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Vehicle auxiliary light luminaire bezel attachment assembly

Abstract

A luminaire bezel attachment assembly with a lens that is defined by a lens body with one or more bezel engagement keyways, and a flange around the lens body. An inner bezel is coupled to the lens and defined by one or more inner bezel keys receivable within the corresponding one of the one or more bezel engagement keyways of the lens. An outer bezel is coupled to the lens and defined by one or more outer bezel keys that are receivable within the corresponding one of the one or more bezel engagement keyways of the lens. The outer bezel keys overlap the corresponding one of the one or more inner bezel keys.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application is a continuation of pending U.S. application Ser. No. 18/047,388 filed Oct. 18, 2022 and entitled “VEHICLE AUXILIARY LIGHT LUMINAIRE BEZEL ATTACHMENT ASSEMBLY” which is a divisional patent application of U.S. patent application Ser. No. 16/870,701 filed May 8, 2020 (now U.S. Pat. No. 11,486,556 issued Nov. 1, 2022) and entitled “VEHICLE AUXILIARY LIGHT LUMINAIRE BEZEL ATTACHMENT ASSEMBLY”, the entire disclosures of which are wholly incorporated by reference herein.

STATEMENT RE: FEDERALLY SPONSORED RESEARCH/DEVELOPMENT
(1) Not Applicable
BACKGROUND

1. Technical Field

(2) The present disclosure relates generally to vehicle lighting, and more particularly to a luminaire bezel attachment assembly for a vehicle auxiliary light.

2. Related Art

(3) Automobiles and other motor vehicles are equipped with a variety of lighting systems that serve illumination, indication and/or alert functions. For example, headlamps installed on the front end illuminate the travel path ahead of the vehicle, while the taillights installed on the rear end may indicate the presence of the vehicle to others traveling behind it. The taillight may be flashed at an increased intensity in response to the activation of the brakes, thereby alerting nearby vehicles that it is slowing down. Furthermore, the taillight cluster may include left and right turn signal lights, reverse indicator lights, and so forth.

(4) Different regulations govern the performance of headlamps installed on vehicles permitted to travel on public roads. In the United States, this is set forth in Federal Motor Vehicle Safety Standard 108 that incorporate the SAE (Society of Automotive Engineers) technical standards. Among the performance parameters set forth in this standard include low beam and high beam functions, as well as permitted glare parameters, the minimum amount of light to be axially projected from the headlamp, minimum and maximum beam heights, headlamp aiming, cutoffs, and so forth. For most low visibility conditions encountered during the nighttime or in inclement weather while traveling on a roadway, the standard headlamps may be sufficient for safe vehicle operation. Some models may be equipped with foglamps that are aimed lower than the low beam headlamp to provide illumination of the road in more extreme fog, rain, dust, and snow conditions while minimizing glare, but this is the typical extent of original equipment.

(5) Vehicles are not limited to being driven on conventional paved roads, and there are many professional as well as recreational off-road driving applications that may take a vehicle through rough, unpaved trails comprised of gravel, rocks, sand, snow, and mud. Typical off-road vehicles are either designed or modified to have higher clearance and greater axle articulation. Furthermore, such vehicles may have drive trains operable in four-wheel drive, locking differentials, off-road tires, and the like to better traverse the varied terrain encountered in off-road driving.

(6) Beyond these modifications, off-road vehicles may also be equipped with various auxiliary lights that provide additional illumination during nighttime/low visibility driving over difficult terrain, where careful and detailed identification is necessary for safe operation. Different types of auxiliary lights improve upon the illumination provided from the original equipment headlamps in different ways. For instance, spotlights may produce a focused beam of light to distances that extend beyond the light emitted from headlamps at greater illumination intensities. Floodlights may have a wider beam pattern at closer distances, while also outputting light after greater illumination intensities. Some auxiliary lights combine multiple spotlights in an array, also referred to as a light bar, while others combine different types to achieve a specific beam pattern. As there is usually no expectation of encountering same direction or oncoming traffic during off-road travel, auxiliary lights are not restricted with respect to light intensity, projection distance, glare, and aiming restrictions that otherwise govern headlamps for on-road use.

(7) Like other types of vehicle lights, auxiliary lights are configured as one or more self-contained units or luminaires each with a housing, a light source (halogen, high intensity discharge, or light emitting diode), a reflector, and a lens. The light source may be connected to the vehicle electrical system and controlled via dashboard switches. Regardless of type, durability and resistance to incursion of foreign particles frequently encountered during off-road travel is important, as auxiliary lights are externally mounted such as on the roof, the bonnet, or the bumper of the vehicle and exposed to the elements. Furthermore, because extensive efforts toward customization are made by off-road enthusiasts, it would be desirable to provide a variety of options for accents/highlight features of the auxiliary lights that enhance the visual appearance of the vehicles.

(8) Accordingly, there is a need in the art for an improved auxiliary light luminaire. There is also a

need in the art for an improved bezel attachment assembly for a luminaire of a vehicle auxiliary light.

BRIEF SUMMARY

(9) One embodiment of the present disclosure is a luminaire bezel attachment assembly. The assembly may include a lens that is defined by a lens body and a flange around the lens body. The lens body may further define one or more bezel engagement keyways. The assembly may also include an inner bezel coupled to the lens. The inner bezel may be defined by one or more inner bezel keys receivable within the corresponding one of the one or more bezel engagement keyways of the lens. The assembly may also include an outer bezel that is coupled to the lens. The outer bezel may be defined by one or more outer bezel keys that are receivable within the corresponding one of the one or more bezel engagement keyways of the lens. The outer bezel keys may also overlap the corresponding one of the one or more inner bezel keys.

(10) Another embodiment of the present disclosure is a luminaire, which may include a housing, one or more illumination sources, and a bezel attachment assembly. The housing may define at least an open front end with a rim, the rim further defining one or more fastener bores. The illumination sources may be mounted to the housing. The luminaire may also include a lens that can be attached to the housing. The lens may further be defined by a lens body and a flange around the lens body. The lens body may define one or more bezel engagement keyways, while the flange may define one or more fastener apertures aligned with a respective one of the one or more fastener bores in turn defined by the rim of the housing. There may also be an inner bezel that is coupled to the lens and defined by one or more inner bezel keys receivable within the corresponding one of the one or more bezel engagement keyways of the lens. Each of the inner bezel keys may further define a central fastener slot axially aligned with a respective one of the fastener bores. The bezel attachment assembly may also include an outer bezel that is coupled to the lens. The outer bezel may be defined by one or more outer bezel keys receivable within the corresponding one of the one or more bezel engagement keyways of the lens. Additionally, the outer bezel may overlap the corresponding one of the one or more inner bezel keys. Each of the outer bezel keys may define a central fastener hole axially aligned with a respective one of the fastener bores.

(11) Still another embodiment of the present disclosure is a luminaire bezel attachment assembly. The assembly may include a lens that is defined by a raised platform and a flange rim. The raised platform may define one or more bezel engagement notches. The assembly may also have a first interlocking bezel that includes one or more inwardly extending tabs receivable within a corresponding one of the one or more bezel engagement notches defined on the lens. The assembly may also include a second interlocking bezel with one or more inwardly extending tabs that are receivable within a corresponding one of the one or more bezel engagement notches defined on the lens. The tabs may also face the corresponding one of the one or more inwardly extending tabs of the first interlocking bezel.

(12) The present disclosure also includes another embodiment of the luminaire bezel attachment assembly. There may be a lens defined by one or more raised platforms and a flange section around the one or more raised platforms. There may also be one or more first annular interlocking bezels each fitted around a respective one of the raised platforms of the lens and each being defined by an outer rim and an inner rim, the outer rim further defining one or more engagement recesses. The assembly may further include one or more second annular interlocking bezels, each of which may be fitted around the outer rim of the respective one of the first annular interlocking bezels. The second annular interlocking bezels may also be defined by an outer rim and an inner rim. The inner rim may include one or more inwardly extending tabs received within a corresponding one of the one or more engagement recesses of the respective one of the first annular interlocking bezels.

(13) The present disclosure will be best understood accompanying by reference to the following detailed description when read in conjunction with the drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) These and other features and advantages of the various embodiments disclosed herein will be better understood with respect to the following description and drawings, in which like numbers refer to like parts throughout, and in which:

(2) FIG. **1** is a front perspective view of one embodiment of a vehicle auxiliary light with a quadrangular front face;

(3) FIG. **2** is a cross-sectional view of the vehicle auxiliary light along axis **2**-**2** of FIG. **1**;

(4) FIG. **3** is an exploded perspective view of the embodiment of the vehicle auxiliary light shown in FIG. **1**, further detailing a luminaire bezel assembly in accordance with the present disclosure;

(5) FIG. **4** is a partial cutaway rear perspective view of an outer bezel that is part of the luminaire bezel attachment assembly of the present disclosure, taken along axis **4**-**4** of FIG. **3**;

(6) FIG. **5** is a partial cutaway front perspective view of an inner bezel that is part of the luminaire bezel attachment assembly taken along axis **5**-**5** of FIG. **3**;

(7) FIG. **6** is a detailed front perspective view of a lens that is part of the luminaire bezel attachment assembly;

(8) FIG. **7** is an exploded front perspective view of another embodiment of the vehicle auxiliary light with a triangular front face; and

(9) FIG. **8** is a partially exploded perspective view of a vehicle light bar with a luminaire bezel attachment assembly in accordance with an embodiment of the present disclosure;

(10) FIG. **9** is an exploded rear perspective view of the luminaire bezel attachment assembly;

(11) FIG. **10** is an exploded front perspective view of the luminaire bezel attachment assembly;

(12) FIG. **11** is an exploded cross-sectional view of the vehicle light bar taken along axis **9**-**9** of FIG. **8**; and

(13) FIG. **12** is a cross-sectional view of the vehicle light bar.

DETAILED DESCRIPTION

(14) The detailed description set forth below in connection with the appended drawings is intended as a description of the several presently contemplated embodiments of a vehicle auxiliary light luminaire bezel attachment and is not intended to represent the only form in which such embodiments may be developed or utilized. The description sets forth the functions and features in connection with the illustrated embodiments. It is to be understood, however, that the same or equivalent functions may be accomplished by different embodiments that are also intended to be encompassed within the scope of the present disclosure. It is further understood that the use of relational terms such as first and second and the like are used solely to distinguish one from another entity without necessarily requiring or implying any actual such relationship or order between such entities.

(15) FIG. **1** illustrates a vehicle auxiliary light luminaire **10***a* in accordance with a first embodiment of the present disclosure. This embodiment of the luminaire **10** is understood to have a generally quadrangular configuration, that is, a front face **12** that is broadly characterized by four sides: a left side **14***a*, a right side **14***b* opposed thereto, a top side **14***c*, and a bottom side **14***d* opposed thereto. Although these sides **14***a*-**14***d* may have further sub segments angled relative to each other, these are understood to be aesthetic enhancements and so the front face **12** may nevertheless be referred to as having a generally quadrangular or square shape. The quadrangular configuration is presented by way of example only and not of limitation, and another variation or embodiment is shown further below. The shape of the front face **12** may be varied without departing from the disclosure.

(16) By way of example, there may also be a cover **16** that may be fitted over the front face **12** of the luminaire **10**. The outer shape of the cover **16** is understood to conform to that of the front face **12**, though slightly undersized. In one embodiment, the cover **16** may be constructed of plastic or

other flexibly resilient material that retains its shape and compressively retained on the luminaire **10**.

(17) With additional reference to FIG. **2**, the luminaire **10** includes a housing **18** defined by a closed rear end **20** and an open front end **22** to a hollow interior **24**. Disposed within the hollow interior may be an illumination source **26**, which in the exemplary embodiment of the luminaire **10***a*, there may be four. In the cross-sectional view of FIG. **2**, a first illumination source **26***a* and a second illumination source **26***b* is shown mounted to a printed circuit board **28**. The illumination source **26** may be a light emitting diode (LED), though any other illumination source such as high-intensity discharge (HID) lamps, halogen lamps, incandescent lamps, or the like may be substituted. The output that is generated by the LED illumination source **26** may be omnidirectional but may be directed toward the open front end **22** with a reflector **30** mounted to the hollow interior **24** of the housing **18**. The electrical power for the illumination source **26** may be provided by the vehicle electrical system via a wiring harness **32** extending into the housing **18** from the closed rear end **20** thereof. In order to minimize the incursion of dust and moisture into the hollow interior **24** of the housing **18**, elastomeric grommets **34** or other seals may be utilized. Likewise, the connection from the wiring harness **32** to the vehicle electrical system may be made with a weather-sealed plug **36** that mates to a corresponding socket connected to the power source. Those having ordinary skill in the art will recognize the specific connection modalities that are suitable for vehicle applications, and the illustrated embodiments show these features of the luminaire **10** by way of example only and not of limitation.

(18) The illumination source **26** is understood to generate a substantial amount of heat, so the luminaire **10** may incorporate various thermal management features. In one embodiment, the illumination source **26** or the printed circuit board **28** may be mounted to a heat sink **38** that conducts away the heat. The heat sink **38** may be integral with the housing **18** as shown, and so there may be a plurality of fins **40** that assist in dissipating the heat into ambient air after being conducted away from the illumination source **26**. In this regard, the heat sink **38**/housing **18** may be constructed of aluminum or other material with high thermal conductivity. In addition to thermal conductivity, however, because the luminaire **10** is expected to encounter mechanical shock, moisture, extreme temperatures (both low and high) during normal service, the material selection for the housing **18** may also factor the durability and temperature resistance, among other qualities. As noted above, the shape and configuration of the housing **18**, as well as the constituent fins **40** may be varied for achieve different aesthetic effects.

(19) The luminaire **10** is envisioned to be mounted to a surface of a vehicle, and accordingly includes an adjustable bracket **42**. Thus, the luminaire **10** may be rotated about a bracket pin **44** upwards and downwards to adjust the vertical aim. The illustrated adjustable bracket **42** is presented by way of example only, however, as any other suitable mounting modality may be substituted without departing from the present disclosure.

(20) Still referring to FIG. **1** and FIG. **2**, but additionally to the exploded perspective view of FIG. **3**, the front face **12** of the luminaire **10** may be a bezel attachment assembly **50** that closes or seals off the open front end **22** of the housing **18**. The bezel attachment assembly **50** incorporates a lens **52** that is constructed of a light-transmissive material that allows the light produced by the illumination source **26** to be emitted from the interior of the housing **18**. Additionally, the bezel attachment assembly **50** incorporates an inner bezel **54**, as well as an outer bezel **56**. Together, the inner bezel **54** and the outer bezel **56** secures the lens **52** to the housing **18** with a set of fasteners **58**.

(21) The open front end **22** of the housing **18** defines a flat rim surface **60**, which may be generally segregated into a right rim side **60***a*, a left rim side **60***b*, a top rim side **60***c*, and a bottom rim side **60***d* that corresponds to the sides **14***a*-**14***d*, respectively, of the front face **12**. Each of the rim sides **60***a*-**60***d* is understood to define a corresponding fastener bore **62**, that is, the right rim side **60***a* defines the right side fastener bore **62***a*, the left rim side **60***b* defines the left side fastener bore **62***b*,

the top rim side **60***c* defines the top side fastener bore **62***c*, and the bottom rim side **60***d* defines the bottom side fastener bore **62***d*. The aforementioned fasteners **58** extend through or at least partially through the outer bezel **56**, the inner bezel **54**, and the lens **52**, and into the respective fastener bores **62***a*-**62***d*. The fasteners are understood to be threaded bolts, and so the fastener bores **62** are likewise understood to be correspondingly threaded.

(22) Sandwiched between the lens **52** and the flat rim surface **60** of the housing **18** is an annular elastomeric seal **64** that prevents the incursion of moisture into the hollow interior **24**. The flat rim surface **60** may define a seal groove **66** within which the annular elastomeric seal **64** is disposed to prevent movement of the same. The seal groove **66** is understood to extend around the circular contours of the reflector **30**, though this is by way of example only.

(23) In further detail, the lens **52** may be defined by a lens body **68** and a flange **70** around the lens body **68**. Additionally, the lens body **68** may also be characterized as a raised platform from the rim of the flange **70**. The lens **52** may have a front surface **72** and an opposed rear surface **74**, with each of the constituent sections thereof, that is, the lens body **68** and the flange **70**, likewise having corresponding front and rear surfaces. With additional reference to the perspective view of FIG. **6**, the lens body **68** is defined by a front surface **72***a* and an opposed rear surface **74***a*, while the flange **70** is defined by a front surface **72***b* and an opposed rear surface **74***b*. The rear surfaces **74** of the lens **52** face and abut against the flat rim surface **60** of the housing **18**. The lens body **68** defines a thickness or height **76** extending between the lens front surface **72***a* and the flange front surface **72***b*, spanning across the entirety of the profile of the lens body **68**. Like the other components of the first embodiment of the luminaire **10***a*, the lens **52** has a quadrangular shape with respective left side **78***a*, right side **78***b*, top side **78***c*, and bottom side **78***d*.

(24) With the lens **52** utilized in the first embodiment of the luminaire **10***a*, each of the sides **78***a*-**78***d* define a corresponding bezel engagement keyway **80***a*-**80***d*, respectively. Preferably, though optionally, the bezel engagement keyways **80** are centered along the respective sides **78**. As shown, the bezel engagement keyways **80** are arcuate notches or insets into the lens body **68**, with the flange **70** extending to the boundaries of the notch. The particular shape of the bezel engagement keyways **80**, however, is presented by way of example only and any other suitable shape or size configuration may be substituted. Also defined in the flange **70** are a series of fastener apertures **82**, of which there is a left fastener aperture **82***a*, a right fastener aperture **82***b*, a top fastener aperture **82***c*, and a bottom fastener aperture **82***d*. Each are located on the corresponding sides **78***a*-**78***d*, though more particularly, centered with the corresponding bezel engagement keyways **80***a*-**80***d*. The fastener apertures **82** are understood to receive the fasteners **58** and are accordingly positioned in axial, overlapping alignment with the fastener bores **62** defined by the flat rim surface **60** of the housing **18**.

(25) Referring additionally to the partial cutaway view shown in FIG. **5**, the bezel attachment assembly **50** includes the inner bezel **54** with an outer rim **84** and an inner rim **86** that closely matches the contour of the lens body **68** such that it may be fitted thereon. Furthermore, the inner bezel **54** is defined by a front rim face **88** and an opposed rear rim face **90** that abuts against the front surface **72***b* of the flange **70** when the inner bezel **54** is attached to the lens **52**. Again, like the lens **52** of the first embodiment of the luminaire **10***a*, the inner bezel **54** has a quadrangular shape with a left side **92***a*, right side **92***b*, top side **92***c*, and bottom side **92***d*. Each of the sides **92** defines an inner bezel key **94**, including a left inner bezel key **94***a*, a right inner bezel key **94***b*, a top inner bezel key **94***c*, and a bottom inner bezel key **94***d*. In the illustrated embodiment, the inner bezel keys **94** may also be referred to as inwardly extending tabs.

(26) The inner bezel keys **94** are contemplated to be received within the bezel engagement keyways **80** when the inner bezel **54** is attached to the lens **52**, and therefore the contour of the inner bezel keys **94** is understood to match that of the bezel engagement keyways **80**, e.g., arcuate and complementary thereto. Each of the inner bezel keys **94** protrude inwardly from the inner rim **86**, and thus the rotational movement of the inner bezel **54** relative to the lens body **68** is limited. The

outer rim **84** of the inner bezel **54**, on the other hand, defines a series of central fastener slots **96** for each of the inner bezel keys **94***a*-**94***d*, e.g., a left central fastener slot **96***a*, a right central fastener slot **96***b*, a top central fastener slot **96***c*, and bottom central fastener slot **96***d*. The central fastener slots **96** are understood to have a semi-circle shape that has substantially the same diameter as the fastener apertures **82** of the lens **52** and are in axial alignment therewith to receive the fasteners **58**.
(27) As best shown in FIG. **3**, the bezel attachment assembly **50** also includes the outer bezel **56** with an outer rim **98** and an inner rim **100** that closely matches the contour of the inner bezel **54** and is fitted thereon. The outer bezel **56** is defined by a front rim face **102** and an opposed rear rim face **104** that faces and abuts against the flange **70** of the lens **52** when it is fitted on to the same. Similar to the lens **52** and the inner bezel **54**, the outer bezel **56** is characterized by a quadrangular shape with a left side **106***a*, a right side **106***b*, a top side **106***c*, and a bottom side **106***d*. The left side **106***a* includes a left outer bezel key **108***a*, the right side **106***b* includes a right outer bezel key **108***b*, the top side **106***c* includes a top outer bezel key **108***c*, and the bottom side **106***d* includes a bottom outer bezel key **108***d*. Each of the outer bezel keys **108** protrude from the inner rim **100** and are received in the corresponding one of the bezel engagement keyways **80** while overlapping a respective one of the inner bezel keys **94**. Thus, the outer bezel keys **108** may also be referred to as inwardly extending tabs. The contour of the outer bezel key **108** is understood to match that of the inner bezel key **94**, e.g. arcuate and complementary to the bezel engagement keyway **80** defined on the lens **52**.
(28) The outer bezel keys **108** may be coplanar with the front rim face **102**, but as shown in the detailed view of FIG. **4**, a rear surface **110** of the outer bezel key **108** is not co-planar with the rear rim face **104**. That is, the thickness of the outer bezel key **108** is less than that of the rest of the outer bezel **56**, and a portion of the inner rim **100** continues uninterrupted across the width of the outer bezel key **108**. This section is understood to conform to the straight edge of the outer rim **84** of the inner bezel **54**.
(29) Turning back to FIG. **5**, the portion of the inner bezel **54** corresponding to the inner bezel key **94** is partially recessed, allowing for the outer bezel key **108** to overlap and be received within such recess. While a rear surface **112** of the inner bezel key **94** may be coplanar with the rear rim face **90** of the inner bezel **54**, the opposite front surface **114** of the inner bezel key **94** is not coplanar with the front rim face **88**. The thickness of the inner bezel **54** and of the outer bezel **56** may be substantially the same, with the outer bezel **56** surrounding the inner bezel **54**.
(30) A secured, interlocked relationship between the inner bezel **54** and the outer bezel **56** may be possible because of the mated inner and outer bezel keys **94**, **108**, with the outer bezel key **108** being further received within a recess defined by the inner bezel **54** and the inner bezel key **94** thereof. The rear surface **110** of the outer bezel key **108** thus faces and abuts against the front surface **114** of the section of the inner bezel **54′** that corresponds to the inner bezel key **94**. Though the specific thickness ratio may be varied, preferably, but optionally, the inner bezel key **94** and the outer bezel key **108** is half or at least less than the entire thickness of the respective bezel body. Combined together, the thickness of the inner bezel key **94** and the outer bezel key **108** add up to the thickness of the either the inner bezel **54** or the outer bezel **56**, and encompass the entire thickness or height **76** of the lens body **68** as it is received within the bezel engagement keyway **80**.
(31) The outer bezel keys **108** also define a series of central fastener holes **116**, with the left outer bezel key **108***a* defining a left central fastener hole **116***a*, the right outer bezel key **108***b* defining a right central fastener hole **116***b*, the top outer bezel key **108***c* defining a top central fastener hole **116***c*, and the bottom outer bezel key **108***d* defining a bottom central fastener hole **116***d*. Each of the central fastener holes **116** are understood to be in axial alignment with the respective one of the central fastener slots **96**, the fastener apertures **82** of the lens **52**, and the fastener bores **62** defined on the flat rim surface **60** of the housing **18**. In one contemplated embodiment, the central fastener holes **116** may be countersunk to receive a tapered head fastener while the head is flush with the front rim face **102**.

(32) The outer rim **84** of the inner bezel **54**, on the other hand, defines a series of central fastener slots **96** for each of the inner bezel keys **94***a*-**94***d*, e.g., a left central fastener slot **96***a*, a right central fastener slot **96***b*, a top central fastener slot **96***c*, and bottom central fastener slot **96***d*. The central fastener slots **96** are understood to have a semi-circle shape that has substantially the same diameter as the fastener apertures **82** of the lens **52** and are in axial alignment therewith to receive the fasteners **58**.

(33) As indicated above, the shape of the luminaire **10** may be varied. Referring to the exploded view of FIG. **7**, a second embodiment of the luminaire **10***b* has a generally triangular configuration characterized by a left diagonal side **118***a*, a right diagonal side **118***b*, and a top side **118***c*. These sides **118***a*-**118***c* may have further sub segments angled relative to each other, these are understood to be aesthetic enhancements so it may nevertheless be referred to as having a generally triangular shape. The triangular configuration is presented by way of example only and not of limitation, and other shape variations are possible. Along these lines, similar to the first embodiment **10***a*, the second embodiment of the luminaire **10***b* includes a housing **18′** though with a triangular open front end **122** and having all of the same features, including the reflector **30**, illumination source **26**, and so on. Because the housing **18′** and the open front end **122** are triangular, so are the components of the bezel attachment assembly **50′** and the elastomeric seal **64′**.

(34) The second embodiment of the bezel attachment assembly **50′** includes a second variation of the lens **52′**, along with a second variation of the inner bezel **54′** and the outer bezel **56′**. While these components are triangularly shaped, the other features of each are understood to be the same as in the quadrangularly shaped first embodiments of the lens **52**, the inner bezel **54**, and the outer bezel **56**. Specifically, the lens **52** is characterized by the lens body **68** and the flange **70**. There are three bezel engagement keyways **80***a*, **80***b*, and **80***c* corresponding to each side of the lens **52′**, and the portion of the flange **70** that defines the bezel engagement keyways **80** includes the fastener apertures **82**.

(35) The second variation of the inner bezel **54′** is similarly engageable to the lens **52′**, and defines the same inner bezel keys **94***a*, **94***b*, and **94***c* for each of the sides of the inner bezel **54′** that extend inwardly from the rim of the inner bezel **54′**. The inner bezel keys **94***a*-**94***c* are received within the bezel engagement keyways **80***a*-**80***c*, respectively, when the inner bezel **54′** is coupled to the lens **52′**.

(36) The second variation of the outer bezel **56′** likewise includes the outer bezel keys **108** that extend inwardly from the rim thereof and received within the corresponding one of the bezel engagement keyways **80** of the lens **52′**. Specifically, there is a left outer bezel key **108***a*, a right outer bezel key **108***b*, and an top outer bezel key **108***c* for the respective sides of the outer bezel **56′**. Each of the outer bezel keys **108** overlap the corresponding inner bezel keys **94**. The same mating/interlocking relationship of the outer bezel key **108** and the inner bezel key **94** as described above apply to this variation of the bezel attachment assembly **50′**. Further, the outer bezel **56′** defines the central fastener holes **116***a*-**116***c* on the respective one of the outer bezel keys **108***a*-**108***c*, and the inner bezel **54′** defines the central fastener slots **96***a*-**96***c* located in alignment with the inner bezel keys **94***a*-**94***c*. The fasteners **58** are inserted through the central fastener holes **116**, the fastener slots **96**, and the fastener apertures **82** on the flange **70** of the lens **52′**, then threaded into fastener bores **124** defined by a rim **126**, securing the bezel attachment assembly **50′** to the housing **18′**.

(37) As illustrated by the foregoing, the specific shape and configuration of the luminaire **10** may be varied, with suitable modifications to the bezel attachment assembly **50** and the constituent components of the lens **52**, inner bezel **54**, and the outer bezel **56** being made to adapt the same attachment mechanism to such alternative shapes. The quadrangular configuration of the first embodiment **10***a*, and the triangular configuration of the second embodiment **10***b* have been presented by way of example only, and those having ordinary skill in the art may make additional modifications for other shapes and configurations of the housing **18**.

(38) Certain features of the disclosed bezel attachment assembly may also be adapted to other auxiliary lights, such as a light bar shown in FIG. **8** that may be more generally referred to as third embodiment of a vehicle auxiliary light luminaire **10***c*. Similar to the previously described embodiments, there is a housing **128**, though having an elongate configuration to house multiple illumination sources **20** side-by-side and mounted on a rectangular printed circuit board **28**. In the exemplary embodiment, Again, the exterior of the housing **128** includes fins **40** that serve as heat sinks to dissipate the heat generated by the illumination sources **20**. Furthermore, the light outputted from the illumination sources **20** are directed forward with the reflectors **30**. The printed circuit board **28** and the reflectors are disposed within a hollow interior **136** of the housing **128**.
(39) The third embodiment of the luminaire **10***c* also includes a bezel attachment **50**″ with an alternative configuration that may nevertheless incorporate a lens unit **130**, one or more inner bezels **132**, and one or more outer bezels **134**. The inner bezels **132** may also be referred to as first annular interlocking bezels, while the outer bezels **134** may also be referred to as second annular interlocking bezels. The bezel attachment **50**″ is attached to a front face **138** of the housing **128**, with an elastomeric seal **140** being disposed between the rear of the lens unit **130** and the front face **138**/reflectors **30**.
(40) As shown in FIG. **8**, the luminaire **10***c* and certain components thereof are configured as a set of four. For example, the single printed circuit board **28** includes four illumination sources, and the single lens unit **130** defines four lens bodies **131***a*, **131***b*, **131***c*, and **131***d*. Although the reflectors **30**, the inner bezel **132**, and the outer bezel **134** are provided individually, the housing **128** defines a single opening **142** into the hollow interior **136**. This is by way of example only and not of limitation, however, and the luminaire **10***c* may be comprised of other multiples of the foregoing combined features, such as groups of three (where the opening **142** accommodates three illumination sources and associated reflectors, a lens unit **130** with three lens bodies, etc.), groups of two, and so on.
(41) With reference to FIGS. **9**, **10**, **11**, and **12**, further details of the bezel attachment **50**″ will now be described. The lens bodies **131***a*, **131***b*, **131***c*, and **131***d* may be characterized as raised circular platforms from a flange section **144** surrounding the same. The flange section **144** is understood to be rectangular and generally conforms to the shape of the front face **138** of the housing **128**. The lens unit **130** is defined by a front face **146** and an opposed rear face **148**, with the lens bodies **131** having a lens body front face **146***a*, a lens body rear face **148***a*, and a lens body rim **149**. Along these lines, the flange section **144** has a flange front face **146***b* and a flange rear face **148***b*. The lens body **131** may be extruded from the flange section **144** and a recess **150** is defined by the portion corresponding to the lens body **131** and the flange rear face **148***b* is not contiguous with the lens body rear face **148***a*. This is by way of example only, as there may be alternative configurations in which the flange rear face **148***b* is contiguous with the lens body rear face **148***a*. The flange rear face **148***b* additional defines a seal groove **152** within which the elastomeric seal **140** is positioned. The lens unit **130** may be formed as a unitary structure with a transparent or translucent material such as plastic, glass, etc.
(42) The inner bezels **132**, also referred to as the first annular interlocking bezel, is fitted around and on to a respective one of the lens bodies **131**. To this end, the inner bezel **132** has an annular, e.g., ring-shaped configuration with an inner rim **154** and an outer rim **156**, along with a front rim face **158** and an rear rim face **160**. The inner rim **154** faces and abuts against the lens body rim **149** and are in sliding engagement with each other. The inner rim **154** and/or the lens body rim **149** may be dimensioned to maintain a freely sliding engagement, though other configurations to maintain some extent of frictional retention is also possible.
(43) The outer rim **156** of the inner bezel **132** further defines a set of multiple, partially circumferential engagement recesses **162**. These engagement recesses **162** are contemplated to extend partially into the body of the inner bezel **132** without extending fully between the front rim face **158** and the rear rim face **160**. In this regard, the body of the inner bezel **132** is understood to

define a constant inner rim **154**, while sections of the outer rim **156** corresponding to the engagement recesses **162** defines a recess shoulder **164** and a recess neck **166** perpendicular thereto. As best illustrated in FIG. **10**, the recess neck **166** has a circumferential taper on each side of the engagement recess **162** towards the outer rim **156**.

(44) The outer bezel **134**, also referred to as the second annular interlocking bezel, is fitted around the outer rim **156** of the inner bezel **132**. The outer bezel **134** is also defined by an inner rim **168** and an outer rim **170**, along with a front rim face **172** and an opposed rear rim face **174**. The inner rim **168** faces and abuts against the outer rim **156**, either in freely sliding engagement or with some degree of frictional retention.

(45) As best shown in the cross-sectional views of FIGS. **11** and **12**, the rear rim face **174** abuts against the front face **146** of the housing **128**, with the inner bezel **132** being fully nested within the outer bezel **134**. Unlike the inner bezel **132**, the outer bezel **134** defines a constant outer rim **170**. In addition, the inner rim **168** includes one or more inwardly extending tabs **176** that are sized and shaped to be received within the engagement recesses **162** of the inner bezel **132**. The tabs **176** are defined by a front face **178**, a flat rear face **180**, and a tab rim **182**. The abutting engagement between the outer bezel **134** (via the tabs **176**, or more specifically the flat rear face **180** thereof) and the inner bezel **132** (via the engagement recesses **162**, or more specifically the recess shoulder **164** thereof) is understood to couple the two against the housing **128**. Furthermore, the tab rim **182** faces the recess neck **166** of the engagement recess **162**. The thickness of the tabs **176**, that is, the thickness dimension of the tab rim **182**, is understood to correspond to the depth of the engagement recesses **162** of the inner bezel **132** that enables the aforementioned nested relationship between such components. The reduced stacking height is contemplated to minimize overall profile of the luminaire **10***c*.

(46) The outer bezel **134** further includes a set of spaced outer tabs **184** each defining a fastener hole **186** that are placed into alignment with corresponding fastener holes **188** defined on the flange section **144** of the lens unit **130**. By way of example, the outer tabs **184** may also be counterbored to receive the head of the fastener **58**. The depiction of the outer tabs **184** is exemplary only, and any other suitable shape or size may be substituted without departing from the scope of the present disclosure.

(47) The particulars shown herein are by way of example and for purposes of illustrative discussion of the embodiments of the vehicle auxiliary light luminaire bezel attachment assembly and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects. In this regard, no attempt is made to show details with more particularity than is necessary, the description taken with the drawings making apparent to those skilled in the art how the several forms of the present disclosure may be embodied in practice.

Claims

1. A luminaire bezel attachment assembly comprising: a lens defined by a lens body and a flange around the lens body, the flange defining one or more lens flange fastener apertures; an inner bezel coupled to the lens and defining one or more inner bezel fastener apertures and a front inner bezel face; and an outer bezel coupled to the lens and to the inner bezel, and defined by one or more outer bezel fastener apertures and a front outer bezel face; wherein corresponding ones of the inner bezel fastener apertures and the corresponding ones of the outer bezel fastener apertures are aligned with corresponding ones of the lens flange fastener apertures, and both the front inner bezel face and the front outer bezel face are exposed and in a concentric relationship with the inner bezel fitted within the outer bezel.

2. The luminaire bezel attachment assembly of claim 1, wherein the flange defines one or more bezel engagement keyways.

3. The luminaire bezel attachment assembly of claim 2, wherein: the inner bezel defines one or more inner bezel keys received within a corresponding one of the one or more bezel engagement keyways; and the outer bezel defines one or more outer bezel keys received within a corresponding one of the one or more bezel engagement keyways.
4. The luminaire bezel attachment assembly of claim 3, wherein one of the inner bezel keys is recessed to mate with a corresponding one of the outer bezel keys.
5. The luminaire bezel attachment assembly of claim 4, wherein one of the inner bezel keys protrude inwardly from a rim of the inner bezel.
6. The luminaire bezel attachment assembly of claim 5, wherein the one of the inner bezel keys is recessed relative to the front inner bezel face.
7. The luminaire bezel attachment assembly of claim 4, wherein one of the outer bezel keys protrude inwardly from a rim of the outer bezel.
8. The luminaire bezel attachment assembly of claim 7, wherein the one of the outer bezel keys is recessed relative to a rear outer bezel face.
9. A luminaire comprising: a housing defining at least an open front end with a rim defining one or more fastener bores; one or more illumination sources mounted to the housing; a lens defined by a lens body and a flange around the lens body, the flange defining one or more lens flange fastener apertures; an inner bezel coupled to the lens and defining one or more inner bezel fastener apertures and a front inner bezel face; and an outer bezel coupled to the lens and to the inner bezel, and defined by one or more outer bezel fastener apertures and a front outer bezel face; wherein corresponding ones of the inner bezel fastener apertures and the corresponding ones of the outer bezel fastener apertures are aligned with corresponding ones of the lens flange fastener apertures, and both the front inner bezel face and the front outer bezel face are exposed and in a concentric relationship with the inner bezel fitted within the outer bezel.
10. The luminaire bezel of claim 9, further comprising one or more fasteners each inserted through corresponding ones of the inner bezel fastener apertures, the outer bezel fastener apertures, and the lens flange fastener apertures.
11. The luminaire of claim 9, further comprising a sealing gasket disposed between the lens and the housing.
12. The luminaire of claim 9, wherein the flange defines one or more bezel engagement keyways.
13. The luminaire of claim 12, wherein: the inner bezel defines one or more inner bezel keys received within a corresponding one of the one or more bezel engagement keyways; and the outer bezel defines one or more outer bezel keys received within a corresponding one of the one or more bezel engagement keyways.
14. The luminaire of claim 13, wherein one of the inner bezel keys is recessed to mate with a corresponding one of the outer bezel keys.
15. The luminaire of claim 14, wherein one of the inner bezel keys protrude inwardly from a rim of the inner bezel.
16. The luminaire of claim 15, wherein the one of the inner bezel keys is recessed relative to the front inner bezel face.
17. The luminaire of claim 14, wherein one of the outer bezel keys protrude inwardly from a rim of the outer bezel.
18. The luminaire of claim 17, wherein the one of the outer bezel keys is recessed relative to a rear outer bezel face.
19. A luminaire bezel attachment assembly comprising: a lens defined by a lens body and a flange around the lens body, the flange defining one or more lens flange fastener apertures; an inner bezel coupled to the lens and defining one or more inner bezel fastener apertures and a front inner bezel face; and an outer bezel coupled to the lens and to the inner bezel, and defined by one or more outer bezel fastener apertures and a front outer bezel face; wherein corresponding ones of the inner bezel fastener apertures and the corresponding ones of the outer bezel fastener apertures are aligned

with corresponding ones of the lens flange fastener apertures, and the outer bezel surrounding the inner bezel in a concentric relationship with both a circumference of the front inner bezel face and a circumference of the front outer bezel face being exposed.