C. L. BETTS.

TUBULAR LANTERN.

APPLICATION FILED MAR. 23, 1911.

1,067,966.

Patented July 22, 1913.

2 SHEETS—SHEET 1.

Fig. 1

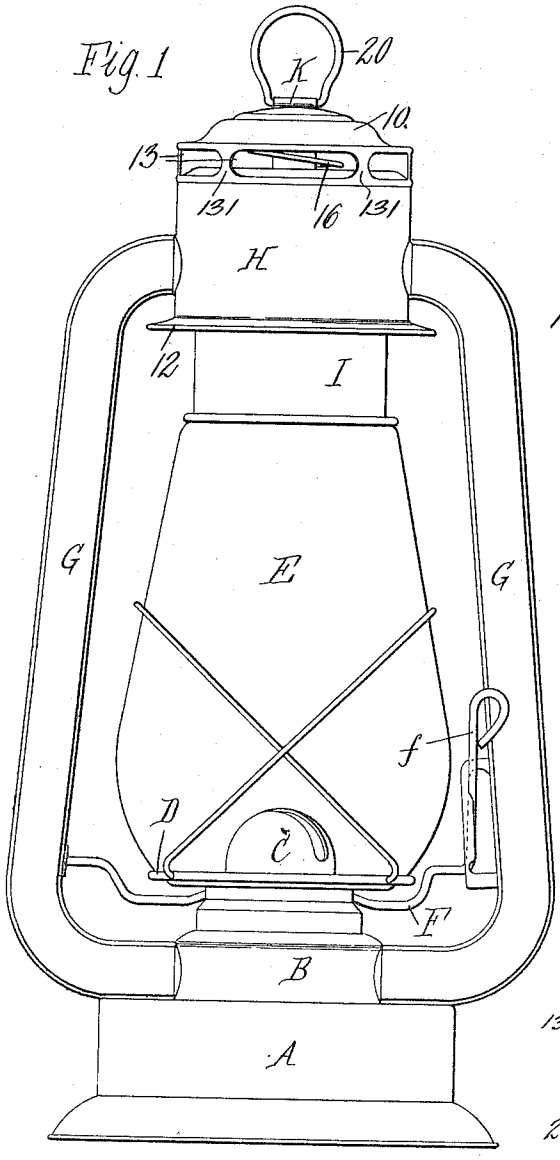


Fig. 2.

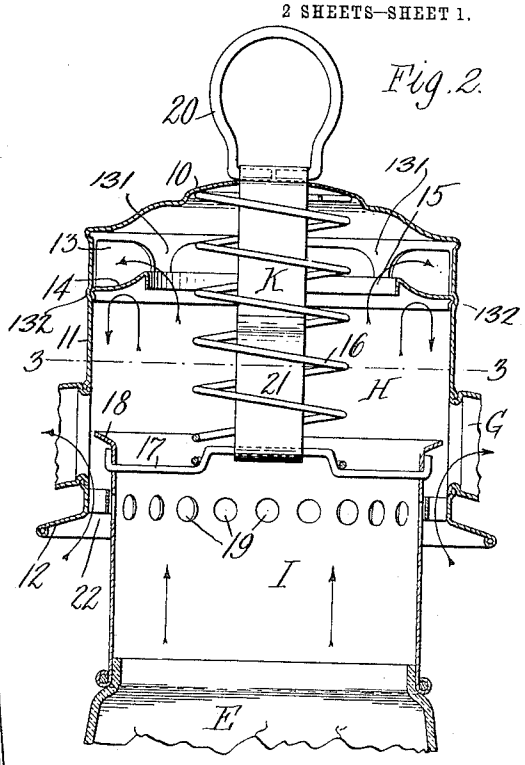


Fig. 4.

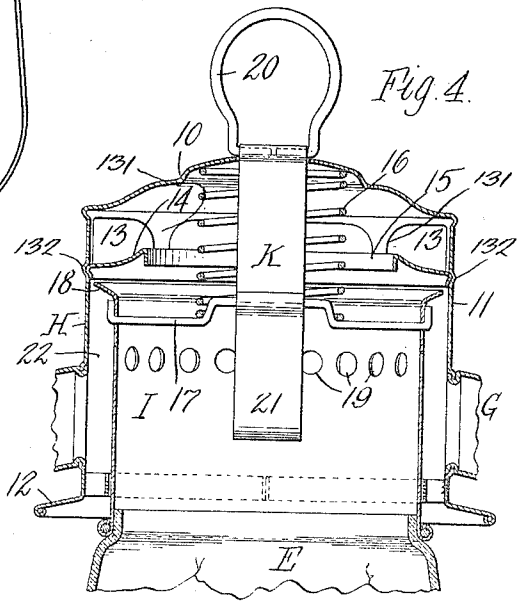
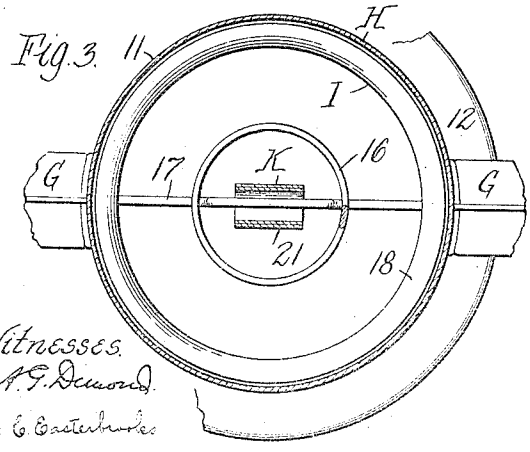


Fig. 3.



Witnesses.
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2 SHEETS—SHEET 2.

Fig. 5.

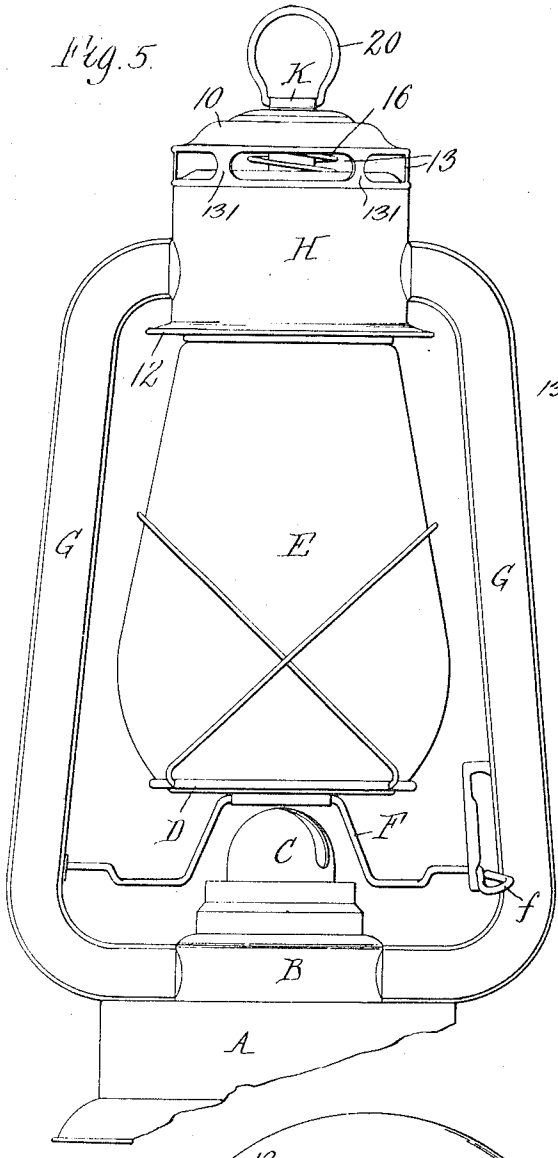
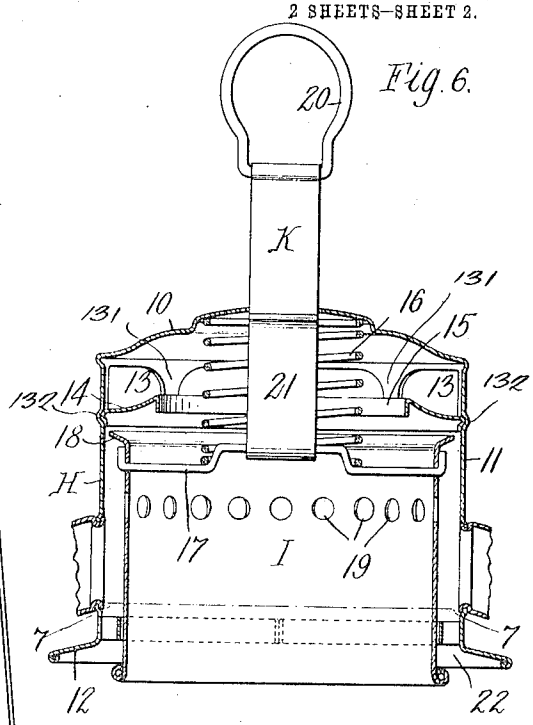


Fig. 6.



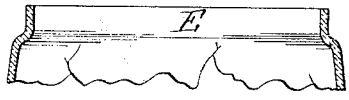


Fig. 7.

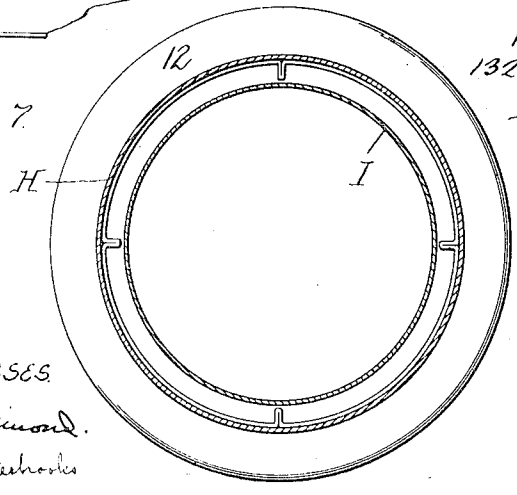
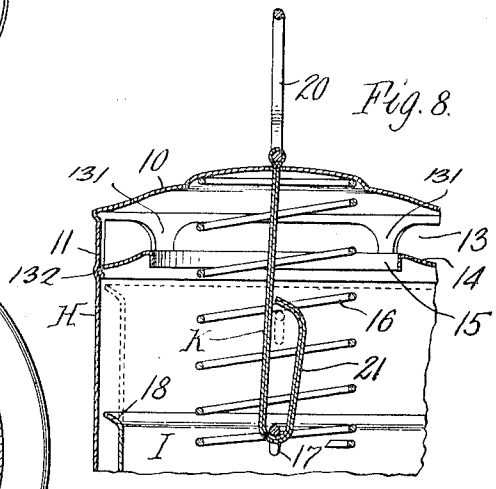


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES L. BETTS, OF NEW YORK, N. Y., ASSIGNOR TO R. E. DIETZ COMPANY, OF NEW YORK, N. Y.

TUBULAR LANTERN.

1,067,966. Specification of Letters Patent. Patented July 22, 1913.

Application filed March 23, 1911. Serial No. 616,543.

To all whom it may concern:

Be it known that I, CHARLES L. BETTS, a citizen of the United States, residing at New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Tubular Lanterns, of which the following is a specification.

This invention relates to that class of tubular lanterns which are provided with a chimney which extends upwardly from the globe and through which the hot gases escape from the globe. This chimney usually extends through the lantern top and is surrounded by an air-inlet chamber which is open to the atmosphere. Cold outside air enters this chamber and passes from the latter through the tubes to the burner and supports the flame. This air is sometimes mixed with a small proportion of globe gases which enter the air-inlet chamber from the chimney under certain conditions through equalizing openings formed in the chimney. This chimney is usually vertically movable in the lantern top and operates as a holder which by bearing upon the globe holds the latter in position and which can be raised to release the globe when the latter is to be removed for cleaning or other purposes.

One object of this invention is to construct the lantern top, comprising the chimney and surrounding air-inlet chamber, in such manner that a considerable proportion of hot globe gases becomes mixed with the cold outside air which enters the air-inlet chamber, thereby supplying the flame with a mixture of air and gases which has a high temperature and produces a whiter and more smokeless flame than heretofore.

Other objects of the invention are to render the lantern top simple, compact and convenient and to permit the globe to be raised from below by a lifter shaft or similar mechanism without causing the lifter bar connected with the chimney to be projected above the top.

In the accompanying drawings: Figure 1 is a front elevation of a tubular lantern embodying this invention, showing the parts in their working position. Fig. 2 is a sectional elevation of the top portion of the lantern, on an enlarged scale, showing the globe-holding chimney and the globe in the lowered or normal position. Fig. 3 is a horizontal section on line 3—3, Fig. 2. Fig. 4 is a sectional elevation similar to Fig. 2 but showing the globe and globe-holding chimney raised. Fig. 5 is a fragmentary elevation of the lantern showing the globe raised. Fig. 6 is a sectional elevation of the top portion of the lantern similar to Fig. 4 but showing the globe-holding chimney raised from the globe. Fig. 7 is a horizontal section on line 7—7, Fig. 6. Fig. 8 is a fragmentary vertical section at right angles to Fig. 2.

Like reference characters refer to like parts in the several figures.

A represents the oil pot, B the air chamber on the same, C the burner, D the globe supporting plate, E the globe, F the globe lifter shaft having a lifter arm *f*, and G the air tubes, all of any well known or suitable construction.

H represents the top chamber to which the upper ends of the tubes are connected and which comprises a top plate 10, an upright peripheral wall 11 and an external bottom flange or deflector ring 12. The peripheral wall is provided in its upper portion below the top plate and adjacent thereto with a horizontal row of openings 13 which are separated by legs or standards 131 and which operate mainly as exits for the products of combustion. The top is provided below said openings and above the tubes with an inwardly projecting deflector flange 14, preferably provided along its inner edge with a depending lip 15. The top plate 10, standards 131 and peripheral wall 11 are preferably formed integrally out of one blank of sheet metal and the internal deflector flange 14 may be secured in this top in any suitable manner, for instance, as shown, in a bead or annular depression 132 formed in the peripheral wall 11 below the openings 13.

I represents the globe-holding chimney which is arranged within the top chamber H and is capable of vertical movement in the same. This chimney is cylindrical and bears upon the shoulder at the upper end of the globe and holds the latter removably on the plate D. The chimney is pressed down by a spiral spring 16 which abuts at its upper end against the top plate 10 and at its lower end against a cross bar or wire 17 secured in the upper portion of the chimney. The latter is preferably arranged with its upper

end about centrally opposite the mouths of the tubes and provided with an outwardly turned top flange 18. The chimney is preferably provided in its upper portion below its top flange with a horizontal row of openings 19 which serve to equalize or balance to a certain extent the air pressure inside and outside of the chimney when the lantern is exposed to a strong wind, thereby reducing the flickering or cutting down of the flame under this condition. For illustration, when the wind blows into the chimney from above these openings operate as exits for a portion of the hot globe gases into the surrounding air chamber, where this part of the gases commingles with fresh air, and this mixture or part thereof is directed to the air tubes by the top flange 18, while when the wind blows into the air chamber outside of the chimney from below these openings operate as exits for a portion of the injected air from the air chamber into the chimney.

K represents a lifter bar which is connected with the chimney for raising the same from the globe, when the latter is required to be removed for cleaning or renewing. This lifter bar is connected at its lower end with the chimney and extends upwardly through the top plate 10 and is provided above the latter with a ring or finger-piece 20. When the lantern is provided with a globe-lifting mechanism by which the globe can be raised from below, as shown, for affording access to the burner, it is desirable to prevent the lifter bar from being raised with the chimney in raising the globe. For this purpose the connection between the chimney and its lifter bar is so constructed that the chimney will be pulled by the lifter bar upwardly, when the lifter bar is pulled up, but is left behind or in its normal position when the chimney is pushed up from below in raising the globe. As shown in the drawings, these movements are provided for by constructing the lower portion of the lifter bar with an elongated hook or loop 21 through which the cross bar 17 passes and in which this bar can move upwardly without moving the lifter bar.

In the normal or working position of the parts, in which the globe plate D rests upon the burner, Figs. 1, 2 and 8, the cross bar 17 is located in the lower portion of the hook or loop. If the globe is raised by means of the lifter shaft F, as shown in Fig. 5, the chimney moves upwardly with the globe and the cross bar 17 moves upwardly in the hook or loop of the lifter bar without raising the latter, as shown in Fig. 4, and as indicated by dotted lines in Fig. 8, thereby preventing the lifter bar from being projected above the top plate 10. When it is desired to release the globe the lifter bar is pulled upwardly, thereby causing the hook or loop of the lifter to engage the cross bar 17 and to raise the chimney from the globe, as represented in Fig. 6.

When the lantern is not provided with a globe-lifting mechanism and other means are provided for giving access to the burner, the slidable or slack connection of the lifter bar with the chimney may be omitted.

When the chimney and globe are in their normal position, shown in Figs. 1 and 2, the external air enters the annular space 22 between the chimney and the peripheral wall 11 of the air-inlet chamber and flows upwardly through this space and is deflected in part into the tubes by the top flange 18 of the chimney. The hot globe gases flow upwardly through the chimney and the upper portion of the air-inlet chamber and spread in the upper portion of this chamber, which is larger in diameter than the chimney. The outermost portion of this rising column of hot globe gases is caught by the inwardly projecting deflector flange 14 of the air-inlet chamber and deflected downwardly toward the mouths of the tubes and becomes mixed with cool outside air which has entered the air-inlet chamber. The inner portion of the rising column of hot gases escapes upwardly and outwardly through the openings 13 underneath the top plate. This action is, however, modified more or less when the wind blows against the lantern or when the lantern is moved about. For illustration, when the wind blows against the lantern the air enters the space below the top plate through the openings 13 on the windward side and part of this air enters the air-inlet chamber in a downward direction and becomes mixed with the hot gases flowing upwardly through this chamber and part of this mixture passes to the tubes. The space between the upper end of the chimney and the deflector flange 14 therefore operates as a mixing chamber in which outside air and hot globe gases become mixed and from which this mixture, which has a high temperature, is supplied to the tubes. The flame is in this manner supplied with air which is heated to a higher degree by admixture with hot globe gases than was possible in lanterns of this character, and this heated air supply improves the combustion and produces a white and practically smokeless flame. The mixing of hot globe gases with cold fresh air above the chimney is promoted by the fact that the mixing chamber above the chimney is larger in diameter than the chimney. This construction causes the hot globe gases to spread after leaving the chimney and to mix freely with fresh air in said mixing chamber.

The deflector flange 14 preferably rises inwardly in order to prevent blasts from entering the top chamber with such force as to seriously disturb the flame, and this

flange preferably projects inwardly beyond the chimney in order to catch the outer portion of the ascending column of hot gases more effectually.

The top chamber may be said to comprise a lower compartment, which is located below the inwardly projecting deflector flange 14, and an upper compartment which is located above that flange. The lower compartment receives fresh outside air and hot globe gases which become mixed, particularly in the mixing chamber or space above the top of the chimney and below the deflector flange. The upper compartment receives the excess of hot globe gases and discharges the same through the openings 13 and also under certain conditions of wind or motion admits outside air to the mixing chamber, as above described.

This invention may be applied also to tubular lamps which are provided with but one tube, as is common in some styles of tubular lamps.

I claim as my invention:

1. In a tubular lantern, the combination with an air tube and an air-inlet chamber connected with the upper end thereof, said chamber having outlets for the products of combustion at its upper end and being open to the atmosphere at its lower end, of a globe-holding chimney arranged in the lower portion of said chamber and separated therefrom by an ascending air-inlet passage, said chimney being open at the top and having its upper end normally positioned opposite the mouth of said tube and discharging the products of combustion into the upper portion of said chamber which communicates with said tube, substantially as set forth.

2. In a tubular lantern, the combination with an air tube and an air-inlet chamber connected with the upper end thereof, having outlets for the products of combustion at its upper end and being open to the atmosphere at its lower end, of a globe-holding chimney arranged in the lower portion of said chamber and separated therefrom by an ascending air-inlet passage, said chimney having its upper end arranged adjacent to the mouth of said tube and provided with an outwardly turned flange, and opening into the upper portion of said chamber which communicates with said tube, substantially as set forth.

3. In a tubular lantern, the combination with an air tube and an air-inlet chamber connected with the upper end thereof, said chamber having outlets for the products of combustion at its upper end and being open to the atmosphere at its lower end, of a globe-holding chimney arranged in the lower portion of said chamber and separated therefrom by an ascending air-inlet passage, said chimney being open at the top and having its upper end normally positioned opposite the mouth of said tube and discharging the products of combustion into the upper portion of said chamber which communicates with said tube, and a deflector projecting inwardly from the wall of said chamber above said tube and chimney and below said outlets for the products of combustion, substantially as set forth.

4. In a tubular lantern, the combination with an air tube, and an air-inlet chamber connected with the upper end thereof, of a globe-holding chimney arranged in the lower portion of said chamber and having its upper end arranged adjacent to the mouth of said tube and opening into the upper portion of said chamber with which said tube communicates, and a spring which presses said chimney downwardly and holds the same yieldingly in its normal position, substantially as set forth.

5. In a tubular lantern, the combination with an air tube, of a top chamber comprising a lower portion with which the tube is connected and which has an inwardly extending flange at its upper end, and a top plate arranged above said flange and separated therefrom by outlets for the products of combustion, said top plate being permanently connected with the peripheral wall of said chamber, and a globe-holding chimney arranged in said lower compartment and separated from the peripheral wall thereof by an ascending air passage, said internal flange extending inwardly beyond said chimney and intercepting the outer portion of the column of hot gases rising therefrom, substantially as set forth.

6. In a tubular lantern, the combination with an air tube, of a top chamber comprising a lower compartment with which the tube is connected and which has in its top an opening for the escape of the products of combustion, an upper compartment rigidly secured to said lower compartment and provided in its peripheral wall with outlets for the products of combustion, and a vertically movable globe-holding chimney arranged in said lower compartment, said chimney being separated from the peripheral wall of said lower compartment by an ascending fresh air passage and being larger in diameter than the opening in the top of said lower compartment and communicating at its upper end with said lower compartment, delivering the outer portion of the rising column of hot gases into said lower compartment where such gases mingle with fresh air, substantially as set forth.

7. In a tubular lantern, the combination with an air tube, of a top chamber comprising a lower compartment to which the air tube is connected and which is open at its lower end to the outer air and an upper compartment which is provided with outlets

for the products of combustion, and a vertically movable, spring-pressed globe-holding chimney arranged in said lower compartment and separated from the peripheral wall thereof by an ascending air passage, said chimney having an external deflecting flange opposite said tube, substantially as set forth.

8. In a tubular lantern, the combination with an air tube and an air-inlet chamber connected therewith which is provided below its closed top with outlets for the products of combustion, of a vertically movable globe-holding chimney arranged in the lower portion of said chamber and having its upper end arranged adjacent to the mouth of said tube, and a lifter bar extending through the top of said chamber and having its lower end connected with said chimney by an extensible connection which has sufficient vertical play to permit the chimney to be raised without raising said lifter bar, while causing the chimney to be raised upon raising said bar, substantially as set forth.

9. In a tubular lantern, the combination with an air tube and an air-inlet chamber connected therewith which is provided below its closed top with outlets for the products of combustion, of a vertically movable globe-holding chimney arranged in the lower portion of said chamber and having its upper end arranged adjacent to the mouth of said tube, a plate on which the globe rests, a lifter mechanism for raising said plate from the burner, and a lifter bar extending through the top of said air-inlet chamber and having its lower end connected with said chimney by an extensible connection which has sufficient play to permit the chimney to be raised without raising said bar when the globe plate is being raised from the burner by its lifting mechanism, while causing the chimney to be raised for releasing the globe upon raising said bar, substantially as set forth.

10. In a tubular lantern, the combination with an air tube, of a top chamber with which said tube is connected, a vertically movable globe-holding chimney arranged in said chamber, and a lifter having at its lower end an upright loop by which it engages said chimney, substantially as set forth.

11. In a tubular lantern, the combination with a lantern base, a tube and a top chamber rigidly connected with said base by said tube, of a vertically movable globe-holding chimney arranged in said chamber, a lifter extending out of said chamber and having at its lower end an upright loop by which it engages said chimney, and a globe-lifting mechanism, substantially as set forth.

12. In a tubular lantern, the combination with an air tube and an air-inlet chamber connected with the upper end thereof, said chamber having outlets for the products of combustion at its upper end and being open to the atmosphere at its lower end, of a globe-holding chimney arranged in the lower portion of said chamber and separated therefrom by an ascending air passage, said chimney being open at the top and having its upper end normally positioned opposite the mouth of said tube and provided near its upper end with equalizing openings, the chimney discharging the products of combustion into the upper portion of the air-inlet chamber, substantially as set forth.

13. In a tubular lantern, the combination with an air tube and an air-inlet chamber connected with the upper end thereof, having outlets for the products of combustion at its upper end and being open to the atmosphere at its lower end, of a globe-holding chimney arranged in the lower portion of said chamber and separated therefrom by an ascending air passage, said chimney having its upper end arranged adjacent to the mouth of said tube and provided near its upper end with an outwardly projecting flange and below said flange with equalizing openings, substantially as set forth.

14. In a tubular lantern, the combination with an air tube and an air-inlet chamber which is open to the atmosphere at its lower end and comprises a top plate, a peripheral wall and connecting standards separated by openings, of a globe-holding chimney arranged in the lower portion of said chamber and separated therefrom by an ascending air-inlet passage, said chimney being open at the top and having its upper end normally positioned opposite the mouth of said tube and discharging the products of combustion into the upper portion of said chamber which communicates with said tube, substantially as set forth.

15. In a tubular lantern, the combination with an air tube, of an air chamber connected with the upper end thereof and comprising a top plate, a peripheral wall and connecting standards formed integrally, an inwardly projecting annular deflector secured to said peripheral wall below said openings and above said tube, and a globe-holding chimney arranged in the lower portion of said chamber, substantially as set forth.

Witness my hand in the presence of two subscribing witnesses.

CHARLES L. BETTS.

Witnesses:
FRED H. TWOMBLY,
ROBERT A. CURRIE.