

Feb. 27, 1940.

L. SCHEPMOES.

2,192,019

LIGHTING FIXTURE

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Fig. 1.

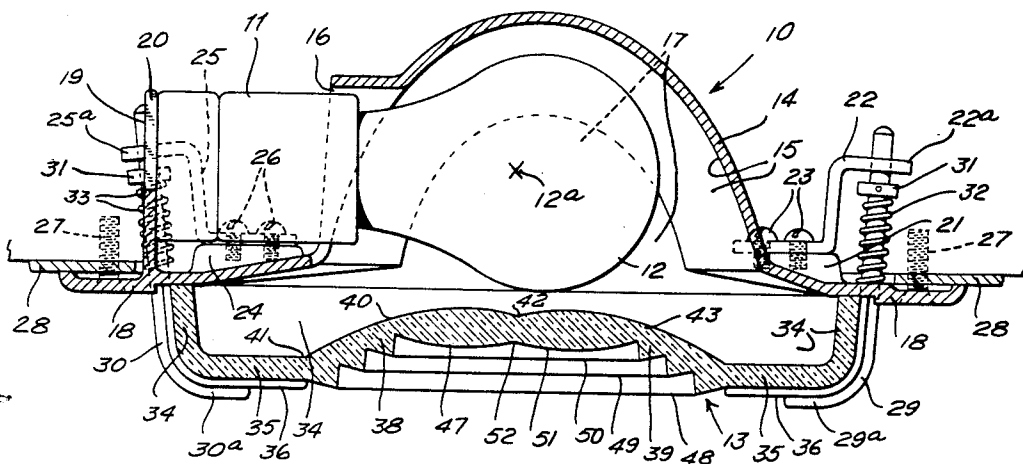
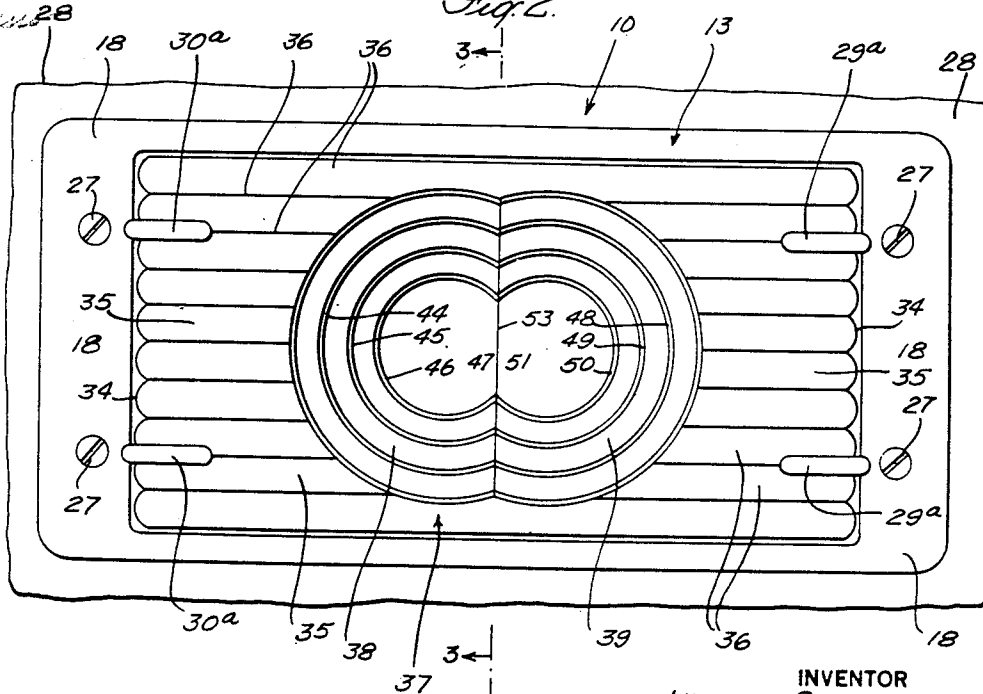


Fig. 2.



INVENTOR  
LINDSLEY SCHEPMOES

BY  
Blair, Curtis, Dumas & Hayward  
ATTORNEYS

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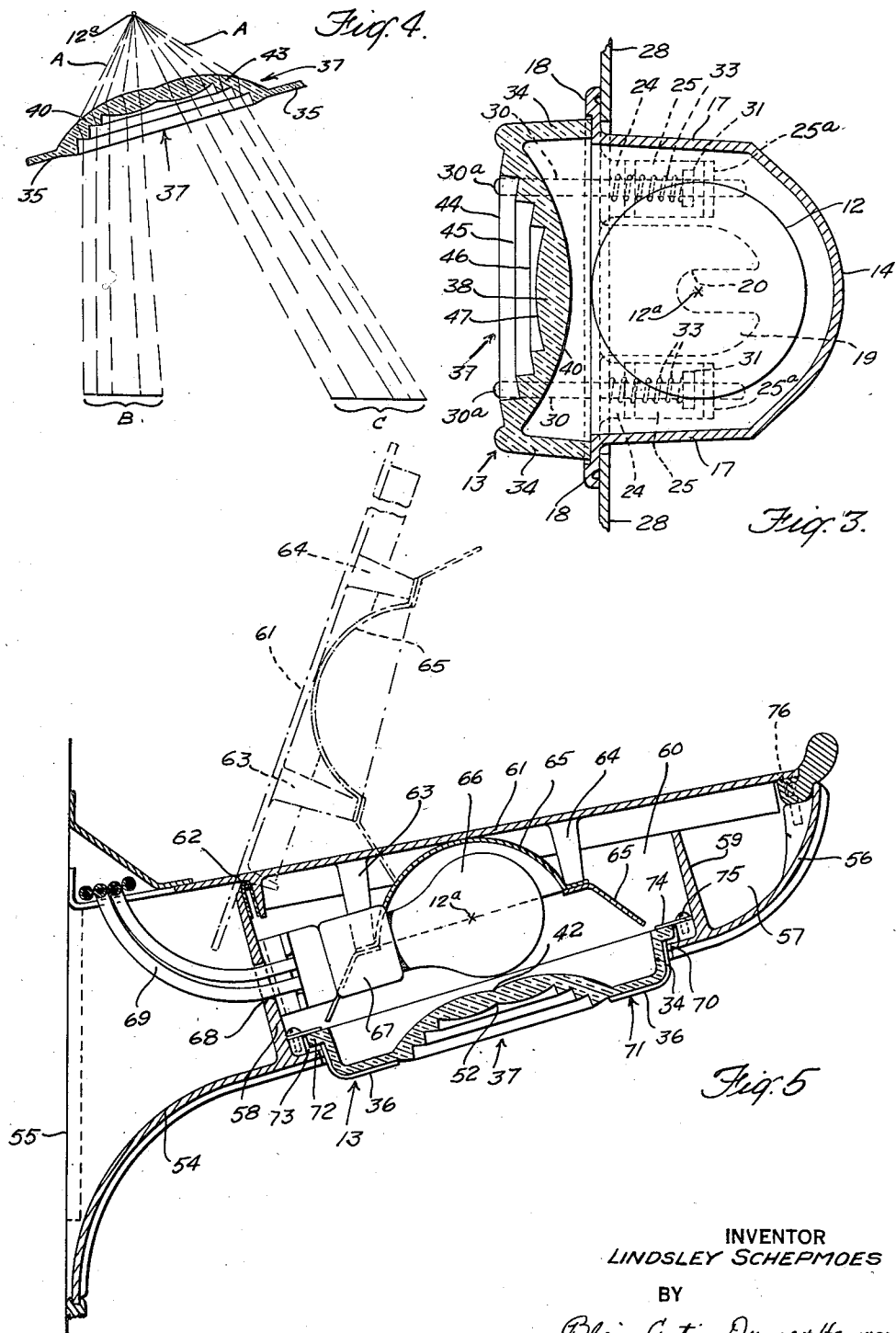
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INVENTOR  
LINDSLEY SCHEPMOES

BY

Blair, Curtis, Dumas & Hayward  
ATTORNEYS

## UNITED STATES PATENT OFFICE

2,192,019

## LIGHTING FIXTURE

Lindsley Schepmoes, New Haven, Conn., assignor to The Safety Car Heating & Lighting Company, a corporation of New Jersey

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2 Claims. (Cl. 240—7.35)

This invention relates to a lighting fixture and more particularly to a lighting fixture and lens for illumination of a railroad car or the like.

In accordance with the seating arrangement of modern railroad cars, busses and similar vehicles, it is often desirable to provide lighting fixtures which not only harmonize with the interior decoration of the vehicles but which effectively provide localized illumination. Many such vehicles are provided with aligned pairs of seats over which a baggage rack extends and which are more effectively illuminated by light sources which illuminate generally the entire interior of the vehicle. Such illumination is often too weak to provide sufficient reading light but is, nevertheless, productive of glare and light streaks which cause eye strain. When such fixtures are increased in illuminating power, the resulting glare is still more bothersome. Still other fixtures which attempt to provide localized illumination for each pair of seats do so indifferently because of improper location, poor lens structure, and numerous other reasons. These fixtures also very often cause an atmosphere of gloominess in the upper portions of the car and accordingly detract from rather than enhance the interior decoration thereof.

It is accordingly among the objects of this invention to provide a lighting fixture for a railroad car or similar vehicle which is reasonably inexpensive, sturdy, durable under conditions of rigorous use, which effectively illuminates the reading plane in the car without creating a condition of glare and finally which enhances the general appearance of the car interior.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, all as will be illustratively described herein, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings in which are shown two of the various possible embodiments of my invention,

Figure 1 is a longitudinal sectional elevation of my light fixture;

Figure 2 is a bottom plan view of the fixture;

Figure 3 is a sectional elevation taken along the line 3—3 of Figure 2;

Figure 4 is a diagrammatic view showing the distribution of light from the lens in my fixture; and

Figure 5 is a sectional elevation of a modified form of my fixture.

Similar reference characters refer to similar

parts throughout the several views of the drawings.

Referring first to Figure 1, my light fixture comprises generally a housing indicated at 10 which mounts an electric bulb socket 11 holding a bulb 12, casing 10 having removably mounted therein a lens generally indicated at 13.

Still referring to Figure 1, casing 10 is preferably an integral die-casting or stamping of suitable material such as aluminum and comprises a dome-like reflector portion 14, the inside 15 of which is suitably coated or finished to reflect light rays from bulb or light source 12. An opening 16 is provided in reflector 14 through which the open end of socket 11 extends in bulb-receiving position. Casing 10 also includes substantially vertical side portions 17 (Figure 3) which join reflector 14 with a flange portion 18 (see also Figure 1) which forms a mounting surface for the casing. I also provide an integral socket mounting plate 19 provided with a substantially U-shaped opening 20 by which socket 11 may be mounted in any suitable manner.

A pair of bosses 21 (Figure 1) are provided along one transverse end of casing 10 and on these bosses I secure a bracket 22 as by screws 23 for a purpose hereinafter described. On the other transverse end of casing 10 I provide a similar pair of bosses 24 (Figures 1 and 3) on which are secured similar brackets 25 as by screws 26 (Figure 1).

As is more clearly shown in Figure 2, casing flange 18 has a suitable number of screws 27 extending therethrough which may be threaded into a portion 28 (Figure 1) of the baggage rack (for example) or the ceiling of a railroad car or the like to mount the casing therein.

Brackets 22 and 25 are provided respectively with horizontal portions 22a and 25a having suitable holes formed therein through which extend respectively lens supporting hooks 29 and 30. As all of these hooks are substantially the same, only one will be described. Thus hook 29 (Figure 1) has a collar 31 suitably secured thereto and between this collar and casing flange 18 a spring 32 is coiled about hook 29. Spring 32 is an expansion spring and accordingly thrusts against collar 31 to force hook 29 upwardly to cause lens supporting arm 29a thereof to pull against the bottom of one edge of lens 13 thus holding the lens against casing flange 18 in proper operative position. Similarly lens hooks 30 are provided with springs 33 which force hook arms 30a against the bottom of the opposite edge of lens 13 to hold it in position.

Referring now to Figures 1, 2 and 3, lens 13 is generally box-shaped and comprises side and bottom portions 34 and 35, the upper edges of side portions 34 resting against casing flange 18. The outer surfaces of side and bottom portions 34 and 35 preferably are corrugated, i. e. they have parallel ridges 36 formed thereon (Figure 2) which are suitably treated so as to have a diffusing surface rather than a clear surface.

- 10 It may now be seen that lens 13 may be readily installed or detached from casing 10 by the manipulation of hooks 29 and 30 as these hooks may be pulled downwardly against the action of springs 32 and 33 and thence twisted to swing hook arms 29a and 30a away from the bottom of the lens.

- Positioned substantially centrally of lens bottom portion 35 (Figure 2) is a twin condenser lens generally indicated at 37. As is better shown in Figure 1, twin condenser lens 37 comprises two lens portions 38 and 39 (Figure 1) lying in the same general plane. As each of these lens portions is substantially similar to the other, only one will be described hereinafter.
- 25 Lens portion 38 accordingly has an upper convex surface 40 (see also Figure 3) which extends from a point 41 where it joins the bottom 35 of lens 13 to a point 42 where it joins the upper convex surface 43 of lens portion 39, point 42 being equidistant from the centers of lenses 38 and 39 and preferably being aligned with the center of source 12. With reference to Figure 3, the bottom surface of lens portion 38 is formed in a series of concentric prisms 44, 35 45 and 46, the lower surfaces of each of which are preferably concentrically convex. The central portion 47 of the bottom surface of lens 38 is also preferably convex. Lens portion 39 is similarly provided with concentric prisms 48, 49 and 50 having convex surfaces and with a convex lower surface 51. Thus condenser lens 37 comprises in general a pair of inverted so-called "Fresnel" lenses 38 and 39 lying in the same general plane, each of the "Fresnel" lenses in turn 45 having a segment cut therefrom and the two lenses 38 and 39 joined along their respective chords, i. e. along the line or chord 53 (Figure 2).

As shown in Figure 1, lower lens surfaces 47 and 51 join at a point 52 directly below the point 42 where upper convex surfaces 40 and 43 join thus forming a transverse line 53 (Figure 2) centrally of lens 37.

It should be noted that upper lens surfaces 40 and 43 which are wholly convex are adjacent light source 12 and preferably center point 42 of lens 37 is positioned in alignment with the center portion 12a of light source 12. This positioning of the lens not only facilitates cleaning thereof but also places the main body of the lens above the bottom horizontal plane of lens portion 35 which considerably lessens the production of light streaks and glare therefrom and increases the intensity of the condensed light.

- Referring now to Figure 4 wherein I show diagrammatically the distribution of light from lens 37, it will be seen that light rays A emanating from source 12c strike the upper convex surfaces 40 and 43 of the lens and are distorted by lens 37 so as to emanate therefrom in two 70 relatively distinct beams B and C which are suitably divergent to provide spot illumination for a pair of seats; for example, when the lens is asymmetrically positioned thereover. Beams of light B and C thus amply illuminate the seats toward which they are directed but do

not cause glare outside of their locality. A sufficient diffusion of light, however, emanates from portions 34 and 35 (Figure 1) of the lens to provide a soft illumination in the upper portion of the car or enclosure in which the fixture 5 is installed thus to dispell an otherwise gloomy atmosphere. Furthermore, this soft diffusion of light eliminates to a considerable extent the glare which would otherwise be noticeable when the vision is directed straight at the lens as the brightness of light emanation is graduated between the brilliant part of lens 13, i. e. condenser lens 37 and the relatively darker surrounding portions thereof, i. e. diffusing portion 35.

Referring now to Figure 5 in which I show my above-described lens mounted in a baggage rack support, the baggage rack includes a supporting arm 54 suitably secured to a side 55 of the car and extending therefrom to terminate 20 in an upwardly curved portion 56. On opposite sides of arm 54 I provide substantially vertical side walls 57 (only one of which is shown) and these side walls with a pair of partitions 58 and 59 form an enclosure 60 in which the several 25 parts of the lighting fixture are disposed. An upper support 61 is pivotally connected to the upper end of partition 58 by a hinge 62, support 61 being provided with downwardly projecting arms 63 and 64 and being held in closed 30 position by a screw 76. Support arms 63 and 64 have secured thereto in any suitable manner a reflector 65 which surrounds a light source 66 mounted in a socket 67 secured in any suitable manner to partition 58. Partition 58 has an 35 opening 68 formed therein to accommodate electric conductors 69 which are connected to socket 67. It will appear that support 61 may be pivoted to the dotted line position to permit access to socket 67 and the lens therebelow. 40.

An opening 70 is formed on the bottom of supporting arm 54 through which a lens generally indicated at 71 extends. Lens 71 is substantially similar to lens 13 (Figure 1) except that lens 71 is provided with a flange 72 which 45 rests upon a gasket 73 adjacent the edges of opening 70. A suitable number of clips 74 are secured as by screws 75 to arm 54 and these clips bear against lens flange 72 to hold the lens in its proper operative position.

As has been noted hereinabove, it is desirable to distribute light uniformly over the reading plane in the car, this reading plane being approximately 33 inches above the floor of the car and at an angle of about 45° thereto. It is, however, quite difficult to illuminate this reading plane 55 uniformly when the light source is positioned asymmetrically with regard thereto. However, by utilizing my above-described lens 71 (Figure 5) which throws the twin beams or "spots" B and C as shown in Figure 4, I am able to provide substantially uniform illumination in localized areas about each of the seats disposed below the light source. 60

It may accordingly be seen that I have provided a lighting fixture and a lens therefor which 65 amply and efficiently illuminates the desired locations and accomplishes the several objects noted hereinabove in a thoroughly practical and efficient manner. 70

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth, or shown in the accom-

panying drawings, is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A lighting fixture for a railroad car or the like provided with a line of pairs of seats, said fixture being asymmetrically disposed over a pair of said seats and with respect to the reading planes related thereto, said fixture comprising, in combination, a reflector adapted to be connected to the upper part of the car, a source of light adjacent said reflector, and a light-transmitting and diffusing member adjacent said source of light and having a generally flat bottom facing generally downwardly of said car, a portion of said bottom being translucent and adapted to effect a general diffusion of light in the upper portion of said car, the central portion of said member comprising a pair of concavo-convex condenser lenses, each arranged to direct a spot beam of light of uniform intensity over one of said reading planes, the concave portions of said lenses extending upwardly from the plane of said bottom wall.

2. A lighting fixture for a railroad car or the like provided with a line of pairs of seats, said

fixture being asymmetrically disposed over a pair of said seats and with respect to the reading planes related thereto, said fixture comprising, in combination, a reflector adapted to be connected to the upper part of the car, a source of light adjacent said reflector, and a light-transmitting and diffusing member adjacent said source of light and having a generally flat bottom facing generally downwardly of said car, a portion of said bottom being translucent and adapted to effect a general diffusion of light in the upper portion of said car, the central portion of said member comprising a pair of concavo-convex condenser lenses, each arranged to direct a spot beam of light of uniform intensity over one of said reading planes, the concave portions of said lenses extending upwardly from the plane of said bottom wall, said bottom wall including a plurality of corrugations or the like, and spring-urged catch means associated with said fixture and including portions adapted to interfit with said corrugations to yieldingly retain said member in operative position beneath said light source.

LINDSLEY SCHEPMOES. 25