Oct. 12, 1965 N. H. SCHWENKLER 3,211,904

LIGHTING FIXTURE

Filed March 6, 1964 3 Sheets-Sheet 1

Fig. 1

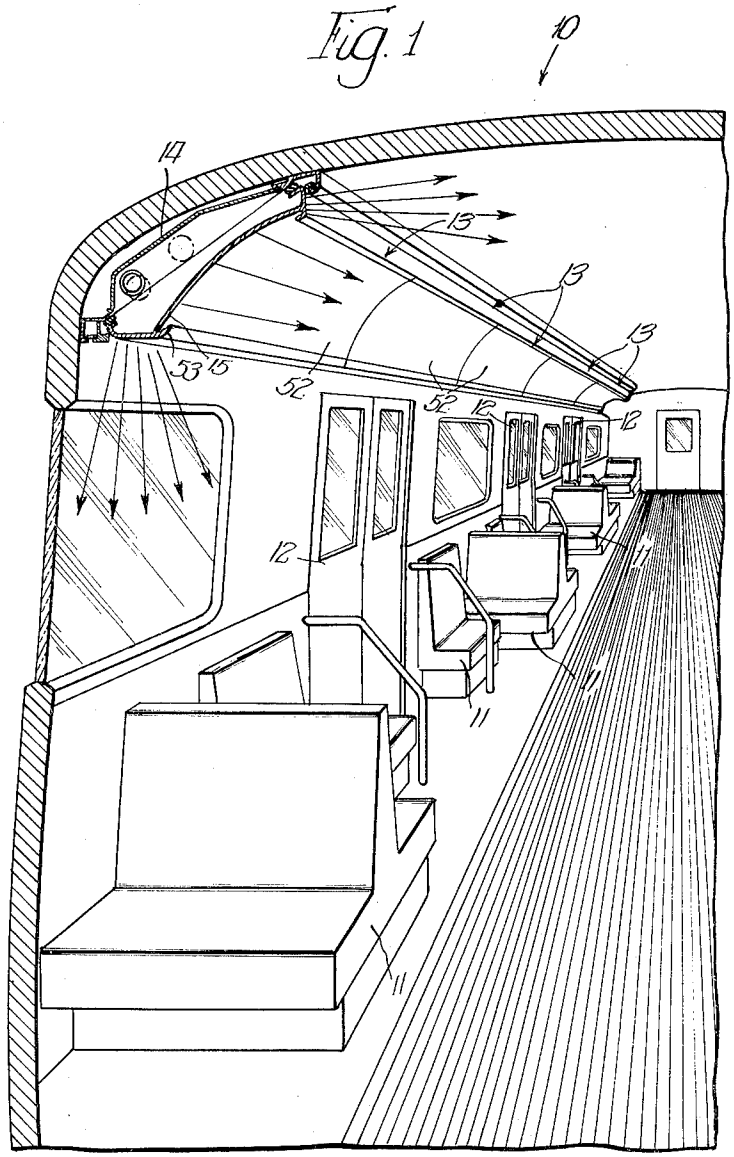

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Fig. 3

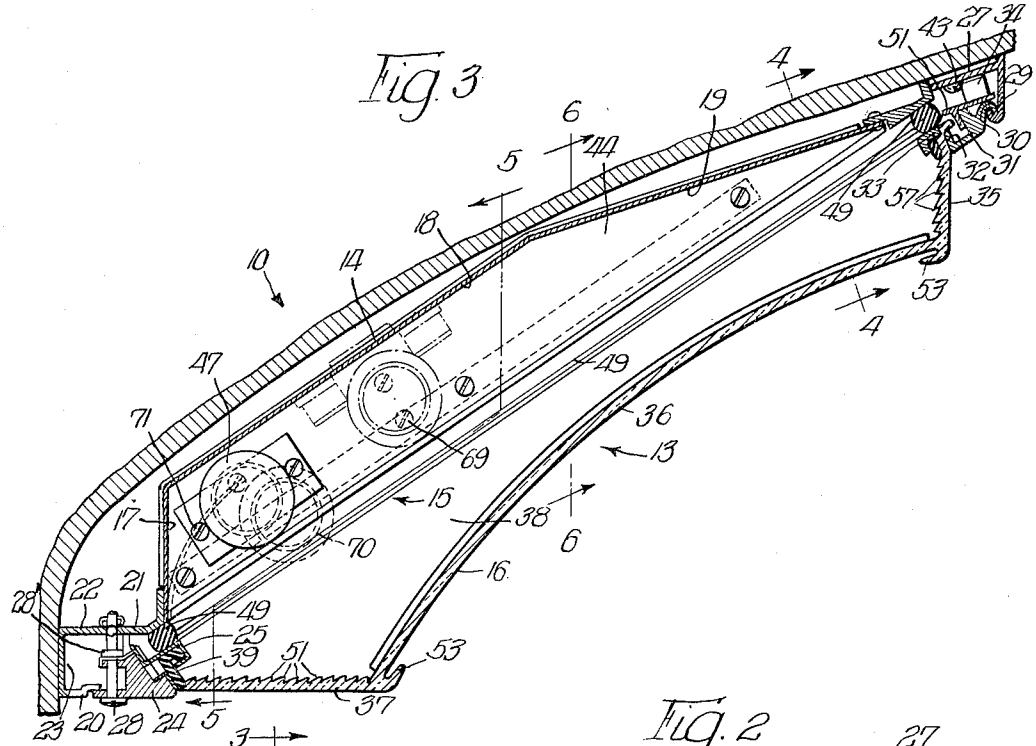

Fig. 2

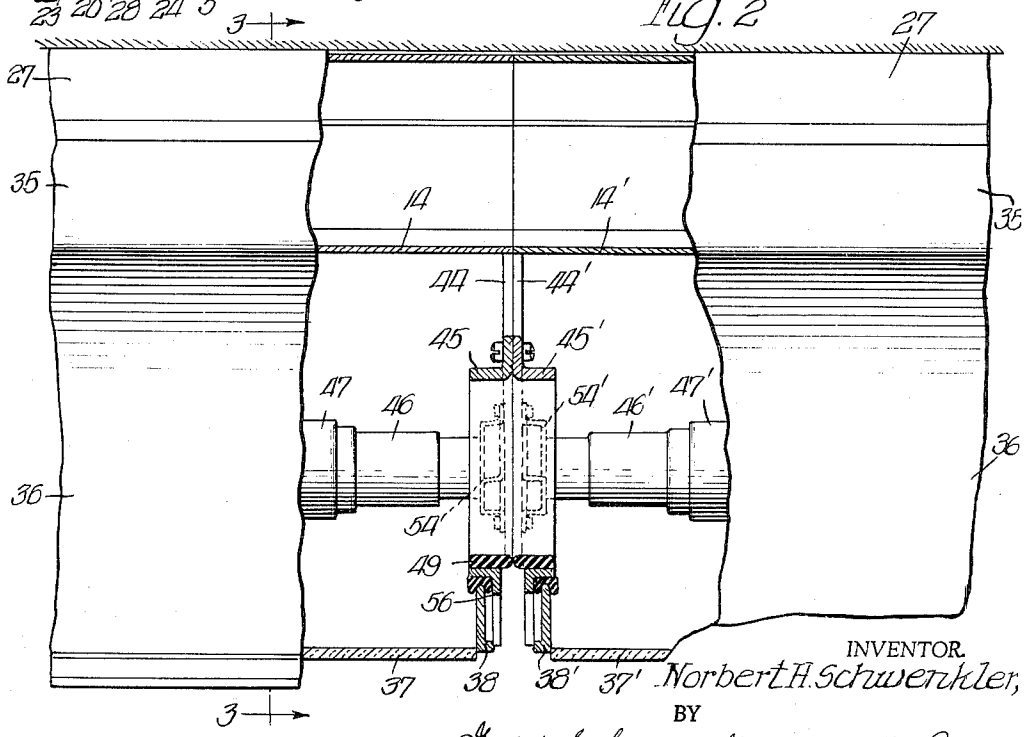

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Fig. 8.

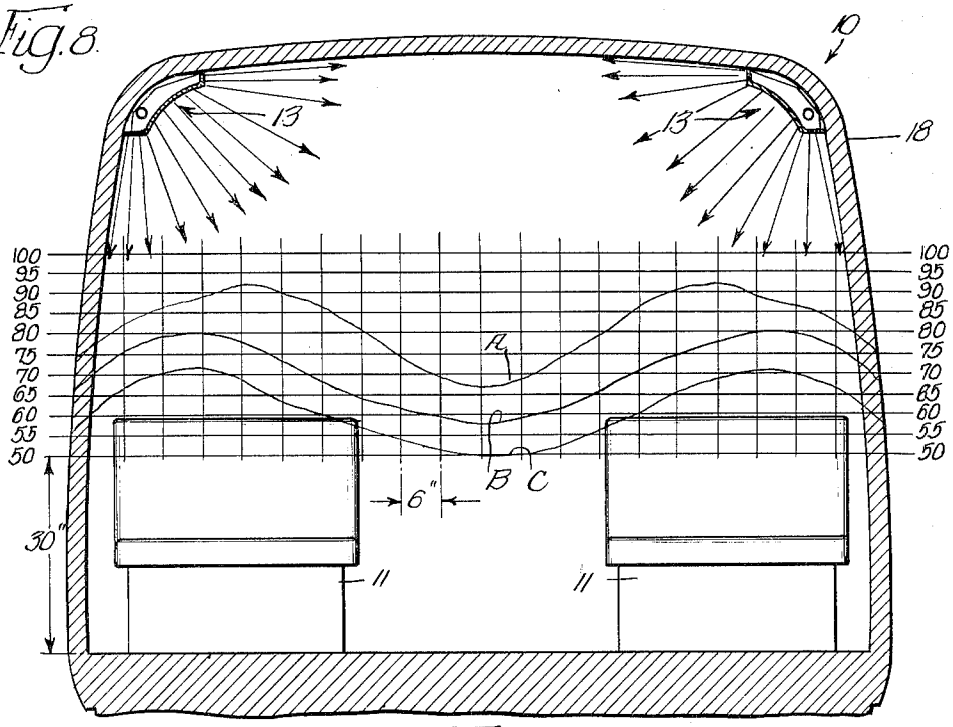


Fig. 7

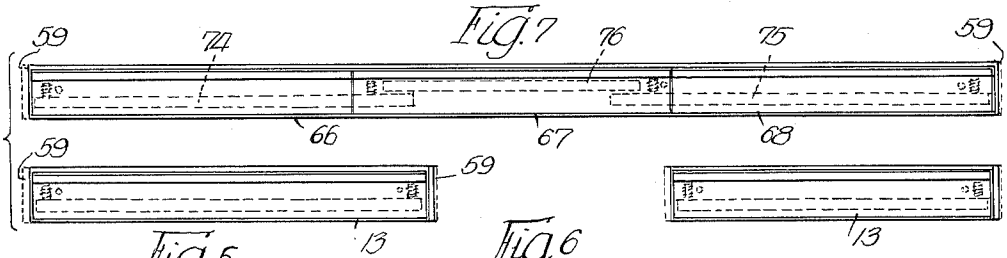


Fig. 5.

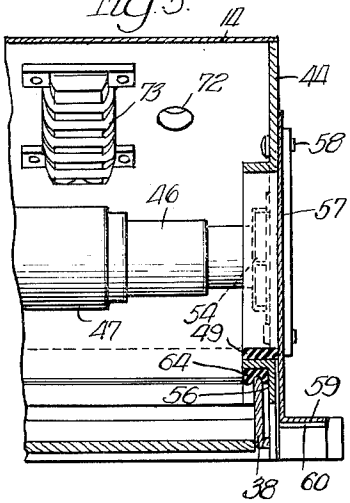


Fig. 6

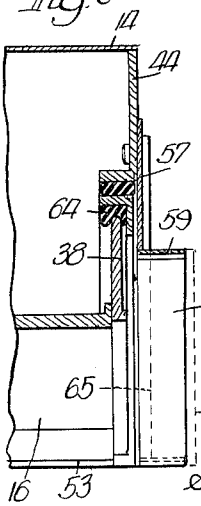
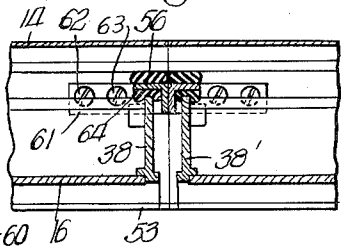


Fig. 4



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3,211,904

LIGHTING FIXTURE

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Filed Mar. 6, 1964, Ser. No. 350,002
2 Claims. (Cl. 240—7.35)

This application is a continuation-in-part of my co-pending application, Serial No. 256,431, filed February 5, 1963, and relates to lighting fixtures in general, and more specifically is directed towards a multi-purpose light fixture of compact design which provides for substantially even intensity light concentrated in a pre-selected area while simultaneously providing general illumination of lesser orders of intensity for advertising display and general lighting purposes.

It is an object of this invention to provide a new and improved form of lighting fixture of simplified and uncomplicated design capable of establishing at least one area of concentrated illumination of substantially even intensity and at least one area of general illumination of a lesser order of intensity with both areas being established as a direct result of the unique arrangeemnt and design of the basic fixture parts.

Another object of this invention is to provide a new and improved lighting fixture particularly adapted for efficient cornice type mounting in a vehicle, such as a passenger carrying train, subway car, bus or the like, with the fixture being capable of simultaneously providing multiple areas of controlled illumination including one area of concentrated light as well as areas of general illumination for display purposes and passenger safety.

A further object of the invention is to provide a new and improved vehicle interior lighting arrangement utilizing a unique form of light fxture of uncomplicated design having a light transmission panel associated therewith which has distinctly arranged light transmitting sections for establishing multiple illumination areas, including one area for general illumination, another area for concentrated illumiation and still another for advertising illumination.

It is a further object of this invention to provide a light fixture of simplified design which is exceedingly flexible in that additional light sources may be added without generally affecting the level of intensity in the concentrated area or requiring change in the fixture construction.

It is a further object of this invention to provide a new and impoved light fixture of simplified design which provides multi-purpose lighting while being easily shaped to fit in a wide variety of environments without requiring design change.

Further and fuller objects will become readily apparent when reference is made to the accompanying drawings wherein:

FIG. 1 is a fragmentary perspective sectional view of a portion of the interior of a passenger vehicle provided with the new and improved lighting fixture of the present invention;

FIG. 2 is a fragmentary elevational view of adjacent end portions of a pair of lighting fixtures with portions broken away to illustrate the relative positioning of adjacent fixtures when mounted in an end-to-end arrangement;

FIG. 3 is a transverse section through one of the light fixtures as viewed generally along the lines 3—3 of FIG. 2;

FIG. 4 is a fragmentary section of an end portion of a fixture taken generally along the lines 4—4 of FIG. 3 to illustrate the end sealing arrangement;

FIG. 5 is a cross sectional view of an end portion of the fixture taken generally along the lines 5—5 of FIG. 3;

FIG. 6 is a fragmentary cross sectional view taken along the lines 6—6 of FIG. 3 illustrating the construction of the longitudinal center section at one end of the fixture;

FIG. 7 is a schematic elevational view of two types of fixture arrangements; and

FIG. 8 is a graphic representation illustrating the level of illumination intensity of the fixture when used in connection with the vehicle illustrated in FIG. 1.

Modern day transportation facilities such as trains, subways, buses, and the like have been designed with the passenger's comfort specifically in mind. One facet of passenger comfort which is of primary importance is the necessity of providing adequate interior lighting to permit the passengers to read, while keeping initial expenditures within reasonable economic limits. Individual or spot type readng lamps are not only objectionable from the standpoint of excessive cost, but if used alone also serve to create areas of diverse levels of light intensity which oftentimes contributes to passenger eye discomfort. When considered for use in connection with short haul, low cost transportation systems, installation and maintenance of suitable individual or spot type lighting systems is considered prohibitive largely for economic reasons.

The present invention is particularly adapted for use in transportation facilities such as subways, buses and the like due to its rather flexible design, low cost of installation and maintenance, and the type of lighting provided. When the present invention is used in one of the above enumerated environments, it simultaneously provides: an area of concentrated substantially even intensity light for passeger reading purposes; a second area of indirect concentrated light for general illumination purposes; and, an intermediate area of diffused light for display and advertising illumination. A single light is adequate as a source for the multiple purposes stated, or a double source may be used without requiring modification of the fixture, thus exemplifying the flexibility and versatility of the design.

As previously noted, the fixture is of uncomplicated construction when compared with existing devices which do not provide the advantages noted, generally including a light source housing, a light source and a light transmission panel with the panel being of a subdivided nature to provide the selected areas of illuimnation discussed above.

Referring now to FIG. 1, reference character 10 indicates approximately one half of the interior of a passenger transporting vehicle. The vehicle includes along opposite side wall areas a series of spaced passenger accommodating means such as the seats indicated at 11. A plurality of passenger door loading areas 12 may also be provided in the side walls of the vehicle to facilitate passenger ingress and egress. A generally arcuate cornice is provided at the junction of each side wall and ceiling portion and serves as a mounting for the cornice type lighting arrangement of the present invention which includes a plurality of longitudinally elongated lighting fixtures 13 which are arranged in end-to-end abutting relation. Generally, the lighting fixture arrangement extends the full length of the car as well as being symmetrically arranged on opposite sides of the longitudinal center line of the car.

As is evident upon inspection of FIG. 1, the available area for mounting the fixture is quite limited, the lower limit being defined by the windows and doors while the ceiling of the car in most instances defines the upper limit. The total vertical depth or thickness of the fixture is limited by the requirement for head room to accommodate

those passengers standing or arising from their seats to leave the vehicle.

It is necessary to utilize the cornice area for mounting in order to provide adequate illumination over the seats for reading, as well as to provide for the proper inclination and maximum area for effective advertising and indirect general illumination. The limitation imposed by the shape of the available mounting area necessitates a unique design as will become evident. Since the vertical depth or fixture thickness is also limited as noted above, problems are encountered as to the placement of the light source to provide the necessary lighting efficiency, while avoiding bright spots which cause discomfort to the passenger and are considered to be injurious to the eyes over prolonged periods. Additional sources are oftentimes added to balance bright spots, however, this is objectionable in that it results in a substantial increase in the initial cost of the fixture as well as being quite costly to operate. It will become evident that a single source strategically placed in a properly designed fixture can not only serve the diverse needs within the cost and space limitations imposed, but also provide the greatest advantages.

Referring now particularly to FIGS. 2 and 3, each lighting fixture **13** basically includes a light source housing **14**, a light source **15** mounted within the housing **14** and a light transmitting panel assembly **16** enclosing the housing **14** and light source **15**. As is best seen in the cross sectional view of FIG. 3, the housing **14** is of generally concave configuration to conform to the generally arcuate configuration of the cornice area joining the side wall and ceiling portions. As seen in FIG. 1, the light transmitting panel **16** is longitudinally elongated, presenting an exterior or outward appearance of being generally concave at its central section with the area of concavity being sharply defined by a horizontal lens portion at the lower end, and a generally vertical lens portion at the upper end.

The housing **14** may be formed of relatively thin metal and as seen in FIG. 3, is shaped to provide a plurality of angularly related flat surfaces **17**, **18** and **19**. A coating of primer may cover the outside of the housing **14** for preservation of the metal surface with the interior suitably finished to provide the necessary reflective characteristics. For this purpose, a white high gloss enamel surface has been used with excellent results since the reflections from this type of surface due to the low order of incidence angle is, for all practical purposes, the same as a specular surface while being less expensive to produce. The foregoing presupposes proper placement of the light source **15** relative to a housing designed within the concepts set forth hereinafter.

A longitudinal mounting rail **22** supports the lower margin of the light fixture **13**. Lower and upper leg members **20** and **21** form a channel which permits the mounting rail **22** to be easily affixed to the car wall by means of a series of fasteners **23** which are ultimately hidden from view. A continuous door or trim rail **24** abuts the lower leg member **20** and provides a mounting for a sealing flange **25** which is joined thereto by means of a threaded fastener or the like. The upper portion of the sealing flange **25** is spaced from a diagonally extending portion on the upper leg member **21** of the mounting rail **22** to provide a longitudinally continuous pair of spaced sealing flanges.

The door rail **24** may be removably joined to the mounting rail **22** by a series of fasteners **28** which extend through the door rail **24** into engagement with the upper leg **21** on the mounting flange **22**. A nylon retainer washer **28'** may be provided on the shank of the fastener **28** allowing the door rail **24** to be released from the mounting rail **22** to gain access to the interior while maintaining the fastener **28** on the door rail **24**.

The upper longitudinal margin of the housing **14** is affixed to a longitudinally continuous hinge rail **27** by rivets or the like. A series of fasteners **43** extend through the hinge rail **27** into suitable holes in the ceiling to join the housing to the vehicle. The upper or hinge rail **27** includes a continuous depending hook-like hinge portion **29** which receives therein a co-operating hook-like hinge portion **30** forming a part of a longitudinally continuous hinge member **31** which joins the light transmitting panel assembly **16** to the upper rail **31** for swinging movement.

An upwardly and inwardly projecting flange portion **32** on the hinge member **31** engages the underside of an outwardly and upwardly projecting flange portion **33** integral with the light transmitting panel assembly **16**. A retainer clip **51** holds the flanges **31** and **33** in engagement being hooked at one end into a shallow channel formed adjacent the flange **33** and extending outwardly over the hinge member **31** terminating adjacent the hook shaped portions **29** and **30**. A wave spring **34** acts through the end of the retainer clip **51** to maintain the hook-like hinge portions **29** and **30** in mutual engagement, while permitting the same to freely pivot relative to the rail during the opening and closing of the fixture.

The light transmitting panel assembly **16** is generally U-shaped as viewed in cross section and is closed at both ends to form a generally box-like structure. A longitudinally extending vertically disposed lens portion **35** is formed at the inner marginal portion being integral with an intermediate display section **36** which merges with a longitudinally extending generally horizontal lens section **37**. The sections **35–37** may be integrally formed from any suitable material such as plastic material or the equivalent with the entire panel being readily fabricated by extrusion when formed of plastic or the like. It is contemplated that the extruded section will be cut to the appropriate length and the end wall sections suitably attached thereto. The upright end wall sections **38** may be also formed from plastic material having lower marginal edge portions which generally conform to the cross sectional configuration of the light transmitting panel assembly **13**. The vertical depth of the fixture adjacent the lens section **35** is less than the vertical depth at the horizontal section to increase the available head room towards the center of the vehicle.

The horizontal lens section **37** of the light transmitting panel **16** is provided at its terminal or marginal edge with an upwardly projecting hook-like portion **39** which is received within a U-shaped mounting portion on the sealing flange **25**. When the door rail **24** is released by releasing the fasteners **28**, the light transmitting panel assembly **16** may pivot in an arcuate path about the upper hinge rail **27** to gain access into the interior of the fixture. When the light transmitting panel assembly is in the position shown, a continuous gasket **49** is clamped between the leg members **21** and the locking flange **25** to seal the inner marginal edges of the housing and light transmitting panel assembly **16** against stray light and/or dust. The gasket **49** also extends transversely of the fixture, being squeezed between the end panels **38** and the end plates **44** on the housing, as well as longitudinally between the flange **33** on the panel **16** and the upper hinge rail **27** to provide a continuous marginal seal.

As noted above, the opposite ends of the housings are partially closed off by end plates **44** having inner flanged marginal edge portions **45** for co-operation with the gasket **49**. Light source mounting means in the form of channel shaped flanged socket mounting members **54** are suitably joined to the inner surface of the end plates **44**. Mounted on the socket mounting members are sockets **46** of known type which suitably mount therebetween a tube type fluorescent lamp **47** serving as the light source.

As seen in the cross sectional view of FIG. 2, when the fixtures are arranged in end-to-end relation as shown schematically in the top half of FIG. 7, the adjacent fixture is of identical construction having an end plate **44'** terminating in a lower marginal flange **45'**. A socket mounting member **46'** is illustrated at **54'** providing a

mounting for the socket member 46' supporting the fluorescent tube 47' in longitudinal alignment with the tube 47. Appropriate fasteners may be used to join the end plates 44 together in face-to-face abutment.

The uniformity in the end construction of the fixture is apparent on examination of FIG. 4 which is a cross sectional view taken adjacent the hinge rail 27. The end wall portions 38 and 38' may be formed of clear or frosted plastic, glass or the equivalent to admit light to the slight space between, with such spacing being of the order of about ¼ inch to accommodate thermal expansion of the adjacent panels 16 and 16'.

As seen in FIGS. 2 and 4, the lower flanges 45 of the end plates 44 abut the gasket member 49 with the underside of the gasket being in sealed relationship to an angle member 56 mounting end section 38. This serves to seal off the ends to an extent that stray light is eliminated and dust cannot gain entry to accumulate within the fixture.

Each lens section 35 and 36 may be formed of clear transparent plastic and is provided along the inner surface thereof with a plurality of longitudinally continuous prisms 51 which provide for the concentration of light transmited through the respective lens sections to establish areas of high intensity illumination. The vertical lens section 35 provides illumination in the area of the overhead or ceiling of the vehicle is illustrated by the generally horizontal arrows in FIG. 1. Illumination of this type is of an indirect nature and is of sufficient intensity to illuminate the interior of the vehicle for general purposes such as safe passenger movement.

The lower horizontal section 37 provides a longitudinally continuous downwardly directed area of high intensity illumination as indicated by the generally vertically directed arrows in FIG. 1, serving to light the area surrounding the passenger accommodating means 11 being generally on the region of the side wall portions of the vehicle. In this respect, the design of the present fixture permitting close end-to-end mounting of a plurality of fixtures provides for a longitudinally continuous area of concentrated high intensity illumination directed downwardly along the side wall portions of the vehicle throughout the entire length of the car.

The display section 36 of the panel 13 is translucent and is adapted to receive against the outer surface thereof a display card 52 for observance by passengers in the vehicle. The section 36 is of arcuate configuration to permit the ready retention of a card 52 thereagainst. In this respect, suitable card retaining means in the form of projecting hook-like members 53 are provided along opposite longitudinal margins of the central section 36. These members are designed to be integrally formed with the panel 16 during extrusion thereof and opposite margins of a card 52 may be readily inserted behind the hook members 58 and the card bowed into surface engagement with the outer surface of the central section 36. Preferably the section 36 is of concave configuration as illustrated for the efficient retention of a flexible display card thereagainst, however, the central section may be formed into other configurations as will be described.

The hook members are open at opposite ends of the fixture permitting advertising media such as card displays or the like to be of any desired length since they can continuously extend from one fixture to the next. As seen in FIGS. 2 and 4, the space between the end walls 38 and 38' is sufficiently illuminated to provide adequate lighting brilliance in the transition from one fixture to the next. It is contemplated that the hook-like members 53 will be frosted to hide any irregularities in the upper and lower marginal edges of the cards with the result that a clean, neat and sharp frame is defined along the upper and lower edges of the cards.

FIG. 5 represents a section through the end portion of a fixture when they are spaced in the manner illustrated in the lower half of FIG. 7. The end plate 44 is identical to the end plate section described in connection with FIG. 2. Also, the socket mounting means 54 and socket 46 are the same as well as the gasket 49, angle member 56 and end wall section 38 of the light transmitting panel assembly. For convenience, the wiring has been omitted in FIG. 5 since it is of conventional design entering the fixture through a grommetted opening 72 to the ballast device 73 mounted on the housing and then to the socket 46.

One major difference exists from the end section of FIG. 2 in that an end filler 57 is joined to the end plate 54 for trimming the end of the fixture. A series of threaded fasteners or the equivalent 58 attach the end filler 57 to the end plate 44. The end filler 57 extends downwardly and curls longitudinally in a flange portion 59 which serves as a mounting for a trim piece 60 when the fixture is placed adjacent the wall or in any other environment requiring a trim piece.

The trim piece 60 may be mounted below the flange 59 and is longitudinally adjustably carried by the flange 59 to accommodate slight variances in the distance between the end of the fixture and the adjacent wall. The trim piece 60 may be fastened to the longitudinally projecting flange portion 59 by means of threaded fasteners or the equivalent received in longitudinal slots of race track shape in the flange portion 59.

The cross sectional view in FIG. 6 illustrates the construction through the central portion of the fixture. For convenience, the socket mounting means, socket and tube 47 have been omitted in FIG. 6, it being understood that mounting thereof would be accomplished in the manner illustrated and described in connection with FIG. 5. As seen in FIG. 6, the lower mounting flange 59 on the trim plate 57 terminates short of the lower end of the fixture or light transmitting panel assembly 16. It is contemplated that the contour of the lower flange 59 will approximate the exterior contour of the light transmitting panel assembly 16 being slightly recessed therefrom to present a neat appearance. As illustrated by the phantom lines 65, the lower trim plate 60 may be adjusted axially to compensate for slight variances in spacing from the end wall of the car.

The end construction in each of the abutting fixtures is similar to the construction illustrated in the cross sectional view of FIG. 4 having the usual end wall 38 on the light transmitting panel 16 sealed to the angle member 56 by means of a gasket 64. Each angle member is terminated at opposite ends by a longitudinally extending flange 61 which is drilled and counterbored, and receives suitable fasteners 62 and 63 for joining the angle member to the hinge member 31 and door rail 24 respectively. Thus, the combination of the door rail 24 and hinge member 31 together with the angle members 56 at opposite ends of the fixture serves as a frame around the top marginal edges of the light transmitting panel assembly 16.

The angle members 56 at opposite ends of the light transmitting panel assembly 16 co-operate with the continuous gasket 49 described in conjunction with FIG. 3 to maintain the light fixture sealed against stray light and dust as noted above. The lower marginal edge of the end wall 38 may be provided with a rabbet joint or shoulder portion to permit joining the longitudinally extending portion of the light transmitting panel assembly 16 thereto by means of plastic adhesives, a plastic weld or the like.

Having described the over-all arrangement of the light fixture, the manner of positioning the light source or sources will now be described. The tube 47, shown in solid line section in FIG. 3, is mounted closely adjacent one side of the fixture to provide illumination of concentrated intensity in the area of passenger seating. It has been found in fixtures designed in accordance with concepts advanced above, that the light source will provide even illumination free of glare spots if the source is maintained spaced from the light transmitting panel 16 a distance at least equal to the diameter of the source. Beneficial results are obtained by positioning the light source

in accordance with this principle in that even intensity illumination is provided in the critical lightng area while permitting the remaining shape of the fixture to be varied substantially to accommodate any irregularities in the mounting environment without adversely affecting the illumination in the critical area. It is clearly evident on inspection of FIG. 3 that approximately three-fourths of the entire fixture remains available for specific shaping to accommodate any special environmental mounting conditions. In the present case, the vertical depth adjacent the vertical lens 35 is less than twice the diameter of the light source 47. Any such shaping, for example, in the present case to conform to the shape of the cornice will not impair the basic function of the fixture, that is, the fixture remains basically a multi-purpose light source providing for adequate reading light as well as interior car illumination and indirect lighting.

As has been discussed briefly above, the fixture is completely functional with only one light source, provided it is properly located relative to the other components of the fixture. The light source 47 is disposed interiorly of the fixture in such a manner that considering the central axis of the tube 47 as a point source, an angle of approximately 80° to 90° of the surface of the lamp is intercepted by the lens area 37. This will provide an illumination controlling aperture for lensing the light from the source to provide adequate illumination on the task below which in the present case is passenger reading purposes. The design configuration of the horizontal lens 37 results from a direct design calculation utilizing the known height of the fixture mounting, degree of beam spread required and is readily calculated when additional factors as incidence angles and index of refraction of the material are known.

A second light source illustrated in phantom in FIG. 3 at 69 may be readily added to the fixture if dsired by providing suitable mountings therefor on the end wall portions 44. The additional light source 69 is placed within the fixture properly spaced from the prime source, which in the present case is the fluorescent tube 47. In practice, a spacing of the order of 2 and ¼ to about 3 and ¼ inches has been found to be satisfactory.

The second source 69 does little to contribute to the downwardly lighting because of its placement relative to the lower lens 37. It does, however, increase the total input (in lumens) into the fixture thereby providing a brighter source of light which is mainly directed to the vertical lens area 35 and the card carrying section 36. Obviously, the brilliance in color of the advertising will be materially increased in this manner without creating glare spots or upsetting the rather delicate balance of illumination intensity passing through the horizontal lens 37.

As a further illustration of the flexibility of the present design, clear flat areas could well replace the lenses 35 and 37, provided suitable means is present to control the direction of the light. In this connection the lamp 47 may be moved to the position illustrated in phantom at 70 and a specular reflector 71 (also in phantom) provided to concentrate the light passing through the clear area which has been substituted for the horizontal lens 37.

Additional modifications are possible with the basic fixture design described above. For example, a modular glass lens of appropriate proportions conducive to production methods known in the glass pressing art may be incorporated. In the present state of the art of glass pressing, lensing prisms, flanges and the like can be used to a design advantage to fit the required needs of fixture shape, while achieving the lighting effects of the basic fixture as described above in connection with an extruded plastic light transmitting panel.

A further variation is also possible since a rolled glass shape closure could be provided in suitable lengths to accomodate the fixture length. It is possible to form a rolled glass shape with a combination of flat and concave surfaces giving the appearance of the extruded light transmitting panel shown. In this design, however, suitable U-shaped longitudinally extending hooks are bonded or joined by any suitable means to the rolled glass shape to accommodate the mounting of advertising media. Under these circumstances the glass may be of a textured nature, much like fine cross hatching, hammerd or cathedral type glass plate. Obviously, other arrangements of this type are possible once the present construction is known.

Two separate arrangements of lighting fixtures are illustrated in the schematic view of FIG. 7. In the top half of FIG. 7, the lighting fixtures 66, 67 and 68 are arranged in end-to-end abutting relation similar to those shown in FIG. 1 with the manner of joining the fixtures to each other of the form described in connection with FIGS. 2 and 4. The outer ends of the end fixtures 66 and 68 may be provided with the adjustable end fillers and trim pieces described in connection with FIG. 5 and 6.

It is contemplated that a fixture arrangement such as that illustrated will extend the entire length of the car. The light sources illustrated at 74 and 75 may be of greater length than the associated fixture extending through suitable openings in the end wall portions into the adjacent fixture 67. In such arrangement an annular gasket surrounds the openings being squeezed between the end walls to maintain the individual fixtures completely sealed. The inner end portions of the light sources 74 and 75 are mounted to the housing of the central aperture by means of L-shaped brackets with the respective opposite ends being mounted in the manner described in connection with FIG. 2.

The central fixture 67 is disposed over the doorway and if additional light in this area is desired, a secondary source or lamp 76 may be mounted within the housing about the same position relative to the axis of the prime light source, as is the second light source 69 illustrated in phantom in FIG. 3. A secondary source arrangement of this type will provide adequate illumination for general purposes however, is not intended for reading since, due to the position of the lamp 76, the light emitted through the lower horizontal lens 37 would be "out of focus" lacking the concentrated quality of the prime sources. This course is not objectionable where the light is being used merely for general illumination purposes.

As noted, the light in the section between the lamps 74 and 75 which is emitted from the source 76 will not be of the quality insofar as evenness of intensity is concerned, however, is perfectly desirable from the standpoint of general illumination. Accordingly, the continuity of general illumination will be maintained since the lamps 74–76 overlap a slight amount and advertising illumination will be completely consistent throughout the entire length of the fixtures. An alternative embodiment is illustrated in the lower half of FIG. 7 wherein the fixtures extend only from the end of the vehicle to adjacent the door area with a break in the continuity of fixtures in the region of the door. It is contemplated that the fixtures will be of appropriate length to extend from one end of the car to adjacent the door area 12 as well as between door areas and also from the last door area to the opposite end of the car thus minimizing the total number required.

The simplified form of fixture design of the present invention permits the fixture to be manufactured to any desired length without requiring design changes. Accordingly, the fixtures are usually manufactured to an appropriate length to accommodate fluorescent tubes of standard length with the resultant effect on initial and maintenance costs. Obviously, other light fixture arrangements other than those illustrated in FIG. 7 are feasible, limited only by the ingenuity of the interior decorator.

FIG. 8 graphically illustrates the advantages arising from the use of the lighting fixture of the invention in the manner previously described. The various curves A, B and C graphically illustrate the light intensity supplied

by the fixtures under varying conditions of use thereof. The readings were taken at a level of thirty inches above the floor of the vehicle and at increments of six inches transversely of the vehicle. The footcandle values were plotted across the vehicle resulting in the various curves.

Curve A illustrates the lighting effects under conditions where display cards **52** are not mounted on the fixtures. With each reading, the light meter used was held horizontally. It will be noted that a very susbtantial degree of light intensity occurs in the seating area and the aisle area is quite adequately illuminated. Curve B results from horizontal light meter readings taken under lighting conditions utilizing translucent display cards **52** mounted in the fixtures. Here again it will be noted that substantial and entirely adequate illumination of the seating and aisle areas occurs with over-all efficient light distribution being retained. Curve C results from horizontal light meter readings under lighting conditions utilizing opaque cards **52** carried by the fixtures. In this respect, it will be appreciated that light is not transmitted through the display sections **36** of the fixtures and is not available for general illumination. However, the efficiency of the lens sections **35** and **37** is quite apparent upon consideration of the resulting curve C in that adequate and substantial light intensity is retained in the seating area and the aisle area is adequately illuminated.

Curve C is of particular interest with regard to illustrating the efficiency of lighting fixture design. Specific and general illumination is maintained at proper levels and the provision of the vertical lens section **35** in each of the fixtures permits oppositely positioned display card illumination. FIG. 3 best illustrates the transverse direction of light through the lens section **35** of oppositely positioned fixtures. This arrangement provides for complete ceiling illumination and display card illumination of oppositely positioned fixtures. Thus, the lighting fixture is readily adapted for use with any type of display either in connection with internal or external lighting thereof.

The fixture described provides a high level glare-free band of controlled light directed towards the passenger reading and seating area. The fixture also provides a controlled band of glare-free high intensity light directed towards the ceiling area and across the upper portion of the vehicle for complete and uniform general illumination thereof. The fixture further permits the ready mounting of a display card and the illumination thereof without detracting from the basic lighting requirements. All of these things are accomplished by the use of a single type of fixture readily adapted for flush mounting and readily accessible for maintenance purposes.

Obviously, certain modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A lighting arrangement particularly adapted for use in mass transportation media such as trains, busses and the like, said lighting arrangement comprising backing means of generally bowed configuration, having a light reflecting surface on one side thereof, first and second panel mounting means attached to said backing means and extending longitudinally thereof to define first and second margins, a light transmission panel assembly bridging said backing means between said first and second margins, said light transmission panel assembly including a light transmissive longitudinally extending band-like portion disposed adjacent one of said margins, said light transmissive band-like portion being in a plane which under normal positioning is horiozntally disposed, said light transmission panel assembly including an intermediate bridging area adjoining said light transmissive band-like portion and extending to adjacent the other of said margins thereby to define with said backing means an internal light source mounting and transmission area therebetween, the spacing of said light transmission panel assembly from said backing means along said bridging area being of lesser dimension as compared to the spacing in the area of said light transmissive band-like portion, a tube-like source means mounted in said light source area generally in the region of greatest spacing of said light transmission panel assembly, said tube-like source being spaced from said light transmission panel assembly a dimension at least equal to the diameter of said tube-like source means to provide even illumination free of glare spots in the area of said band-like portion and said bridging portion, said bridging portion of said light transmission panel assembly being spaced from said backing means a distance of less than twice the diameter of said tube-like source means in the region of the other of said margins and being of slightly increasing spacing relative to said backing means throughout said light source area as it extends over to said light transmissive band-like portion adjacent said one margin, means adjacent opposite sides of said bridging portion to facilitate mounting of advertising thereon, and said backing means reflecting light emitted from said tube-like source means through said light transmission panel assembly said tube-like source means providing illumination of greater intensity through said light transmissive band-like portion than through said bridging portion.

2. The lighting arrangement of claim **1** wherein said light transmission panel assembly includes a second light transmissive longitudinally extending band-like portion disposed at an angle to said first mentioned light transmissive longitudinally extending band-like portion whereby light from said tube-like source means will be directed horizontally.

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