

[54] LIGHT FIXTURE WITH REMOVABLE LENS

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[22] Filed: May 5, 1970

[21] Appl. No.: 34,792

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[52] U.S. Cl. 240/7.1, 240/57, 240/106.1, 240/151

[51] Int. Cl. B60q 3/02

[58] Field of Search ... 240/51.11, 57, 106, 151, 7.1, 240/9, 10, 108; 161/40, 39, 111, 5

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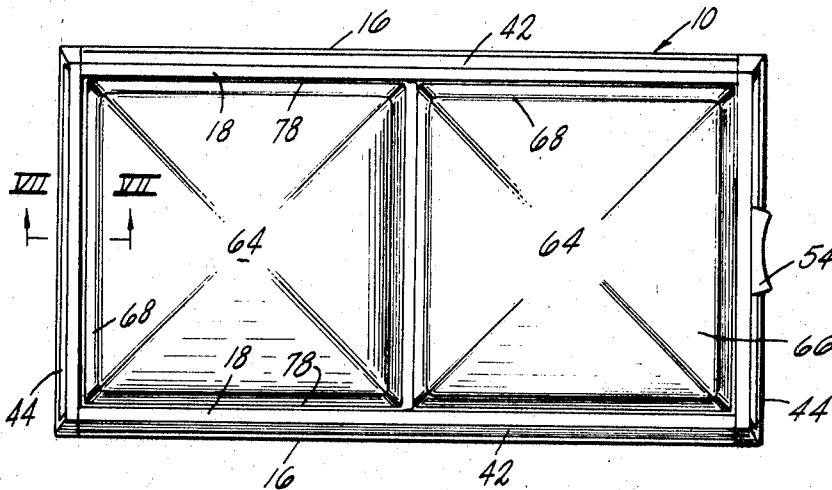
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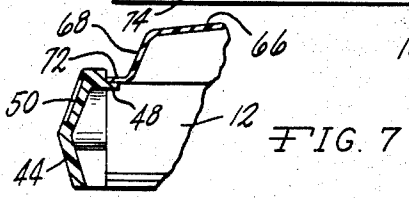
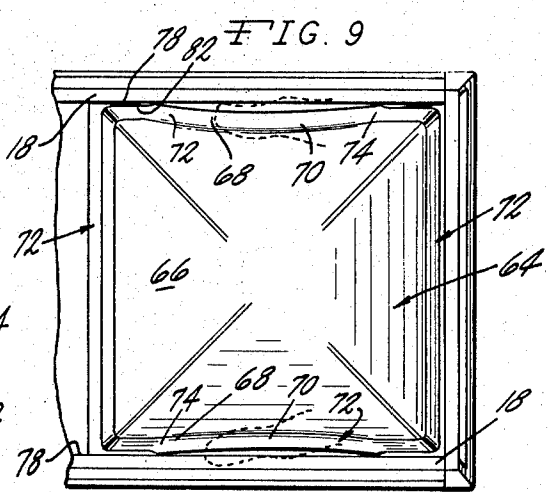
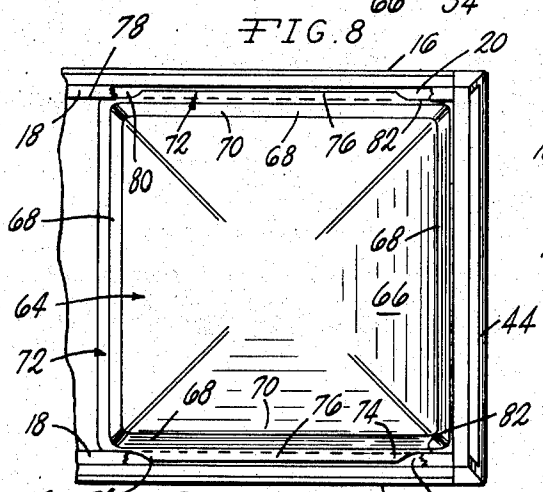
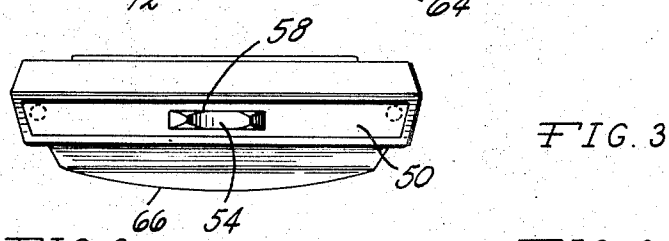
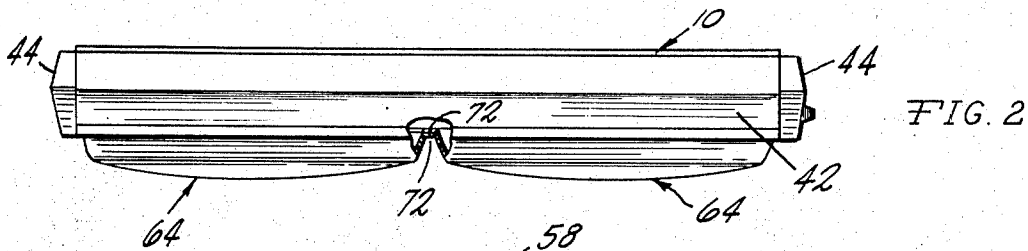
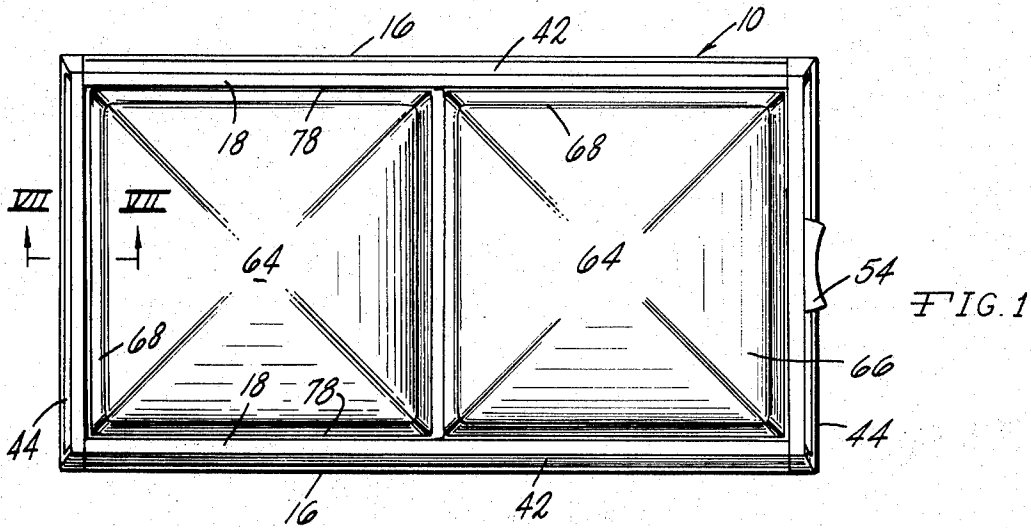
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[57] ABSTRACT

A surface mounted light fixture particularly suitable for use with recreational vehicles and watercraft wherein the fixture includes an extruded body member having end caps affixed to the body member ends. The body member is of a concave configuration receiving electrical lamps, and the lateral edge regions of the body member include lens retaining grooves for retaining a lens or lenses disposed over the body member. The lens is of a rectangular configuration, including transversely disposed base and wall regions, and is so shaped that the lens may be manually deformed for readily assembling and disassembling the lens to the body member for lamp replacement or cleaning.

3 Claims, 10 Drawing Figures





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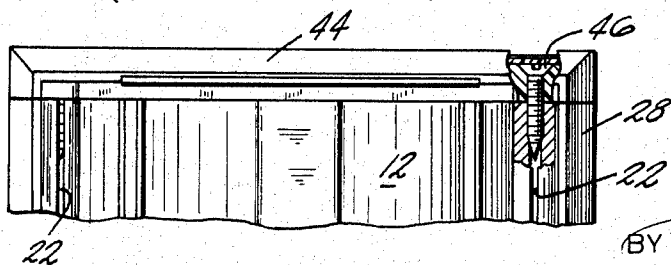
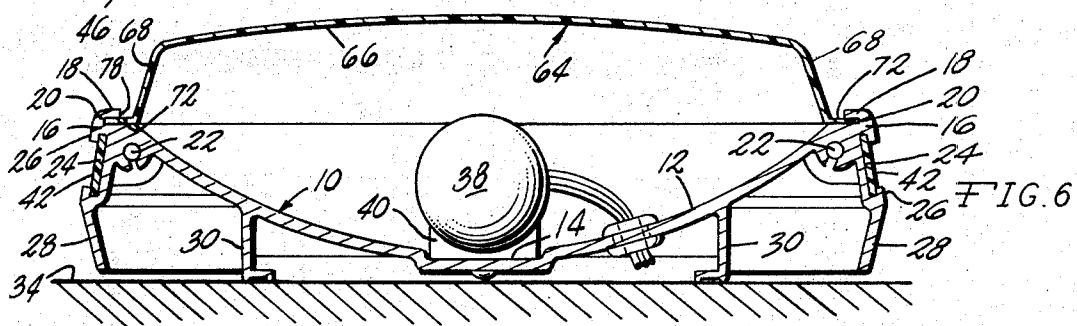
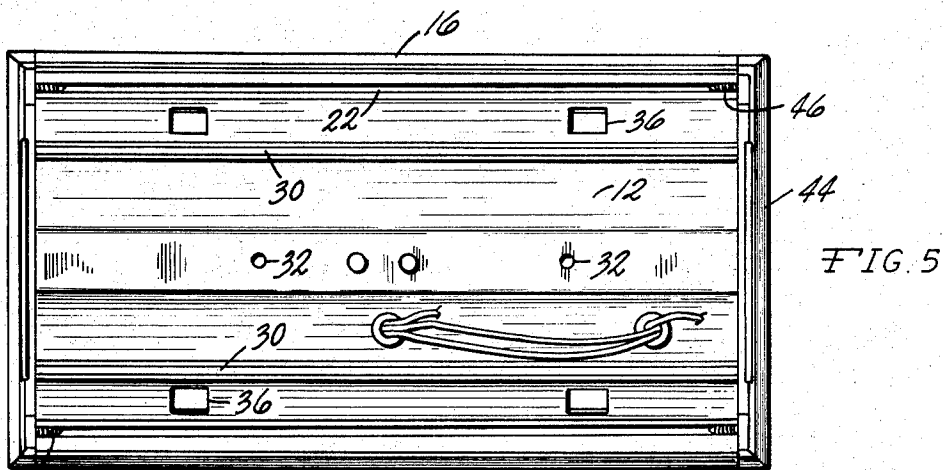
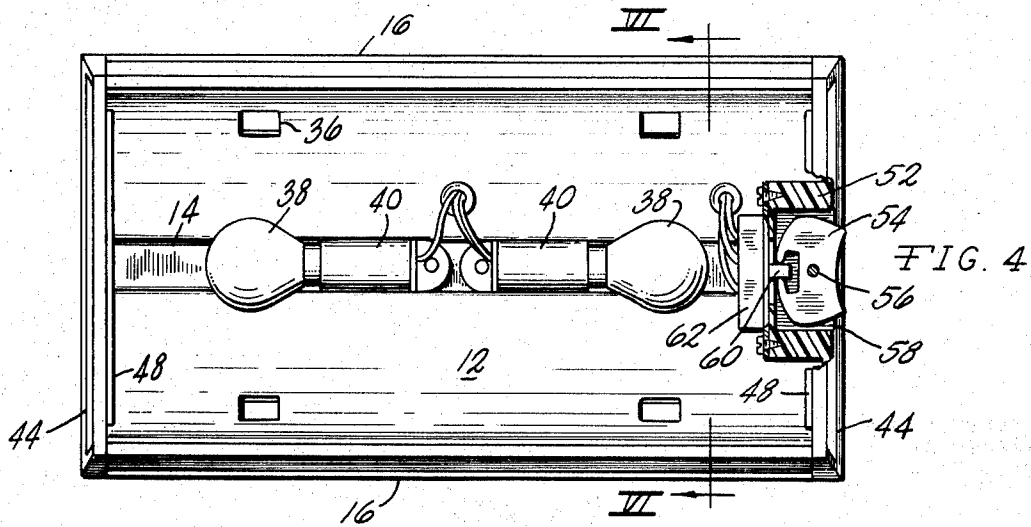


FIG. 10

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LIGHT FIXTURE WITH REMOVABLE LENS**BACKGROUND OF THE INVENTION**

The invention pertains to the field of lamp fixtures utilizing a manually deformable lens wherein access to the fixture interior is achieved by removal of the lens from the fixture frame or body.

The increasing use of recreational vehicles, such as mobile travel trailers, mobile homes, campers and land cruisers, as well as the increased use of private watercraft utilizing cabins and interior accommodations, has created a need for concise, attractive and practical lamp fixtures. Ideally, such fixtures should be of a minimum size, as to occupy as little of the interior space of the associated interior as possible, and are preferably surface mounted as to facilitate attachment to the underside of any horizontal surface, or vertical surface.

Previously, lamps available for recreational vehicles and watercraft were either of the type similar to those lamps utilized in automobiles as dome lights or interior lights, or the light fixtures available are of a plain, functional appearance, usually detracting, rather than adding to the decor. Also, presently available light fixtures for recreational vehicles and watercraft are expensive, relatively limited in use and location of attachment. Additionally, the replacement of burned out lamps was often troublesome and usually requires the use of a screwdriver or other tool.

SUMMARY OF THE INVENTION

The purpose of the invention is to provide a light fixture particularly suitable for use in recreational vehicles, watercraft, and the like which is capable of emitting a high intensity light, incorporates a lens which is readily removable from the fixture for cleaning and lamp replacement without tools, and permits an attractive fixture to be marketed for a reasonable cost.

A further object of the invention is to provide a surface mounted lamp fixture which may be readily mounted upon walls, ceilings, or the underside of cabinets, wherein the fixture includes a switch, and the complete fixture extends only a small distance, such as 2 inches, from the surface upon which it is mounted.

An additional object of the invention is to provide a light fixture construction wherein the concepts of the invention may be practiced in the manufacture of a fixture having a single bulb, two bulbs, three bulbs or more with only minor modifications being necessary to accommodate the desired number of lamps incorporated in the fixture.

An important aspect of the invention is in the utilization of a unique lens formed of a heat resistant sheet plastic material wherein the configuration of the lens permits manual deformation thereof to readily "snap" the lens into assembled relationship with the fixture body, or remove the lens therefrom for cleaning or bulb replacement purposes. Yet, the sheet material of which the lens is formed is of sufficient rigidity to hold its shape, and maintain firm innerconnection with the light fixture body frame.

The basic component of a light fixture formed in accord with the practice of the invention consists of a frame or body member which is extruded of aluminum, or other extrudable material, and in this manner the body member may be formed of any desired length. End caps are mounted upon the ends of the body member in order to produce an attractive appearance, and

insert channels are defined on the longitudinal edges of the body member for receiving decorative trim panels. The extruded body member is of a concave configuration for receiving the lamp bulbs and functioning as a reflector, and the opposite side thereof includes base or foot elements which engage the fixture mounting surface. The fixture switch is mounted in one of the end caps, and the extrusion includes a pair of longitudinal extending screw receiving recesses whereby the end caps may be readily mounted to the body member.

The lamp bulbs and the concave configuration of the body member, are bridged by a lens, or plurality of lenses, depending upon the length of the body member, which are of a generally square plan configuration, and are dish-shaped having a base region and four wall regions depending from the base region. Lips are defined on the edges of the wall regions, and the body member includes spaced, parallel opposed grooves for receiving the lips on opposite sides of a lens whereby the lens is attached to the body member. As the lens are formed of a semirigid sheet material, and are of a three-dimensional configuration, manual deformation thereof is restricted if the manual forces are applied in a direction substantially parallel to the plane of the wall regions. In order to permit assembly of the lens to the body member grooves, the lips are relieved or notched at those regions in general alignment with planar portions of the lens wall regions whereby only those portions of the lips cooperate with the body member grooves which are capable of manual deformation. In this manner the lenses may be readily assembled to, or removed from, the body member without tools, and a most attractive and "clean" appearance results.

BRIEF DESCRIPTION OF THE DRAWING

The aforementioned objects and advantages, and the construction of an embodiment of a lamp fixture in accord with the invention will be appreciated from the following description and accompanying drawings wherein:

FIG. 1 is a plan view of a two lens embodiment of a light fixture constructed in accord with the invention,

FIG. 2 is a side elevational view of the embodiment of FIG. 1, a portion of the lenses being broken away to illustrate the overlapping relationship,

FIG. 3 is an end elevational view as taken from the right of FIG. 2,

FIG. 4 is a view similar to FIG. 1, the lenses being removed to illustrate the fixture interior, and portions of the switch being sectioned for purpose of illustration,

FIG. 5 is a back view illustrating the rear of the lamp fixture,

FIG. 6 is an elevational sectional view as taken along Section VI—VI of FIG. 4, illustrating the lens in assembled relation to the body member,

FIG. 7 is an enlarged, detail elevational sectional view as taken along Section VII—VII of FIG. 1,

FIG. 8 is an enlarged, detail view of the mode of assembly of a lens to the body member, portions of the body member being broken away for purpose of illustration,

FIG. 9 is a view similar to FIG. 8, showing the lens being manually deformed for removal from the fixture body member, and

FIG. 10 is an enlarged, detail end view taken from the rear of the body member, as in FIG. 5, portions of the body member being broken away to illustrate the screw attachment for the end caps.

DESCRIPTION OF A PREFERRED EMBODIMENT

As previously described, a light fixture in accord with the invention may be constructed of variable length, and in the drawing the length of the disclosed light fixture is such as to accommodate two lenses. The principles of the invention may be utilized in a single lens embodiment, or may be utilized in a lamp fixture having three, four, or more lenses. The length of the light fixture will substantially correspond to a multiple of the dimension of the lens, as will be later appreciated.

The primary component of a light fixture constructed in accord with the invention is the frame or body member 10 which is of an extruded construction, and will usually be formed of aluminum, although a plastic or other extrudable material may be utilized. The cross-sectional configuration of the body member 10 is best appreciated from FIG. 6 and includes a concave central region 12 having a depression 14 in which the lamp socket fixture is located. The body member also includes lateral edges 16, and these lateral edges include an overlapping portion 18 which defines a lens receiving groove 20 adjacent each body member edge. The grooves 20 face each other in opposed relationship as will be apparent in FIG. 6.

The lateral edges of the body member extrusion also include end caps screw receiving recesses 22, and a decorative trim panel receiving recess is defined at 24, utilizing overlapping portions 26. An apron 28 extends downwardly, FIG. 6, to further enclose the sides of the body member. Mounting of the body member 10 upon a support surface is provided by foot or base members 30 depending from the concave portion 12, and mounting screw holes 32 are defined in the depression 14 whereby the frame member may be mounted to a supporting surface 34, FIG. 6.

Vent holes 36 are preferably formed in the body member between the feet 30 and the lateral edge regions 16, and as the aprons 28 do not extend all the way to the supporting surface 34, FIG. 6, venting of the interior of the lamp around the apron is possible.

In the two lens embodiment illustrated two electric lamp bulbs 38 are utilized, and these lamps are mounted in conventional fixtures 40 riveted to the body member depression 14. Plastic trim panels 42 slide into the body member recesses 24, prior to assembling of the end caps to the body member, and the decorative panels 42 may simulate a wood grain, or may be of any desired color.

The ends of the body member 10 are enclosed by end caps 44, preferably formed of a plastic material, and of a width and height substantially corresponding to the width and height of the body member 10 as defined by the lateral edge regions and apron 28. In this manner attachment of the end caps 44 to the body member encloses the body member transverse cross section to form an attractive appearance as will be appreciated from FIGS. 2 and 3. Attachment of the end caps is accomplished by means of screws 46, FIG. 10, extending through holes formed in the end caps and received within the body member recesses 22. The end caps 44 each include an inwardly disposed ledge 48, FIG. 4, dis-

posed over region 12 upon which a lens lip rests, as will be later described. The end caps also preferably include a recessed portion 50, FIG. 3, which includes a decorative panel material matching the panels 42.

It is usually desirable that the switch for the lamp be directly associated with the lamp, and the electric switch is preferably mounted in one of the end caps. The right end cap 44, FIG. 4, includes a boss 52 which pivotally supports the switch actuator 54 on a pivot pin 56. Portions of the switch actuator extend through a slot 58 defined in the end cap whereby the actuator may be manually pivoted. The inner end of the actuator engages the switch slide 60 of a switch 62 mounted on boss 52, and rocking of the actuator 54 will linearly translate the slide 60 between an off position, one lamp on, or both lamps on. Suitable electrical conductors interconnect the switch to the lamps passing through grommets received in holes formed in the central region 12, as shown.

As will be apparent in FIGS. 1, 2, 3 and 6, the fixture includes a pair of lenses 64 which bridge the body member region 12 and through which the light of the lamps 38 passes. As apparent in FIG. 1, the disclosed embodiment discloses a pair of identical lenses 64, and these lenses are preferably formed of a semirigid translucent plastic sheet material such as polypropylene. It is desired that the lenses have a resistance to heat, due to the proximity to the lamp bulbs, and the gauge of the sheet material is such that the material is manually bendable under manual forces exerted transversely to the plane of the material, but is resistant to manual bending when manual forces are imposed in a direction substantially parallel to the material plane.

Each of the lenses 64 is of a square form as viewed in FIGS. 1, 8 and 9, and is of a dish-shaped configuration including a square base region 66. Wall regions 68 depend from the base region, and are transversely disposed hereto. While the base region 66 is of a slightly convex configuration, FIG. 6, the wall regions 68 are substantially planar in shape and each includes a central region 70. Adjacent wall regions 68 are perpendicularly disposed to each other due to the square configuration of the lens. As apparent in FIGS. 6, 7, 8 and 9, each of the wall regions terminates in an outwardly extending lip 72. Each lip 72 includes end regions 74 and a central region 76.

The dimension between the intersection of the opposed wall regions 68, and their associated lip 72, is only slightly less than the dimension separating the inwardly disposed edges 78 of the body member portions 18, FIG. 6, and the extension of the lips 72 from the associated wall region 68 is such that the central region of two of the opposed lips, FIG. 6, will be well received within the retainer grooves 20. Due to the overlapping of the portions 18 over the lips 72, it will be appreciated that the lenses 64 will be firmly locked to the body member 10. Those lips 72 which are not disposed under the portions 18, i.e., are transversely disposed to the length of the body member 10, will either rest upon an end cap ledge 48, FIG. 7, or be in an overlapping relationship with a lip of the adjacent lens, FIG. 2. Thus, the assembly between the lenses 64 and the body member 10 and end caps 44 will produce an attractive appearance as apparent in FIG. 1.

To remove a lens 64 from the body member grooves 20 those wall regions 68 having lips disposed under the portions 18 are manually deflected inwardly or toward

each other as shown in FIG. 9. The central regions 70 of these wall regions are grasped with the fingers and may be manually deformed as illustrated against the resiliency of the lens material. However, such manual deformation of the central portion of the wall regions will not produce an inward movement of end regions 74 of the lips associated with the grooves 20 due to the fact that the manual forces in the deformed wall regions would be substantially parallel to the plane of adjacent wall regions. Thus, to permit the desired disassembly those lips 72 which associate with the retainer groove 20 are notched at 80, FIGS. 8 and 9, at the end regions 74 in such a manner that the notch edge 82 is substantially in alignment with the overlapping portion inner edge 78, and is thus not received within the retainer groove 20. This "clearance" provided at the end regions 74 of the lips 72 permits the deformation shown in FIG. 9 to remove all of the associated lip 72 from the retainer groove 20, and thereby permit removal of the lens from the body member. Thus, the portion of the lips 72 associated with the grooves 20 constitutes the central region 76 of the lips.

The degree of deformation shown in FIG. 9 permits the lenses 64 to be readily disassembled from the body member, or permits the lens to be readily inserted into the retainer grooves 20. No tools are required, and the manual force required to produce the illustrated deformation is within the capability of a normal adult.

It will be appreciated that if only a single lens light fixture is to be constructed, the length of the extruded body member 10 will be substantially that of the squared dimension of the lens 64; if two lenses are to be employed, as illustrated, the body member length will be slightly less than twice that of the lens dimension due to the overlapping of lips 72. Likewise, a three lens fixture will have a body member slightly less than three times greater than the lens dimension. As the lips 72 of the adjacent lenses overlap, there will be no "crack" through which light may pass from the fixture around the lenses, and regardless of the length of the fixture, an attractive appearance will result.

Usually, the light fixture of the invention is used with the 12 volt lighting circuit of the recreational vehicle or watercraft. However, it will be appreciated that the fixture could also be used with high intensity 110 volt lamps, or of other capacities.

Due to the fact that the body member 10 is an extrusion its cost is most reasonable, and as it is merely a matter of cutting the extrusion to the proper length, the adaptation to the desired length fixture requires no special equipment or apparatus. The same end caps are used with the different lengths of the light fixture, and the prime modification required between different lengths of light fixtures is the number of lamp bulbs and lamp fixtures 40 affixed to the body member.

It is appreciated that modifications to the disclosed embodiment may be apparent to one skilled in the art without departing from the spirit and scope of the invention.

We claim:

1. A light fixture characterized by its economy of construction, ease of assembly and maintenance and attractive appearance comprising, in combination, an elongated body member formed by an extrusion pro-

cess having ends and lateral edges including overlapping portions, said body member including a recessed central region intermediate said lateral edges, a longitudinally extending lens retaining groove defined in said body member adjacent each lateral edge by said overlapping portions and extending the length of said body member, said grooves each having an opening extending toward said central region, longitudinally extending base elements formed on said body member defining fixture support surfaces, a lamp mounted on said body member recessed central region, an end cap mounted on each end of said body member having a width and height substantially corresponding to the width and height of said body member, a rectangular light transmitting lens mounted on said body member extending over said lamp and formed of a sheet material manually bendable upon applying manual forces thereto in a direction transverse to the plane of the material and resistant to manual bending upon applying forces in a direction substantially parallel to the plane of the material, said lens being of a dished configuration including a rectangular central base region, four planar peripheral wall regions depending from said base region transversely disposed to said base region and substantially perpendicularly disposed to the adjacent wall regions, and a peripheral lip outwardly extending from at least two of said wall regions located on opposite sides of said base region and spaced from said base region, said lips each including an outer edge, a central region and end regions, said lips on opposite sides of said base region being parallel to each other constituting lateral lips extending in the longitudinal direction of said body member and the spacing between the outer edges of said lateral lips' central regions being greater than the spacing between said body member overlapping portions whereby said lateral lips' central regions are received within said lens retaining grooves, said lateral lips' end regions being of reduced width with respect to the associated lip central region whereby said reduced width end regions are removed from said grooves and the length of the wall regions disposed transversely of the body member length are defined by the reduced width of said lateral lips' end regions and is no greater than the spacing between said overlapping portions, manual deformation of said lateral lips and their associated wall regions toward each other removing said central regions within said grooves from said grooves for releasing said lens from said body member.

2. In a light fixture as in claim 1 wherein said two wall region lips end regions are notched to define reduced widths at said end regions.

3. In a light fixture as in claim 1 wherein a peripheral outwardly extending lip is defined on each of said transverse wall regions, a plurality of identical light transmitting lens mounted on said body member, a plurality of lamps mounted on said body member, a lamp being associated with each lens, said body member being of a length slightly less than a multiple of the dimension separating the outer edges of said transverse wall regions lips, the adjacent transverse lips of adjacent lenses overlapping.

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