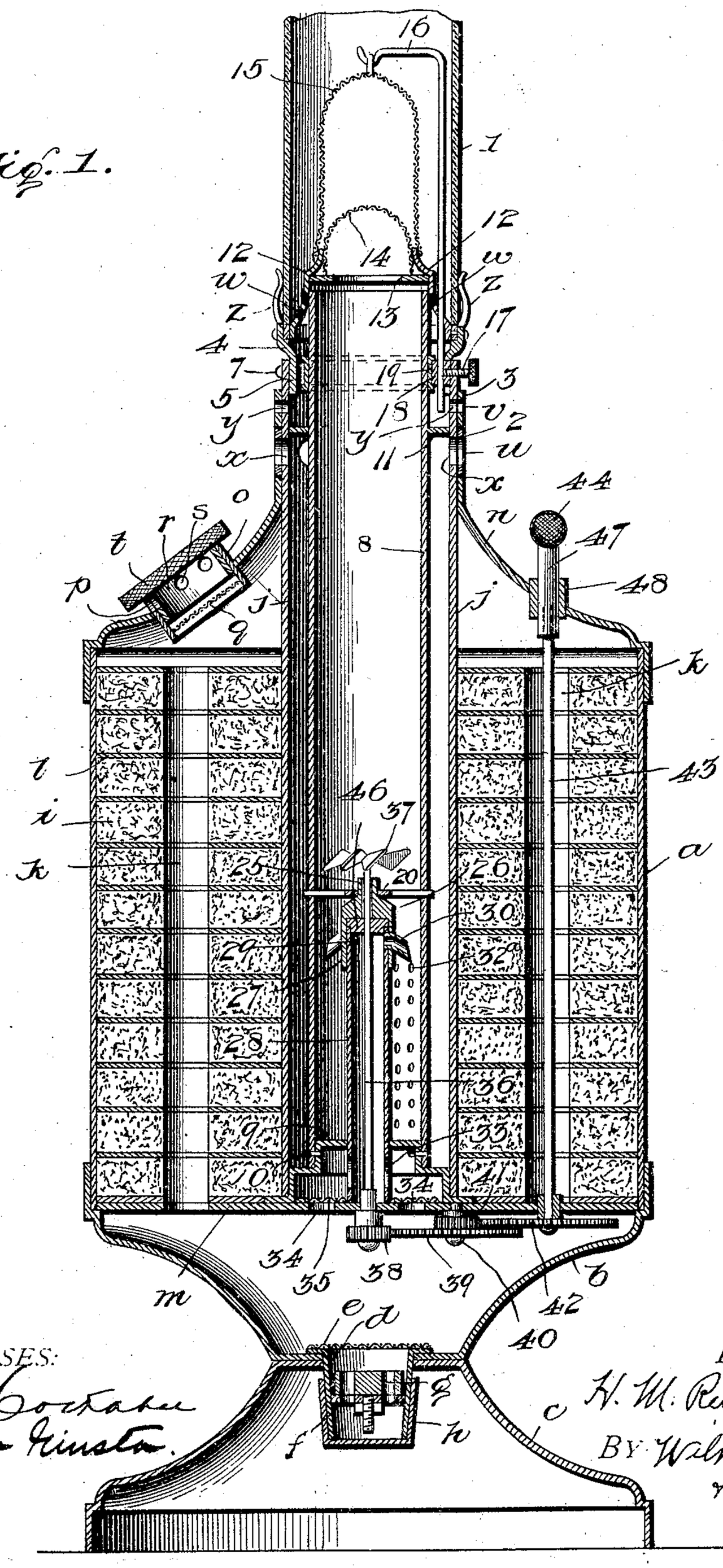
H. M. REICHENBACH.

SELF CARBURETING LAMP.

APPLICATION FILED APR. 30, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

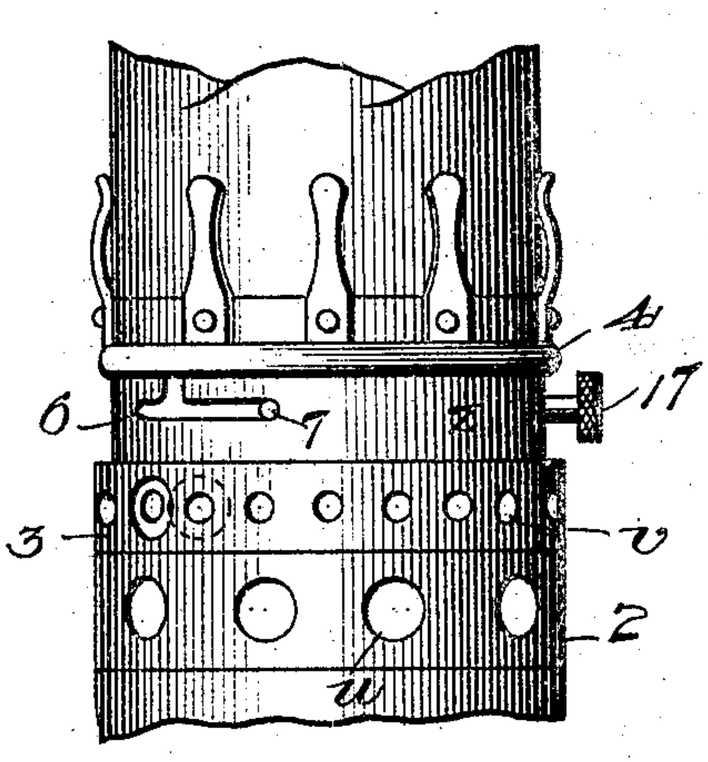

Fig. 2.

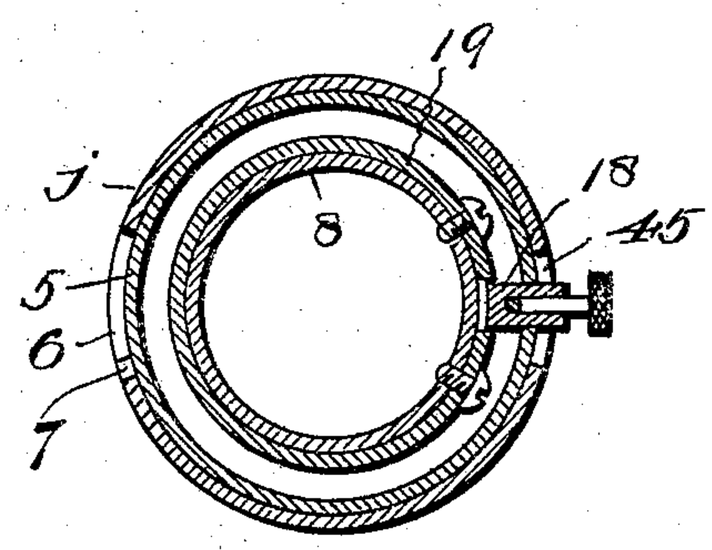

Fig. 3.

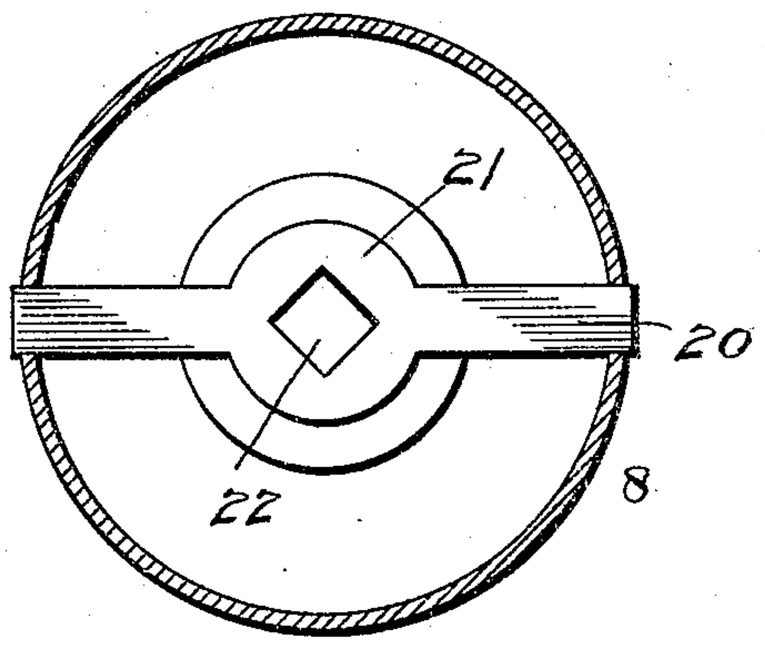

Fig. 4.

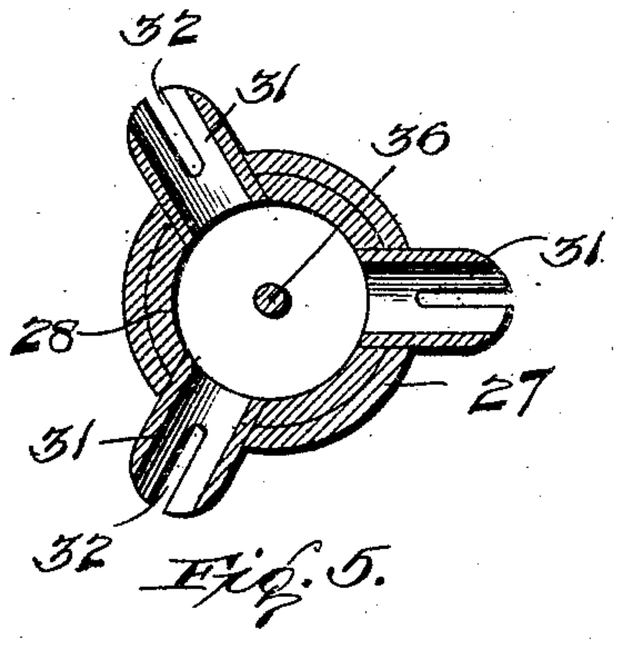

Fig. 5.

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UNITED STATES PATENT OFFICE.

HENRY M. REICHENBACH, OF NEW YORK, N. Y., ASSIGNOR TO GENERAL SAFETY MANTLE LIGHT CO., OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

SELF-CARBURETING LAMP.

SPECIFICATION forming part of Letters Patent No. 788,427, dated April 25, 1905.

Application filed April 30, 1904. Serial No. 205,788.

To all whom it may concern:

Be it known that I, HENRY M. REICHENBACH, a citizen of the United States, residing at Riverdale, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Self-Carbureting Lamps; 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.

My invention relates to improvements in self-carbureting lamps; and the object of my invention is to produce a simple and easily-operated lamp of this description and one primarily intended for purposes of illumination in connection with an incandescent mantle, although the lamp may also be used for heating purposes.

With these objects in view my invention consists in the construction and combinations of parts, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a vertical section of my improved lamp, and Figs. 2, 3, 4, and 5 represent details thereof.

a represents the body of the lamp, which is preferably round and made of any desired material, such as metal or porcelain. The body *a* of the lamp rests within a support *b*, which in turn rests upon a support *c*, preferably of metal and provided with an open bottom. Through the supports *b* and *c*, at the point where they meet, extends a tube *d*, the upper part of which is closed by a gauze partition *e* and which is provided at about its middle portion with a perforated disk *f*, the perforations in which are adapted to be opened and closed by the rotatable valve *g*, which is provided with perforations adapted to register with the perforations in the disk *f*.

h represents a cap adapted to fit over the lower end of the tube *d*, the parts *d* to *h* forming a drainage apparatus, as in my invention no oil or burning fluid is contained in the lamp except that held by the absorbent disks hereinafter referred to. Any ordinary lamp-support, however, may be used, and my lamp may be fitted into the kerosene-lamp bases now in use.

Within the body *a* of the lamp is a series of annular absorbent disks *i*, made of felt or other suitable absorbent material. Each of these disks *i* is provided with a central opening for the reception of the tube *j* and with a series of openings *k* preferably arranged concentrically around the central opening for the downward passage of air. The openings in the various disks are of course located above each other. I find it desirable in most cases to separate the absorbent disks *k* by disks of metal or pasteboard *l*, perforated like the absorbent disks *i*. These disks prevent the fluid from settling in the bottom of the lamp. I prefer to use in this lamp gasolene of about 76°; but I do not confine myself to the use of such a burning fluid. Furthermore, it is necessary or desirable in all carbureting devices to supply external heat thereto to prevent the refrigeration of the fluid caused by evaporation held by the absorbent. When fluids of higher boiling-points than gasolene are used, the metal disks conduct the heat from the tube *j* into the absorbent material, which tube is heated by convection from the tube 8 and also by conduction from the disk 11.

The body of the lamp is closed, except, as hereinafter described, by the plate *m*; but the top is open, and this top is closed by a curved cover *n*, preferably made of metal and provided with a flanged ring which fits down over the top of the body *a* of the lamp. Through one side of the cover *n* projects a tube *o*, provided with a series of perforations *p*, the inner part of this tube being closed by a gauze partition *q*. Within the tube *o* is a valve *r*, provided with perforations *s* and a milled head *t*, by turning which the perforations *s* may be caused to register with the perforations *p*, thus permitting air to pass inside of the cover *n*.

Resting on top of the cover *n* is a ring 2, provided with perforations *u*, and on this ring rests another ring 3, provided with perforations *v*, one of which is much larger than the others, as shown in dotted lines in Fig. 2.

Located centrally of the lamp-body *a* is the tube *j*, open at the bottom and top and provided with rows of perforations *x* and *v*, adapted to register with the perforations in the rings 2 and 3. This tube supports the gallery *z*, which is of the usual construction and which in turn supports the chimney 1. This chimney is of glass when the lamp is used for illuminating purposes; but it may be replaced by a metal chimney about eight inches long when the lamp is to be used for heating purposes.

The gallery *z* is provided with a bead 4 and a reduced portion 5, fitting within the tube *j*. This tube has a slot 6, shaped as shown in Fig. 2, in which a pin 7, which is attached to the gallery, is adapted to engage, this being for the purpose of preventing the gallery from being disengaged from the tube *j*. Opposite the slot 6 is a similar slot 45, in which the bracket 18 works. Within the tube *j* and separated from it by an annular space is the tube 8. The lower end of this tube 8 is movably mounted on a stepped base 9. Pins 10, attached to this base, work in slots in the lower part of the tube 8, similar to the slot 6, (shown in Fig. 2,) and permit the tube 8 to be partially rotated on the base 9, the tube *j*, soldered to the base 9, surrounding the lowest step thereof. The stepped base 9 is soldered to the plate *m*. A partition 11 practically closes the annular space between the two tubes *j* and 8, this partition being located opposite the junction of the rings 2 and 3. This is to cause the air which enters through the perforations *u* and *x* to pass downwardly, as will be hereinafter more fully described.

Attached to the gallery *z* is the cap 12, provided with perforations *w*, through one of which the supporting-wire 16 of the mantle 15 passes. Within the cap 12 is a ring 13, having a large central perforation, and the ring and cap together support a dome-shaped screen 14, which is preferably fastened to the cap 12 by screws. The upper end of the mantle 15 is supported by means of a loop on a hook formed on the horizontal portion of the bent wire 16, which wire is movably secured by a set-screw 17 in a bracket 18, (see Fig. 3,) which is attached to the gallery *z*. One end of the bracket 18 works in the slot 45, and the other end engages a slot in the ring 19, which is secured by screws to the tube 8. (See Fig. 3.) The set-screw 17 clamps the mantle-holding wire 16 in the bracket 18, which is fastened to the ring 19 and also to the gallery 2. It follows that a partial rotation of the gallery in a horizontal plane will move the tube 8. This is for the purpose of opening the gas-valve in the lower part of the lamp, which is effected as follows:

20 represents an arm passing through slots in the tube 8. This arm 20 has an enlarged central portion 21, provided with a square opening 22, (see Fig. 4,) in which opening is mounted the squared top 25 of the gas-valve 26. The upper part of the gas-valve 26 is solid and the lower part is tubular, as shown at 27, passing over the top of a tube 28. The top 28 is provided with perforations 29, which are adapted to register or not, according as the valve 26 is opened or closed, with perforations 30 in the valve 26. Surrounding the perforations 30 are the troughs 31, (see Fig. 5,) which are inclined downwardly, as shown in Fig. 1, and slotted, as shown at 32, so that the ascending air breaks up the supply of gas and becomes thoroughly mingled with it. Below the lower edges of the troughs 31 the tube 8 is provided with a series of perforations 32^a to admit air beneath the supply of gas. The tube 28 passes downwardly through the stepped base 9 and is provided with openings 33 to admit the gas or vapor from the body of the lamp. The gas passes upward through holes 34 in the plate *m*, which holes are covered by wire-gauze 35, then passes through the holes 33 into the tube 28, and out through the perforations 29 and 30, where it is mixed with the air, and the mixed air and gas pass up to the mantle, where they are burned. If the perforations 29 and 30 do not register, this of course cuts off the supply of gas or vapor to the lamp, putting it out. Through the tube 28 passes a shaft 36, provided with a small fan 37 on its top. A plate 46, mounted on the top of the tube 28, furnishes a bearing for the shaft 36, which also passes through the plate *m*, which furnishes a second bearing therefor and is revolved by means of a gear-wheel 38, which meshes with a gear-wheel 39, which is mounted on a stub-shaft 40, which stub-shaft carries a gear-wheel 41, meshing with a gear-wheel 42, carried on the lower end of a shaft 43. The upper part of the shaft 43 is squared and inserted into a squared opening in the bottom of the shaft 47, which is provided with a milled head 44. The shaft 47 is supported in a sleeve 48 in the cover *n*.

When it is desired to start the lamp, the valve 26 is opened and the milled head 44 turned by hand, thus turning the fan 37 and forcing a current of mixed air and gas upwardly, the air entering through the apertures *p* and *s* and *u* and *x*. The gas mixed with air rises through the tube 8, being driven by the fan 37, and passes out through the apertures *v* in the ring 3, and the mixture is ignited by means of the large apertures shown in the ring 3 in Fig. 2. After the gas has been ignited, the ring 3 is turned so that the small apertures *v* register with the apertures *y*. Air will then flow in through the apertures *v* and *y* outside of the mantle and will flow in through the apertures *x* and *u* down around the tube 8 through the apertures 32, where it will mix with the gas coming out of the tube 28, although this gas has already been partially mixed with air which comes in

through the apertures *p* and *s*, and passes downward through the openings *k* and upward through the openings 34 and 33. By means of the rings 2 and 3 the supply of air may be accurately regulated, and by means of the gas-valve the supply of gas or vapor may also be exactly regulated. The gallery, mantle-support, mantle-cap 12, and tube 8 all move together, the extent of movement being determined by the length of the slot 45. The valve 26 can thus be opened or closed to start or stop the flow of gas and air by simply turning the gallery. The higher the boiling-point of the fluid the more air must be admitted through the apertures *p* and *s*, and by means of the various apertures the supply of air and gas or vapor to every part of the lamp may be regulated to a nicety, so that the gas when ignited at the mantle 15 will burn with a non-luminous flame.

A very important feature of my invention is that the current of air which passes downward between the tubes *j* and 8 is warmed by contact with the tube 8, supplying heat to prevent refrigeration of the absorbent material containing the liquid fuel and the consequent reduction of the rate of volatilization thereof. It should be noted particularly that if for any reason the fuel becomes less volatile a comparatively larger portion of air travels through the absorbent material and a smaller portion between the tubes 8 and *j*; but in this case the air between the tubes 8 and *j* becomes more highly heated. Consequently the fuel is more readily volatilized than before, as already explained. Thus within certain limits the lamp automatically regulates itself.

In assembling the lamp the parts are first placed on the plate *m*, which is then placed on the support and the circular casing *a* slipped in place. Then the cover *n* is put on and the various upper portions of the lamp placed in position.

To fill the lamp, the gallery, chimney, &c., are removed. The tube *r* and the cap *h* are also removed, and fluid is poured through the lamp-soaking into the aborbent packings *i*, the excess flowing off.

While I have thus described my invention, I wish it to be understood that I do not limit myself to the exact details shown and described, as these might be varied greatly without departing from the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a self-contained and self-carbureting lamp, the combination of a burner, means for conducting air and carbureted air to said burner, a lamp-body, absorbent material packed in said lamp-body, and perforated non-absorbent partitions extending through said material and dividing it into layers, said partitions extending from the inside of the lamp-body into contact with said means, substantially as described.

2. In a self-contained and self-carbureting lamp, the combination of a burner, a lamp-body, absorbent material in said body, heat-conductors passing through said absorbent material to distribute the heat therethrough, said heat-conductors being in metallic thermal communication with said burner, means for causing currents of air and carbureted air to pass through said lamp, and means located within said lamp-body for shutting off the current of carbureted air in said lamp, substantially as described.

3. In a self-contained and self-carbureting lamp, the combination of a lamp-body, absorbent material therein, a mantle surmounting said lamp-body, means within said lamp-body for delivering the air and carbureted air to said mantle, means for regulating the supply of air and carbureted air to said mantle, and means located within said lamp-body for entirely cutting off the supply of carbureted air to said mantle, substantially as described.

4. In a self-contained and self-carbureting lamp, the combination of a burner, a lamp-body, absorbent material therein, heat-conductors extending through said absorbent material, means located within said lamp-body for delivering air and carbureted air to the point of combustion, a fan in said lamp-body for starting the current of carbureted air, and hand-operated means for said fan, part of said means extending out through said lamp-body, substantially as described.

5. In a self-contained and self-carbureting lamp, the combination of a burner, a lamp-body, absorbent material in said body, heat-conductors extending through said material, said heat-conductors being in metallic thermal communication with said burner, a tube passing through said body to deliver carbureted air to the burner, a valve in said tube, and means for operating said valve from the outside of the lamp-body to cut off the flow of carbureted air, substantially as described.

6. In a self-contained and self-carbureting lamp, the combination of a lamp-body, absorbent material therein, a tube within said body for delivering air and carbureted air to the point of combustion, a valve within said tube, a gallery, and connections between said gallery and said tube, and between said tube and said valve, whereby the movement of the gallery opens or closes said valve, substantially as described.

7. In a self-contained and self-carbureting lamp, the combination of a lamp-body, absorbent material apertured for the purpose of drainage, located within said body, a tube within said body for delivering air and carbureted air from said absorbent material to the point of combustion, a fan mounted in said tube, a milled head on the outside of said lamp-body, and connections and gearing be-

tween said head and said fan, whereby the operator by revolving said head may start said fan in motion, thereby creating an upward draft when it is desired to start the lamp in operation, substantially as described.

8. In a self-contained and self-carbureting lamp, the combination of a lamp-body, perforated disks of absorbent material located within said body and in contact therewith, heat-conductors extending between such disks, said heat-conductors being in metallic thermal communication with said burner, means for draining said lamp, a tube within said absorbent material for conveying carbureted air to the point of combustion, and a valve located in said tube, substantially as described.

9. In a self-contained and self-carbureting lamp, the combination of a burner, a lamp-body, perforated annular disks of absorbent material located in said body, perforated non-absorbent disks located between and in contact with said disks of absorbent material, said non-absorbent disks being in metallic thermal communication with said burner, a tube located partially within said absorbent material for conveying air and carbureted air from said material to the point of combustion, a valve in said tube, and means for operating said valve from the outside of the lamp, substantially as described.

10. In a self-carbureting lamp, the combination of a lamp-body, perforated annular disks of absorbent material located therein, disks between said disks of absorbent material, a central tube around which said disks are located, a smaller tube located within said first-named tube and adapted to carry mixed air and gas to the point of combustion, a plurality of series of holes in said outer tube, a partition located between said series of holes, means for wholly or partially closing both of said series of holes, a gas-valve in said inner tube, and means for operating said gas-valve, substantially as described.

11. In a self-carbureting lamp, the combination of a lamp-body, disks of absorbent material located therein, a central tube on which said disks are mounted, a smaller tube within said first-named tube and adapted to convey the mixed air and gas to the point of combustion, a smaller tube within said second-named tube to convey gas to said second-named tube, a gas-valve mounted on said smallest inner tube, and connections between said second-named tube and said gas-valve, whereby the movement of said second-named tube will open or close said gas-valve, substantially as described.

12. In a self-carbureting lamp, the combination of a lamp-body, perforated disks of absorbent material therein, a tube around which said disks are located, a gallery mounted on the top of said tube, a cap mounted on said gallery, a gauze screen supported by said cap, a mantle mounted above said screen and supported on said gallery, a second tube within said first-named tube, means for clamping said second-named tube to the mantle-support, a gas-valve, and an arm engaging said second-named tube and said gas-valve whereby the movement of said gallery will open or close said gas-valve, substantially as described.

13. In a self-carbureting lamp, the combination of a lamp-body, disks of absorbent material located therein, a tube around which said disks are located, said tube being provided with two sets of air-openings, a cover for said lamp surrounding said tube, rings mounted above said cover and surrounding said tube, each ring being provided with a series of air-openings, a gallery mounted on the top of said tube, a second smaller tube located within said first-named tube, connections between said gallery and said second-named tube, a gas-valve located in said second-named tube, and an arm engaging said second-named tube and said gas-valve, whereby the movement of said gallery will operate said gas-valve, substantially as described.

14. In a self-carbureting lamp, the combination of a lamp-body, disks of absorbent material therein, a cover for said lamp-body provided with air-openings, a tube around which said disks are grouped, said tube being provided with two sets of air-openings, rings each provided with sets of air-openings mounted on said cover, a second smaller tube mounted within said first-named tube and adapted to deliver mixed air and gas to the point of combustion, a gas-valve in said second-named tube, an arm engaging said gas-valve and said second-named tube, a gallery mounted in said first-named tube, connections between said gallery and said second-named tube, a fan mounted in said second-named tube, and means for operating said fan to start said lamp, substantially as described.

15. In a self-carbureting lamp, the combination of a base provided with drainage devices, a lamp-body, perforated disks of absorbent material in said lamp-body, a perforated cover for said lamp-body, a tube in said lamp-body around which said disks are grouped and provided with sets of air-openings, a gallery supported by said tube, rings mounted above said cover around said tube, each ring being provided with a set of air-openings, a second and smaller tube mounted within said first-named tube and adapted to convey mixed air and gas to the point of combustion, a mantle, a mantle-support, means for fastening together said gallery, said mantle-support and said second-named tube, a gas-valve in said second-named tube, a connection engaging said second-named tube, and said gas-valve, a fan mounted in said second-named tube, and means for operating said fan from the outside of the lamp to start the same in operation, substantially as described.

16. In a self-contained and self-carbureting lamp, the combination of a burner, a lamp-body, absorbent material therein in thermal communication with said burner, illuminating devices on the top of said lamp, and heat-conductors for causing uniform volatilization of the liquid fuel held by said absorbent material, said heat-conductors being located beneath the illuminating devices and partially within said lamp-body, substantially as described.

17. In a self-contained and self-carbureting lamp, the combination of a lamp-body, absorbent material therein, metal disks passing through said material, said material and disks being provided with passages, illuminating devices on the top of the lamp, and means for heating said disks from said illuminating devices, substantially as described.

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

HENRY M. REICHENBACH.

Witnesses:

MABELLE F. LAKE,

EDITH J. GRISWOLD.