2 Sheets—Sheet 1.

C. N. TYLER.

Lamp.

No. 53,506. Patented March 27, 1866.

Fig. 3,

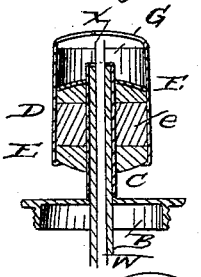


Fig. 1,

Fig. 2,

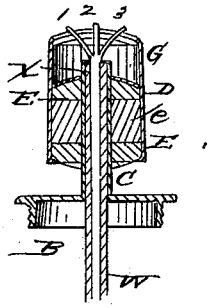


Fig. 15,

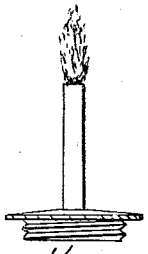
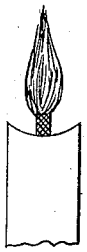


Fig. 14



Witnesses:
J. C. Clayton
V. Clayton

Inventor:
Charles N. Tyler

2 Sheets—Sheet 2.

C. N. TYLER.

Lamp.

No. 53,506. Patented March 27, 1866.

Fig. 4,

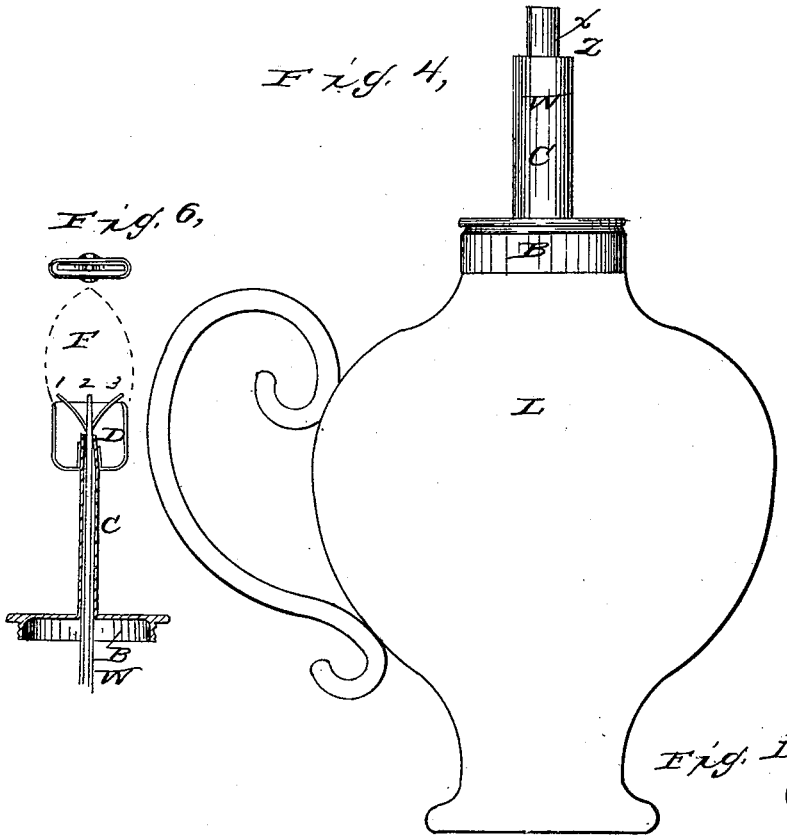


Fig. 6,

Fig 5,

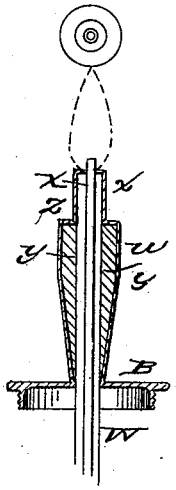


Fig. 16,

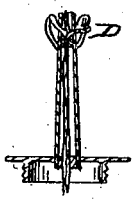


Fig. 7, Fig. 8, Fig. 9,

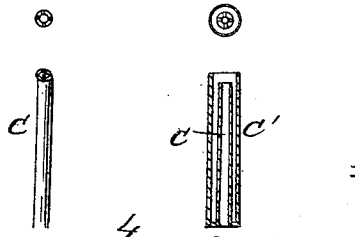


Fig. 10,

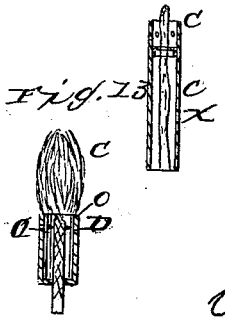


Fig. 13

Fig. 11,

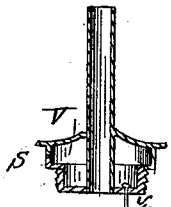


Fig. 12

Witnesses:

J. C. Clayton

V. C. Clayton

Inventor:

Charles N. Tyler

UNITED STATES PATENT OFFICE.

CHARLES N. TYLER, OF BUFFALO, NEW YORK.

IMPROVEMENT IN LAMPS.

Specification forming part of Letters Patent No. **53,506**, dated March 27, 1866.

To all whom it may concern:

Be it known that I, CHARLES N. TYLER, of Buffalo, Erie county, in the State of New York, have invented a new and useful Lamp; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference thereon marked.

In the drawings, Figure 1 is an elevation, showing the wick-tube provided with the cap. Fig. 2 is a vertical section through the wick-tube and cap, and shows the divided wick. Fig. 3 is a similar view, the wick not divided. Figs. 4 and 5 show modifications of the wick-tube. Fig. 6 shows a modified form of the cap. Fig. 7 shows the grooved wick-tube. Fig. 8 shows a wick-tube composed of a small tube inclosed in a larger one. Figs. 9 and 10 represent the perforated sliding partition. Fig. 11 shows the valve-chamber for preventing the overflow of the oil.

In the drawings, L represents the lamp-reservoir, which may be of any desired form or material.

B represents the ordinary metallic screw-top of the lamp. C is the wick-tube, which is a straight piece of metal tubing, being very small in diameter and very thin, for the purpose of conveying the least possible heat to the wick. The hole for the wick is also small, and partially closed at its upper end by compressing the end of the tube or by soldering in a small thin plate with a hole through its center for the passage of the combustion-wick. The wick is passed through the tube, filling it loosely its whole length; but, the hole in the end upon which the flame rests being much smaller than the main tube carrying the wick, it is necessary to cut out a portion of the wick to let it pass freely through the small hole. This may be done by first drawing the wick through the small hole and closely compressing it, and then cutting out enough of it, so that but two or three strands remain for the light to burn upon above the end of the tube. Then the main wick can be slightly drawn back, so as not to press the wick too firmly through the small hole in the end of the tube. Then, if a small light only is required, the threads may be left partially apart, which will make a small round flame, like that of the candle. Should a larger light be desired, the wick can be divided in three parts, having the points arranged as at the corners of an equilateral triangle and all in the same plane, as shown in Fig. 12, the points being as far apart as possible without causing the flame to smoke; or the strands may be divided in a straight line, as shown in Figs. 2 and 6, making the flame thin and flat. In this case two strands may be sufficient, leaving the third one cut slightly above the end of the wick-tube. The flame in these three different arrangements of the wick ranges from one to four candles in illuminating power, thus requiring a large flow of oil through the tube, while the metal surface presented at the base of the flame is very small. It is desirable to use a cap whenever the wick is divided. It will thus be seen that the rapid flow of cold oil through the small tube to support the flame keeps the tube sufficiently cool. Making the exterior of the wick-tube very rough assists in radiating the heat.

It is highly important to permit a free egress of the vapor in the lamp, and more especially in the wick-tube, as, if there be no such free egress, the vapor will force itself through or around the wick and the oil in it, forcing the oil or vapor up to the flame too rapidly. In Fig. 7 is shown a tube which is well adapted for this purpose. The tube is provided with several vertical grooves, *a a*, in the inside, which may be either spiral or straight. I prefer making them spiral in order to prevent their being filled up or obstructed by the wicking, but they answer a good purpose if made straight. The same object is readily accomplished by allowing the wick to be very loose in its tube, suitably supported. The combustion-wick may be supported (if quite short) by the supply-wick alone. Figs. 9 and 10 show a good device for supporting the loose wick.

c is a small metal disk, which may be made to slide inside of the tube, or may be fixed at a proper point therein, having a central opening, through which the wick passes and by which it is supported, and other openings around the central one for the free egress of the vapor. When this device is used the combustion-wick does not touch the tube at all. The disk *c* may be used, as shown in Fig. 9, at a point from about one-eighth to one-third of an inch below the tube, so as to close up the openings *o*. In Fig. 10 the disk *c* is shown about the middle of the tube, leaving open the holes *o*. The openings *o* are for the purpose

of admitting air to support the flame when exposed to a sudden draft of air.

In all of these devices in which the wick does not touch the tube I use a rather large tube, about the size of the common fluid-lamp wick-tube, or somewhat larger.

W is the supply-wick, which fits moderately loosely in the tube, as shown in Figs. 2, 3, and 6, and carries the oil up from the lamp-reservoir L.

X is the combustion-wick, which is much smaller—one-tenth to one-third the size of the supply-wick. I always use a combustion-wick much smaller than the supply-wick, considerably smaller than a candle-wick, so that I may be able to carry it as high as possible and expose as much vertical wick-surface as I can to the action of the atmosphere. The best mode known to me of making this combined supply and combustion wick is to let the smaller wick pass up through the center of the larger wick; but the same effect may be produced by different constructions.

D is the metallic cap. In Figs. 2 and 3 the cap is shown with its lower part packed with charred wood, cork, or other non-conducting packing, E, so that the wick-tube can derive no direct heat from the cap, since only the non-conducting portion of the cap comes in contact with the tube. There are several modes of applying the packing to the cap; but the best known to me is to make the packing of two or more layers of partially-charred wood which have been covered with glue, (or other substance insoluble in the oils used,) and having one or more layers, *e*, of cork between them. A hole for the passage of the tube is drilled through the layers of wood, which are merely intended to center the cap on the tube and through the cork which fits closely to the tube.

G is the vapor-chamber within the cap, closed except by the flame-slot *a* at the top, and surrounding one-eighth to one-half of an inch of the wick-tube, and also that part of the wick between the flame and the tube. This chamber contains a supplemental supply of vapor formed out of the imperfectly-expanded particles of oil, which will enable the flame to better withstand a sudden current of air.

In Fig. 6 the cap is shown open only at the top, where there is a slit of a width sufficient for the base of the flame. This cap is flattened, as shown, and fits closely to the tube. The cap provided with packing more perfectly accomplishes the object of keeping the oil in the tube cool. Fig. 16 shows a modification of the cap D.

In Fig. 13 is shown a cap of cylindrical form, open wholly at the top and fitting to the tube like the other caps described, the upper edge of the cap being higher than the top of the tube. There are several holes around the cap below the top of the inclosed wick-tube for the purpose of admitting air to support the flame when exposed to a sudden draft.

Fig. 4 shows the wick-tube made with a large portion, *w*, to contain the supply-wick, and a small upward extension, *x*, to receive the combustion-wick, there being a square shoulder, *z*, at the junction of the two portions *w* and *x*, to serve as a deflector of the heat from the lower part of the wick-tube, and to allow the combustion-wick to fit so loosely in the part *x* as not to touch its sides.

In Fig. 5 the construction is the same, except that the upper portion of the supply-wick tube *w* is larger than the lower portion, so as to admit of the insertion of a sponge or other elastic packing.

In Fig. 8 is shown another arrangement of wick-tube. The small wick-tube C, constructed as first described, is surrounded by a concentric tube, C′, considerably larger, its bottom being closed and fixed to the screw-cap B and its top being open and a little above the top of the wick-tube. The effect of this device is to throw the base of the flame above the top of the wick-tube and lessen the heat imparted to the wick.

In Figs. 2, 4, and 5 the combustion-wick is shown as a small undivided wick.

In Figs. 3 and 6 the wick is shown as divided into three points, so as to distribute and expose the oil to the action of a larger quantity of atmosphere than if the same quantity of wick and the oil therein contained formed but a single wick.

In Fig. 14 is shown the size of the common candle wick and flame, which serves to illustrate the size of the small wick and small tube used by me. For the same reason Fig. 15 represents the common lamp-tube.

It is not very easy to define the limits of a small wick or a small wick-tube such as I use, but the result, such as I have described, from the use of the devices set forth can only occur from the use of a small wick or small tube, and will serve as a criterion by which to determine whether a given wick or tube is a small one.

In Fig. 11, V is a valve-chamber, and *v* a valve for allowing the escape of compressed air from the lamp, so as to avoid overflow.

In the operation of my invention, the reservoir L being provided with a suitable quantity of oil, light is applied to the wick, and the flame F is formed at the end or ends of the wick somewhat above the end of the wick-tube, and resting on the cap, which radiates the heat into the atmosphere and away from the lamp.

The operation of the lamp is such that the flame, being above the tube, imparts no direct heat to the wick-tube, which is further kept cool by the large supply of oil in the tube, which is carried up by the supply-wick so fast that the consumption by the flame is rapid enough to prevent the formation of any vapor in the tube, and there being no vapor created in the tube faster than it is consumed, there is none to rush up into the flame to form smoke. It will be found, too, that the base of the flame is broader than that of the common lamp and is similar to that of the common candle. This is the operation of the supply and combustion

wicks with the simple tube shown in Fig. 3, but without the cap or the divided wick. In this case I increase the amount of oil consumed, and also the surface of the wick exposed to the air, by separating the strands of the wick at such a distance from each other as to give the largest amount of light from a given quantity of oil consumed. When the strands are at a proper distance from each other the flame is clear, being entirely free from all traces of smoke or other unconsumed carbon.

In the combustion of oils rich in carbon a strong current of atmosphere is constantly sought in all modes of burning now in use, while by my discoveries this is avoided, and the desired result is obtained by carrying the liquids consumed through the required space in the atmosphere to make the most perfect light.

When the cap D is applied to the tube the operation is similar, but the vapor-chamber G will contain a supply of vapor formed at the base of the flame. This vapor serves as a supplemental supply to sustain the flame during exposure to any sudden draft or motion, and also serves to raise the flame a little higher up from the top of the tube and make it rest upon the cap. It also protects the ends of the strands 1 and 3 from the upward current of air, so as to prevent their too rapid charring.

The tubes shown in Figs. 4 and 5 are intended to be used without the caps, though they may be used. They operate upon the same principle as the other tubes, but their shoulders *z* serve to reflect the heat, and the greater capacity of the tube *w*, which contains the sponge or supply-wick, allows a larger quantity of cool fluid to be brought near the burning-point.

Burners or lights constructed as above described may be used with draft-chimneys, if desired.

Although by my invention I have considerably lessened the danger from using the explosive hydrocarbons, yet prudence requires that they should be used only for stationary lamps, as in streets, for head-lights, and the like.

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

1. The wick W X, as shown in Figs. 2 and 3, substantially as and for the purposes set forth.

2. The divided wick, substantially as and for the purposes set forth.

3. The wick-supporters *c*, substantially as and for the purposes set forth.

4. The wick-supporter *c*, in combination with a wick-tube larger than the wick, substantially as and for the purposes set forth.

5. The wick-tube C, as shown in Fig. 4, substantially as and for the purposes set forth.

6. The wick-tube C, as shown in Fig. 5, substantially as and for the purposes set forth.

7. The grooved wick-tube, as shown in Fig. 7, or its equivalent, substantially as and for the purposes set forth.

8. The wick-tube, used with the loose wick, when provided with openings *o*, as in Fig. 9, substantially as and for the purposes set forth.

9. The closed vapor-chamber G, in combination with wick W X, substantially as and for the purposes set forth.

10. The cap D, in combination with wick W X, substantially as and for the purposes set forth.

11. The cap D, in combination with the small wick, substantially as and for the purposes set forth.

12. The cap D, as shown in Fig. 6, substantially as and for the purposes set forth.

13. The cap D, with openings *o*, as shown in Fig. 13, substantially as and for the purposes set forth.

14. The valve-chamber V, provided with a valve, *v*, and opening *s*, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand.

CHARLES N. TYLER.

In presence of—
V. C. CLAYTON,
JO. C. CLAYTON.