P. H. CONRADSON.

TUBULAR LANTERN.

APPLICATION FILED MAY 17, 1906.

916,533.

Patented Mar. 30, 1909.

3 SHEETS—SHEET 1.

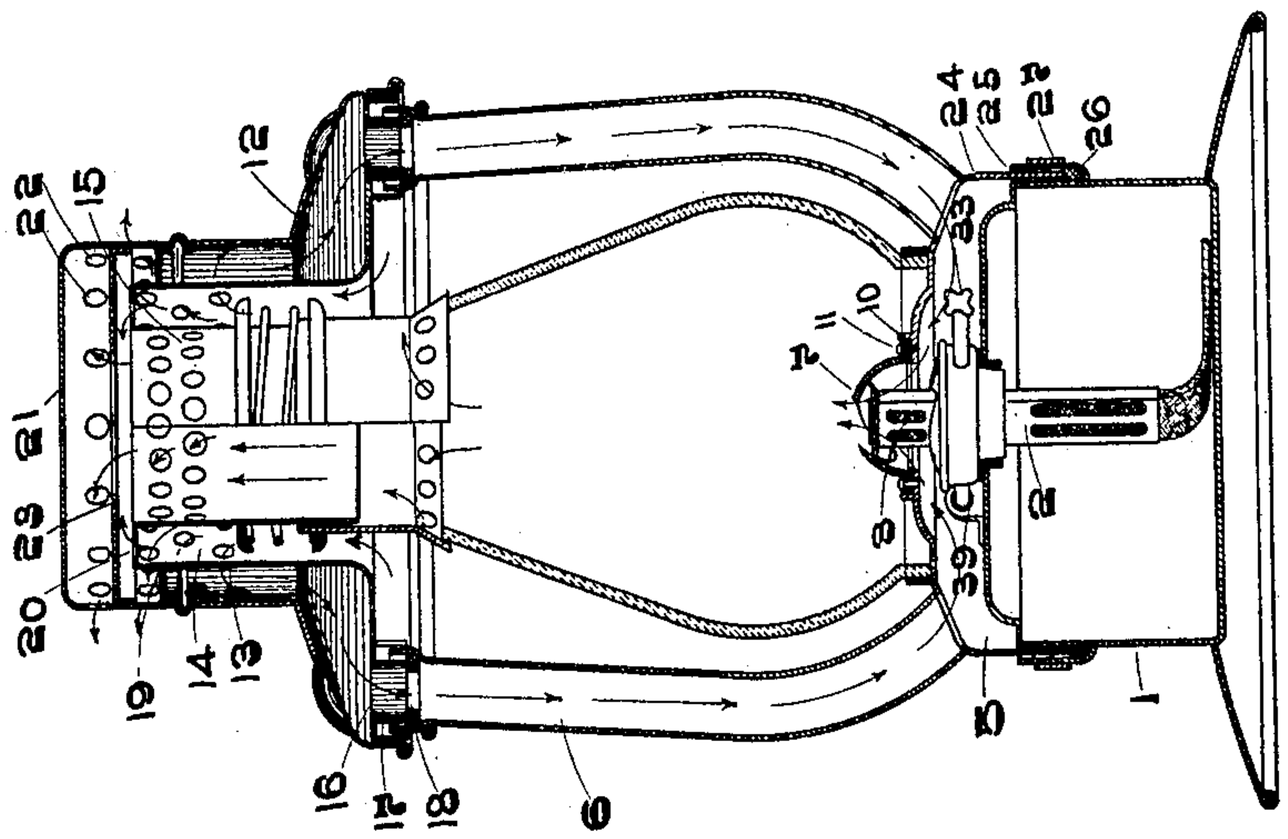

FIG. 2.

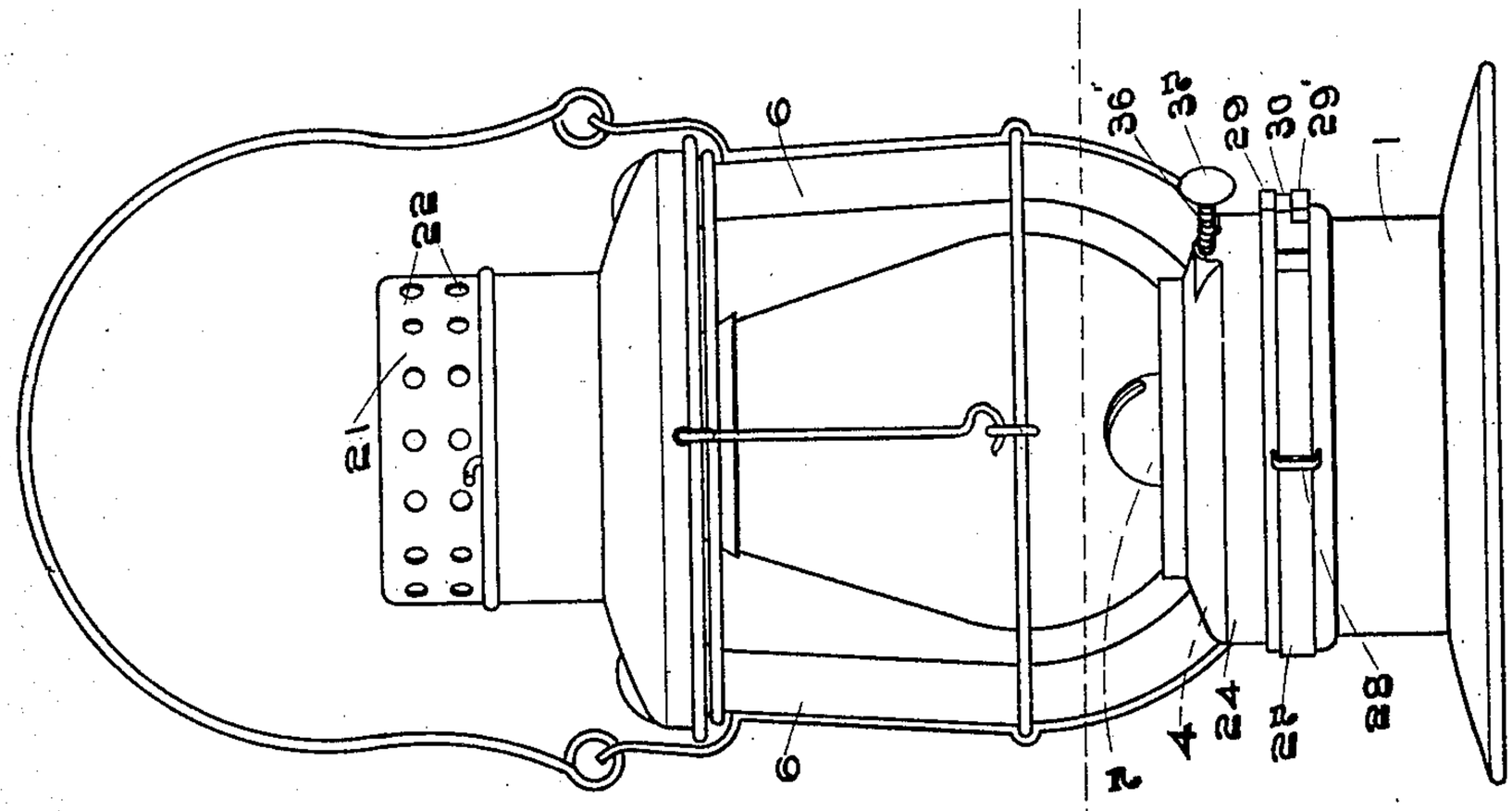

FIG. 1

Witnesses

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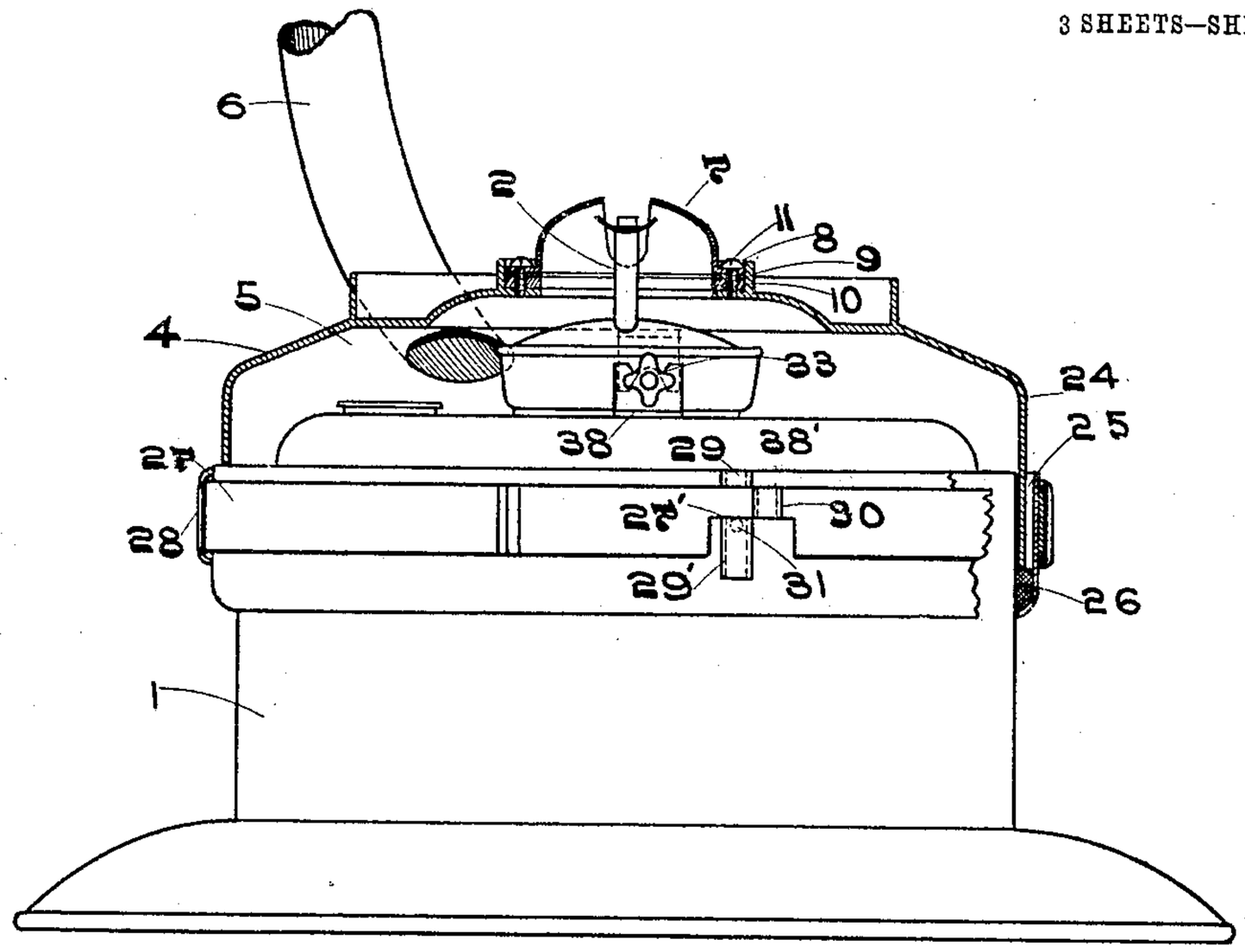

FIG. 3.

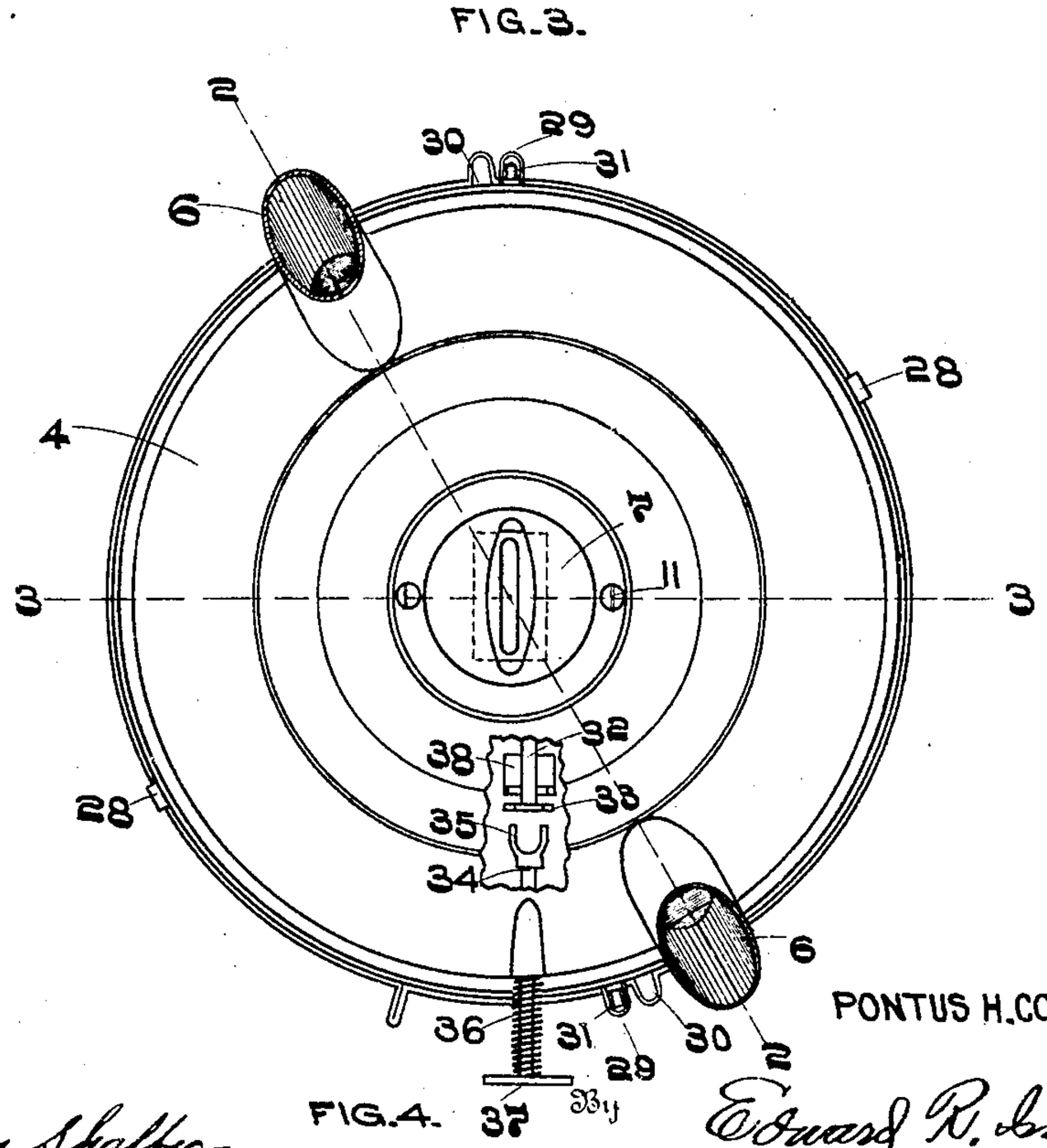

FIG. 4.

Witnesses

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3 SHEETS—SHEET 3.

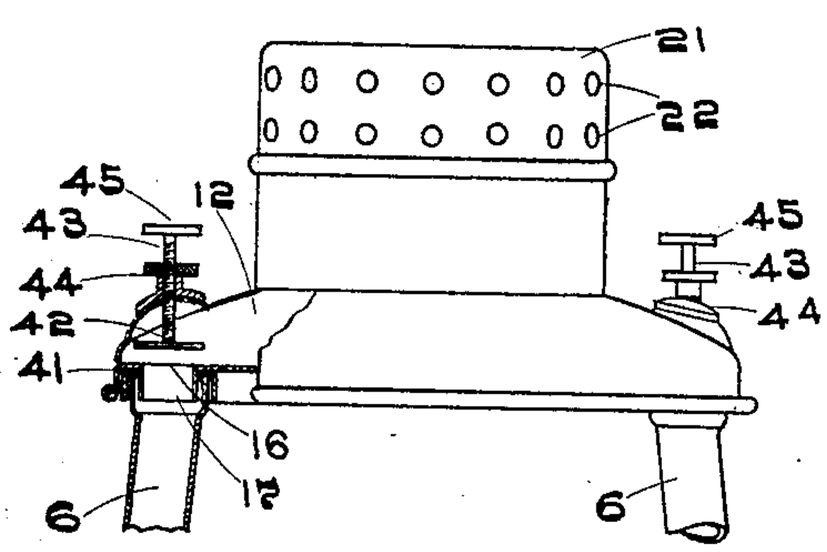

FIG. 5.

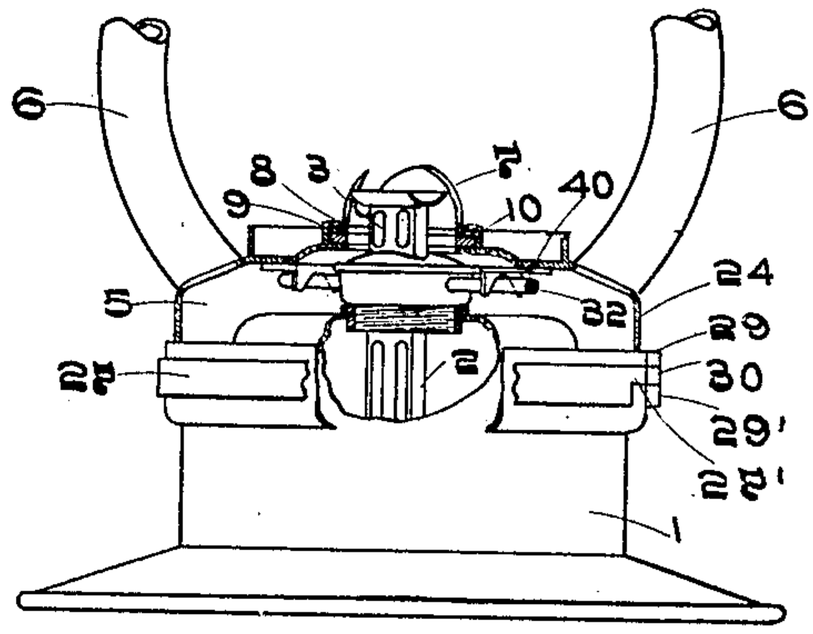

FIG. 6.

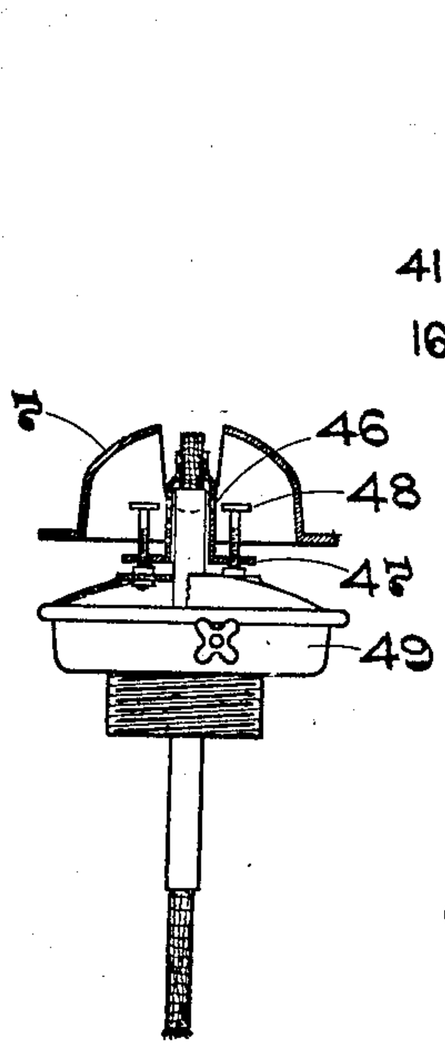

FIG. 8.

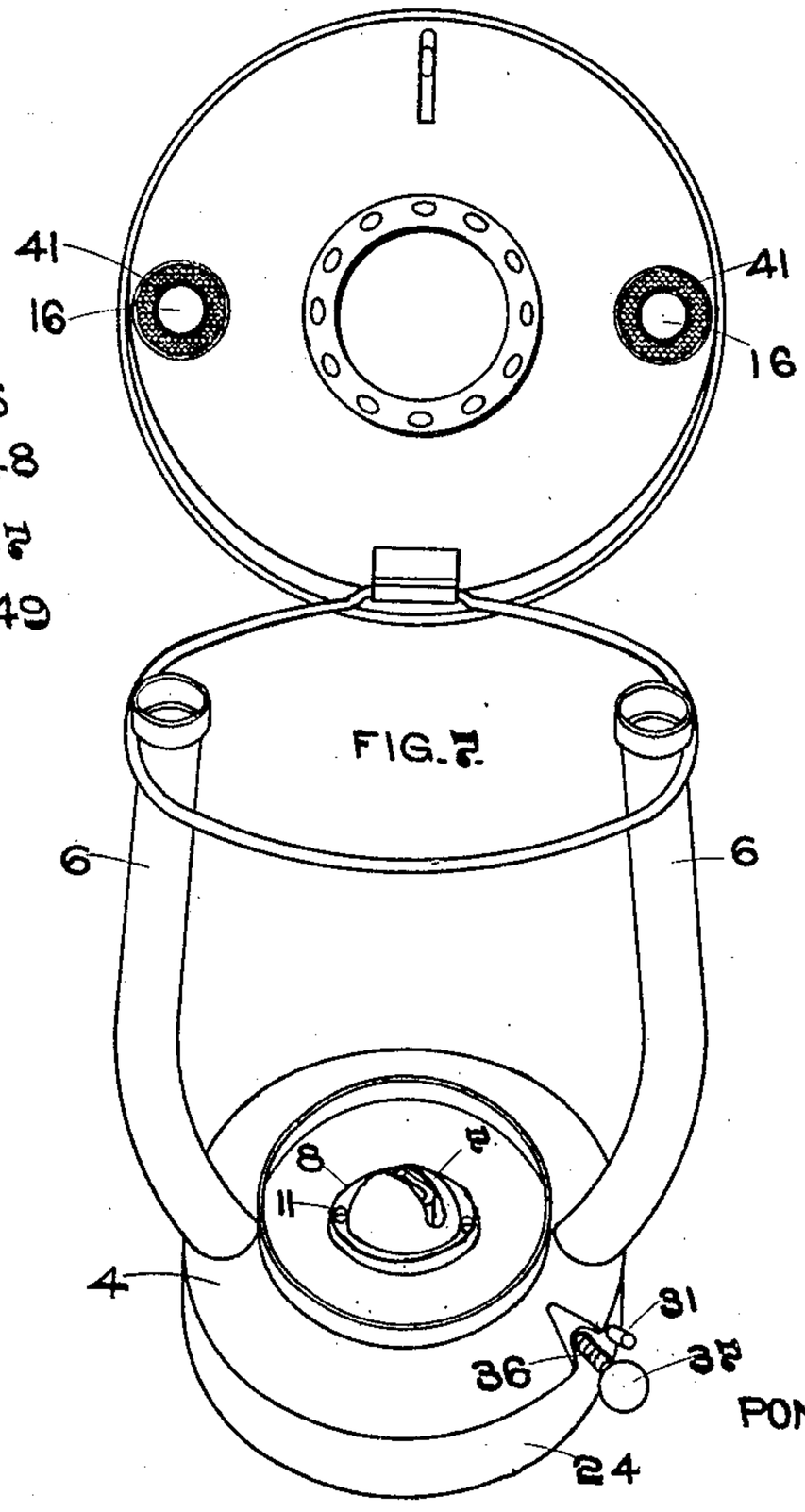

FIG. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

PONTUS H. CONRADSON, OF FRANKLIN, PENNSYLVANIA.

TUBULAR LANTERN.

No. 916,533. Specification of Letters Patent. Patented March 30, 1909.

Application filed May 17, 1906. Serial No. 317,350.

To all whom it may concern:

Be it known that I, PONTUS H. CONRADSON, citizen of the United States, residing at Franklin, in the county of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Tubular Lanterns, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in tubular lanterns for burning high fire-test illuminating oils, the construction and operation of which is fully set forth in the following specification and illustrated by the accompanying drawings, which form a part hereof, and in which,

Figure 1, is an elevation. Fig. 2, is a central vertical section on line 2—2 of Fig. 4. Fig. 3, is a section on line 3—3 of Fig. 4, through the lower air chamber and the burner cone, the oil reservoir being shown in elevation. Fig. 4, is a plan view of the burner, a portion of the upper wall of the lower air chamber being broken away to expose a portion of the wick raiser mechanism to view. Fig. 5, is an elevation, partly in section of the upper air chamber, showing a modified form of air regulating device. Fig. 6, is an elevation of the oil reservoir, showing the lower air chamber in section,—the purpose of this view is to show the alining mechanism for a screw-jointed wick-tube. Fig. 7, is a perspective view of the lantern frame showing the top open. Fig. 8, is an elevation, partly in section of my vertically adjustable wick-tube.

The same reference figures indicate identical parts in several views.

As is well known to those skilled in the art to which this invention pertains, lanterns are divided into two well defined classes, viz: non-tubular and tubular.

The use of non-tubular lanterns is confined largely to railway service, and for the purpose of securing the highest degree of safety to life and property, (because of the presence of a substance which is considered so highly inflammable, as most of the illuminating oils are); non-tubular lanterns are designed to burn a high fire-test oil, having a fire test above 250° F. While very satisfactory results have been obtained from these lanterns, it has not been possible, prior to my invention, to produce with the lanterns for burning high fire-test oils, so bright a flame as has been produced by lanterns using a low fire-test oil of 150° F., or below, for the following reason:

In the non-tubular or hand signal lantern, the process of combustion is the most simple and natural known in the art, it is the same process which obtains in the common candle,—hence the essential elements or features of this lantern, as thus far constructed, are the wick, wick-tube, and the oil reservoir; the globe, frame and other elements which constitute the complete lantern are merely for the purpose of protecting the flame,—1st. to keep it from being "blown out". 2nd. as a safe-guard, to prevent inflammable material from coming in contact with the flame. In securing these prime effects, the lantern is incidentally so constructed, as to maintain such conditions, as to air supply, as would exist were none of the other elements present, except the wick and means of supplying it with oil.

The tubular type of lanterns, which are adapted to general use, are designed to burn low fire-test illuminating oils, and are constructed with the purpose of not only embodying the objects above named, but with a further important object of increasing the rapidity of combustion, and the consequent luminosity or candle power of the flame, by delivering to the burner, or point of combustion, an increased quantity of air by means of draft.

Heretofore the difficulty in accelerating the rate of combustion in lanterns, for the use of high fire-test oil, to secure greater brilliancy of light, has been to construct a burner which would permit the escape of the increased heat, with such readiness, that the wick would not, even in a short time become carbonized to such an extent, that its capillary action and oil delivery would not be reduced, and wholly obstructed. Hence in all non-tubular lanterns now in the market, it has been necessary to sacrifice brilliancy of light to safety, and the simple construction which would successfully burn high fire-test oils.

Be it understood, therefore, my invention lies in the construction, whereby I am enabled to successfully employ a high fire-test illuminating oil, having a fire-test of 250° F., or above, wherein the rate of combustion is accelerated, an increased brilliancy of flame is obtained, and the heat developed thereby

is permitted such ready escape, as to cause no undue carbonizing or charring of the wick, especially within the wick-tube.

The construction by which these effects are obtained is substantially as follows:—I provide an oil reservoir, which conforms in general design to those commonly in use; the wick tube 2 may be inserted therein by either a slip joint, as shown in Fig. 2, or a screw joint, as shown in Fig. 6, both being commonly employed; my wick-tube differs from those in common use, by having the upper portion thereof, which is outside of the oil reservoir, ventilated or provided with openings 3, which assist in preventing the carbonizing of the wick, due to being in contact with the heated metal of the tube.

The lower portion 4 of the frame of the lantern, in conjunction with the upper wall of the oil reservoir, forms the lower air chamber 5, to which air is admitted by means of the tubes 6, 6. The only egress for air, from said lower air chamber, is through the flame slot of the burner cone 7, hence all the air passing through said lower chamber, is directed to the flame, thus producing an accelerated combustion. The wick-tube extends up into such close proximity to the dome of the burner cone, as to cause the luminous portion of the flame to be wholly above said cone. This is an essential point in the successful burning of high fire-test oils in tubular lanterns, and is a point of novelty in my invention. If the top of the wick-tube does not extend into close proximity to the dome of the burner cone, no good or practical results are obtained, with high fire-test illuminating oils, because if the top of the wick-tube is placed low in the burner cone, as is the custom, and correctly so with low fire-test oils, it would be necessary, with high fire-test oils to raise the wick far above the top of the wick-tube to get a satisfactory flame, (wherein the luminous portion is wholly above the cone), the result of this would be to cause the wick above the top of the wick-tube to carbonize very fast (inside a few hours), and practically stop the capillarity or flow of oil to point of combustion or volatilization, and consequently the luminous part of the flame would soon be impaired, the brilliancy or candle power greatly diminished, and in a few hours useless for satisfactory practical service.

In order to secure the proper height of the burner cone above the wick-tube, said cone is so constructed as to be capable of a certain amount of vertical adjustment, and for this purpose, I form an annular flange 8 at the base of said cone, beneath which may be placed gaskets 9—10, one or more as may be required to effect the proper adjustment of said cone. Cone 7 is then firmly secured in position by means of screws 11.

I have found in actual practice, that the distance between the top of the wick-tube and the dome, or top wall of the burner cone, must be approximately three-sixteenths (3/16) of an inch, in order to successfully burn high fire-test illuminating oils, composed of from 80 to 85 per cent. high fire-test hydrocarbon illuminating oil, and from 20 to 15 per cent. of suitable fat oils, and that said distance must be decreased as the percentage of fat oil is increased, and vice versa; therefore in order to successfully meet all possible conditions imposed by the use of high fire-test oils, I have, in addition to my vertically adjustable cone, devised a vertically adjustable wick-tube, shown in Fig. 8. From an inspection of said figure, it will be noted that the upper portion of the wick-tube is provided with a vertically movable member 46, having at its base the horizontal members 47, which are suitably screw-threaded for the reception of the vertical screws 48; the lower ends of which screws are revolubly secured to the upper wall of the body 49 of the burner. By turning said screws, the extension 46 of said tube may be vertically adjusted to a nicety as and for the purpose set forth.

A further object is secured by the construction of the dome and wick-tube above set forth, viz,—an easy, convenient and inexpensive renewability of each, when it becomes burned out, or for any reason, becomes defective.

From the foregoing description of the lower air chamber, the wick-tube and the burner cone, it will be noted that there are here four points of novelty in my construction, viz: 1st. the causing of all the air which supports combustion, or for any other purpose, enters the lower part of the lantern globe, to pass through the flame slot of the burner cone. 2nd. the vertical adjustability of said cone, whereby the luminous portion of the flame is brought above said cone. 3rd. the vertically adjustable wick-tube. 4th. the ventilation of the upper portion of the wick-tube for the purpose specified.

The upper air chamber 12 (which is shaded in Fig. 2 for the purpose of indicating the same more clearly) is of peculiar and novel construction, inasmuch as there is no direct opening therefrom to the outer air; it will be readily noted from an inspection of Fig. 2, that the only openings in said chamber 12 are through the inner wall 13 thereof, and that all air must enter said chamber by way of the annular space 14, which is surrounded by said air chamber 12, and which space 14, surrounds the flue or chimney 15. Openings 16—16 in the lower wall of chamber 12 are constructed to register with the upper end of each tube 6, so that air enters said tube only from said chamber 12. To the lower wall of chamber 12 is affixed a short tube 17, which enters the upper end of each tube 6; tube 6

is enlarged at the upper end, and upon the shoulder formed by said enlargement, is placed a washer 18, (preferably by some resilient material), the opening in which washer, may be of such diameter as to properly regulate the amount of air passing through tubes 6; by supplying a washer 18 with the proper area of opening therein, various sizes of burners may be successfully used in my lantern, without other alteration. Washer 18 serves the additional purpose of forming a tight joint between the upper end of tubes 6 and the wall of the air chamber, so that no exterior air can enter said tubes. Wall 13 extends somewhat above the horizontal top of wall 19 of chamber 12, which wall 19 is imperforate; the top wall 20 of space 14 is perforated for the exit or entrance of air as conditions may determine, and to said wall 20 the upper end of flue 15 is attached,—the upper end of which flue is open. A cap 21 surmounts said chambers and flue; the outer wall of said cap has perforations 22 formed therein, for the purpose of ventilation, and to permit the escape of products of combustion. An annular shelter 23 is placed in cap 21 so that a current of air cannot blow directly through the perforations 22, and into, the perforations in the top wall 20, and thus disturb the equilibrium of air entering chamber 12.

From a careful analysis of the construction above set forth, it will be noted that the steady and even flow of air entering chamber 12 and tubes 6 cannot be disturbed by strong gusts of wind or eddying currents. Cap 21 is preferably removably affixed to the upper portion of the walls of chamber 12; in order that it may be removed for the purpose of cleaning; it may be secured in place by any means commonly employed in the sheet metal working art.

The frame of the lantern (Fig. 7) is attached to the oil reservoir in the following manner: The outer vertical wall 24 of the lower air chamber enters a channel 25, which is formed about the periphery of the upper portion of the oil reservoir; in the bottom of said channel is placed a suitable packing material 26, upon which the lower edge of wall 24 rests, thus forming a joint at the point which no air can enter, and interfere with the proper regulation of the air supply. A band 27 passes loosely around the upper portion of the channel wall, and is held in place by the loops 28 and the vertically alined pin arches 29, 29′, which are attached to said wall. Pin arches 30 are formed in band 27, which arches 30 are adapted to be brought into register with arches 29, 29′, by giving band 27 a slight rotation through the loops 28. When said arches are thus in register, pins 31, which project rigidly from wall 24 of the frame, are caused to enter said loops,—pins 31 being so placed that they will occupy the lower arch 29′, as shown in Fig. 3, when the frame is in its proper or permanent position; band 27 is then given a slight rotation in the opposite direction, which brings the narrow portion 27′ of band 27 over pin 31, and secures the frame and oil reservoir firmly together forming an air tight joint.

With a view to having the lower air chamber so constructed, that no air can enter the same, except through the tubes 6, I employ a wick raiser of a special construction as follows: The wick raiser shaft 32, which is attached to the wick-tube, has at one end thereof, the notched wheel 33; extending through the upper wall of the lower air chamber is an auxiliary shaft 34, to the inner end of which is affixed the fork 35, adapted to engage wheel 33; shaft 34 is slidingly mounted in a suitable bearing, and about the outer end of this shaft is placed a coiled spring 36, the office of which spring is to carry shaft 34 outward, and to hold fork 35 away from engagement with wheel 33. When it is desired to raise or lower the wick an inward pressure upon the thumb wheel 37 will cause said fork to engage wheel 33, when shaft 32 may be turned as desired.

In order to insure a correct and proper alinement of the wick-tube and the flame slot of the burner cone, I place upon the upper wall of the oil reservoir, the guides 38 and 39, which serve as proper and definite locating and registering means for a wick-tube, having a slip joint. For a wick-tube having a screw joint, I place guides 40, upon the upper wall of the lower air chamber, which engage shaft 32 for the purpose specified.

In Fig. 5 I have shown a modified form of air regulating device. In this form of device washer 18 may be dispensed with, and a gasket 41 is employed to secure a tight joint at the meeting point of tube 6, and the wall of the upper air chamber. Directly above the tube opening in the upper air chamber is located a vertically adjustable disk 42, provided with a screw-threaded stem 43, which extends through an internally screw-threaded boss 44; by turning the thumb-wheel 45 attached to the upper end of stem 43, disk 42 may be brought into close proximity to or removed from the opening above tube 6, and the area of said opening may be thus varied and the air supply harmonized with various sizes of wick, and the various compounds of high fire-test illuminating oils now upon the market.

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

1. In a tubular lantern the combination of a lower air chamber and a hinged, swinging upper air chamber, tubes leading from said lower to said upper chamber and forming an air passage between the same, there being an annular channel formed about the lower side

of each of the tube openings in said upper air chamber and adapted for the reception of the upper end of said tubes respectively, and a suitable elastic material partially filling said channels, for the purpose set forth.

2. In a tubular lantern, an annular air chamber in the upper portion of the frame, a cylindrical flue extending through the opening surrounded by said chamber, an air space between the periphery of said flue and the inner wall of said chamber, means for admitting air to said chamber from said space, a cap mounted above said chamber and removably attached to the outer wall thereof, an annular shelter in said cap, there being perforations in said cap above and below said shelter, in combination with an air chamber located in the lower portion of said frame, means for conducting air from said upper to said lower chamber, and means for regulating the amount of said air.

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

PONTUS H. CONRADSON.

Witnesses:
A. L. MYERS,
EDW. R. INMAN.