June 4, 1968 KUN S. LIM 3,387,126

ROADWAY LUMINAIRE

Filed May 18, 1966 3 Sheets-Sheet 1

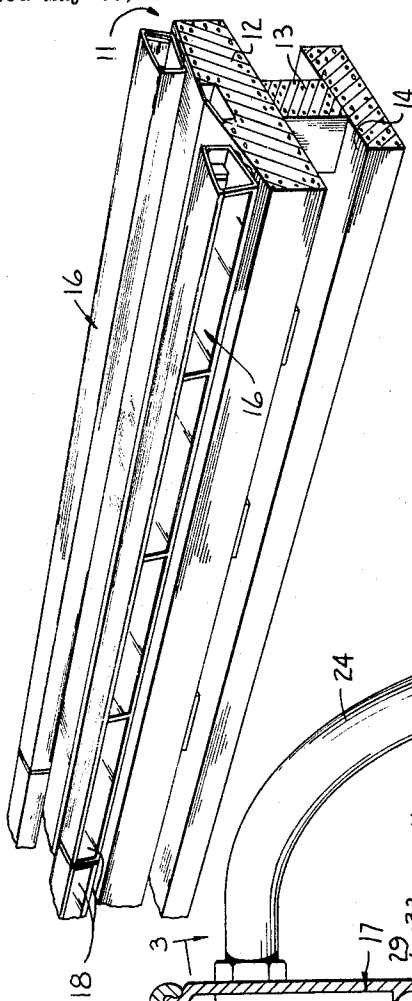


FIG. 1

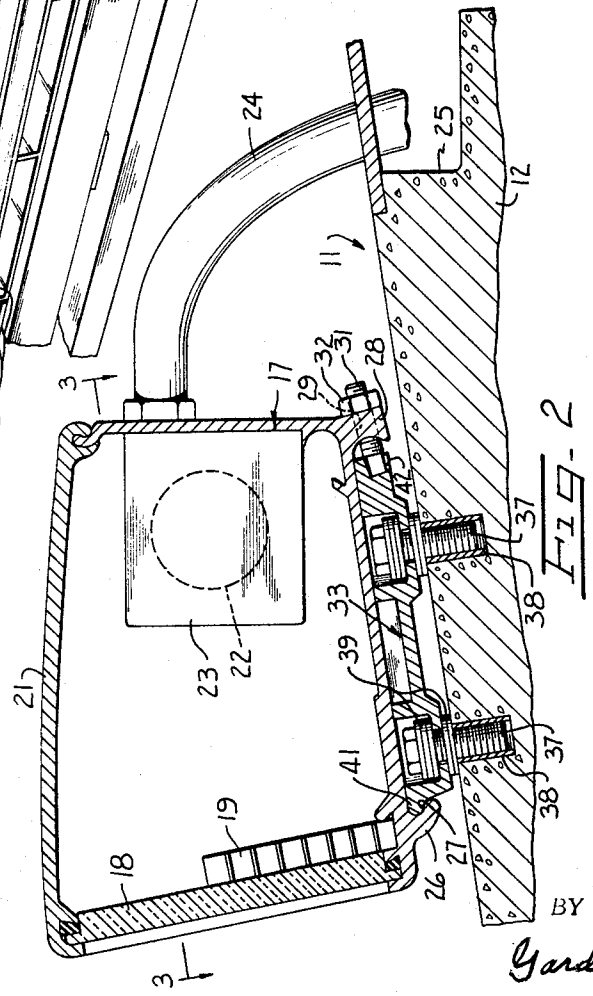


FIG. 2

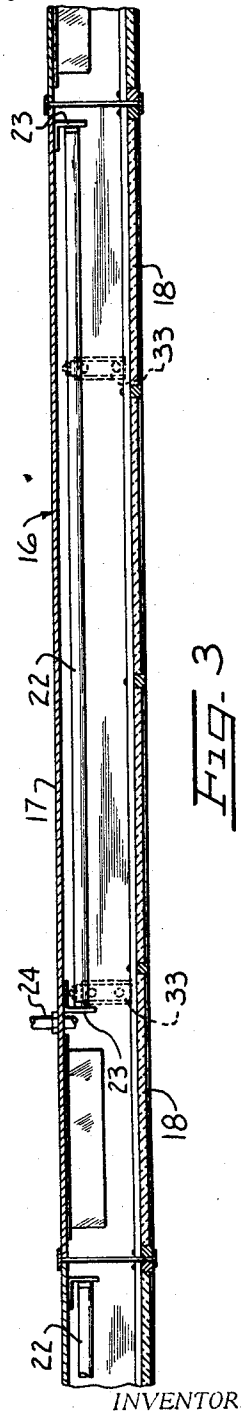


FIG. 3

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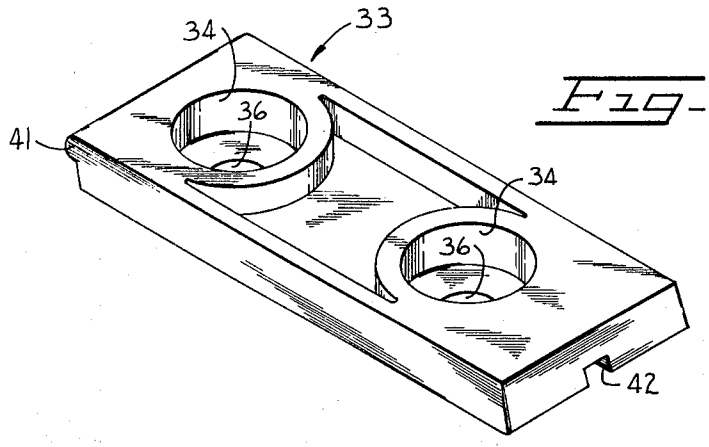


Fig. 4

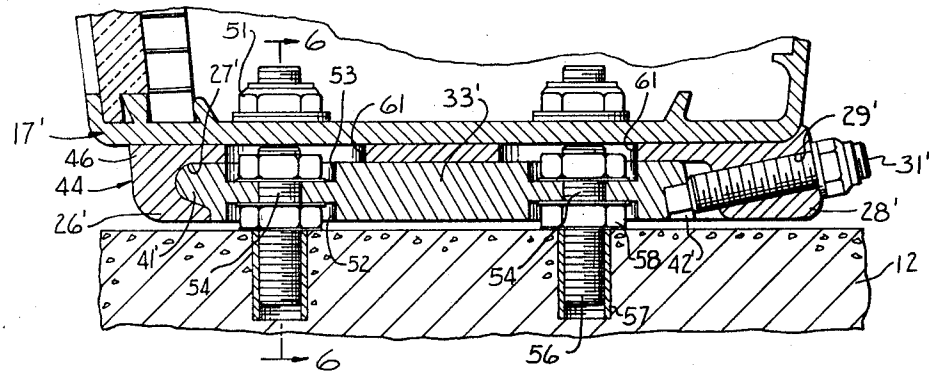


Fig. 5

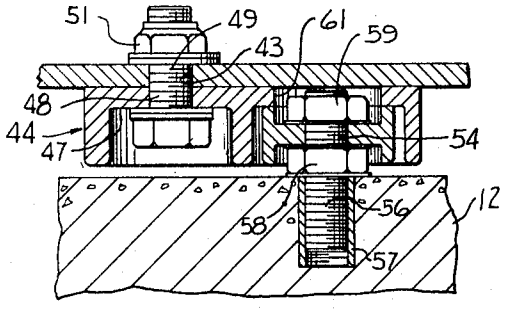


Fig. 6

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ROADWAY LUMINAIRE

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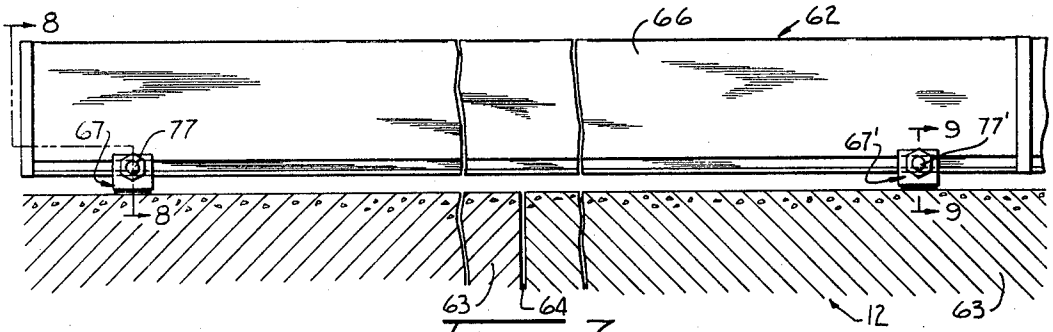


Fig. 7

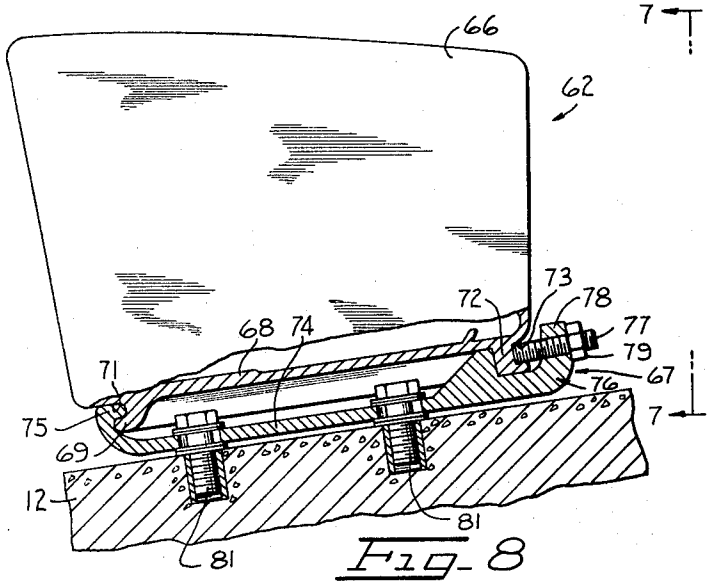


Fig. 8

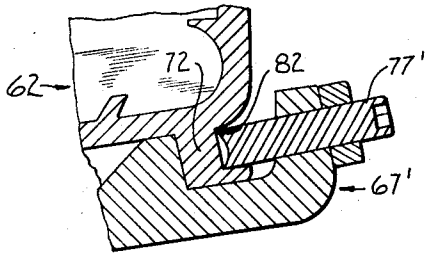


Fig. 9

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3,387,126

ROADWAY LUMINAIRE

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10 Claims. (Cl. 240—25)

ABSTRACT OF THE DISCLOSURE

A luminaire is described having a quick release mounting arrangement for securing the same to a roadway barrier such that the luminaire may be removed from the barrier with a minimum of time and effort. The mounting arrangement includes a pair of mounting brackets which may be permanently secured to a roadway barrier. A first pair of complementary interengaging elements are respectively on first ends of the brackets and on the base of the housing adjacent a first longitudinal edge of it, and a second pair of engageable elements are respectively on second ends of the brackets and on the base of the housing adjacent the other longitudinal edge thereof. The second pair of elements includes a projecting flange on one of the members which overlaps an end face of the other member. A set screw threadably extends through the flange for engagement with a recess in an end portion on the other member to provide for quick release occurrence of the light housing to the brackets.

Disclosure

This invention relates generally to luminaires for lighting the dividing barrier between opposite direction lanes of a roadway, or the like, and is more particularly directed to luminaires of this type which are characterized by their ease of installation on the barrier and removal therefrom to facilitate ready replacement.

It is becoming popular practice to illuminate the dividing barrier between the lanes of oppositely directed traffic flow of a freeway, bridgeway, or equivalent roadway. In this regard, luminaires are typically mounted on the barrier at a level slightly below the normal eye level of the driver of a motor vehicle. In this manner the divider is illuminated and yet the luminaires do not present a glare to the drivers. Heretofore, existing luminaires have been provided with hinged lids, or equivalent means, to facilitate ready access to the interiors thereof for purposes of changing lamps, or the like, in a minimum of time. However, the luminaires have usually been directly bolted to the barrier in such a manner as to require opening of the lids in order to provide a somewhat obstructed access to internally disposed nuts threaded on bolts projecting from the barrier. It will be thus appreciated that it is a relatively tedious and time consuming process to replace a conventional luminaire. This is undesirable inasmuch as a number of luminaires are damaged daily by vehicles colliding with the barrier, and usually it is necessary that a lane of traffic be closed during replacement of a luminaire by a maintenance crew.

It is therefore an object of the present invention to provide an improved luminaire having a quick release mounting arrangement for securing same to a roadway barrier such that the luminaire may be removed from the barrier with a minimum of time and effort.

Another object of the invention is to provide a luminaire of the class described wherein the fastener means for securing the luminaire to a barrier are externally accessible.

Still another object of the invention is the provision of a luminaire wherein the mounting arrangement includes means for compensating for misalignment in the mounting of the luminaire and accommodating thermal expansion thereof.

It is yet another object of the invention to provide means for adapting existing luminaires to quick release mounting.

It is a further object of the present invention to provide a luminaire mounting arrangement of the class described which is of relatively simple design.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

FIGURE 1 is a perspective view of a roadway dividing barrier with luminaires in accordance with the invention installed thereon.

FIGURE 2 is a fragmentary transverse sectional view on an enlarged scale through the barrier illustrating constructional details of one of the luminaires.

FIGURE 3 is a sectional view on a reduced scale taken at line 3—3 of FIGURE 2.

FIGURE 4 is a perspective view of a mounting bracket of the luminaires.

FIGURE 5 is a view similar to FIGURE 2, but of a modified form of luminaire mounting arrangement.

FIGURE 6 is a sectional view taken at line 6—6 of FIGURE 5.

FIGURE 7 is an elevational view of another modified form of luminaire installed on a roadway dividing barrier.

FIGURE 8 is a sectional view taken at line 8—8 of FIGURE 7.

FIGURE 9 is a fragmentary sectional view taken at line 9—9 of FIGURE 7.

Referring now to FIGURE 1, there is shown a roadway barrier 11 including a continuous beam 12 supported upon a plurality of longitudinally spaced posts 13 extending upwardly from a roadway surface 14. In the illustrated case the barrier is of concrete, although it will be appreciated that various alternative forms of barrier exist. Mounted upon the beam 12, or equivalent upper portion of the barrier, are provided a plurality of longitudinally aligned, end to end abutting luminaire units 16 which are each of the order of 10 ft. in length. The particular barrier illustrated in the drawings is of the center line divider variety, and therefore two sets of luminaire units are provided, one on each side of the barrier. Each luminaire unit includes a light housing 17 of substantially rectangular cross section including a plurality of longitudinally spaced lenses 18, of plastic, or the like, mounted in the side thereof and backed by batting 19 of preferably honeycomb material. Each housing is provided with a hinged lid 21 which may be pivoted open to provide access to the housing interior. This facilitates the ready replacement of a fluorescent lamp 22, or equivalent illuminating source, mounted longitudinally within the housing between appropriate sockets 23. A cable 24 connected to the sockets extends into a wireway 25 provided centrally of the beam 12.

It will be appreciated that the luminaire unit described to this point is substantially conventional. However, with a conventional unit it has been the practice to bolt the lamp housing directly to the barrier 11. Typically, bolts have been extended through apertures in the base of the housing into threaded inserts embedded in the beam 12. Thus, when a luminaire is damaged and must be replaced, it is necessary to open the lid of the unit in order to gain access to the bolts and then manipulate a wrench, or other

tool within the confines of the housing in order to remove the bolts.

To obviate the foregoing difficulties, the luminaire unit of the present invention is provided with a quick release mounting arrangement which requires the removal of only several externally accessible fasteners to effect release of the housing from the barrier. More particularly, the base of the housing is provided with an arcuate inwardly turned flange **26** adjacent one longitudinal edge thereof and spaced from the base of the housing to define an intervening groove **27**. Along the opposite longitudinal edge of the base of the housing there is provided a continuous depending flange **28**, or alternatively a pair of longitudinally spaced flanges. The flange is provided with a pair of longitudinally spaced transversely extending tapped bores **29** which receive set screws **31**, and a lock nut **32** is threadably secured to the outwardly projecting end of each set screw.

Cooperating with the flange **26** and set screws **31**, there are provided at least a pair of mounting brackets **33**, as best shown in FIGURE 4, secured to the upper surface of the beam **12** at longitudinally spaced positions. Each bracket is in the form of a rectangular plate having a pair of spaced apart countersinks **34** with bores **36** extending centrally through the bases thereof. Bolts **37** extend through the bores **36** to threadably engage internally threaded inserts **38** embedded in the beam **12**, and washers **39** are preferably interposed between the bases of the countersinks **34** and heads of the bolts, as well as between the bracket and surface of the beam. The brackets are thereby mounted on the beam with transverse orientations relative thereto. One end of the bracket is formed with an outwardly projecting lip **41** for engaging the groove **27** defined between flange **26** and base of the luminaire housing **17**. The opposite end of the bracket is provided with an undercut, outwardly facing rectangular recess **42** extending into the end surface or portion and bottom face thereof for receiving the tip of one of the set screws **31**. Thus, with a pair of the brackets **33** secured to the beam **12** at longitudinally spaced positions, to install one of the housings **17** it is placed on the brackets with the groove **27** engaging the lips **41** of the brackets. The set screws **31** are then tightened to engage their tips in the bracket recesses **42**, and the lock nuts **32** are tightened to lock the set screws in place. The luminaire housings are thus secured to the barrier. When it is desired to remove the housing from the barrier, quick release is effected by loosening the lock nuts **32** and retracting the set screws **31** out of the recesses **42**. The housing may then be disengaged from the brackets. It is of importance to note that the recesses **42** are larger than the tips of the set screws in order to provide clearance therebetween for the purposes of accommodating thermal expansion of the housings and beams and compensating for misalignment thereof.

Referring now to FIGURES 5 and 6, there is shown, a modified form of mounting arrangement in accordance with the invention which is suited to use with existing luminaire housings to provide quick release securance to the barrier **11**. In this regard the housings **17'** are not integrally provided with the flanges **26**, **28** but rather have flat bases with apertures **43** normally traversed by bolts serving to directly bolt the housings to the barrier. Adapters **44** are secured to the base of each housing, each adapter being in the form of a plate **46** formed with an arcuate inwardly turned flange **26'** adjacent one end to define a groove **27'**, and a depending flange **28'** adjacent the opposite end. The flange **28'** is provided with a tapped bore **29'** which receives a set screw **31'**. The plate is provided with a pair of countersinks **47** with bores **48** extending through the bases thereof. The countersinks receive the heads of bolts **49** which extend through the bores **48** and apertures **43** to receive nuts **51** and thereby serve to secure the adapter to the housing. A slightly modified form of bracket **33'** is provided which includes a lip **41'** for engaging the groove **27'** and recess **42'** for receiving the tip of the set screw **31'**. The bracket has sets of countersinks **52**, **53** in the opposite faces thereof and interconnected by a bore **54**. Threaded studs **56** are engaged in internally threaded inserts **57** embedded in the barrier beam **12**. Lock nuts **58** are secured to the studs and engage the surface of the beam. The studs extend through the bores **54** with the nuts **58** being received by the countersinks **52**. The countersinks **53** receive nuts **59** secured to the ends of the studs. The adapter plate **46** is then provided with apertures **61** which serve as recesses for receiving the ends of the studs and nuts **59**.

It will be appreciated that with the adapters **44** secured to the housings **17'**, the adapters cooperate with the brackets **33'** to provide quick release securance of the housings to the barrier.

A further modified form of luminaire **62** in accordance with the present invention is illustrated in FIGURES 7–9. This form of luminaire is particularly well suited to installations wherein a relatively large amount of thermal expanson and contraction is encountered. For example, the beam **12** of the barrier **13** is typically provided as a plurality of sections **63** in end to end alignment and having expansion gaps **64** between adjacent ones thereof. Some of the luminaires mounted upon the beams bridge the gaps between adjacent sections **63**. The opposite ends of such a luminaire are thus secured to different beam sections which may move substantial distances relative to each other by thermal expansion and contraction. In order to prevent buckling of the light housing of the luminaire by such action, it is desirable that relative movement between the luminaire and beam sections be permitted over the entire range of distances through which the beam sections might move. In the case of the previously described embodiments of FIGURES 1–6, the relative movement that is permitted is limited by the confines of the recesses **42** of the mounting brackets and in some instances is insufficient to accommodate the full range of movement of the beam sections. However, the luminaire **62** of FIGURES 7–9 is arranged to provide unlimited longitudinal movement relative to the beam sections whereby any amount of expansion and contraction of the beam sections can be tolerated.

The luminaire **62** includes an elongated rectangular light housing **66** which in general respects is similar to the housing **17**. As shown in FIGURE 7, the housing **66** is removably secured adjacent its opposite ends to adjacent ones of the beams sections **63** by means of mounting brackets **67**. The housing thus bridges the expansion gap **64** between the adjacent beam sections. In order to provide the desired longitudinal movement of the housing relative to the beam sections, the base **68** of the housing is provided with a downwardly and outwardly projecting arcuate flange **69** spaced slightly inward from one edge of the housing and extending the length thereof. The free end of the flange is downwardly spaced from the exterior face of the base **68** so as to define an outwardly facing groove **71** therebetween. An inverted L-shaped flange or end portion **72** depends from the base of the housing at a position spaced slightly inward from the opposite edge thereof. Such flange extends the entire length of the housing and defines with the base **68** an outwardly facing rectangular channel or recess **73**.

To cooperate with the flange **69** on the base of the housing, the mounting brackets **67** are each provided as a substantially rectangular plate **74** having an upwardly and inwardly projecting lip **75** at one end for engagement in the groove **71**. The free end of the flange **69** fits under the lip **75**. The opposite end of the plate is provided with a raised channel portion **76**, the groove of which faces upwardly to receive the flange **72**. A set screw **77** is provided in a tapped bore **78** extending through the outer leg or flange of the channel portion **76**. The set screw may be tightened against the base of the channel **73** to thereby secure the housing to the mounting bracket. A lock nut **79** is thread-

ably secured to the outer end of the set screw to lock same in position. The mounting brackets **67** are initially secured to the beam sections **63** in a manner analogous to that employed with the previously described embodiments by means of threaded fasteners **81** engaging threaded inserts embedded in the beam sections.

It is of importance to note that the set screws **77** employed with the respective brackets may be dissimilar and arranged to provide a positive locking securance at one end and longitudinal slippage at the other end of the housing. For example, one set screw **77** may have a flat tip for engaging the base of the channel **73** so as to permit slippage longitudinally between the housing and mounting bracket **67**. The other set screw **77'** may have an inwardly dished tip defining a relatively sharp annular edge **82** for biting into the base of the channel **73** upon tightening of the screw. Such set screw **77'** therefore secures the housing in non-sliding relation to the mounting bracket **67'** and therefore the associated beam section. In this manner one end of the housing is mounted in fixed relation to one beam section to establish a desired fixed location of the housing relative thereto. However, the opposite end of the housing mounted upon the adjacent beam section is longitudinally slidable relative thereto by virtue of the flat headed set screw such that thermal expansion and contraction of the adjacent sections is accommodated to and buckling of the housing is prevented.

There is thus provided by the present invention a roadway luminaire which features a quick release mounting arrangement. From the several embodiments described in detail hereinbefore, it will be appreciated that in broad terms the mounting arrangement includes means defining a pair of interengaged elements respectively at one end of each mounting bracket and on the base of the light housing adjacent one longitudinal edge. In addition, means are provided to define a second pair of engaged elements respectively at the second end of each bracket and on the base of the light housing adjacent its second longitudinal edge. Finally the arrangement includes a set screw mounted in one element of each second pair thereof and engaging the other elements of the same pair to provide quick release securance of the light housing to the brackets.

What is claimed is:

1. A roadway luminaire comprising a light housing for containing a light source, a mounting bracket adapted for securance to a roadway barrier, a first pair of complementary interengaging elements respectively on said bracket at a first end thereof and on the base of said housing adjacent a first longitudinal edge thereof, one of the elements of said first pair being an outwardly projecting lip on one of said housing and said bracket and the second of the elements of said first pair being an inwardly turned flange on the other of said housing and brackets and spaced therefrom to define an intervening groove adapted for engagement by said lip; a second pair of engageable elements respectively on said brackets at a second end thereof and on the base of said housing adjacent a second longitudinal edge thereof, one of said elements of said second pair being a projecting flange on one of said housing and said bracket adapted to overlap an end portion of the other of said housing and said bracket, said end portion being the other of said elements of said second pair and having an outwardly facing recess; and a set screw threadably mounted in said projecting flange for extension therethrough and into engagement with said recess to provide quick release securance of said light housing to said bracket.

2. A roadway luminaire comprising a light housing for containing a light source, a pair of mounting brackets adapted for securance to a roadway barrier, means defining first pairs of complementary interengaged elements respectively on said brackets at first ends thereof and on the base of said housing adjacent a first longitudinal edge thereof, means defining second pairs of engaged elements respectively on said brackets at second ends thereof and on the base of said housing adjacent a second longitudinal edge thereof, and a set screw threadably mounted in one element of each of said second pairs of elements and engaging the other element thereof to provide quick release securance of said light housing to said brackets, each of said mounting brackets being in the form of a plate having an outwardly projecting lip at said first end thereof defining one of the elements of first said pair thereof, means defining an inwardly turned flange at the base of said housing adjacent said first longitudinal edge thereof and spaced from said base to define an intervening groove, said flange being the second of the elements of said first pair thereof with said groove engaged by said lip, and means defining a depending flange at the base of said housing adjacent said second longitudinal edge thereof, said depending flange engaging the end face of said bracket at said second end therof, said end face and said depending flange being respectively the elements of said second pair thereof, said end face having an undercut recess, each of said set screws extending through said depending flange in threadable engagement therewith with the tip of the set screw received by said recess.

3. A luminaire according to claim **2**, further defined by said inwardly turned and depending flanges being formed integrally with the base of said housing.

4. A luminaire according to claim **2**, further defined by said means defining said inwardly turned flange and said means defining said depending flange comprising an adapter plate having said inwardly turned and depending flanges respectively adjacent opposite edges thereof, said adapter plate secured to the base of said housing.

5. A luminaire according to claim **2**, further defined by said recesses being enlarged with respect to the tips of said set screws to provide clearance therebetween.

6. In combination with a roadway barrier, a luminaire arrangement comprising a plurality of mounting brackets each in the form of a plate having an outwardly projecting lip at one end and an undercut recess at the opposite end, fastener means securing said plates to said barrier at longitudinally spaced positions with said lips extending longitudinally, an elongated light housing for containing a light source, means defining an inwardly turned arcuate flange at the base of said housing adjacent a longitudinal edge thereof and spaced from said base to define an intervening groove, means defining a depending flange at the base of said housing adjacent the opposite longitudinal edge thereof, sets screws extending through said depending flange at longitudinally spaced positions, said light housing disposed with said groove receiving said lips of said bracket plates and the tips of said set screws engaging said recesses, and lock nuts threadably engaging said set screws to lock same in position.

7. The combination of claim **6**, further defined by each of said bracket plates having a pair of spaced countersinks in the upper face thereof with bore extending centrally through the bases of the countersinks, and said fastener means comprising internally threaded inserts mounted in said barrier, and bolts extending through said bores into threaded engagement with said inserts and having heads disposed in said countersinks.

8. The combination of claim **6**, further defined by each of said bracket plates having a pair of sets of countersinks respectively in the upper and lower faces thereof with the countersinks of each set being interconnected by a central bore; said fastener means comprising stud bolts projecting from said barrier and extending through said bores, and first and second nuts threadably secured to said bolts and respectively disposed in said sets of countersinks; and said means defining said inwardly turned flange and said means defining said depending flange comprising an adapter plate having said inwardly turned and depending flanges respectively adjacent opposite edges thereof, said adapter plate having countersinks in the lower face thereof with bores extending centrally through the bases thereof, said adapter plate having apertures there-

through, bolts extending through said bores of said adapter plate and base of said housing with heads disposed in said countersinks of said adapter plate, nuts within said housing threadably engaging said last named bolts, said stud bolts received by said apertures.

9. A roadway luminaire comprising a light housing for containing a light source, a pair of mounting brackets adapted for securance to a broadway barrier, means defining first pairs of complementary interengaged elements respectively on said brackets at first ends thereof and on the base of said housing adjacent a first longitudinal edge thereof, means defining second pairs of engaged elements respectively on said brackets at second ends thereof and on the base of said housing adjacent a second longitudinal edge thereof, and a set screw threadably mounted in one element of each of said second pairs of elements and engaging the other element thereof to provide quick release securance of said light housing to said brackets, said luminaire being further defined by means defining a downwardly and outwardly projecting flange on the base of said housing spaced inward from said first longitudinal edge of said housing and extending the length thereof with the free end of said flange spaced downwardly from said base to define an outwardly facing groove therebetween, means defining an inverted L-shaped flange depending from the base of said housing at a position spaced inward from said second longitudinal edge of said housing and extending the length thereof to define with said

base an outwardly facing rectangular channel, and said mounting brackets being each in the form of a plate having an upwardly and inwardly projecting lip at the first end thereof engaging said groove and a raised channel portion at the second end thereof defining an upwardly facing groove receiving said inverted L-shaped flange, one of said set screws extending through the outer leg of said channel portion of each of said brackets in threadable engagement therewith with the tip of the set screw engaging the base of said outwardly facing rectangular channel.

10. A luminaire according to claim 9, further defined by the set screw extending through the outer leg of the channel portion of one bracket having a flat tip and the set screw extending through the outer leg of the channel portion of the other bracket having a dished tip defining a sharp annular edge.

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