(No Model.) 2 Sheets—Sheet 1.

# A. L. LARWILL & F. E. SMALL.

## OIL BURNER.

No. 585,822. Patented July 6, 1897.

Fig. 1

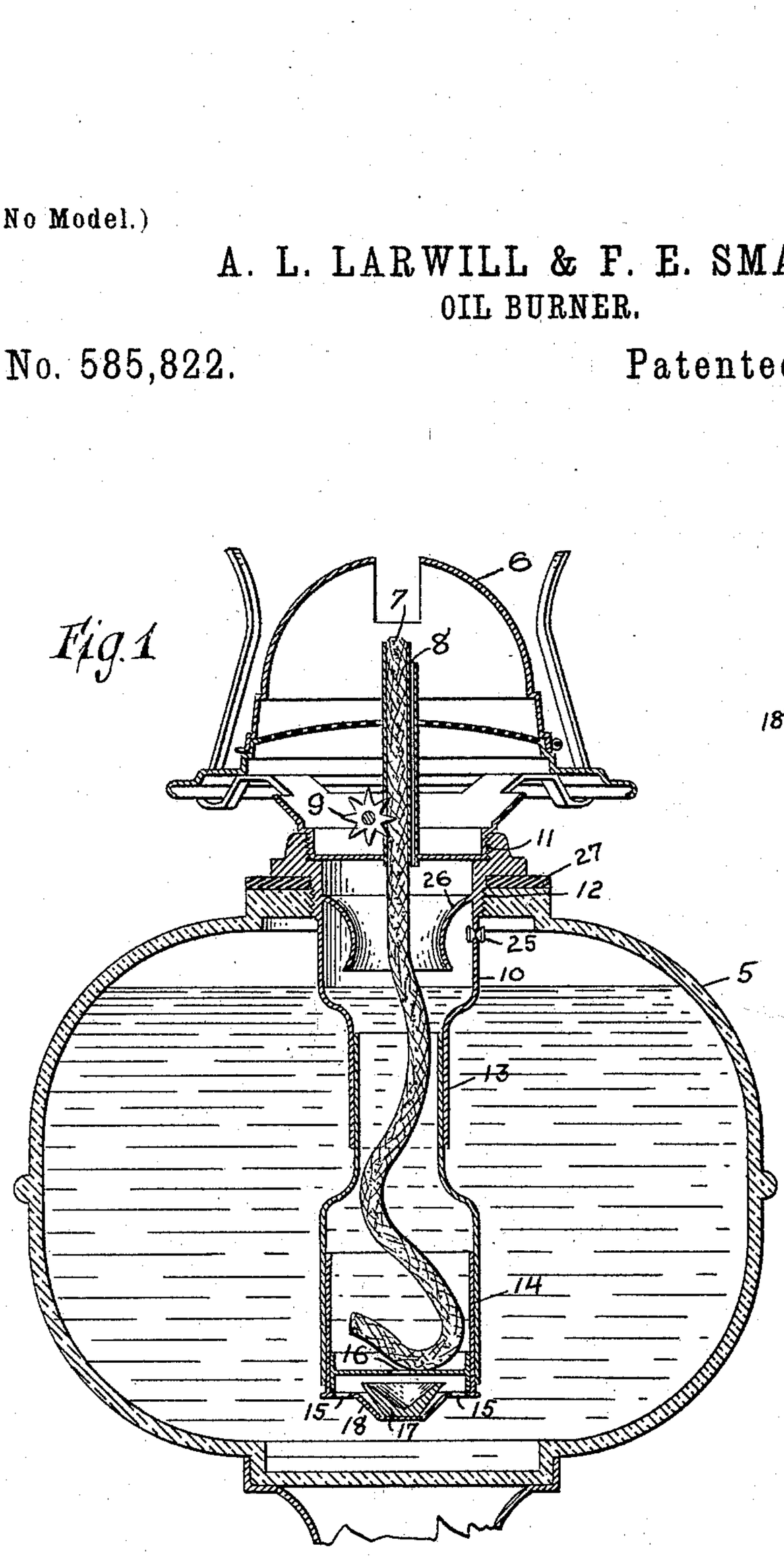



Fig. 2

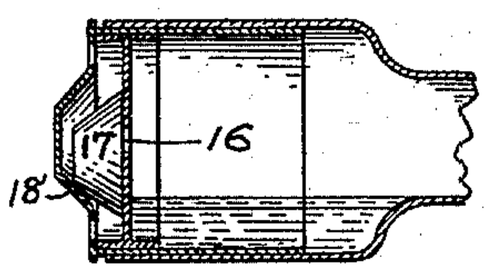



Fig. 3.

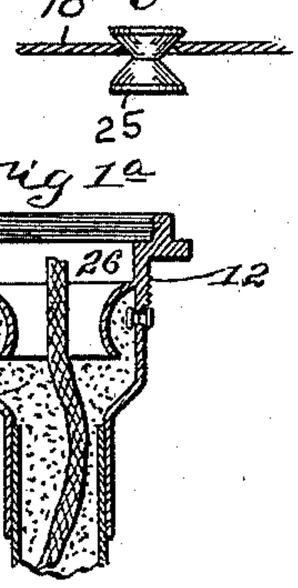



Fig 1a




Fig. 5.

Fig. 6.

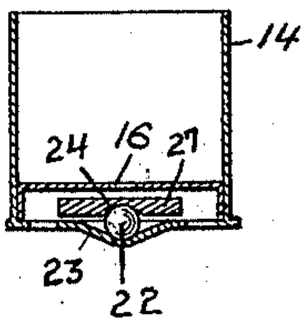
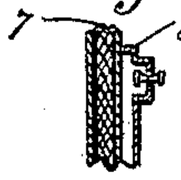



Fig. 1b.



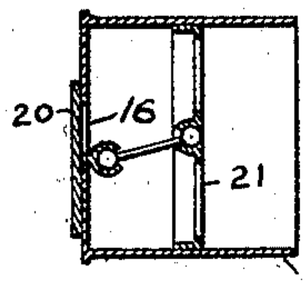
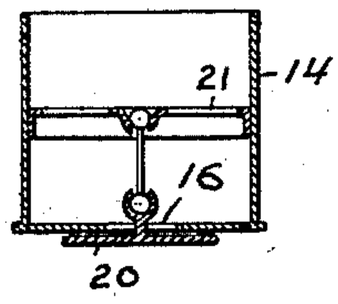




Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

# A. L. LARWILL & F. E. SMALL.

## OIL BURNER.

No. 585,822. Patented July 6, 1897.

Fig. 8.


Fig. 7.

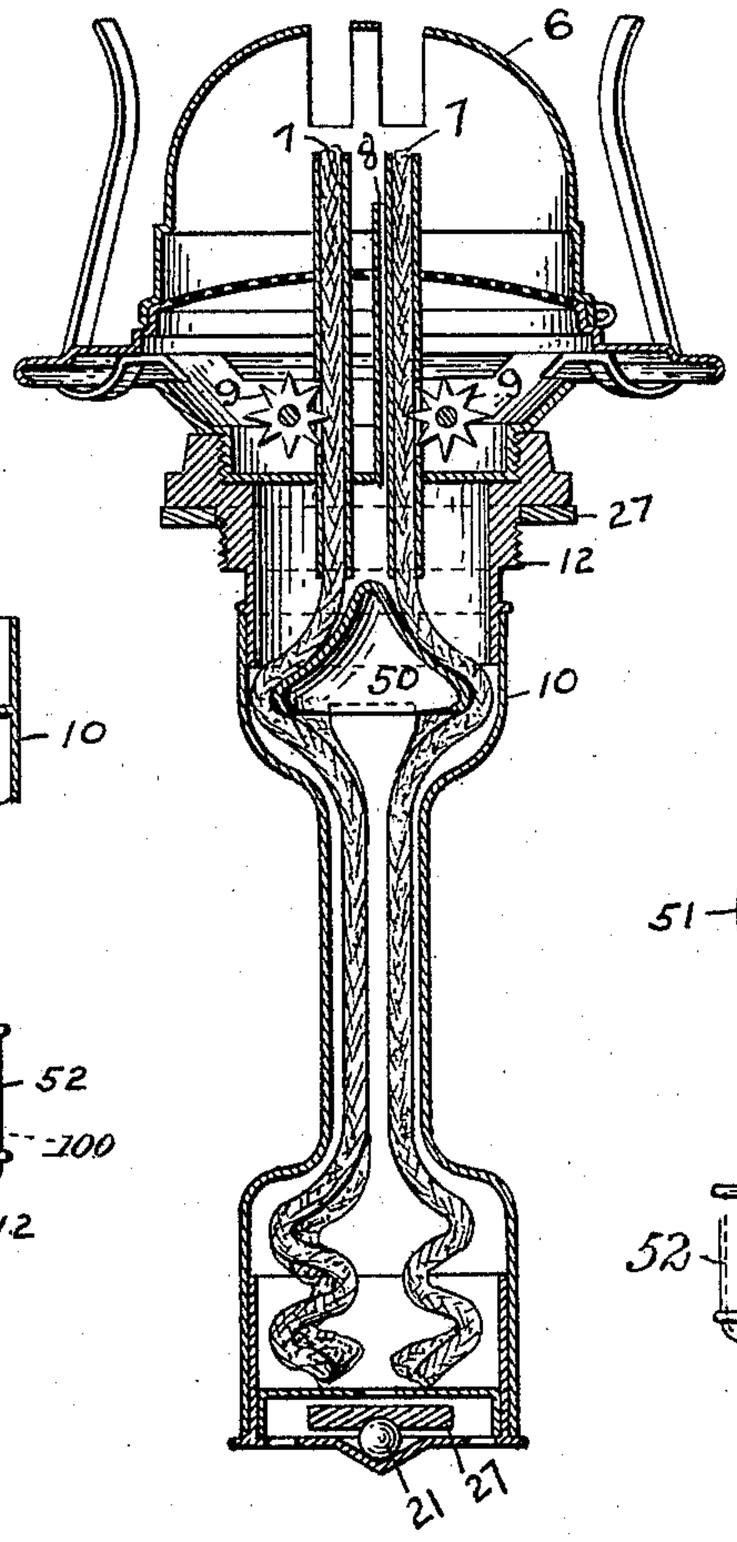



Fig. 11.

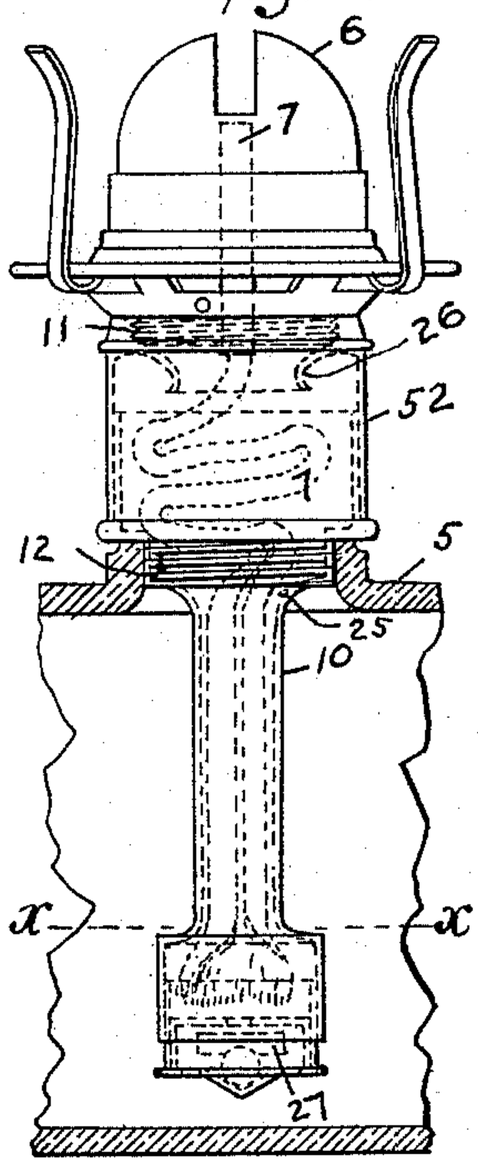
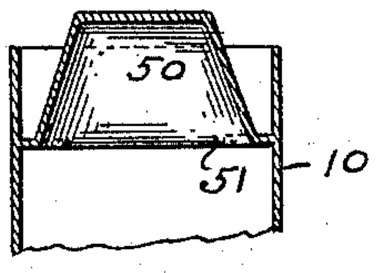



Fig. 9.



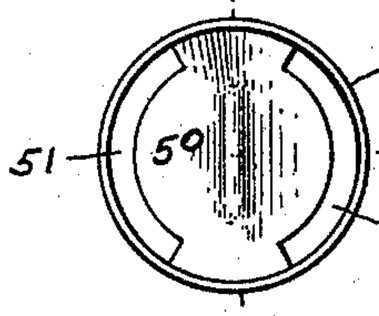




Fig. 10.

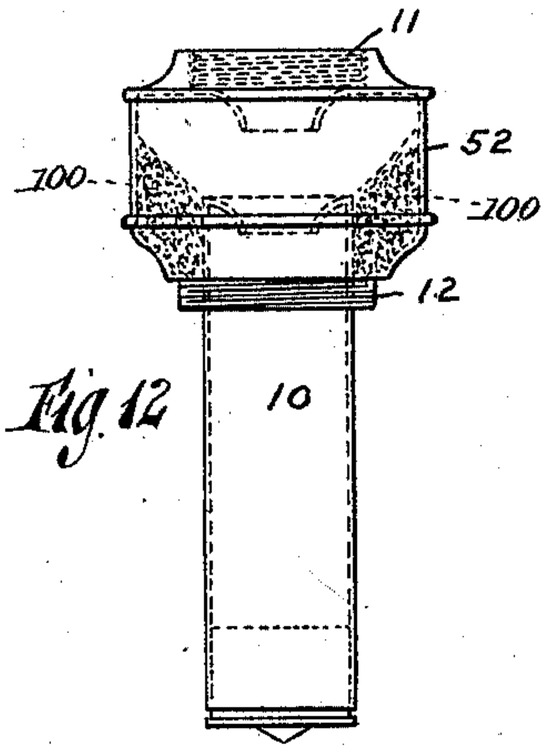



Fig. 12

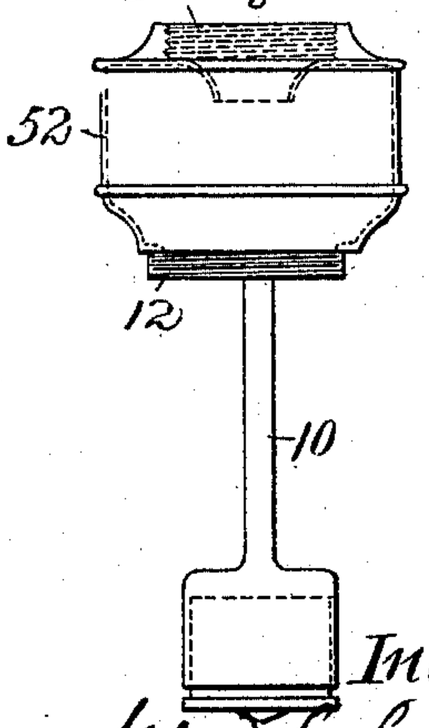



Fig. 13.

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# UNITED STATES PATENT OFFICE.

ALFRED LANGDON LARWILL AND FRANK E. SMALL, OF BROOKLYN, NEW YORK.

## OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 585,822, dated July 6, 1897.

Application filed April 4, 1895. Serial No. 544,428. (No model.)

*To all whom it may concern:*

Be it known that we, ALFRED LANGDON LARWILL and FRANK E. SMALL, citizens of the United States, and residents of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Oil-Burners, of which the following is a specification.

Our present invention relates to oil-lamps, stoves, &c., of various descriptions; and it consists of certain novel parts and combinations of parts particularly pointed out in the claims concluding this specification.

In the accompanying drawings we have shown our invention applied in several of the forms at present preferred by us to a kerosene-lamp of ordinary construction, but it will be understood that various other modifications and changes may be made without departing from the spirit of our invention, and that it may be applied to lamps of different construction and burning other fluids than kerosene. It is also applicable to oil-stoves and analogous contrivances.

In the accompanying drawings, Figure 1 is a vertical section through a kerosene-lamp of ordinary construction, showing our invention applied thereto. Figs. $1^a$, $1^b$, 2, 3, 4, 5, and 6 are detail views of various valve mechanisms. Fig. 7 shows another form of burner and wick-chamber embodying our invention, and Figs. 9 and 10 are detail parts thereof. Fig. 11 shows still another form of burner and wick-chamber involving our invention, and Fig. 8 is a section through the same on the line $x\,x$, Fig. 11. Fig. 12 is a modification of Fig. 11. Fig. 13 is a view of the wick-chamber shown in Fig. 12, taken at right angles to the view of said figure.

Similar numerals of reference indicate the same or corresponding parts in all the figures of the drawings.

The following is a description of the structures illustrated in the drawings, which, as we have said before, show some of the forms in which our invention may advantageously be embodied.

Referring to Fig. 1, 5 is the oil-well of an ordinary kerosene-lamp. 6 is a burner of ordinary construction attached thereto. 7 is the wick, 8 a vent for admitting air, and 9 the spur-wheel by means of which the wick is raised and lowered. Attached to the burner 6 is a tube 10, forming a receptacle for that part of the wick which projects downward below the burner.

In the drawings we have shown the burner 6 attached to the tube 10 by means of a screw-threaded joint 11; but obviously this joint might be made, if preferred, a slip-joint, or the parts might be attached in any other suitable manner. The tube 10 is likewise provided with a screw-threaded section 12, engaging with the screw-thread on the top of the well. We prefer to make the tube 10 with one or more telescopic or sliding joints, such as 13 14, by means of which its length may be varied and adjusted to wells of different depths. This tube forms a chamber inclosing the wick, which chamber is normally in communication with the well of the lamp, containing oil.

In the form shown in Fig. 1 the bottom of the chamber 10 is pierced by apertures 15 15 and 16, through which oil from the well gains access to the interior of said chamber. These apertures are preferably, as shown in the drawings, provided with a valve which normally permits oil to pass from the well into the chamber, but which, when the lamp is tipped or upset, prevents the further ingress of oil. Such a chamber, however, has a useful function even if the apertures communicating with the well are not controlled by a valve, in that if the wick is turned down so as to fall free from the burner it is caught therein and does not fall to the bottom of the well. We prefer, however, to control these apertures by means of a valve which, when the lamp is tipped or upset, will automatically close. Such a valve 17 is shown in Fig. 1. It is in the form of a truncated cone and normally rests in a depression 18 in the bottom of the reservoir. The valve-face is preferably cut away so as to present only a thin annular ring or knife-edge in contact with its seat to avoid sticking. In the position shown in Fig. 1 it presents no obstacle to the free entry of oil from the well into the reservoir, but when the lamp is tipped the valve 17 (see

Fig. 2) slides down the inclined surface 18, on which it rests, and in so doing is forced forward onto its seat, closing the aperture 16 and preventing oil subsequently entering the reservoir while the lamp is in this position.

Referring to Fig. 2, it will also be seen that the center of gravity of the valve in this position is nearer its valve-face than is its center of support. Hence it is in a state of unstable equilibrium and closes flat against its valve-seat. Various forms of valves having substantially the same function may be employed.

Referring to Figs. 4 and 5, 20 is a valve supported with universal joints from a spider 21, and which, when in a vertical position, permits the free passage of oil through the aperture 16. When the lamp is tipped, as shown in Fig. 5, the valve 20 seats itself against the port 16 and prevents the further passage of oil until it is restored to its normal position. In Fig. 6 still another form of valve is shown, consisting of a piece 27 and a ball or shot 22, resting in a depression 23 in the bottom of the chamber. The piece 27 is made with a depression or concavity 24 on its under side, in which the shot rests. When this valve is tipped, the ball 22 rolls down the inclined surface 23, carrying the valve 27 with it, and at the same time pressing it forward against its seat, thus closing the port 16.

All of the forms of valves we have described are sensitive and positive in their action, closing the port 16 even before the lamp has been turned on its side.

With respect to the valve shown in Figs. 1 and 7 it will be observed that the said valves roll or slide on a plane inclined toward the valve-seat. This is the form of valve which we prefer, as it is extremely sensitive and positive in action, is less liable to get out of order, and requires but a very small space for the working parts.

The chamber 10 is provided with a vent 25, which may or may not be controlled by a valve. Through this vent atmospheric air enters into the space in the well above the oil to take the place of the oil as burned. In the drawings we have shown this vent as valved, so that oil cannot enter therethrough when the lamp is on its side. This valve is illustrated, enlarged, in Fig. 3. It consists of two conical sections joined end to end, which close the vent-hole when the chamber 10 is in a horizontal position, but which offer no obstruction to the free passage of air when it is in a vertical position.

26 is an annular flange which prevents some or all of the oil contained in the reservoir flowing out through the wick-hole or vent-hole 8 when the lamp is turned on its side.

We consider it preferable to make the reservoir as small as practicable, so that there may be as little oil as possible contained therein to be burned after the valve 17 closes. For this reason we preferably make the middle section of the tube smaller, increasing it again at the lower end, so as to permit a considerable length of wick to be coiled therein. The tube may be made in any suitable form, either circular or flat.

27 is a washer between the shoulder on the upper end of the tube and the top of the well to secure a tight joint at this point.

Fig. 7 shows a duplex burner with our invention applied thereto. 7 7 are the wicks, 8 the air-vent, and 9 9 the spur-wheels controlling the raising and lowering of the wick. 10 is the chamber containing that part of the wicks which projects below the burner. 27 is the washer, and 12 the screw-thread taking in a corresponding thread on the top of the well, which in this figure is not shown. 50 is a guide or spreader which intervenes between the wicks. A top view of the chamber 10 and the spreader 50 is shown in Fig. 10. 51 51 are the slots, in this instance curved, through which the wicks 7 7 pass. Fig. 9 shows a vertical section through the same on the line *y y*, Fig. 10. As the wicks fit the slots 51, when the lamp is overturned the oil contained in the chamber 10 will have to pass this barrier before it can leak, and such barrier effectually aids in preventing any oil being scattered when the lamp is upset. The chamber 10 is preferably made flat, so that but a small amount of oil will be held therein. Of course in the case of a single wick, such as shown in Fig. 1, the chamber 10 may be provided with a diaphragm and the wick pass through the slot in such diaphragm substantially as the two wicks pass through the slots 51 51, Fig. 10.

Still another form of wick-tube is shown in Fig. 11. In this instance the chamber 10, or that part of it which in the normal operation of the lamp contains oil, is still further reduced in capacity, the excess of length in the wick being coiled in a chamber 52, situated above the oil of the lamp. In this chamber 10 the wick may be made flat, or it may be curved, as shown in Fig. 8. We prefer to have the chamber 10, or the upper part of it at least, arranged so as to hold the wick curved or doubled longitudinally, as shown in Fig. 8, to diminish the lateral or radial dimension of the wick-tube within the annular flange which holds the oil in the reservoir from flowing out through the burner. In other words, by diminishing the lateral extent of this wick-tube we increase the effective size of the chamber which holds the oil when the lamp is upset.

The advantage of the form shown in Fig. 11 is that it enables us to have the chamber in the lamp only just large enough to contain the wick, and hence when the lamp is upset there is no danger of oil being ejected through the burner, and the lamp will continue lighted only a few minutes, when all the oil in the chamber will be exhausted. Indeed, the part of the chamber 10 which contains oil when the lamp is upright may be so small that the wick is, practically speaking, only kept wet, and little or no free oil is contained in the chamber. The tube or chamber or any de-

sired part thereof may be filled with an absorbent 75, Fig. 1[a].

By referring to Fig. 12 it will be readily seen that if the tube 10 be filled with absorbent material—such as sponge or worsted, &c.—and the wick be coiled on top and in contact with the absorbent it will take up enough oil to burn, and there will be no free oil to flow out, and the flame from the wick will be the sooner burned out, while if the upper part be filled with the absorbent 100, Fig. 12, and kept from contact with the wick it would remain dry and when the lamp was upset would take up the oil from the tube, with the result of shortening the time the wick will burn. As before described, this tube 10 may be provided with telescopic joints to adjust it to the depth of the well, and its parts may be united by any suitable form of joints.

A modification of Fig. 11 is shown in Fig. 12. In this case the tube 10 at its upper end projects above the floor of the chamber 52. This removes the wick from continuous contact with the tube 10 and chamber 52 and prevents the oil draining from the wick down the sides of the tube 10.

The operation of the devices may be thus described: It is well known that oil-lamps not infrequently explode when overturned, and that even if they do not explode they often set fire to surrounding objects. We have demonstrated by repeated experiments that the devices hereinbefore described effectually do away with all danger incident to the overturning of lamps. The prompt closing of the valve which controls the port by which communication is normally established between the chamber containing the wick and the well prevents the ejection of oil, and the lamp after being overturned continues to burn only for a brief period of time, or until the available oil contained in the chamber is exhausted. The air-vent in the reservoir being closed by the oil and being very small, will in most cases not permit oil to flow into the wick-chamber while the lamp is on its side, or such small quantities will pass that little or no injury will result therefrom; but even this danger is removed by the employment of a valve controlling this vent-opening. As the contents of the reservoir are small, all or nearly all of the oil contained therein, owing to its shape, will be retained therein and practically none will flow out past the wick or through the air-vent 8.

If desired, a valve operating in substantially the manner above described may be applied to the air-vent 8 in the burner, as shown in Fig. 1[b]. The reservoir instead of being removably attached to the burner might of course be made integral therewith.

What we claim is—

1. The combination with an oil-burner and a reservoir containing oil of a wick-chamber, a valve having a transverse as well as a to-and-fro motion with reference to its seat moving on a plane inclined thereto interposed between said wick-chamber and said reservoir, the valve being constructed and arranged to automatically close when the lamp is laid horizontally and to automatically open when the lamp returns to its normal position.

2. The combination with an oil-burner and a reservoir containing the oil, of a chamber in valved communication with said reservoir the valve of said chamber being constructed and arranged to automatically close when the lamp is tipped, a wick contained in said chamber and a flange forming a pocket when the reservoir is overturned.

3. The combination with an oil-burner of a reservoir containing the oil, of a chamber in valved communication with said reservoir, said chamber being of diminished section where submerged in the oil and of enlarged section above and the valve of said chamber being constructed and arranged to automatically close when the lamp is tipped.

4. The combination with an oil-burner and a reservoir containing the oil, of a chamber adjustable in length, in valved communication with said reservoir the valve of said chamber being constructed and arranged to automatically close when the lamp is tipped.

5. The combination with an oil-burner and a reservoir containing oil, of a wick-chamber, a flange forming a pocket when the reservoir is overturned and a wick-tube within said flange smaller in width than the width of the wick so that the latter is doubled or curved therein.

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