Nov. 5, 1935. A. L. ARENBERG 2,020,273

LIGHTING EQUIPMENT

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Fig. 1

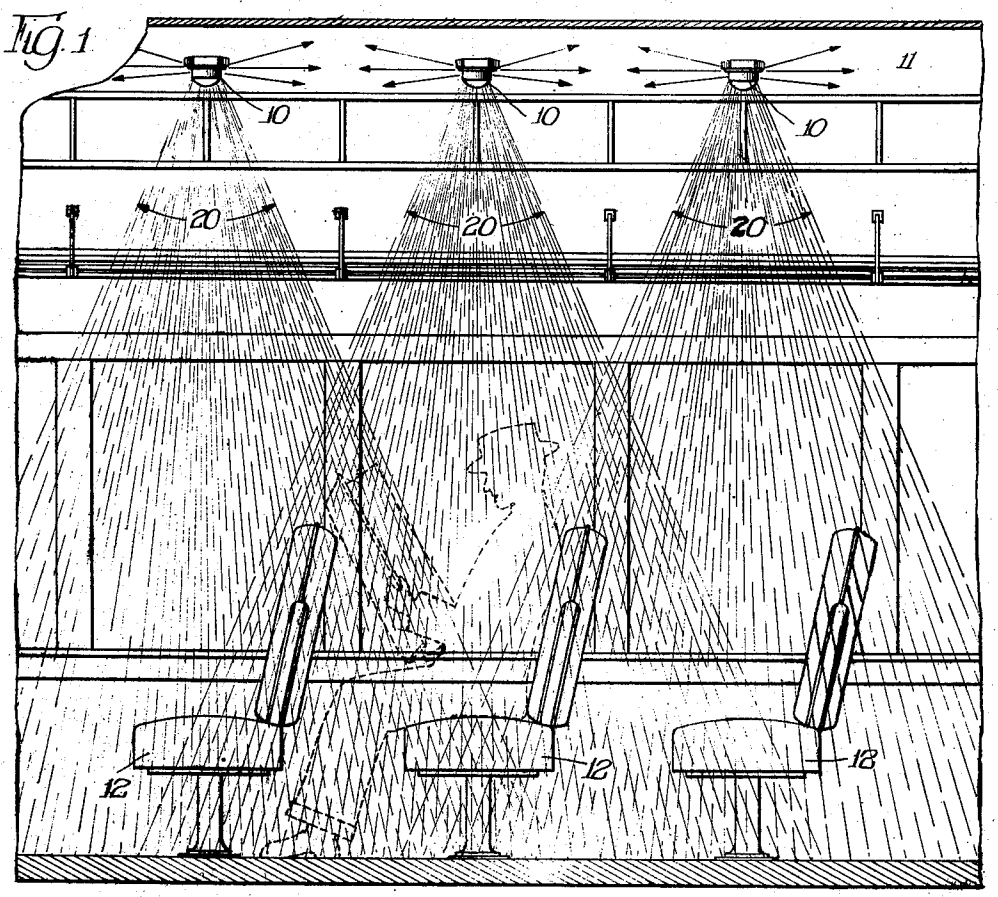
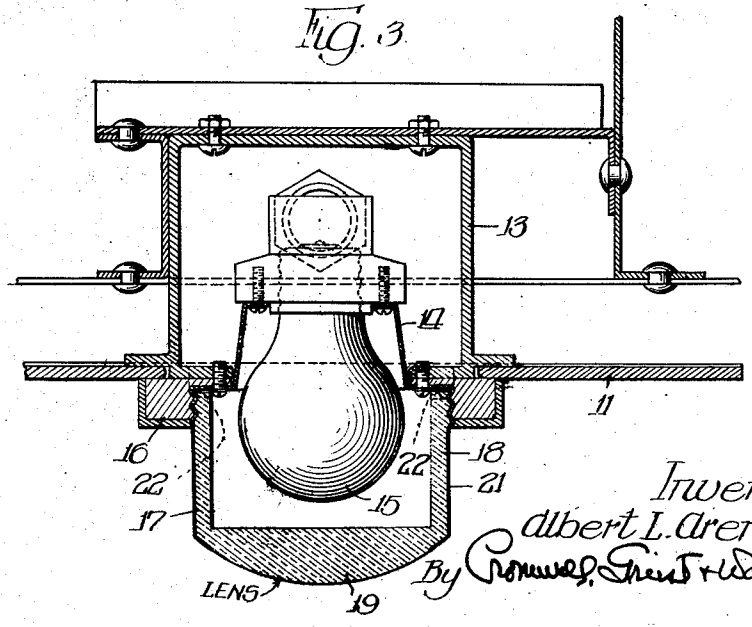


Fig. 3



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Fig. 2

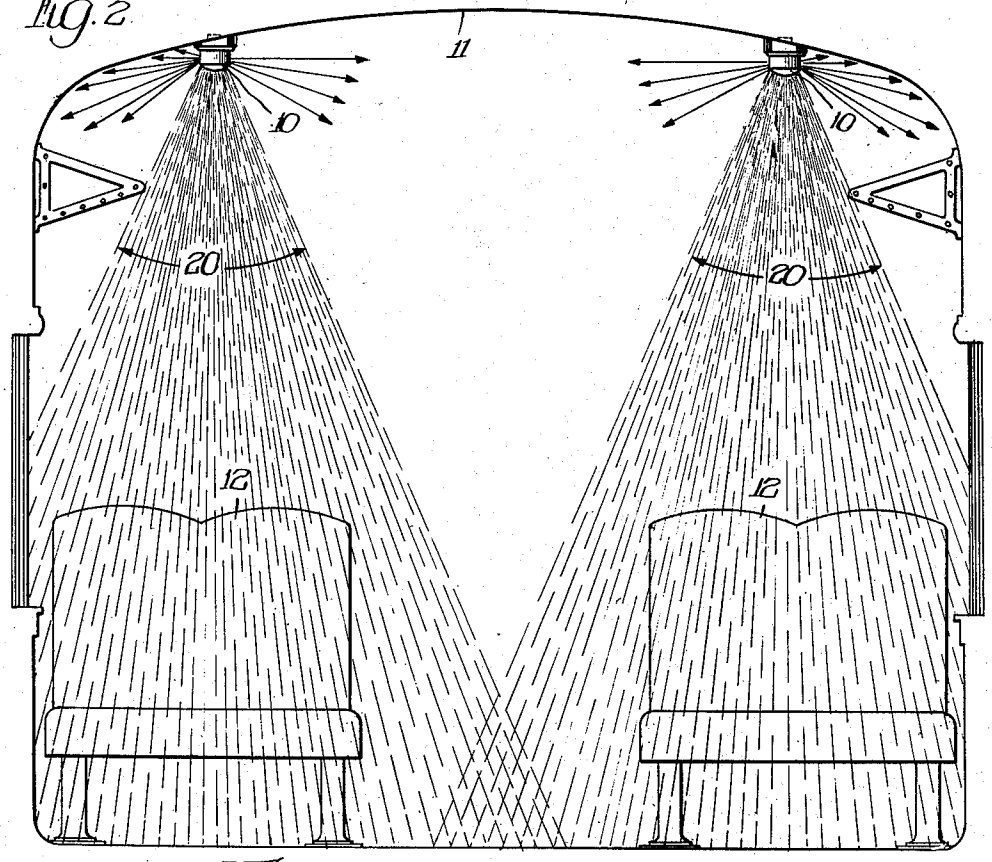


Fig. 4

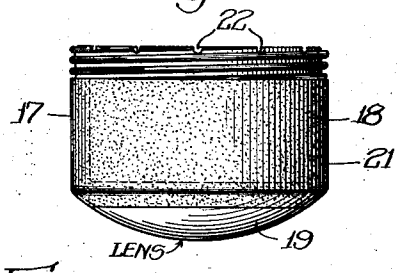


Fig. 5

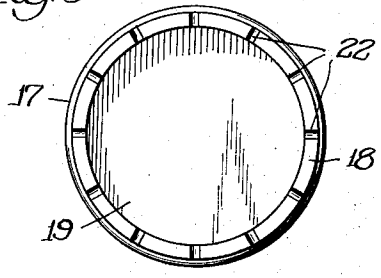


Fig. 6

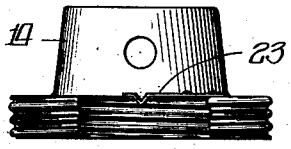
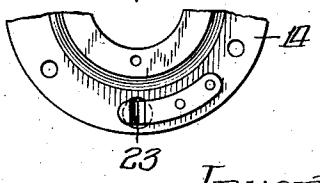


Fig. 7



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UNITED STATES PATENT OFFICE

2,020,273

LIGHTING EQUIPMENT

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Application February 2, 1935, Serial No. 4,605

5 Claims. (Cl. 240—7.35)

One of the principal objects of this invention is to provide improved means for illuminating the interior of a passenger vehicle, such as a railway car or bus, with properly directed light for reading purposes, without any objectionable glare within the normal range of vision of the passengers, and without the formation of shadows within the reading zone.

Another important object of the invention is to provide a novel lens unit, in the form of a specially constructed globe, which globe, when positioned about an electric bulb, will produce a concentrated beam of light within a limited area while softly illuminating the surrounding area.

The improved unit is especially applicable to passenger vehicle interiors, where by arranging rows of the units near the sides of the vehicle along the ceiling a very desirable form of illumination is obtained, but it is to be understood that the unit is not limited in its use to a ceiling fixture, as it may be used in many other different ways, for instance as a reading light in any desired location.

In its preferred form the globe is made of glass in one piece and is characterized by densely enameled diffusing sides of generally cylindrical shape and an integrally moulded lens bottom which is flat on the inside and convex on the outside, with the upper edge of the globe threaded in order to screw into a suitable holder in an outlet box, and with a readily releasable latching device provided in the holder for the purpose of preventing the globe from becoming unscrewed through continued vibration.

While the foregoing statements are indicative in a general way of the nature of the invention, other more specific objects and advantages will be apparent to those skilled in the art upon a full understanding of the construction and function of the device.

The preferred form of the invention is presented herein for the purpose of exemplification, but it will of course be understood that the invention is susceptible of embodiment in other structurally modified forms coming equally within the scope of the appended claims.

In the accompanying drawings:

Fig. 1 shows a row of the lens units arranged along one side of the ceiling of a railway car and illustrates the way in which the light rays are directed and distributed lengthwise of the car;

Fig. 2 illustrates the way in which the light rays are distributed by the same units crosswise of the car;

Fig. 3 is a vertical section through one of the novel globes, showing the same screwed into a holder in a ceiling outlet box;

Fig. 4 is a side view of the globe;

Fig. 5 is an inside view of the globe, looking toward the bottom of the same;

Fig. 6 is a side view of the holder for the globe, with a portion of the rim of the holder broken away to show one of the latching devices; and

Fig. 7 is a fragmentary top view of the holder, showing one of the two diametrically opposed latching devices.

In the installation of the lighting equipment shown in Figs. 1, 2 and 3 of the drawings, the lighting units 10 are mounted in the ceiling 11 of the car, above the seats 12. The units are preferably located near the sides of the ceiling, in longitudinally extending rows directly above the rows of seats, with one unit to each seat, all as shown in Figs. 1 and 2.

Each of the units 10 includes an outlet box 13 which is set back into an opening in the ceiling, a sheet metal holder 14 in the box, an electric bulb 15 screwed into a socket in the holder, an exposed rim 16 on the box about the rim of the holder, and a specially constructed light-transmitting globe 17 screwed into the rim of the holder, all as illustrated in Fig. 3.

The globe 17 is made of glass, in one piece, and forms an enclosure for the main portion of the bulb 15. The globe is characterized by side walls 18 of cylindrical shape and by an integrally formed bottom which is flat on the inside and convex on the outside. The bottom 19 is a lens and serves to direct light rays downwardly from the bulb 15 in an intense concentrated beam, as shown at 20 in Fig. 1. The sides 18 of the globe are plain, in the sense that while they will transmit light they are not of refracting lens construction like the bottom 19. These sides are preferably rendered diffusing either by frosting or enameling, so as to illuminate the area surrounding the downwardly cast conical beam 20 with a soft subdued light that is free of any concentration or glare. Splendid results and also decorative effects can be obtained by applying several coats of a light ground-glass-base enamel 21 to the sides 18.

By this combination of plain sides and lens bottom the arrangement of the units in rows as shown in Figs. 1 and 2 will allow the concentrated beams to overlap near the seats and will provide a good reading light over the seats throughout the reading zones which are present

between each seat and the back of the preceding one while eliminating all concentration of rays throughout the surrounding areas in the car where such a bright light is not needed. As a result of this, a person sitting in one of the seats and looking lengthwise or sidewise of the car will not see any of the glare from any of the units unless he should look directly overhead at the lens of the particular unit used to illuminate his own reading zone. At the same time there can be no shadow cast upon his reading matter from the units behind him.

This use of what may be aptly termed "spot-ray" lens units above the seats, by localizing the intensified light where most needed, permits of a considerable saving in the electric current consumption, as experience has shown that a 15 watt lamp when used with this type of unit is sufficient for each seat area.

In order to prevent the globe 17 from working loose and dropping out of the threaded rim of the holder 14, the upper edge of the globe may be provided with a plurality of notches 22. When the globe is screwed up tightly in the holder downwardly spring-pressed fingers 23 secured to the holder will engage at their free ends within certain of the notches and the yielding resistance offered by these devices to any unscrewing movement of the globe will effectively prevent the latter from inadvertently working loose.

I claim:

1. In an enclosure containing a plurality of reading zones, means for illuminating said zones comprising a lighting unit above each zone casting a narrow beam of direct high intensity light downward over the same, each zone being also disposed within the beam of the unit located above the preceding zone while out of the beam of the unit located above the succeeding zone, the beams from adjacent units intersecting with each other above the upper plane of the reading zones, and the beams from every other unit intersecting with each other at approximately the lower plane of the reading zones.

2. In a vehicle for the transportation of passengers, a row of seats mounted on the floor of the vehicle in tandem relation, with the normal reading space in front of each seat between that seat and the back of the preceding one constituting a reading zone for the passenger occupying that seat, and means for illuminating the interior of said vehicle comprising a row of lighting units mounted on the ceiling of the vehicle above the row of seats, with a lighting unit over each seat, each of said units including means for directing a beam of high intensity light directly down onto both the seat and reading zone below the same, and the spread of the beam from each unit being so arranged with respect to the spread of the beams from the other units that the reading zone for each seat will be covered by the beam of the unit above that seat and by the beam of the unit above the preceding seat but not by the beam of the unit above the succeeding seat.

3. In a vehicle for the transportation of passengers, a row of seats mounted on the floor of the vehicle in tandem relation, with the normal reading space in front of each seat between that seat and the back of the preceding one constituting a reading zone for the passenger occupying that seat, and means for illuminating the interior of said vehicle comprising a row of lighting units mounted on the ceiling of the vehicle above the row of seats, with a lighting unit over each seat, each of said units including means for directing a beam of high intensity light directly down onto both the seat and reading zone below the same, and the spread of the beam from each unit being so arranged with respect to the spread of the beams from the other units that the reading zone for each seat will be covered by the beam of the unit above that seat and by the beam of the unit above the preceding seat but not by the beam of the unit above the succeeding seat, and each of said units also including means for producing illumination on the ceiling and walls of the vehicle.

4. In a vehicle for the transportation of passengers, a row of seats mounted on the floor of the vehicle in tandem relation, with the normal reading space in front of each seat between that seat and the back of the preceding one constituting a reading zone for the passenger occupying that seat, and means for illuminating the interior of said vehicle comprising a row of lighting units mounted on the ceiling of the vehicle above the row of seats, with a lighting unit over each seat, each of said units including a lens for directing a beam of high intensity light directly down onto both the seat and reading zone below the same, and the spread of the beam from each unit being so arranged with respect to the spread of the beams from the other units that the reading zone for each seat will be covered by the beam of the unit above that seat and by the beam of the unit above the preceding seat but not by the beam of the unit above the succeeding seat, and each of said units also including in addition to the lens a light transmitting section arranged to illuminate the ceiling and walls of the vehicle.

5. In combination with an enclosure having a plurality of contiguous passenger seating areas, illuminating means for each of said areas including an overhead light, and means directing a diverging beam of direct light downwardly from each light without including therein the upper body portion of a passenger normally seated in either adjacent seating area, two adjacent light beams intersecting each other to define a highly illuminated shadowless reading zone between passenger positions, said lights and the angle of divergence of said beams being so arranged that the source of light glare producing the light beams is not visible to passengers in normal seated positions.

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