

(No Model.)

2 Sheets—Sheet 1.

K. TROBACH.
INCANDESCENT LAMP FOR LIQUID HYDROCARBONS.

No. 581,090.

Patented Apr. 20, 1897.

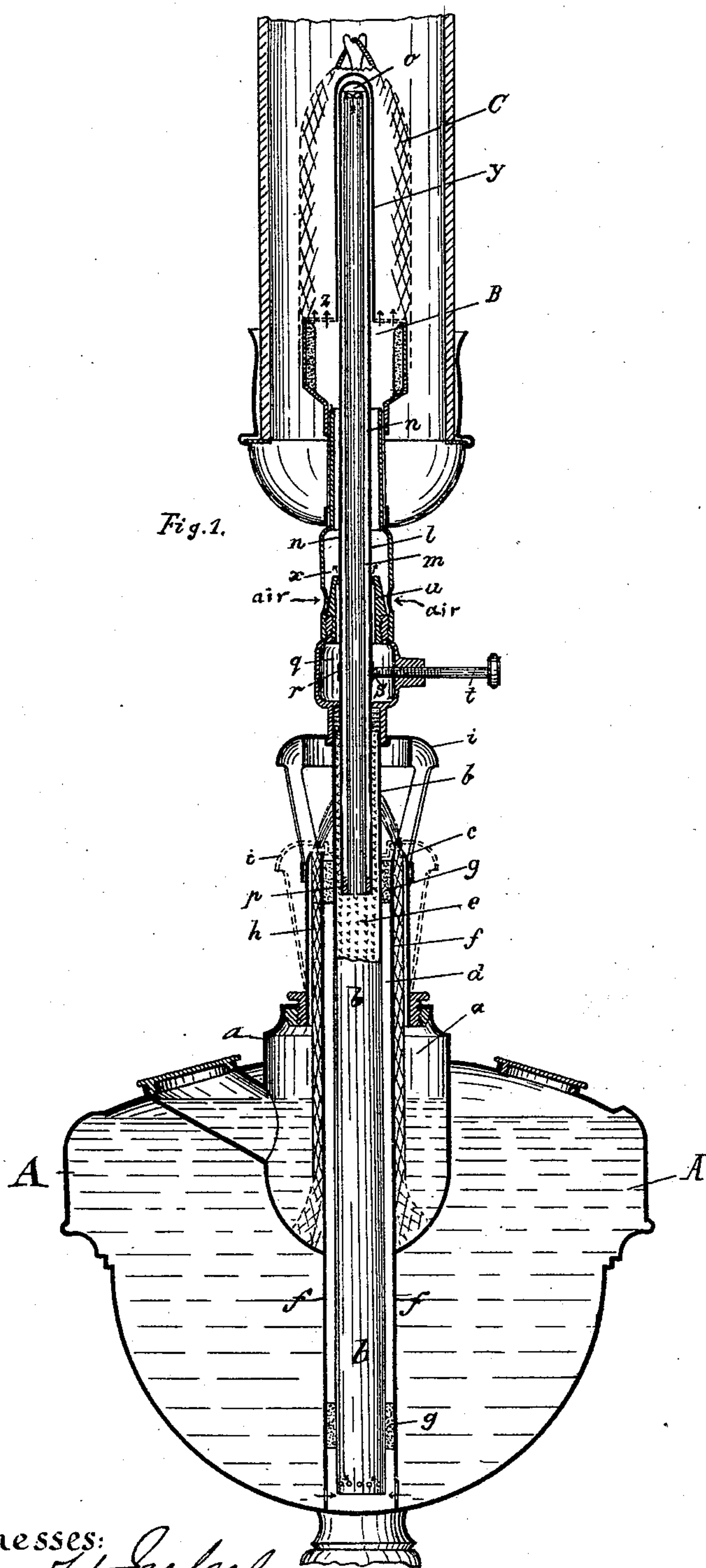


Fig. 2.

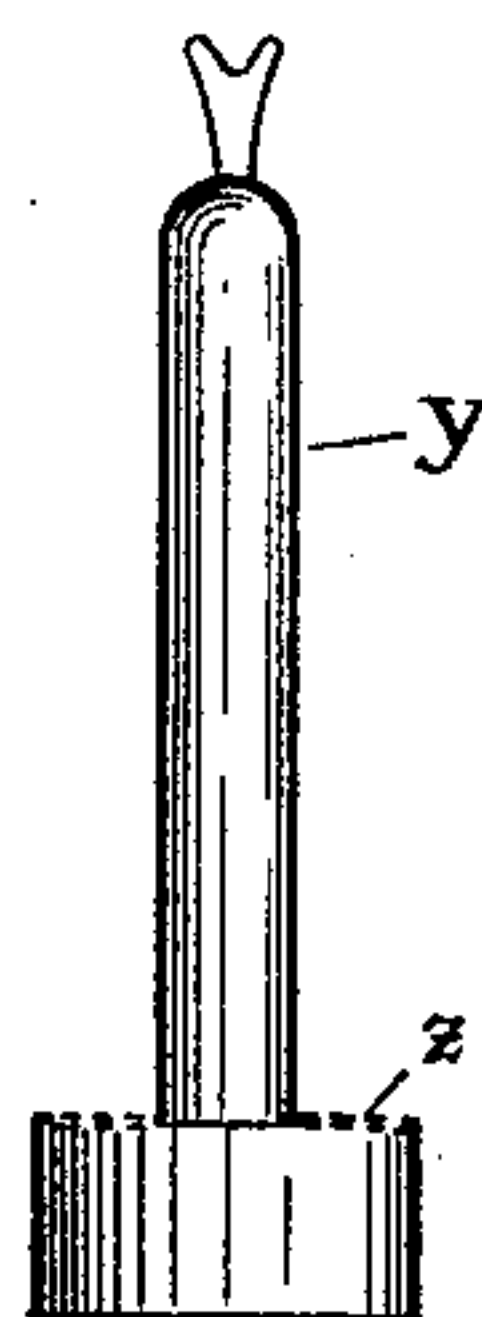
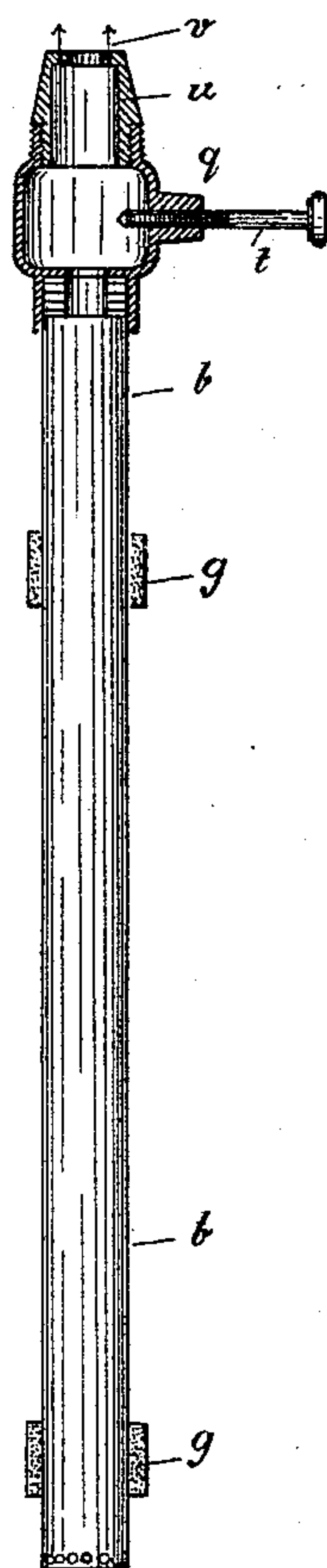


Fig. 3.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4

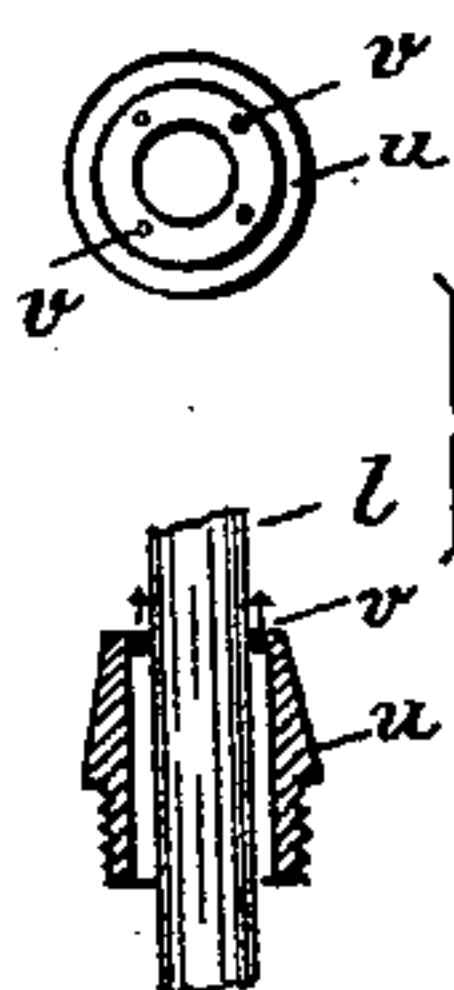


Fig. 5

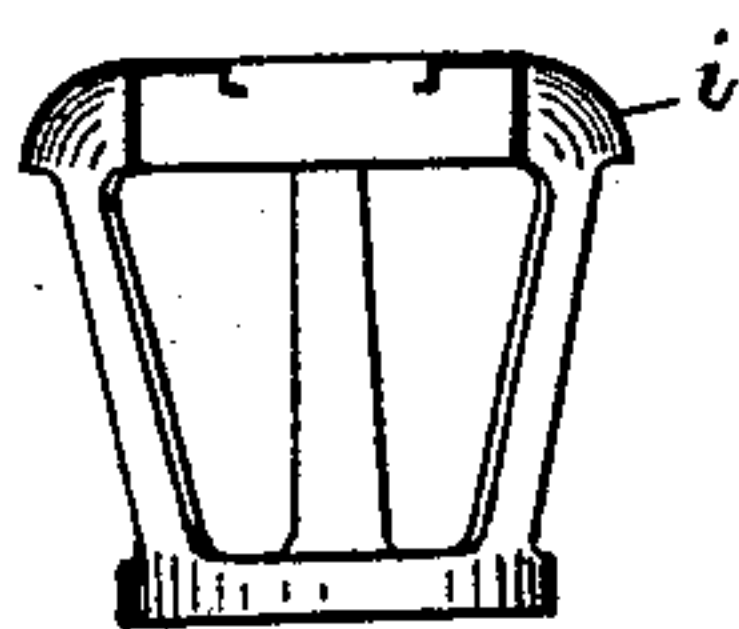
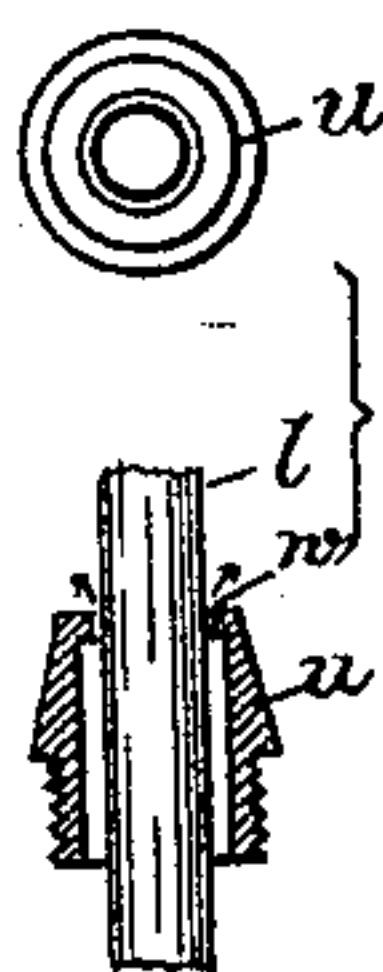
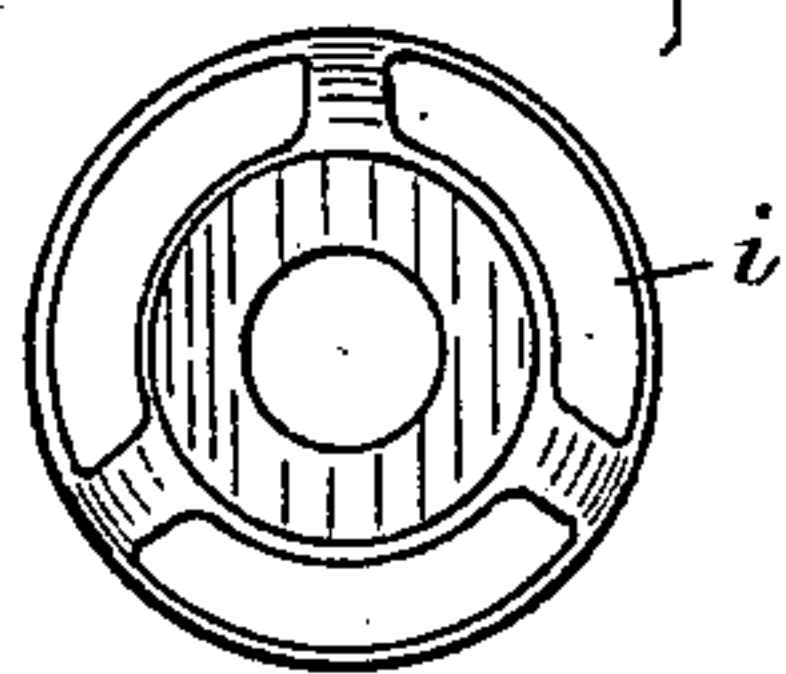


Fig. 6.



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UNITED STATES PATENT OFFICE.

KONRAD TROBACH, OF PANKOW, GERMANY.

INCANDESCENT LAMP FOR LIQUID HYDROCARBONS.

SPECIFICATION forming part of Letters Patent No. 581,090, dated April 20, 1897.

Application filed September 16, 1895. Serial No. 562,682. (No model.)

To all whom it may concern:

Be it known that I, KONRAD TROBACH, a subject of the King of Prussia, German Emperor, residing at Pankow, in the Kingdom of Prussia and German Empire, have invented certain new and useful Improvements in Incandescent Lamps for Liquid Hydrocarbons, of which the following is a specification.

This invention relates to an improved incandescent lamp for liquid hydrocarbons—such as alcohol, benzin, petroleum, &c.—in which an incandescent mantle can be employed for the reason that the liquid hydrocarbons are first vaporized and the vapors thus obtained conducted in superheated state into a mixing-chamber, from which they are conducted by an air and gas mixer to the burner-head for being burned.

The lamp is provided with a combined receptacle for the starting and heating flame, which receptacle is insulated from the devices which are used for the vaporizing and mixing of the liquid hydrocarbon, while the regulation of the gas-pressure is obtained by the adjustment of the vaporizing and mixing devices in connection with the level of the liquid in the lamp-fount, as will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a vertical central section of my improved incandescent lamp for liquid hydrocarbons shown in the act of heating up the same. Fig. 2 is a detail vertical section of the holder for the incandescent mantle, which holder incloses the gas-mixing device. Fig. 3 is a side elevation, partly in section, of the vaporizing-retort with its gas-supply nozzle. Figs. 4 and 5 are respectively top views and vertical sections of the gas-supply nozzle, showing two different modifications of the same; and Fig. 6 is respectively a detail vertical transverse section and a plan view of the extinguishing-cap for the heating-flame.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a lamp-fount, in the upper part of which is arranged a receptacle *a*, the contents of which serve for the preliminary heating and the gen-

eration of vapors from the liquid in the wick-tube *b*, which latter leads from the fount A in upward direction through the receptacle *a*.

The receptacle *a* is preferably filled with alcohol. Into the upper part of the receptacle *a* is inserted a burner *c*, which surrounds the wick-tube *b* of the main burner B, so as to form an annular space *d* around the wick-tube. The flame of the preliminary heating produces the heating of the upper part of the wick-tube *b*, so that the liquid hydrocarbon which is raised by the wick *e* in the wick-tube is vaporized, the heated portion serving in the nature of a retort for vaporizing the liquid hydrocarbon.

The wick *e* is preferably composed of charcoal, which is preferably used in the form of grains in place of a wick formed from textile fibers. Charcoal is used because it is a bad conductor of heat, by which it is enabled to act as an insulating material between the fount A and the receptacle *a*, and, further, because it does not yield at higher temperature any products of distillation such as would be the case by using a fibrous wick of ordinary construction. Charcoal has the further advantage that it retains permanently its porous character and is thereby adapted in a high degree for the raising of liquid hydrocarbons.

The wick-tube *b* is surrounded by a second larger tube *f*, in which the wick-tube is vertically movable, it being held in position by means of elastic rings *g*. Between the wick-tube *b* and the surrounding tube *f* is formed the annular air-chamber *d*, before described. The tube *f* serves also as a wick-tube for the preliminary heater *c*, and can be again inclosed by a special wick-tube, over which the ordinary tubular wick *h* is then placed, which is actuated by means of spur-wheels in the same manner as in the ordinary burners with round wicks.

The guiding and raising mechanism for the wick for preliminary heating is not shown, as any desired construction can be used and as the same forms no part of this invention.

On the heater *c* is arranged a sliding cap *i*, which incloses the wick-tube *b*, and which for preliminary heating is moved in upward

direction, as shown in Fig. 1, while it is pushed in downward direction in the position shown in dotted lines in Fig. 1 when the preliminary heating is accomplished, so that the cap incloses the alcohol-carrying wick *h* at its upper end.

For converting the vapors obtained from the liquid hydrocarbons into gas adapted for combustion there are arranged two tubes *l* *m*, which are, as shown in Fig. 1, of different diameters, so that an annular space *n* is formed between the tubes *l* and *m*. The interior tube *m* is open at both ends, while the larger outer tube *l* is closed at its upper end, forming a rounded-off portion *o*, its lower end being closed by an interposed packing-ring *p*, as shown in Fig. 1.

The outer tube *l* is provided at that portion which is located at the inside of the retort-chamber *q* with a reinforcing-ring *r*, in which the outlet-orifice *s* is arranged that is opened or closed by the needle-valve *t*. The retort-chamber *q* terminates in a nozzle *u*, which is made of a suitable non-conductor of heat, such as speckstein, and which either incloses tightly the gas-generator *l m*, and has small outlet-apertures *v*, as shown in Fig. 4, or which is provided with an annular opening *w* for the escape of the gases into the mixing-chamber *x*, as shown in Fig. 5. The mixing-chamber *x* is provided with an opening for the ingress of air, so that an effective injector-mixer is thus obtained.

The gas-generating tubes *l m* are extended downward into the wick-tube *b* to a point below the vaporizing-point—that is to say, to a point below the upper edge of the round burner *c*. The tubes *l m* are surrounded at their upper ends by a tubular mantle-holder *y*, so that the main heating-burner *B*, with its incandescent mantle *C*, can be readily removed without difficulty by unscrewing the threaded neck of the mixing-chamber *x* from the threaded neck of the retort-chamber *q*. The incandescent mantle *C*, with its holder *y*, can also be detached directly from the main burner *B*, so that the devices for vaporizing and mixing the gases can be inspected and adjusted for producing the proper degree of gas-pressure. The tubular holder *y* for the incandescent mantle is provided at its lower end with an enlarged base having a covering-screen *z*, said base encircling the main burner *B*, as shown in Fig. 1.

The operation of my improved incandescent lamp for liquid hydrocarbons is as follows: After the fount *A* is filled with a suitable hydrocarbon, for instance petroleum, and the interior receptacle *a* with the heating liquid, for instance alcohol, the extinguishing-cap *i* is moved in upward direction, so that the circular burner *c* can be lighted. At the interior of the wick-tube *b* and above the circular burner *c* are generated petroleum-vapors, which gradually fill the tubes *m* and *l* and remain in the same as long as the needle-valve

t is in closed position. As soon as a quantity of vapors sufficient for producing the incandescence of the mantle is generated the needle-valve is opened and the vapors are conducted in the retort-chamber *q* and from the same through the nozzle *u* into the mixing-chamber *x*, in which they are mixed with air and from which they are conducted to the main burner *B*, where they are burned. While this process takes place, the gas-generating tubes *l m* are heated by the preliminary heating-flame, as well as by the main flame, so that the petroleum-vapors which enter into the lower end of the tube *m* are changed in their passage through the outlet-orifice *s*, within the gas-retort *q*, and are conducted in superheated state into the mixing-chamber *x*. When this conversion into gas and the superheating of the same is obtained—that is to say, when the gas-tubes *l m* are sufficiently heated—the preliminary heating-flame is extinguished by turning down the wick *h* and moving the extinguishing-cap *i* into downward position, as shown in dotted lines in Fig. 1. The evaporation and conversion of the petroleum, which is conducted in upward direction by the charcoal wick-body *e* from the fount *A*, into vapors and gas is thenceforth accomplished automatically by the heat which is transmitted from the gas-generating tubes in downward direction, so that gas in sufficient quantities for producing the complete incandescence of the mantle *C* is obtained.

When it be desired to extinguish the main heating-flame, it is only necessary to close the needle-valve *t*. The vapors which are generated after the closing of the valve are retained in the gas-generating tubes *l m* and in the wick-tube *b*, which extends around the same, so that any obnoxious smell caused by the generation of vapors is obviated. For regulating the pressure of the gas the wick-tube *b* is made, by means of the packing-ring *g*, movable in the tube *f*. When the wick-tube *b*, with its carbon wick-body *e*, is immersed more or less into the fount *A*, the gas-pressure is greater or smaller in proportion to the increased or decreased height of the liquid hydrocarbon contained in the fount *A*. Notwithstanding the gradual lowering of the level of the liquid hydrocarbon in the fount *A* the gas-pressure can be easily kept constant by the gradual downward sliding of the wick-tube *b* into the fount *A*.

My improved incandescent lamp for liquid hydrocarbons has the advantage, as compared with other constructions heretofore known, that the combination of the main fount with a separate chamber for the liquid for preliminarily heating the main heating-flame for the incandescent mantle *C* can be generated with gas from various hydrocarbons, such as alcohol, benzin, petroleum, &c., which can be used at the same time without danger, inasmuch as the heating and vaporizing take

place separately from the supply of gas to the main heating-flame and as a means is devised by which the perfect conversion of the vapors of the liquid hydrocarbons into gas form is obtained.

Another advantage consists in the fact that the preliminary heating-flame is only required intermittently whenever the incandescent lamp has to be started, which preliminary heating is discontinued when the proper generation of vapors and the conversion of the same into gas is obtained, which is an important feature for the advantageous use of incandescent lamps to which no gas is supplied by special conducting-pipes.

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

1. An incandescent lamp for liquid hydrocarbons, which comprises a main fount, a wick-tube extending into the same, a burner for the preliminary heating of the wick-tube for producing the vaporizing of the hydrocarbon in the main fount, a retort above the heating-flame provided with a valved orifice, a mixing-chamber above said retort, gas-generating tubes extending above and below the mixing-chamber, a main heating-burner, and a holder for the incandescent mantle supported on the main burner and provided with a screened base, substantially as set forth.

2. In incandescent lamps for liquid hydrocarbons, the combination of a main fount containing the liquid hydrocarbon for feeding the main heating-flame, with a secondary chamber arranged at a considerable distance above the bottom of the main fount for supplying the preliminary heating-flame, a wick-tube extending through the secondary chamber into the main fount, and a burner extend-

ing from the secondary chamber and encircling the wick-tube, substantially as set forth.

3. In incandescent lamps for liquid hydrocarbons, a shiftable wick-tube for supplying the main heating-flame, gas-generating tubes connected with the shiftable wick-tube and provided with a valved orifice, and a burner for the preliminary heating of said wick-tube, whereby the gas-pressure is regulated in connection with the level of the liquid in the fount, and the automatic generation of vapors from the liquid hydrocarbon and their conversion into gas is secured, substantially as set forth.

4. In incandescent lamps for liquid hydrocarbons, the combination of a wick-tube, gas-generating tubes connected with and extending upwardly from the tube, a needle-valve for said generating-tubes, a closed retort-chamber encircling the gas-generating tubes and communicating with the latter through the medium of the orifice controlled by said valve, a mixing-chamber above the retort, and a nozzle by which the vapors are discharged into the mixing-chamber, substantially as set forth.

5. In an incandescent lamp for liquid hydrocarbons, a detachable holder consisting of a tubular portion provided at its lower end with an enlarged base, said base having a covering-screen at the lower end of the tubular portion of the holder, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

KONRAD TROBACH.

Witnesses:

CHAS. H. DAY,
G. WILLNER.