No. 649,993. Patented May 22, 1900.

J. E. PFIEL.

INCANDESCENT LAMP BURNER FOR PETROLEUM OR OTHER LIQUID COMBUSTIBLES.

(Application filed Mar. 17, 1899.)

(No Model.)

Fig. 1.

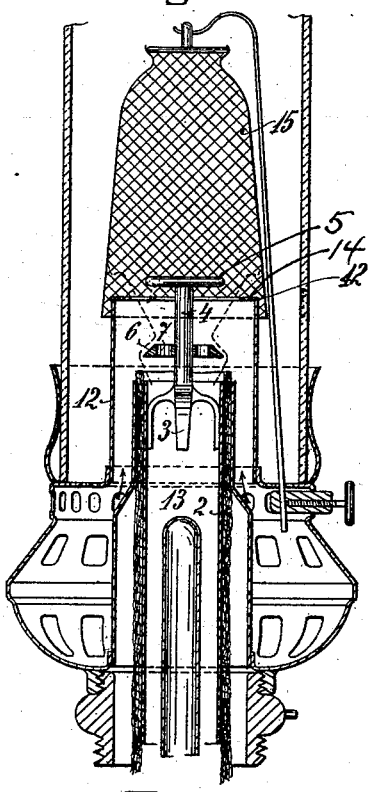


Fig. 2.

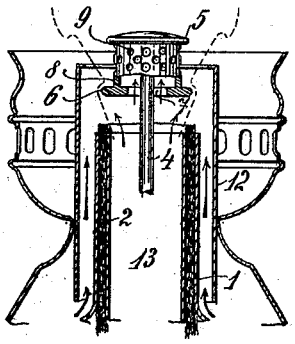


Fig. 4.

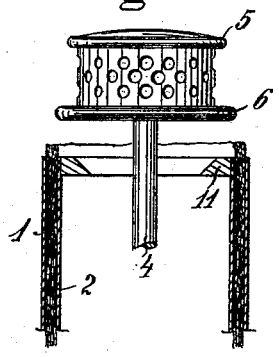
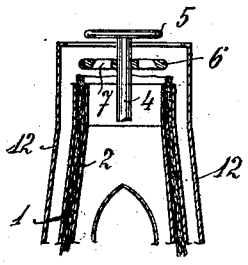


Fig. 3.



WITNESSES:

Ella L. Giles

INVENTOR

Joseph Eduard Pfiel

BY

Richards & R

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOSEF EDUARD PFIEL, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNOR TO ALFRED LENNER, OF SAME PLACE.

INCANDESCENT-LAMP BURNER FOR PETROLEUM OR OTHER LIQUID COMBUSTIBLES.

SPECIFICATION forming part of Letters Patent No. 649,993, dated May 22, 1900.

Application filed March 17, 1899. Serial No. 709,477. (No model.)

To all whom it may concern:

Be it known that I, JOSEF EDUARD PFIEL, chemist, of Vienna, Austria-Hungary, have invented certain new and useful Improvements in Incandescent-Lamp Burners for Petroleum or other Liquid Combustibles, of which the following is a specification.

In the incandescent-lamp burners for petroleum and other liquid combustibles as heretofore constructed variously-combined arrangements of caps and chimneys have been proposed for conducting and regulating the air-supply to the burner, the form of which caps is such as to produce a more or less restricted area of air-outlet for the upper discharge-opening as compared with the larger area of the air-inlet opening below. These arrangements consequently have the effect of affording a high speed of outflow for the air, while the speed of flow through the channels conducting to the outlet is maintained at a lower rate. In addition such forms of conducting-channels always give rise to eddies and counter-currents in the moving body of air.

The subject of the present invention is an incandescent wick lamp—that is, a burner for liquid burning material—in which the above-mentioned drawbacks do not appear, as the burner supplies a non-luminous heating-flame of high temperature, which burns quietly and fits intimately on the glowing body for the protection of the same.

The improved external air-conduit appears in construction as an outer tubular casing parallel in form to that of the outer burner-tube.

The material advantages possessed by the present burner are that the body of the burner is kept cool, owing to the uniform draft of air, notwithstanding the high temperature generated in the heating-flame, whereby the application of the burner becomes entirely free from danger and the burner itself becomes highly durable, while possessing a small radiation of heat. The ample air-supply of oxygen to the flame secures a complete combustion, so that the bad smell of lamps caused by an incomplete combustion, specially in kerosene-lamps, is abolished. At the same time the burner yields bright light, owing to the ample air-feed, and it will not soot, inasmuch as the incomplete combustion which causes soot is not present.

Figure 1 is a vertical sectional view of the invention. Figs. 2, 3, and 4 are similar views of modifications.

The wick-tubes 1 and 2 have a central air-passage 13, within which is situated the support 3 of the flame-spreader. The latter consists of a spindle 4 and two disks 5 and 6, situated at a certain distance one above the other. The lower disk serves to produce the heating-flame at the inner edge of the wick, and it must have the following properties:

First. It must have openings in the middle part in order to allow air to pass through to the upper disk 5, which expands the flame. These openings must therefore be of the same size, but not such that the above-mentioned heating-flame is drawn up through them. This flame must rather burn in an outward direction below the under side of the disk 6.

Second. The lower disk 6 must extend toward the outer edge of the wick in such manner that the outer side of the flame is forced into the air-current rising between the wick-tube 1 and the tubular casing 12, so as to be carried up thereby, whereby the vapors are mixed intimately with the air, so as to produce perfect combustion, and consequently a blue flame. The disk 6 must, however, not extend to such a distance that the inner part of the heating-flame is brought into the path of the outer air-current, as this would cause the flame to be blown away and extinguished. The heating-flame must rather be brought into a quiescent zone, which effect is in the arrangement in Fig. 1 produced by making the disk 6 of some thickness and with the upper edge beveled off, so as to produce a conical surface the larger diameter of which is at the bottom, as shown. The term "quiet zone" refers to that part of the space between the disks 5 and 6 which lies between the air-currents ascending vertically from the edge of the disk and of the opening through the disk. By this means the heating-flame is enabled at the commencement and until the inner air-draft has become active to draw inward away from the outer air-current, while the air-currents passing through the holes of disk 6 are caused by upper disk 5 to gradu-

ally spread out such flame again and bring it to perfect combustion. In Fig. 2 this quiescent zone is produced by forming the lower disk 6 of the ordinary thickness of sheet metal and fitting upon it a ring 8 of smaller diameter. The quiescent zone thus formed causes the flame to travel in the inward direction, as described, while air issuing through the perforations 9 in the upper part of the ring spread it out again in the upward direction. This has the same effect upon the inner part of the flame as above described.

Third. The lower disk 6 of the flame-spreader must be at such a height above the wick that the heating-flame has a certain sufficient size so as to have the required action in generating the combustible vapor. It will be evident that the lower the disk 6 is relatively to the upper end of the wick the smaller will the said flame be and that it will increase in proportion as the disk is raised. With the small size of heating-flame necessary with ordinary incandescent burners the too-near approach of the lower disk to the wick would cause an unpleasant smell on lighting the lamp. It is therefore of advantage to enable only a small heating-flame to be obtained when the lower plate 6 is arranged in a higher position. This is effected by throttling the air-current rising at the inner edge of the wick either by turning inward the edge of the inner wick-tube or by the insertion of rings at the upper end of the said tube. By this means the rising air cannot pass directly in contact with the inner edge of the wick, such air being only brought in contact with the inner edge by being deflected outward by the disk 6, and thus only a small heating-flame is produced at that point instead of a flame extending over the entire uncovered inner surface of the wick just below the edge. The action of such throttling edge or conical ring, &c., such as is now used with the ordinary burners can be considerably improved if such inserted rings are formed with an upwardly and outwardly directed bevel or conicity, as shown at 11, Fig. 4.

The outer air-supply is effected through the annular space between the outer wick-tube 1 and the tubular casing 12, which is parallel to the former. The distance of the casing 12 from the wick-tube is made such that the velocity of the air-current determined by the draft of the lamp-chimney and the sectional area of the annular passage shall be sufficiently great to carry the outer part of the flame, which is forced outward by the disk 6, as above described, away from the wick and carry it upward.

For sufficiently supplying the vapors generated with air it is necessary that the flame should be raised up to a certain height and be maintained at such height. This is effected by maintaining the rapid and uniform air-draft up to the said height, and this is effected by making the tubular casing 12 extend upward to a corresponding height. In order to adapt the configuration of the pure blue flame thus obtained as much as possible to that of the incandescent mantle, it is advisable to act upon it on its issue from the tubular casing 12, so as to spread it out somewhat in a tulip shape. This is effected by arranging the upper disk 5 of the flame-spreader at a suitable extent above the upper end of the tubular casing 12 and also by providing such upper end with an inward-projecting bend or flange 14, as shown in Fig. 1. The tubular casing 12 extends downward to such an extent that the air-current has a considerable length of travel through the same; but it should not be made of such excessive length as to cause any considerable frictional resistance of the air against the casing. It is of advantage to leave the space between the wick-tube 1 and the tubular casing 12 perfectly free and to avoid making perforations in the sides of the tubular casing in order that the current of air through the space may meet with no obstruction. For this purpose the tubular casing is only fixed to the burner by external attachments, as shown.

Fig. 1 shows a type of burner in which the outer wick-tube 1 has its lower part of an enlarged diameter, the tubular casing 12 being only continued downward to a point above that at which the enlargement of the wick-tube commences, and it is extended to a considerable height above the edge of the wick at the upper end for the above-named reasons. The part of the tubular casing extending downward from the edge of the wick must, however, not be reduced beyond a certain length, because the tubular casing would then not have the proper effect. If the tubular casing requires to be extended farther downward, then in extending it over the enlarged part of the wick-tube it must also be enlarged to such an extent that the sectional area of the space between the two remains the same as that of the upper part.

Fig. 2 shows a type of burner with cylindrical wick-tube in which the tubular casing 12 is uniformly concentric thereto.

Fig. 3 shows a burner with the lower part of the wick-tube formed conical, the upper part being cylindrical in order to maintain a vertical direction for the issuing air-currents. The tubular casing 12 is in a similar manner formed with a cylindrical upper part and with a conical lower part of such a size that the sectional area of the air-passage remains the same throughout. Fig. 3 of the drawings does not show this lack of parallelism; but in practice the difference is so slight as not to appear in the drawings.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. An incandescent-light burner for liquid burning materials, comprising a two-part

flame-spreader 5, 6 the lower plate or disk of which 6 is situated near the wick and acts to force the flame against the outer current of air, by which it is raised and carried into a quiet zone above the lower disk 6 said disk 6 being perforated so that the air passing through the said holes expands the flame, and shell or casing 12 arranged around the wick-casing and extending up to a plane lying between the two plates or disks of the flame-spreader for the supply of the outer air, the transverse section for the passage for the air being constant, said shell having a flange, substantially as described.

2. In combination, the flame-spreader and a wick-tube arranged below the same and having a shoulder 11, with its edge flaring upwardly, substantially as described.

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

JOSEF EDUARD PFIEL.

Witnesses:

ALVESTO S. HOGUE,

P. B. HURST.