2 Sheets—Sheet 1.

F. L. HOWARD.

CANDLE LAMP.

No. 183,398. Patented Oct. 17, 1876.

Fig 1.

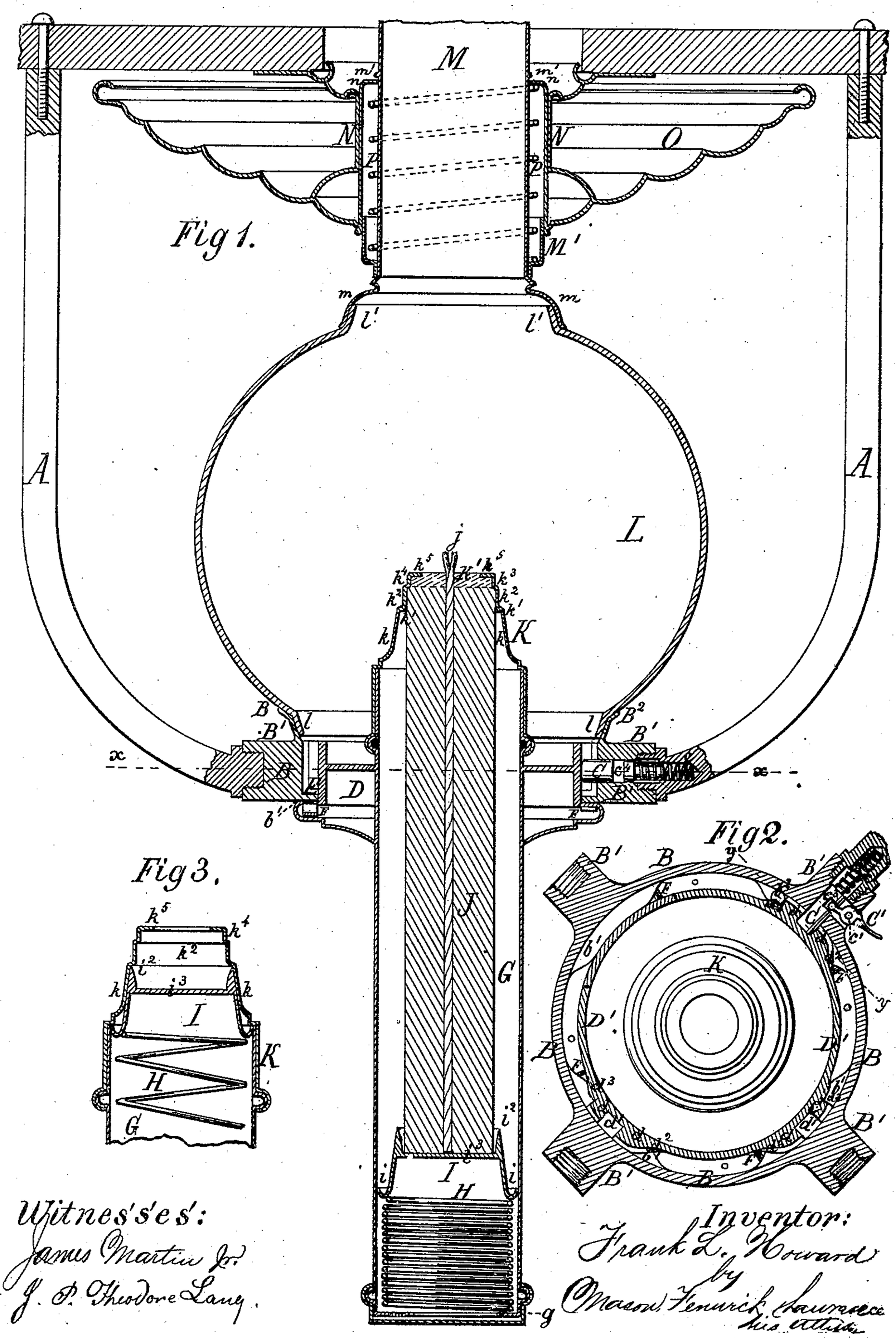

Fig 3.

Fig 2.

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2 Sheets—Sheet 2.

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Fig 4.

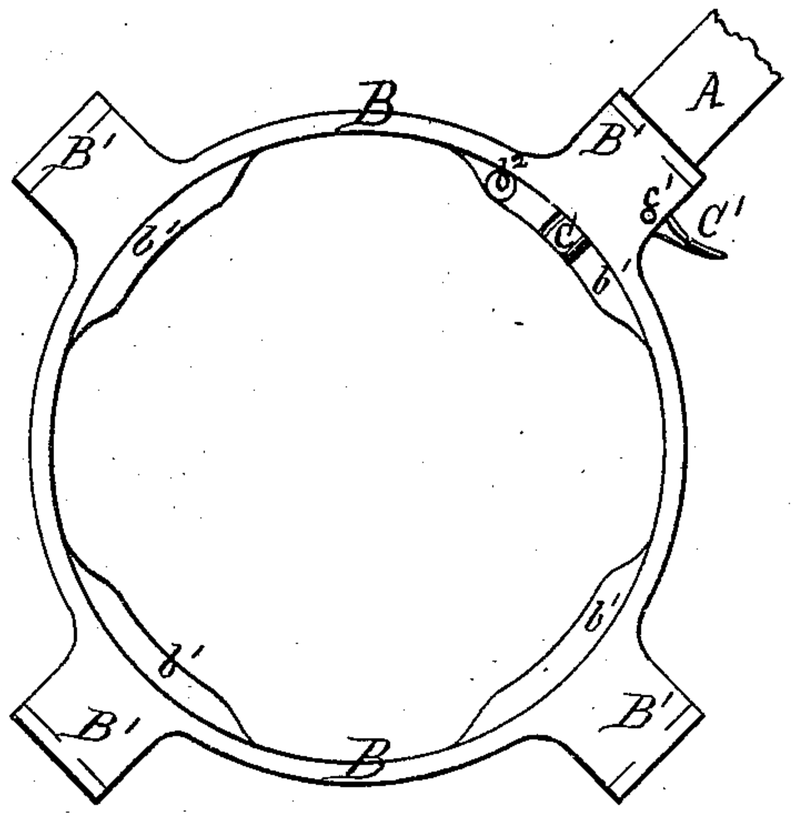


Fig 5.

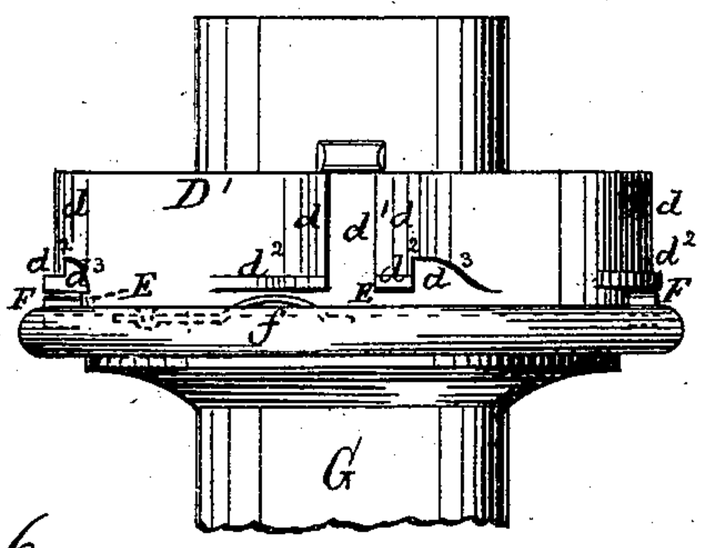


Fig 6.

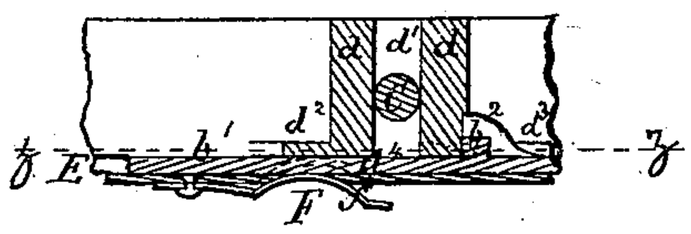
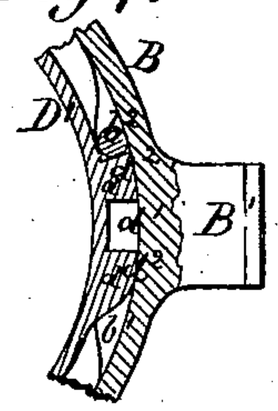


Fig 7.



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UNITED STATES PATENT OFFICE.

FRANK L. HOWARD, OF HARTFORD, CONNECTICUT, ASSIGNOR TO JAMES L. HOWARD & CO., OF SAME PLACE.

IMPROVEMENT IN CANDLE-LAMPS.

Specification forming part of Letters Patent No. **183,398**, dated October 17, 1876; application filed September 14, 1876.

To all whom it may concern:

Be it known that I, FRANK L. HOWARD, of Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Candle-Lamps for Cars, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a central section of my improved car-lamp. Fig. 2 is a horizontal section of the same in the line *x x* of Fig. 1. Fig. 3 is a sectional view of the top of the candle-holder as it appears when the candle is almost consumed. Fig. 4 is a top view of the annular bearing which supports the body of the candle-lamp. Fig. 5 is an elevation of the lamp-body. Fig. 6 is a vertical section of the lamp and its bearing in the line *y y* of Fig. 3, and Fig. 7 is a horizontal section of the same in the line *z z*.

The nature of my invention consists in certain constructions, combinations, and arrangements of parts, as hereafter described and specifically claimed, whereby a candle-lamp for a car is produced with increased facilities of illumination, or which lamp burns a candle completely from its top to its base, and without the annoyance of having the feeding apparatus clogged up with candle-grease, and without the danger of having melted candle splashed about by the motions of the car.

Another object secured by my invention is a car-lamp fastened to its bearings in such a way that by a very simple manipulation of the operator any movement or rattling, either in a vertical or horizontal direction, is avoided; and another object secured by my invention is a glass globe fastened to a car-lamp in such a manner that it cannot move or rattle between its bearings, and that its removal or reinsertion can be effected with very little labor and by simple constructions.

In the drawings, A represents arms or brackets fastened to the ceiling of a car, and having an annular lamp-seat, B, attached to them by means of sockets and screws in radial projections B^1. The lower part of the said lamp-seat B has a number of horizontal flanges, b^1, Fig. 4, at equal distances from each other, one of which is, near its extremity, provided with a stopping-pin, b^2, for a purpose hereafter explained. One of the projections, B^1, is provided with a spring-bolt, C, the spring *c* of which is partly inserted into the adjoining bracket-arm A. The spring-bolt C is operated by a thumb-lever, C′, pivoted at c^1, and having a cylindrical head, c^3, moving in a vertical notch, c^4, of the said bolt C. The lamp-body D is, at its top, provided with a number of wedge-shaped projections, *d*, around an annular rim, D′, arranged in pairs, so that between each two of them a vertical space, d^1, is formed as wide as the diameter of the bolt C, above described. The said projections *d* extend not quite down to the lamp-body, and thus form a groove, E, with the said lamp-body, of the thickness of the flanges b^1, above described. The thickness of the projections *d* is such that there is plenty of play between them and the annular lamp-seat B, but near the foot of each projection *d* a lap, d^2, is added thereto, which bears against the inner side of the said lamp-seat, and thereby prevents diagonal movement. The number of the said projections *d* is double that of the flanges b^1, and they are so constructed that they may be vertically passed up between the said flanges. One projection, *d*, of each pair described, is provided with a notch, d^3, for the reception of the pin b^2 when the lamp is in proper position. The lamp-body D is provided with a number of springs, F, which have a bend, *f*, near the end projecting through an opening, d^4, in the lamp-body, whereby a pressure upon the lower sides of the flanges b^1 is effected, and the projections *d* are pressed upon the upper sides of the said flanges. The said construction prevents vertical movement, and consequent rattling, of the lamp-body D.

The lamp-body D is provided with a central tube, G, which has a horizontal bottom flange, *g*, and may be closed at the bottom by a cap, *g′*. Upon the flange *g* a spiral spring, H, is placed, which has a cap, I, attached to its top. The said cap I is of conical shape, with an annular gutter, *i*, at its base, which fits the bore of the tube G. The top of the said cap I ends in an annular knife-edge, i^2, and a horizontal bottom, i^3, near the top, serves to form a cap or socket for the foot of a candle, J,

The top of the tube G is provided with a cap, K, which is attached thereto by means of a bayonet-fastening, or by other known means. The said cap K has a conical bearing, k, which forms a joint with the conical part of the cap I when the said cap is moved up to it by the spring H, as seen in Fig. 3. When the cap I is in the said position the annular knife-edge i^2 rests against a shoulder, k^1, of the cap K. Above the shoulder k^1 the formation of the cap K is cylindrical, as shown at k^2, with a small rounded step, k^3, at the top. The said cylindrical part k^2 is made of such size that the top of the candle may easily be inserted into it. Above the step k^3 is another smaller and shorter cylinder, k^4, with a broad horizontal top rim, k^5, forming a chamber, K′, with the solid top of the candle J, which chamber is, during the operation, filled with melted tallow.

The lamp-seat B is provided with a flaring flange or socket, B^2, for the reception of the lower rim l' of a glass globe, L. The upper rim l' of the said glass globe L is fitted into a similar socket, m, at the lower termination of a vertically-movable tube, M, which is made to slide within another tube, N, in the center of the reflector O. A short-stepped tube, M′, is attached to the tube M above the socket m, which fits snugly in the tube N, and serves as the housing and abutment of the lower part of a spiral spring, P, which is thus hidden from view as an objectionable feature in the elegant appearance of the lamp. The said spring P abuts with its upper end against a horizontal flange, n, at the top of the tube N. The upper and greater part of the spring P is housed between the tubes M N.

To prevent the tube M from leaving its bearing, its down movement may be limited by a bead, m', or any suitable means. The globe L is, by the force of the spring P, held tightly between the sockets m and B^2.

Operation: The cap K is removed from the tube G, the candle J is put upon the bottom i^3 of the cap I, and the cap K is put upon the candle, so that its top enters the part k^2 and touches the shoulder k^3. The cap K is now pressed down and fastened to its place upon the tube G, whereby the candle J and the cap I are also moved down, and the spring H is compressed, as seen in Fig. 1. The lamp is then from below moved into its lamp-seat B by slipping the projections d between the flanges b^1 until the lamp touches the said lamp-seat, and then turning the lamp toward the pin b^2. The slope of the projection d next to the bolt C pushes the same back until the notch d^3 arrives at the pin b^2, when the bolt enters the space d^1 between the said projections, and the lamp is locked between the pin b^2 and the bolt C so it cannot turn. At the same time the said operation goes on, the springs F are pushed down by the flanges b^1 entering the groove E and the said flanges are firmly held in the said groove, and prevented from moving vertically therein by the springs F. The bolt C, when in working order, and when judiciously operated, is sufficient for preventing the lamp from turning; but when the lamp is inserted and turned for the purpose of having it locked by the said bolt, it is often turned so quickly that the bolt has not time to enter the space d^1, and the operation has to be repeated until successful. This is avoided by the pin b^2 and notch d^3, which positively arrest the farther turning of the lamp at the very moment the bolt C is opposite the space d^1, and thereby allow it to enter the said space and lock the lamp. If the lamp is to be removed, the bolt C is withdrawn from the space d^1 by means of the lever C′, the lamp is then turned until the laps d^2 on the projections d are disengaged from the flanges b^1 of the lamp-seat, and the lamp is finally slipped down and out of its seat. The wick j of the candle J is lit previously to placing the lamp in its seat. The space between the top of the candle and the top rim k^5 of the cap K being empty the hot gases therein heat the metal to such a degree that the part of the candle near the step k^3 is melted. When the melted tallow rises to the top rim k^5 it deprives the heated metal of a part of its heat, so that no more of the candle is melted; but as the melted tallow burns away, and the rim k^5 is more exposed to the heat of the candle flame, the metal is again sufficiently heated to melt another part of the candle. The melted tallow never rises above the rim k^5, because as it rises it interferes with the communication of heat between the flame and the top part of the cap K, and because the pressure of the spring H upon the candle effects a turning over in an inward direction, and a crowding away of the half-melted tallow in the corner k^3, where the metal is constantly cooled down by the fresh tallow moved up from below, and so the operation of elevating the candle is always in proportion to the consumption of tallow by the flame. The illuminating properties of the candle flame are developed at a certain distance above the melted tallow, and by having the surface of the melted tallow even with the top of the cap K the light is shed from a higher elevation above the opaque cap K, which thus creates less shadow below the lamp in comparison with other candle-lamps in which the surface of the melted tallow is generally much below the top of the cap. This last stated advantage is enhanced by the reduced diameter of the upper flange k^5, whereby the shadow below the lamp is considerably reduced.

If by any accident melted tallow should enter the tube G, it is caught and collected by the groove i on the cap I. If melted tallow should collect at the foot of the candle J, and become hard, the knife-edge i^2, as soon as it arrives at the corner k^3, cuts it through, so that the pieces fall down into the groove i, and are prevented from obstructing the conical bearings of the upper and lower caps. The cap I, in reaching its highest point, forms

a joint with the conical part *k* of the cap K, and thus prevents the leakage of tallow while the rest of the candle is being consumed.

If the globe is to be removed, the lamp is removed previously. The globe is then lifted from the lower socket B^2 and taken off sidewise. To replace the globe, the tube M is pushed up until the globe will enter between the upper and lower sockets, and the tube M is allowed to come down with its socket *m* upon the rim *l'* of the globe, while the rim *l* settles in the socket B^2. The globe so held between the two sockets above described cannot move in any direction, and consequently is free from rattling, and still it is confined between yielding instead of rigid fastenings, which save it from being broken in many instances.

The described improvements for fastening candle lamps and globes to their seats are also applicable to lamps which have oil-reservoirs in place of candle-holders.

Having thus described my invention, I claim the following:

1. In a candle-lamp, a cap, K, having a horizontal annular flange or rim, k^5, and a shoulder, k^3, which, together with the top end of the candle, form a chamber, k^1, for the melted tallow, the said chamber being of smaller diameter than the candle, substantially as and for the purpose set forth.

2. The combination of the tube G, having a flange, *g*, the spring H, and the conical cap I, and a circular knife-edge, i^2, and the cap K, having a conical bearing, *k*, and a step, k^1, all constructed and operating substantially as set forth.

3. The combination of the notches d^3 and the stopping-pin b^2, constructed and operating substantially as set forth.

4. The combination of the projections *d*, spaces d^1, laps d^2, the pin b^2, and the spring-bolt C, all constructed and operating substantially as set forth.

5. The combination of the body D, the springs F, the flanges b^1, and the projections *d*, all constructed and operating substantially as set forth.

6. In a bracket or center car-lamp, the combination of tubes M M', spring P, socket *m*, socket B^2, and lamp-globe L, substantially as described.

7. The combination of the reflector O, the tubes M, M', and N, the socket *m*, the flange *n*, and spring P, all constructed and operating substantially as set forth.

Witness my hand in the matter of my application for a patent on candle-lamps for cars this 12th day of August, 1876.

FRANK L. HOWARD.

Witnesses:

ALBERT L. BURKE,

GEORGE C. BARNES.