(No Model.)

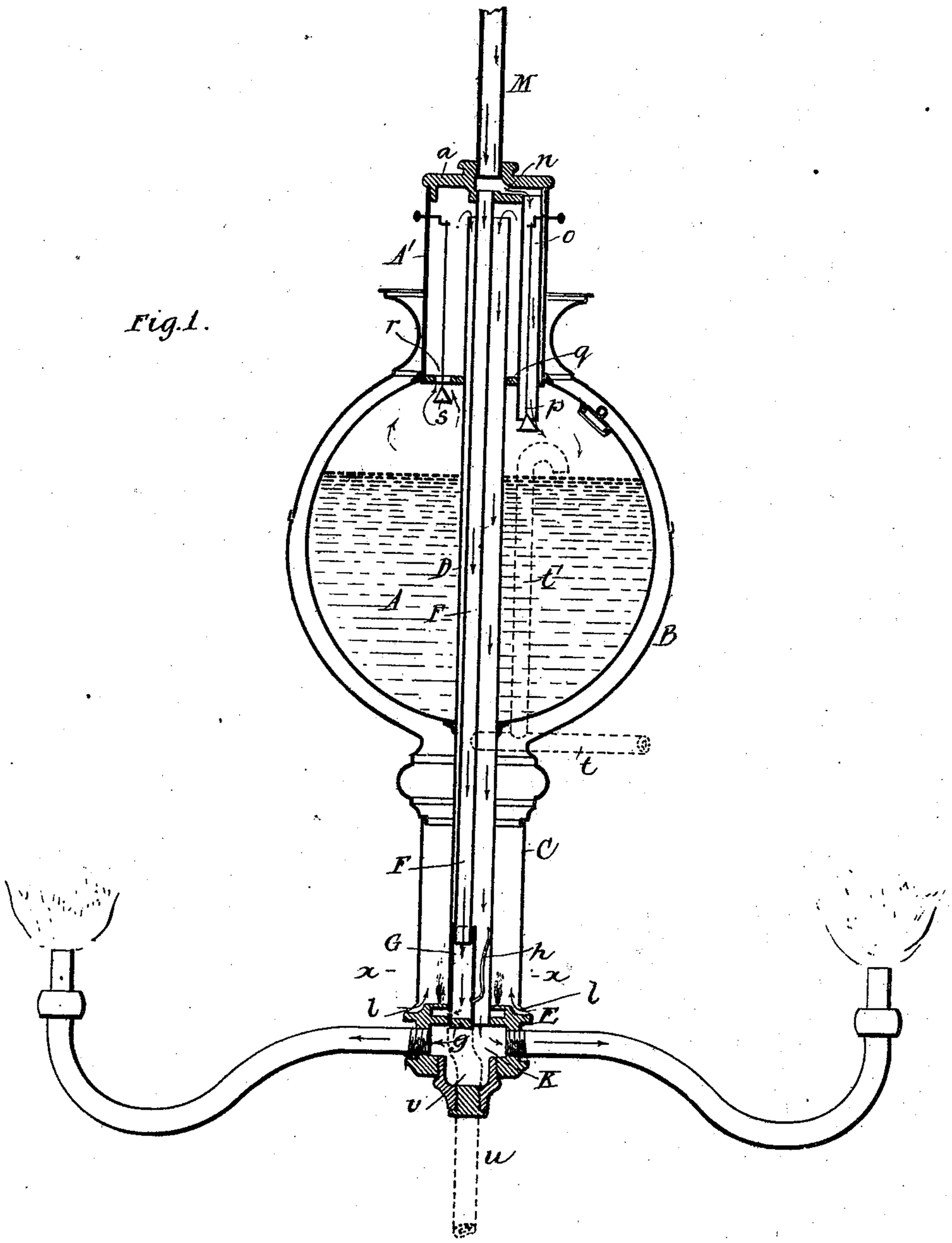
3 Sheets—Sheet 1.

N. FINCK.

CARBURETING LAMP.

No. 502,251. Patented July 25, 1893.

Fig. 1.



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(No Model.)

3 Sheets—Sheet 2.

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CARBURETING LAMP.

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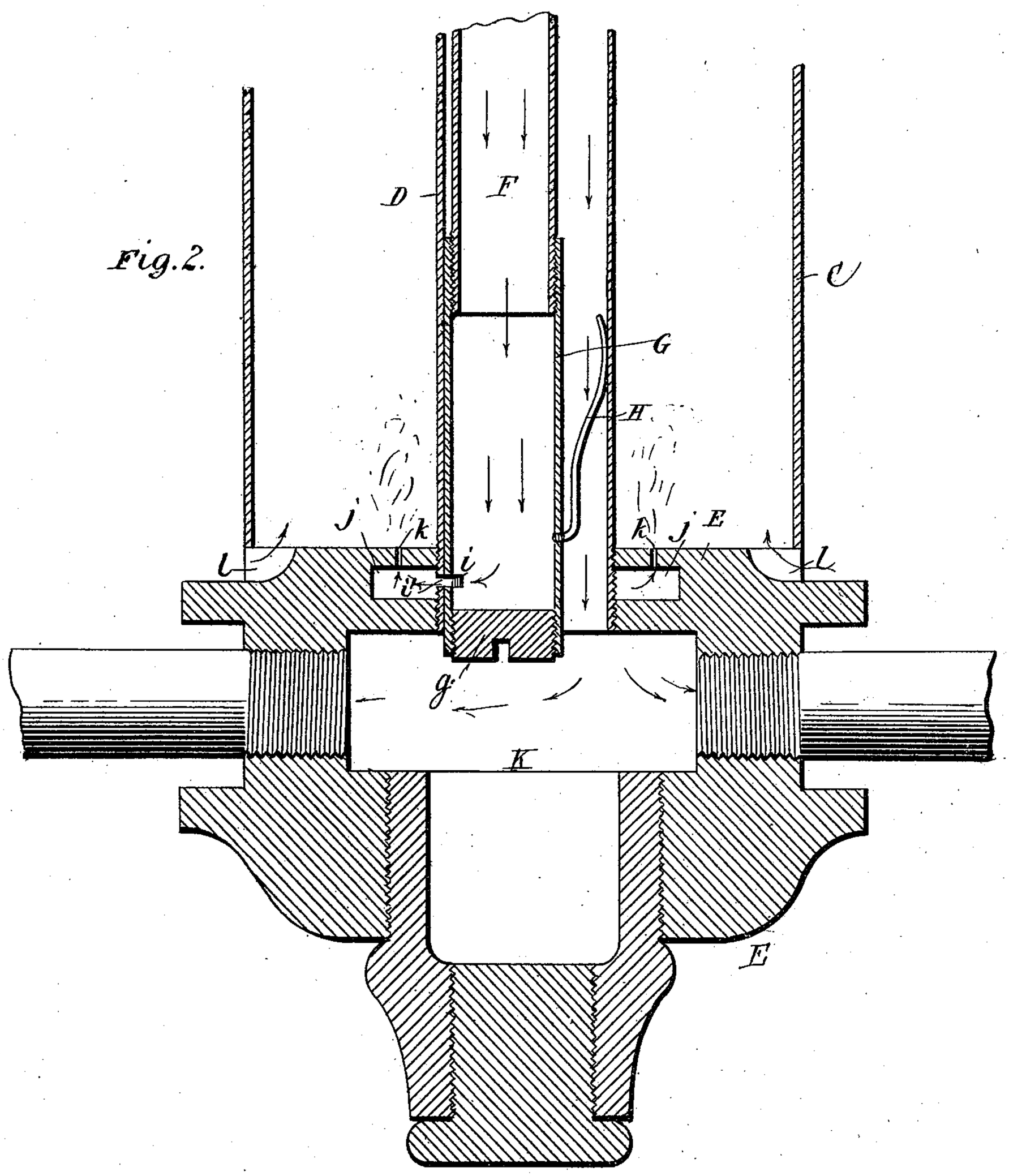
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

N. FINCK.

CARBURETING LAMP.

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Fig. 3.

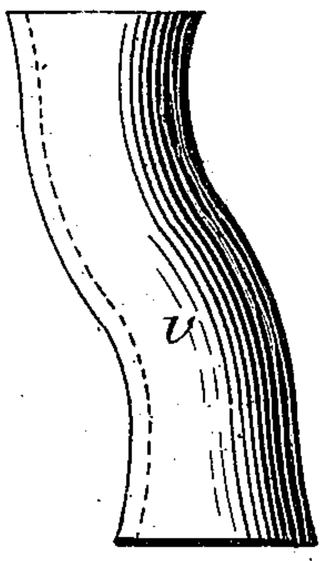
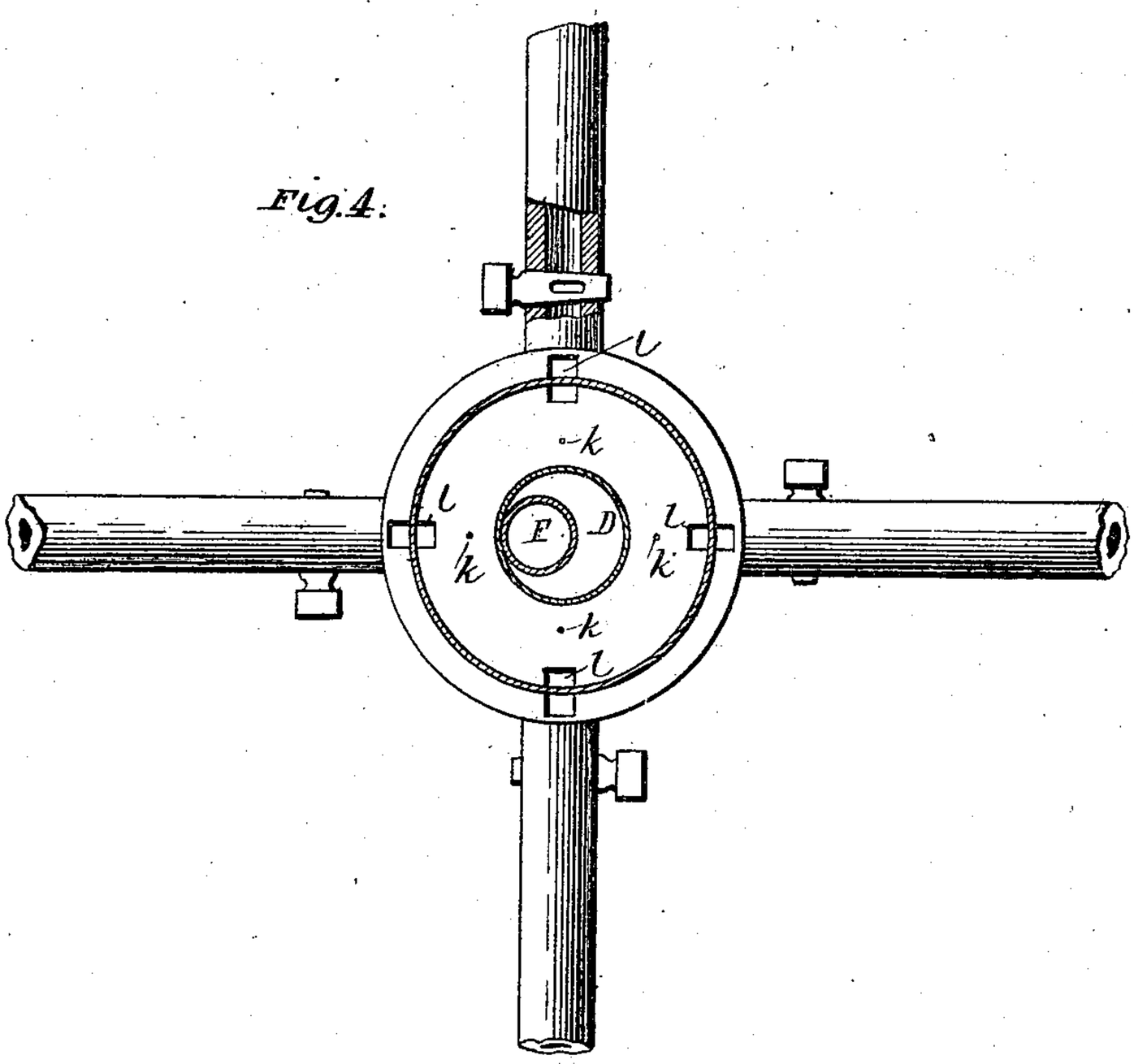


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CARBURETING-LAMP.

SPECIFICATION forming part of Letters Patent No. 502,251, dated July 25, 1893.

Application filed March 11, 1890. Serial No. 343,470. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS FINCK, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in 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 improvements relate to that class of burners for gas, in which means are provided for enriching the gas before it reaches the illuminating flame; such means serving to convey the gas into a chamber containing hydrocarbons either in a liquid or other state, the gas thus circulated being impregnated with carbon which converts the flame into a brilliant white light having an increased lighting and heating power; and my invention consists in certain novel features of construction whereby such enriching of the gas is attained, and controlled, and whereby the temperature of the hydro-carbon is controlled by an automatic regulator or thermo-valve to prevent its being overheated, and in certain other features all of which will appear from the following description: the general construction also being such as to render the structure easily adaptable for admitting the gas either at top, or at bottom or at the side.

In the drawings Figure 1, indicates a vertical central section of a lamp embodying my invention; Fig. 2, an enlarged detail view of Fig. 1; Fig. 3, a detail of a coupling used when gas is admitted at the bottom; Fig. 4, an enlarged section in the line *x*—*x* of Fig. 1.

A, is the mixing chamber, or reservoir, constructed of sheet or other metal, and it may be of any desired form. This chamber is partially filled with any suitable hydro-carbon, (preferably naphthalene,) which on being heated to the required temperature, gives off hydro-carbon vapors, which mix intimately with the gas and convert it into a rich carbonized gas. The mixing of said gas and vapors is done within this chamber, and the enriched gas then passes to the illuminating burners.

Screwed or otherwise secured to the top of the chamber or reservoir is a cylinder A′, having a screw cap *a*, at its top.

A casing B, open at its top surrounds the mixing chamber, and extends below the same as shown forming there a cylindrical chamber C, for a purpose presently to be explained.

D, is a tube of brass or copper, or of other metal which expands to a good degree under the action of heat. This tube extends upward nearly to the under side of the cap *a*, and passes through the hydro-carbon reservoir, and the chamber C, and is screwed at its lower end to the base E. Within this tube D, is a smaller pipe F, of iron or other metal having a capacity for expansion by heat less than that of the larger pipe. This pipe F is screwed to the under side of the cap *a*, but has its lower end free, to allow for the difference of expansion of the two pipes. I preferably screw onto the lower free end of pipe F, a short section G of a heavier pipe, and in the extreme end of this section, I secure a screw plug *g*, having a slit head which permits the adjustment of the operative or practical length of the pipe F, with relation to that of the pipe D. These two pipes are kept in side lineal contact at their lower ends by means of a spring *h*. In this line of contact I provide each of these pipes with a small opening *i* or *i′* which normally register or coincide with each other, thus forming an unobstructed passage for the gas flowing from the smaller tube.

In the upper part of the base E, is formed an inclosed chamber *j*, the only inlet to such chamber being through the openings *i*, *i′*, in the two pipes; and the only outlet being a series of small jet holes *k*, for furnishing small heating flames, inside the casing, with gas. Air is admitted to these flames through small passages *l*, in the base E.

K is a chamber in the base, through which the enriched gas passes to the illuminating burners.

M, is a pipe, for admitting gas from a chandelier or pendent gas pipe, at the top of the lamp. Said pipe is screwed into a small chamber *n*, which opens into the pipe F, and into a pipe *o*, which communicates directly with the hydro-carbon reservoir. This pipe *o*, is

preferably provided with a valve *p*, adapted to be operated from the outside as shown. A metallic disk *q*, through which this pipe *o*, is passed, is secured to the inside, and at or near the lower end of the cylindrical chamber A′, and has one or more inlets *r*, for admitting enriched gas to the said chamber from the mixing reservoir A; this inlet (or inlets) being controlled by a valve (or valves) *s*, arranged to be operated from the outside as shown. Neither of the valves *p*, or *s*, is automatic. The valve *p*, at the end of pipe *o*, hangs down when the lamp is in position for use. It is positively actuated and raised so as to close the mouth of the pipe *o*, when the lamp is taken down or put up. The function of this valve *p*, is to close the mouth of pipe *o* and the function of the valve *s*, is to close its corresponding opening in the partition *q*, when the lamp is being moved—especially when the hydro-carbon is in a semi liquid state (not fluid) so as to prevent the liquid hydro-carbon from getting into the tubes and passages leading to the burners, and condensing in these tubes and stopping them up. This valve *p*, is preferably operated positively from the outside, in order to insure its operation. If either of these valves *p*, or *s*, were automatic and not capable of positive control from the outside, the minute crystals of condensation formed within the entire apparatus, after each heating from the hydro-carbon fluid or gas, might clog and prevent the automatic action of these valves.

In Fig. 1, is shown in dotted lines, means for allowing the admission of gas at the side of the lamp instead of at the top; said means consisting of a supply pipe *t*, connected directly with the pipe F, and having a branch pipe *t′*, connecting with the mixing chamber.

Means for admitting gas from the bottom of the lamp are also shown in dotted lines in Fig. 1, and consist of the supply pipe *u*, which passes through the base and is connected by a coupling *v*, (shown in detail in Fig. 3) with the pipe F.

Without departing from the principle or spirit of my invention, the lamp may (dependent upon whether it be desired to be hung from above, upheld on a side gas pipe or bracket, or supported on a vertical service pipe) be adapted for all the varieties of gas illuminating apparatus now in use, and as will be seen, may be substituted for any ordinary gas chandelier, side gas bracket, or standing gas lamp, while it admits of any desired form or ornamental style in its exterior.

The operation, when gas is admitted at the top of the lamp is as follows: A portion of the gas admitted to the lamp from the service pipe, is first conducted directly to the heating burners through the pipes F, G, and thence through the small passages *i*, *i′*, and into the chamber *j*, from which it issues in very small jets, which when ignited form the heating burners, to heat and vaporize the hydro-carbon. The heated air and products of combustion, from these small heating burners pass up, around and between the reservoir, and the outer casing, and escape through the open top of the casing. The remaining portion of the gas passes through the pipe *o*, into the hydro-carbon reservoir, where it is mixed with the hydro-carbon vapors and converted into a rich illuminating gas. This gas, thus treated, passes up through the passage or passages in the disk *q*, into the chamber A′, from thence to the pipe D, which conducts it to the chamber K, and from this chamber to the illuminating burners.

It will be seen that the heating burners located as shown within the casing C, are supplied with the ordinary gas only, and have no connection whatever with the carbonized gas; for the latter if burned in a partly confined space, would give off an offensive odor. Should the temperature of the hydro-carbon become too great, the regulator or thermo-valve (which as before stated, is composed of two parts, constructed of different metals, having different degrees of expansion by heat) acts under the influence of the heat to lessen the passage of the gas to the heating flame sufficiently to reduce such flame, and consequently to allow the temperature of the hydro-carbon to lower in degree. Thus it will be seen, that by means of this automatic thermo-regulator a substantially uniform temperature of the hydro-carbon is maintained. So long as the main gas supply pipe is open, the passage of the gas to the heating burners is never, by my devices, entirely cut off by the action of the regulator; for this would necessitate the relighting of such burners, when the cooling of the hydro-carbon would allow the opening of the thermo-valve, while if these heating flames were allowed to go out and were not relighted, there would be not only an escape of gas, but the hydro-carbon would grow cold and perhaps solidify, and would fail to give out a proper supply of carbon-

In Fig. 4, I have shown a section of a lamp, having four burners, three of these burners being each provided with a stop cock for controlling the flow of gas, and the other burner being provided with a "blind" cock; as I have found it essential to have at least one burner that can only be extinguished by cutting off the gas from the main supply or service pipe. This arrangement is for preventing the turning off of all the illuminating burners, while the heating burners are ignited; as this would cause the heated hydro-carbon to "back up" and fill the lamp.

I claim—

1. In a carbureting lamp for enriching gas, the combination with the heating burners, of the tubes D and F. composed of metals or materials of different expansibility, placed eccentrically one within the other and having a touching contact in a single line only and at one end of such tubes as set forth, and both having a small lateral passage through them

in such contact line and leading to the heating burners, as set forth.

2. In a carbureting lamp, the combination with the independent tubes D and F. composed relatively of materials of different expansibility and placed eccentrically one within the other, and having a touching linear contact with each other, and a small passage through them both in such contacting line, and serving automatically to control the flow of gas to the heating burners,—of the chamber *j*. in the base and between such passage and said burners, substantially as shown and described.

3. In a carbureting lamp for enriching gas, the tubes D. and F. made of metals or materials having different expansibilities, and placed one eccentrically within the other and in linear contact with each other at their lower ends, each tube having a small orifice in such contacting line, normally coinciding and registering with that in the other; these orifices affording the only outlet to the heating burners.

4. In a carbureting lamp, the combination of the carburetor with illuminating burners and with heating burners, and with the pipe connecting the carburetor and burner, of an outer tube and an interior gas tube which supplies the burners with gas, communicating with the carburetor and placed eccentrically within such other tube, and provided with an enlarged extension in lineal contact only, with and at one side of the other tube which supplies the illuminating burners, these tubes being of material of different expansibility, and each having a small outlet performing jointly the duty of a single outlet and normally registering with each other and serving when heated to control the supply of gas to the heating burners only, these outlets constituting a thermo-regulator valve located within the pipe.

5. In a carbureting lamp, the combination with a carburetor of the tubes D and F. made relatively of materials of different expansibility, and communicating with the carburetor and set eccentrically one within the other and having registering orifices in the contacting sides as set forth, the base E. having in its upper part the inclosed chamber *j*., and also within it and below said chamber another independent chamber K, and the chamber C. having air passages between it and base E as set forth, all substantially as and for the purposes described.

6. In a carbureting lamp, the combination with the carburetor, of two tubes D and F, composed of metals or materials having relatively different expansibility, the tube F being set eccentrically within tube D. and contacting lineally with it for short distance at their lower ends and communicating with the carburetor, said tubes being provided with orifices *i. i.* as shown and described—and a base E. having therein two connecting chambers *j*. and K, the tube D. leading to chamber K, and the tube F. leading to the chamber *j*. all as set forth.

7. In combination, the carburetor, the tube D. and the tube F, these tubes being composed of metals or materials of different expansibility and provided with orifices *i. i.* normally coinciding,—the tube F being set eccentrically within the tube D. and contacting with it in a short single line of touch as set forth, said tubes communicating with the carburetor,—the chamber E, the illuminating burners branching from said chamber, chamber *j*. and heating burners *k*. communicating therewith and serving to regulate the supply of gas, all as set forth.

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

NICHOLAS FINCK.

Witnesses:

JONA. B. CILLEY,

P. B. RYON.