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(71) Applicant: **JAGUAR LAND ROVER LIMITED** [GB/G-B]; Abbey Road, Whitley, Coventry, Warwickshire CV3 4LF (GB).

(72) Inventor: **SIDDALL, Jeremy**; c/o Jaguar Land Rover, Patents Department W/1/073, Abbey Road, Whitley, Coventry, Warwickshire CV3 4LF (GB).

(74) Agent: **JAGUAR LAND ROVER PATENTS DEPARTMENT**; c/o Jaguar Land Rover, Patents Department

W/1/073, Abbey Road, Whitley, Coventry, Warwickshire CV3 4LF (GB).

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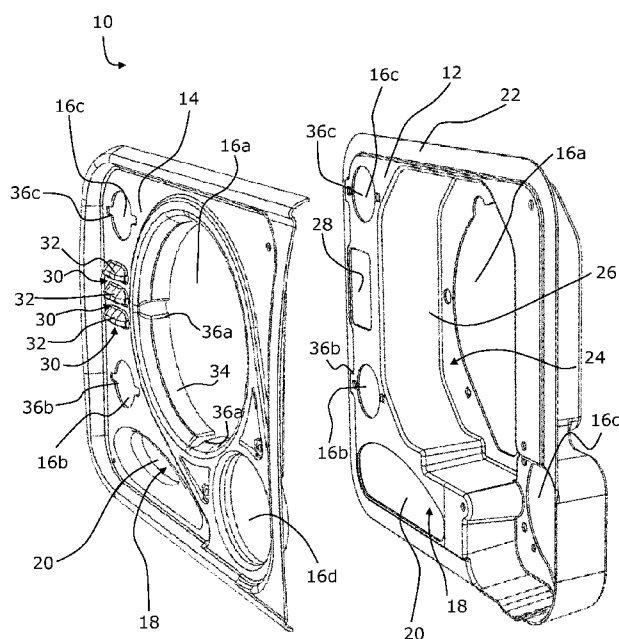


Fig. 1

(57) Abstract: Aspects and embodiments of the invention relate to a mounting structure (10) for the exterior lights of a road vehicle, the mounting structure (10) having at least one light aperture (16a, 16b, 16c, 16d) configured to receive at least partially therethrough an exterior lighting assembly, the mounting structure (10) comprising an inner component (12) and an outer component (14), wherein the inner component (12) is configured for attachment to a body portion of the vehicle in order to at least partly cover an opening in the body portion.

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MOUNTING STRUCTURE AND EXTERIOR LIGHT ASSEMBLY

TECHNICAL FIELD

The present disclosure relates to a mounting structure for the exterior lights of a road vehicle. The present disclosure also relates to an exterior light assembly including a mounting structure, and a vehicle including an exterior light assembly.

5 BACKGROUND

It is a requirement of road vehicles to have an exterior light assembly, so that the driver of the vehicle can see where they are driving and so that other road users can see the vehicle.

10 A known mounting structure for such an exterior light assembly includes a plurality of light apertures in a front surface of a front wing of the vehicle, each light aperture being configured to receive at least partially therethrough an exterior lighting assembly. Examples of exterior lighting assemblies include: main headlight assemblies, side light assemblies and indicator assemblies. Such a known mounting structure is suitable for vehicles which are produced in high volumes for road use, and which have standard lighting requirements.

15 For vehicles which are produced in low volumes, such as those produced for off-road and/or endurance racing, it may be desirable to customise the exterior light assembly. For example, it may be desirable to provide one or more additional exterior lighting assemblies, such as spot lights, fog lights, etc. In such vehicles, the additional exterior lighting assemblies are sometimes mounted to the vehicle (e.g. in front of the radiator grill or on the roof of the vehicle) by brackets and/or light bars which are secured the vehicle. This typically requires the drilling of holes within the bodywork of the vehicle to secure the brackets and/or light bars, and to run additional wiring for the additional exterior lighting assemblies.

The present disclosure aims to provide an improved mounting structure for an exterior light assembly.

20 SUMMARY OF THE INVENTION

It is an aim of the present invention to address one or more of the disadvantages associated with the prior art. Aspects and embodiments of the invention provide a mounting structure for the exterior lights of a road vehicle, an exterior light assembly for a road vehicle, a vehicle, and a method of mounting an exterior light assembly to a road vehicle, as claimed in the appended claims.

25 Throughout the summary of the invention, description and claims the terms front, rear, left, right, upper and lower are defined with reference to their normal use in the description of a forward facing upright standing vehicle. It follows that features of the invention are described in relation to a vehicle such that, for example, front features are those closer to the front of the vehicle than rear features and upper features are those closer to the top of the vehicle than lower features.

30 According to an aspect of the invention there is provided a mounting structure for the exterior lights of a road vehicle. The mounting structure has at least one light aperture configured to receive at least partially therethrough an exterior lighting assembly. The mounting structure comprises an inner component and an outer component. The inner component is configured for attachment to a body portion of the vehicle in order to at least partly cover an opening in the body portion.

Such a mounting structure allows the configuration of exterior lights to be altered and additional vehicle accessories mounted to a vehicle by configuring the mounting structure as desired and then attaching the mounting structure to a body portion of

the vehicle. This contrasts with a conventional arrangement in which the body portion itself must be modified in order to change the configuration of exterior lights/accessories.

For example, the mounting structure allows additional exterior lighting to be provided without needing to be mounted (traditionally) in front of the radiator grill, or on the roof. In addition, when the mounting structure is configured to provide additional exterior lighting, the mounting structure reduces the need to drill or secure brackets or light bars, to run additional wiring harnesses and/or to install fuses etc.

Optionally, the outer component is discrete from the inner component.

Optionally, the outer component is configured for supporting the lighting assembly when mounted over the inner component.

Optionally, the outer component is secured to the inner component.

- 10 Securing the outer component to the inner component provides a simple means of fixing the outer component, which does not require any adaptations of the body portion of a vehicle (which might be necessary in alternative configurations where the outer component is secured to the body portion).

Optionally, the mounting structure further comprises an accessory mounting location configured to support a vehicle accessory.

- 15 This provides the mounting structure with the additional purpose of housing a vehicle accessory, such as an air intake, a horn or an illuminated emblem, at a convenient location on the vehicle and without the need for additional mounting structures to be provided elsewhere on the vehicle.

Optionally, the accessory mounting location comprises an accessory aperture configured to receive at least partially therethrough a vehicle accessory.

- 20 Such an accessory aperture provides a simple means for mounting a vehicle accessory.

Optionally, the accessory aperture is provided in both the inner and outer components.

In this way, a vehicle accessory can be supported in the accessory aperture and have a communication with both sides of the mounting structure. For example, the accessory aperture being provided in the outer component allows sound/light produced by the vehicle accessory to be emitted forward of the mounting structure, and the accessory aperture being provided in the inner component allows a rear of the vehicle accessory to be connected to vehicle wiring behind the mounting structure.

- 25 Optionally, the at least one light aperture comprises a plurality of light apertures.

Having a plurality of light apertures allows multiple different types of lights (e.g. main beams, dipped beams, indicators, side lights, driving lights, fog lights etc.) to be supported by the mounting structure. This increases the number of lighting options of the associated vehicle.

- 30 Optionally, the plurality of light apertures comprises a main headlamp aperture, and at least three auxiliary light apertures.

Having at least three auxiliary light apertures allows at least three auxiliary lights to be supported by the mounting structure (e.g. dipped beams, indicators, side lights, driving lights, fog lights, etc.). This increases the number of lighting options of the associated vehicle.

Optionally, the at least one light aperture is provided in both the inner and outer components.

- 5 In this way, at least one exterior lighting assembly can be supported in the at least one light aperture and have a communication with both sides of the mounting structure. For example, the light aperture(s) being provided in the outer component allows light to be emitted forward of the mounting structure, and the light aperture(s) being provided in the inner component allows a rear of the or each light assembly to be connected to vehicle wiring behind the mounting structure.

- 10 Optionally, the inner component has one or more transverse flanges at its periphery by which the inner component is configured for attachment to the body portion.

Having one of more transverse flanges provides a simple means for attaching the inner component to the body portion.

Optionally, the inner component comprises one or more recessed portions radially inboard of the one or more transverse flanges, wherein the one or more recessed portions are configured to extend behind the opening in the body portion.

Optionally, the mounting structure is substantially flat in the area surrounding the at least one light aperture.

- 15 It will be understood that the term "substantially flat" means that the mounting structure has a width and/or height dimension which is at least three times its depth, preferably at least five times its depth.

The mounting structure being substantially flat allows it to be coupled to a body portion to at least partly surround an opening in a correspondingly flat area of the body portion of a vehicle without substantially altering the internal or external dimensions of the vehicle.

- 20 According to an aspect of the invention, there is provided an exterior light assembly for a road vehicle. The exterior light assembly comprises a mounting structure as disclosed herein, and at least one exterior lighting assembly supported by the mounting structure.

Such an exterior light assembly benefits from the advantages of the mounting structure outlined above.

- 25 Optionally, the exterior light assembly further comprises a vehicle accessory supported by the or an accessory mounting location of the mounting structure.

This provides the mounting structure with the additional purpose of housing a vehicle accessory, such as an air intake, a horn or an illuminated emblem, at a convenient location on the vehicle and without the need for additional mounting structures to be provided elsewhere on the vehicle.

Optionally, the accessory comprises a horn.

- 30 A horn is a legal requirement of road vehicles and must be mounted at an appropriate location on the vehicle.

Mounting the horn in the mounting structure of the exterior light assembly removes the need for a separate horn mount.

Furthermore, it will be understood that the exterior assembly could be mounted on a forward portion of a body portion of a vehicle. This is a particularly useful location for a horn because it allows sound produced by the horn to project forwards (e.g. in the direction of pedestrians or other vehicles in front of the vehicle) to warn of the vehicle's approach.

- 5 Mounting the horn in the mounting structure of the exterior light assembly also places the horn in a convenient location above the typical installation position behind the vehicle grill. This can be particularly beneficial when the road vehicle is used in an off-road setting, because it can reduce the risk of fouling of the horn by mud and dirt during use of the vehicle.

Optionally, the accessory mounting location comprises a mesh with visible indicia and an illumination source configured to illuminate the visible indicia.

- 10 Such a mesh allows the visible indicia to be displayed at the accessory mounting location without blocking sound, air etc. which is emitted from or received by an accessory behind the mesh.

In addition, having an illumination source configured to illuminate the visible indicia allows the indicia to be viewed easily, even in dim or dark light conditions.

- 15 Optionally, the at least one exterior lighting assembly comprises a main headlamp assembly, an indicator assembly, a side light assembly, and an additional light assembly, each supported by a different aperture of the mounting structure.

Such a combination of lighting assemblies provides a flexible range of lighting options.

According to an aspect of the invention, there is provided a vehicle comprising an exterior light assembly as disclosed herein and a body portion having an opening. The inner component of the mounting structure of the exterior light assembly is attached to the body portion such that the inner component at least partly covers the opening.

- 20 Such a vehicle assembly benefits from the advantages of the exterior light assembly and mounting structure outlined above.

Optionally, the body portion is a front wing of the vehicle.

The front wing provides a convenient location for mounting an exterior light assembly.

Optionally, the opening is provided in a front surface of the front wing; optionally, wherein the front surface of the front wing is substantially flat.

- 25 The front surface of the front wing provides a convenient location for mounting an exterior light assembly.

The front surface being substantially flat facilitates easy mounting of a mounting structure (e.g. via a transverse flange).

According to an aspect of the invention, there is provided a method of mounting an exterior light assembly to a road vehicle, the method comprising the steps of:

- 30 providing an opening in a body portion of the vehicle;
providing a mounting structure as disclosed herein;

attaching the inner component of the mounting structure to the body portion to at least partly cover the opening; supporting at least one exterior lighting assembly in the at least one light aperture of the mounting structure; and mounting the outer component of the mounting structure over the inner component.

5 Such a method allows the configuration of exterior lights to be altered and, optionally, additional accessories mounted to a vehicle, by configuring the mounting structure as desired before coupling the mounting structure to the body portion of the vehicle. This contrasts with a conventional arrangement in which the body portion itself must be modified in order to change the configuration of exterior lights/accessories.

10 For example, this method allows additional exterior lighting to be provided without needing to be mounted (traditionally) in front of the radiator grill, or on the roof. In addition, when the mounting structure is configured to provide additional exterior lighting, the mounting structure reduces the need to drill or secure brackets or light bars, to run additional wiring harnesses and/or to install fuses etc.

Optionally, the step of attaching the inner component of the mounting structure to the body portion comprises securing a transverse flange at the periphery of the inner component to a region of the body portion surrounding the opening.

15 Securing a transverse flange of the inner component to a region of the body portion surrounding the opening (e.g. by welding, bonding or using fasteners such as rivets) provides a simple means for securing the inner component to the body portion.

Optionally, the method further comprises the step of removing a prior exterior light assembly from the body portion before the step of attaching the inner component of the mounting structure to the body portion.

This method of mounting an exterior light assembly can conveniently be used to replace a prior exterior light assembly of a vehicle with a different exterior light assembly having a different configuration.

20 Optionally, the step of providing the opening in the body portion is carried out after the step of removing the prior exterior light assembly.

It will be understood that the opening for the mounting structure may be the same as an existing opening in the body portion for the prior exterior light assembly. In such cases, the step of providing an opening in the body portion merely comprises exposing the existing opening by removing the prior exterior light assembly.

25 Alternatively, the step of providing an opening in the body portion is carried out by modifying an existing opening in the body portion for the prior exterior light assembly, or by providing an entirely new opening in the body portion, after removal of the prior exterior light assembly.

30 Within the scope of this application, it is expressly intended that the various aspects, embodiments, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular the individual features thereof, may be taken independently or in any combination. That is, all embodiments and/or features of any embodiment can be combined in any way and/or combination, unless such features are incompatible. The applicant reserves the right to change any originally filed claim or file any new claim accordingly, including the right to amend any

originally filed claim to depend from and/or incorporate any feature of any other claim although not originally claimed in that manner.

BRIEF DESCRIPTION OF THE DRAWINGS

The subjects of the present disclosure are now described, by way of example only, with reference to the following figures in which:

Figure 1 is an exploded perspective view of a mounting structure for the exterior lights of a road vehicle, according to an embodiment;

Figure 2 is perspective view of a front wing of a vehicle to which the mounting structure of Figure 1 can be attached;

Figure 3 is a perspective view of the front wing of Figure 2 with an inner component of the mounting structure of Figure 1 attached;

Figure 4 is a perspective view of the front wing of Figures 2 and 3 with an outer component of the mounting structure of Figure 1 attached;

Figure 5 is a perspective view of an exterior light assembly including the mounting structure of Figure 1;

Figure 6 is a front view of the exterior light assembly of Figure 5;

Figure 7 is a vehicle in accordance with an embodiment of the invention; and

Figure 8 is a flowchart illustrating a method of mounting an exterior light assembly to a road vehicle in accordance with the invention.

DETAILED DESCRIPTION

Referring firstly to Figure 1, a mounting structure for the exterior lights of a vehicle (e.g. a road vehicle) is indicated at 10. The mounting structure 10 has an inner component 12 which is configured for attachment to a body portion of a vehicle in order to at least partly cover an opening in the body portion (e.g. an opening 204 of the kind illustrated in Figure 2). In other words, the inner component 12 is configured so that at least a portion of the inner component 12 can be secured to a region of the body portion surrounding the opening (e.g. by welding, adhering, fastening or the like).

The mounting structure 10 also has an outer component 14. As described in more detail below, the outer component 14 of the illustrated embodiment is discrete from the inner component 12. In some embodiments, the outer component 14 is configured for supporting an exterior lighting assembly when mounted over the inner component 12. In other words, the outer component 14 may be configured to help retain an exterior lighting assembly in place. For example, the outer component 14 may be configured for interaction with one or more portions of an exterior lighting assembly (e.g. the outer component 14 may have one or more side walls for abutment with one or more complementary portions of an exterior lighting assembly, one or more notches for engagement with one or more complementary projections on an exterior lighting assembly, and/or one or more formations for receiving one or more fasteners of an exterior lighting assembly).

As described in more detail below, the mounting structure 10 has at least one light aperture 16a, 16b, 16c, 16d configured to receive at least partially therethrough an exterior lighting assembly.

In the illustrated embodiment, there are a plurality of light apertures 16a, 16b, 16c, 16d, which allows multiple different types of lights (e.g. main headlamps, side lights, indicators, fog lights etc.) to be supported by the mounting structure 10. In particular, the plurality of light apertures 16a, 16b, 16c, 16d includes a main headlamp aperture 16a and at least three auxiliary light apertures 16b, 16c, 16d. In the illustrated embodiment, the auxiliary light apertures 16b, 16c, 16d include an indicator aperture 16b, a side light aperture 16c, and an additional light aperture 16d.

In the illustrated embodiment, each of the light apertures 16a, 16b, 16c, 16d is provided in both the inner and outer components 12, 14. This allows light to be emitted forward of the mounting structure 10 and for connection to vehicle wiring behind the mounting structure 10.

The illustrated mounting structure 10 also has an accessory mounting location 18 configured to support a vehicle accessory.

5 In other words, the accessory mounting location 18 is configured to help retain a vehicle accessory in place. In some embodiments, the accessory mounting location 18 may be configured for interaction with one or more portions of a vehicle accessory (e.g. the accessory mounting location 18 may have one or more side walls for abutment with one or more complementary portions of a vehicle accessory, one or more notches for engagement with one or more complementary projections on a vehicle accessory, and/or one or more formations for receiving one or more fasteners of a vehicle accessory).

10 In this way, the illustrated mounting structure 10 provides an additional purpose of housing a vehicle accessory, such as an air intake, a horn or an illuminated emblem, at a convenient location on the vehicle and without the need for additional mounting structures to be provided elsewhere on the vehicle.

In the illustrated embodiment, the accessory mounting location 18 includes an accessory aperture 20 configured to receive at least partially therethrough a vehicle accessory. In particular, the accessory aperture 20 is provided in both the inner and outer components 12, 14. This allows sounds/light produced by a vehicle accessory supported in the accessory aperture 20 to be emitted forward of the mounting structure 10 and for connection to vehicle wiring behind the mounting structure 10.

In the illustrated embodiment, the inner component 12 has a transverse flange 22 which extends around a periphery of the inner component 12. The inner component 12 is configured for attachment to the body portion of a vehicle by the transverse flange 22. For example, the transverse flange 22 may be secured (e.g. by welding, bonding or using fasteners such as screws, bolts or rivets) to a region of the body portion surrounding the opening (as illustrated in Figure 3). In alternative embodiments, there are a plurality of transverse flanges 22 which are distributed around the periphery of the inner component 12.

In the illustrated embodiment, the inner component 12 has a recessed portion 24 radially inboard of the transverse flange 22, which is configured to extend behind the opening of the body portion (as illustrated in Figure 3). The recessed portion 24 includes a side wall 26 which extends around two of the light apertures 16a, 16d. Such a recessed portion 24 makes it easier to support exterior lighting assemblies received in the respective apertures 16a, 16d because the side wall 26 provides a surface against which one or more exterior lighting assemblies can rest. In alternative embodiments, the inner component 12 has a plurality of recessed portions 24 (e.g. each surrounding a single respective light aperture 16a, 16b, 16c, 16d).

Despite the recessed portion 24, the mounting structure 10 is still substantially flat in the area surrounding the light apertures 16a, 16b, 16c, 16d. It will be understood that the term "substantially flat" means that the area of the mounting structure 10 surrounding the light apertures 16a, 16b, 16c, 16d has a width and/or height dimension which is at least three times its depth, preferably at least five times its depth. In this way, the area of the mounting structure 10 which surrounds the light apertures 16a, 16b, 16c, 16d does not substantially alter the internal or external dimensions of a vehicle when the mounting structure 10 is secured in an opening in a body portion of the vehicle (as illustrated in Figure 4).

In the illustrated embodiment, the inner component 12 has a vent aperture 28 which is configured to be aligned with a plurality of vent openings 30 on the outer component 14. Such a configuration allows external air to pass through the vent openings 30 and vent aperture 28 (e.g. for cooling lighting assemblies or accessories supported by the mounting structure 10). A hood

32 is provided over each vent opening 30 to inhibit rain passing through the vent openings 30. In alternative embodiments, only a single vent opening 30 and associated hood 32 is provided. In some embodiments, an accessory such as a horn is received at least partly in the vent aperture 28 or one or more of the vent openings 30. In other words, in some embodiments, the vent aperture 28 and/or vent openings 30 are configured as an additional accessory mounting location 18, in addition to the accessory aperture 20.

In the illustrated embodiment, the portion of the main headlamp aperture 16a defined by the outer component 14 includes a side wall 34 which extends towards the inner component 12 in a direction approximately perpendicular to a plane defined by the outer component 14. It will be understood that this side wall 34 helps to support a main headlamp lighting assembly received within the main headlamp aperture 16a.

In the illustrated embodiment, some of the light apertures 16a, 16b, 16c include notches 36a, 36b, 36c in their periphery. In particular, the locating formations 36b, 36c of the auxiliary apertures 16b, 16c are notches provided in both the inner component 12 and the outer component 14, and the locating formations 36a of the main headlamp aperture 16a are notches provided in the side wall 34 of the outer component portion of the main headlamp aperture 16a.

In some embodiments, at least one of the notches 36a, 36b, 36c is configured to receive a fastening arrangement for securing an exterior lighting assembly to the respective aperture 16a, 16b, 16c. In other embodiments, at least one of the notches 36a, 36b, 36c is configured to receive a complementary formation on an exterior lighting assembly supported therein. It will be understood that these notches 36a, 36b, 36c facilitate a correct rotational orientation of exterior lighting assemblies received in the respective light apertures 16a, 16b, 16c (either by facilitating securing with a fastening arrangement, or by receiving a complementary formation which abuts against the notches 36a, 36b, 36c to resist rotation).

In alternative embodiments, the notches 36a, 36b, 36c are a different shape and/or configuration.

In alternative embodiments, at least one of the light apertures 16a, 16b, 16c, 16d is non-circular, which provides a similar function of inhibiting rotation and helping to ensure correct rotational orientation of exterior lighting assemblies, without requiring additional notches or other locating formations.

In the illustrated embodiment, the accessory aperture 20 is non-circular. Therefore, when an accessory of complementary shape is at least partly supported in the accessory aperture 20, the non-circular shape inhibits rotation of the accessory and helps to ensure correct rotational orientation of the accessory. In alternative embodiments, the accessory aperture 20 is approximately circular, with additional locating formations provided proximal the accessory aperture 20 (similar to the locating formations 36a, 36b, 36c described above).

Referring now to Figures 2 to 6, a method of mounting an exterior light assembly to a road vehicle using the mounting structure 10 disclosed herein will be described.

Figure 2 shows a body portion 202 of a vehicle (e.g. a body portion of the vehicle 200, illustrated schematically in Figure 7). An opening 204 is provided in the body portion 202 for receiving the mounting structure 10.

In the illustrated embodiment, the body portion 202 is a front wing of a vehicle, which is a suitable location for mounting an exterior light assembly. The opening 204 is provided in a substantially flat front surface 206 of the front wing 202. In alternative

embodiments, the body portion 202 may be different (e.g. the body portion 202 may be a different part of a vehicle other than a front wing, or the body portion 202 may be a front wing of a different shape).

In some embodiments, the mounting structure 10 replaces an existing mounting structure of the vehicle. In such embodiments, a prior exterior light assembly may be removed from the body portion 202 to expose the opening 204 shown in Figure 2. In other words, the opening 204 may be an existing opening in the body portion 202.

Alternatively, the opening 204 may be provided after removal of a prior exterior light assembly by modifying an existing opening in the body portion 202 (e.g. making the existing opening bigger), or by providing an entirely new opening in the body portion 202.

In alternative embodiments, the mounting structure 10 is installed during an original build of the vehicle. In other words, the original body portion 202 is manufactured with the opening 204 as shown in Figure 2.

Referring now to Figure 3, after providing the opening 204, the inner component 12 of the mounting structure 10 is attached to the body portion 202 so that it at least partly covers the opening 204. In particular, the transverse flange 22 at the periphery of the inner component 12 is secured to a portion of the body portion 202 surrounding the opening 204 (e.g. by welding, bonding or using fasteners such as screws, bolts, rivets or the like).

Referring now to Figure 4, after securing the inner component 12 to the body portion 202, the outer component 14 is mounted over the inner component 12. In some embodiments, the outer component 14 is mounted over the inner component 12 by securing the outer component 14 to the inner component 12 (e.g. by using one or more fasteners, and/or by forming an interference or snap-fit between complementary portions of the inner and outer components 14, and/or by welding or adhering the outer component 14 to the inner component 12). In alternative embodiments, the outer component 14 is mounted over the inner component 12 by securing the outer component 14 to the body portion 202 (e.g. by using one or more fasteners, and/or by forming an interference or snap-fit between complementary portions of the outer component 14 and the body portion 202, and/or by welding or adhering the outer component 14 to the body portion 202). In other words, there may be either a direct or indirect connection between the outer component 14 and the inner component 12. It will be understood that regardless of how the connection between the inner and outer components 12, 14 is made, the outer component 14 is fixed relative to the inner component 12 once it is mounted over the inner component 12.

In Figure 4, the outer component 14 is mounted over the inner component 12 before exterior lighting assemblies are installed in the light apertures 16a, 16b, 16c, 16d and an accessory is supported by the accessory mounting location 18. In alternative embodiments, the outer component 14 is mounted over the inner component 12 after exterior lighting assemblies have been installed in light apertures 16a, 16b, 16c, 16d in the inner component 12. In other words, the outer component 14 may be mounted over exterior lighting assemblies supported by the inner component 12. In alternative embodiments, the outer component 14 is mounted over the inner component 12 after at least one of the exterior lighting assemblies is installed in the respective light aperture 16a, 16b, 16c, 16d but before at least one other of the exterior lighting assemblies is installed in the respective light aperture 16a, 16b, 16c, 16d. In other words, some exterior lighting assemblies may be installed before the outer component 14 is mounted over the inner component 12, while other exterior lighting assemblies may be installed after the outer component 14 is mounted over the inner component 12.

Referring now to Figures 5 and 6, a plurality of exterior lighting assemblies 102a, 102b, 102c, 102d are supported in the respective light apertures 16a, 16b, 16c, 16d of the mounting structure 10. In addition, a vehicle accessory 104 is attached to the accessory mounting location 18 of the mounting structure 10. In this way, an assembled exterior light assembly 100 is provided, as described in more detail below.

- 5 As mentioned above, the exterior light assembly 100 includes the mounting structure 10 disclosed herein, a plurality of lighting assemblies 102a, 102b, 102c, 102d supported by the respective light apertures 16a, 16b, 16c, 16d of the mounting structure 10, and a vehicle accessory 104 supported by the accessory mounting location 18.

10 In the illustrated embodiment, the plurality of lighting assemblies includes: a main headlamp assembly 102a (e.g. including a main beam light and/or a dipped beam light), an indicator assembly 102b, a side light assembly 102c, and an additional lighting assembly 102d, each supported by the respective light aperture 16a, 16b, 16c, 16d.

The additional lighting assembly 102d may include a fog light, an additional main beam light, an additional dipped beam light and/or any other suitable light. In other words, the additional lighting assembly 102d may be any type of lighting assembly with a suitable diameter for fitting in the additional light aperture 16d. In exemplary embodiments, the additional lighting assembly 102d and the additional light aperture 16d both have a diameter in the range of 70mm to 110mm, e.g., approximately 90mm.

- 15 In some embodiments, the indicator assembly 102b includes a clear lens with an orange bulb. In alternative embodiments, the indicator assembly 102b includes an orange lens with a clear bulb.

20 It will be understood that the illustrated combination of lighting assemblies 102a, 102b, 102c, 102d is just one possible configuration of lighting assemblies, and that an alternative configuration can simply be provided by swapping one or more of the lighting assemblies 102a, 102b, 102c, 102d for alternative lighting assemblies. An alternative configuration can also be provided by reconfiguring the mounting structure 10 to add new light apertures for new lighting assemblies or to remove existing light apertures (e.g. by modifying the existing mounting structure 10 or manufacturing a new mounting structure 10).

25 In some embodiments, the vehicle accessory 104 is a horn. Mounting the horn in the mounting structure 10 of the exterior light assembly 100 removes the need for a separate horn mount. Furthermore, it will be understood that, since the exterior assembly 100 is mounted on a front surface 206 of the body portion 202 of a vehicle, this is a particularly useful location for a horn because it allows sound produced by the horn to project forwards (e.g. in the direction of pedestrians or other vehicles in front of the vehicle) to warn of the vehicle's approach. In addition, mounting the horn in the mounting structure 10 of the exterior light assembly 100 also places the horn in a convenient location above the typical installation position behind a vehicle grill of the vehicle. This can be particularly beneficial when the associated road vehicle is used in an off-road setting, because it can reduce the risk of fouling of the horn by mud and dirt during use of the vehicle.

30 In the illustrated embodiment, the accessory mounting location 18 includes a mesh 106 with visible indicia. In some embodiments, there is an illumination source configured to illuminate the visible indicia. In such embodiments, the illumination source and visible indicia collectively form an accessory 104 which is at least partly supported by the accessory aperture 20. However, such a mesh 106 allows the visible indicia to be displayed at the accessory mounting location 18 without blocking sound, air etc. through the accessory aperture 20. Therefore, this configuration allows an additional accessory 104, such as
35 a horn, to also be mounted at the accessory mounting location 18 behind the mesh 106. In other words, the accessory mounting location 18 may support more than one accessory 104.

Referring now to Figure 7, a vehicle having a mounting structure 10 and exterior light assembly 100 as hereinbefore described is indicated schematically at 200. As has been described above, the mounting structure 10 and exterior light assembly 100 are provided in an opening 204 in a front surface 206 of a front wing 202 of the vehicle. It will be understood that, while only one side of the vehicle 200 is shown in Figure 7, and only one wing 202 of the vehicle 200 is shown in Figures 2 to 6, the vehicle 200 would include a mounting structure 10 and exterior light assembly 100 on each side of the vehicle 200 (i.e. on left and right front wings 202 of the vehicle 200).

Figure 8 illustrates the exemplary method of mounting an exterior light assembly to a vehicle described above as a flowchart, including the following steps:

At step 801, providing an opening 204 in a body portion (e.g. a front wing 202) of the vehicle 200.

At step 802, providing the mounting structure 10 described above.

At step 803, attaching the inner component 12 of the mounting structure 10 to the body portion to at least partly cover the opening 204 (e.g. by securing a transverse flange 22 at the periphery of the inner component 12 to a region of the body portion surrounding the opening 204).

At step 804, supporting at least one exterior lighting assembly 102a, 102b, 102c, 102d in the at least one light aperture 16a, 16b, 16c, 16d of the mounting structure 10.

At step 805, mounting the outer component 14 of the mounting structure 10 over the inner component 12.

Although steps 801 to 805 are shown in a particular order in Figure 8, it will be understood that these steps can be carried out in any suitable order. For example, steps 804 and 805 may be reversed. Alternatively, step 804 may be carried out for a first exterior lighting assembly 102a, 102b, 102c, 102d before step 805, and then step 804 may be repeated for a second exterior light assembly 102a, 102b, 102c, 102d after step 805.

In some embodiments, the method also includes, at step 800, removing a prior exterior light assembly from the body portion before step 803 (e.g. before step 801). In Figure 8, step 800 is shown in a dashed box to indicate that this is an optional step in the exemplary method.

It will be appreciated that various changes and modifications can be made to the present disclosed examples without departing from the scope of the present application as defined by the appended claims. Whilst endeavouring in the foregoing specification to draw attention to those features believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

Table 1 - Reference text for Figure 8

800	Remove prior light assembly
801	Provide opening
802	Provide mounting structure
803	Attach inner component

804	Support at least one light assembly
805	Mount outer component

CLAIMS

1. A mounting structure for the exterior lights of a road vehicle, the mounting structure having at least one light aperture configured to receive at least partially therethrough an exterior lighting assembly, the mounting structure comprising an inner component and an outer component, wherein the inner component is configured for attachment to a body portion of the vehicle
5 in order to at least partly cover an opening in the body portion.
2. The mounting structure of claim 1, wherein the outer component is discrete from the inner component.
3. The mounting structure of claim 2, wherein the outer component is configured for supporting the exterior lighting assembly when mounted over the inner component.
4. The mounting structure of any preceding claim, wherein the mounting structure further comprises an accessory
10 mounting location configured to support a vehicle accessory, wherein the accessory mounting location comprises an accessory aperture configured to receive at least partially therethrough a vehicle accessory.
5. The mounting structure of any preceding claim, wherein the at least one light aperture comprises a plurality of light apertures, and wherein the plurality of light apertures comprises a main headlamp aperture, and at least three auxiliary light apertures .
6. The mounting structure of any preceding claim, wherein the at least one light aperture, and the accessory aperture
15 when present, is provided in both the inner and outer components.
7. The mounting structure of any preceding claim, wherein the inner component has one or more transverse flanges at its periphery by which the inner component is configured for attachment to the body portion.
8. The mounting structure of claim 7, wherein the inner component comprises one or more recessed portions radially
20 inboard of the one or more transverse flanges.
9. An exterior light assembly for a road vehicle, the exterior light assembly comprising:
the mounting structure of any preceding claim; and
at least one exterior lighting assembly supported by the mounting structure.
10. The exterior light assembly of claim 9, further comprising a vehicle accessory supported by the or an accessory
25 mounting location of the mounting structure, wherein the vehicle accessory is optionally a horn; and optionally wherein the accessory mounting location comprises a mesh with visible indicia and an illumination source configured to illuminate the visible indicia.
11. The exterior light assembly of any of claims 9 or 10, wherein the at least one exterior lighting assembly comprises
30 a main headlamp assembly, an indicator assembly, a side light assembly, and an additional light assembly, each supported by a different light aperture of the mounting structure.

12. A vehicle comprising the exterior light assembly of any of claims 9 to 11 and a body portion having an opening, wherein the inner component of the mounting structure of the exterior light assembly is attached to the body portion such that the inner component at least partly covers the opening.

5 13. The vehicle of claim 12, wherein the opening is provided in a front surface of a front wing of the vehicle; and optionally, wherein the front surface of the front wing is substantially flat and wherein the mounting structure is substantially flat in the area surrounding the at least one light aperture.

10 14. A method of mounting an exterior light assembly to a road vehicle, the method comprising the steps of:
providing an opening in a body portion of the vehicle;
providing the mounting structure of any of claims 1 to 8;
attaching the inner component of the mounting structure to the body portion to at least partly cover the opening;
supporting at least one exterior lighting assembly in the at least one light aperture of the mounting structure; and
mounting the outer component of the mounting structure over the inner component.

15 15. The method of claim 14, wherein the step of attaching the inner component of the mounting structure to the body portion comprises securing a transverse flange at the periphery of the inner component to a region of the body portion surrounding the opening.

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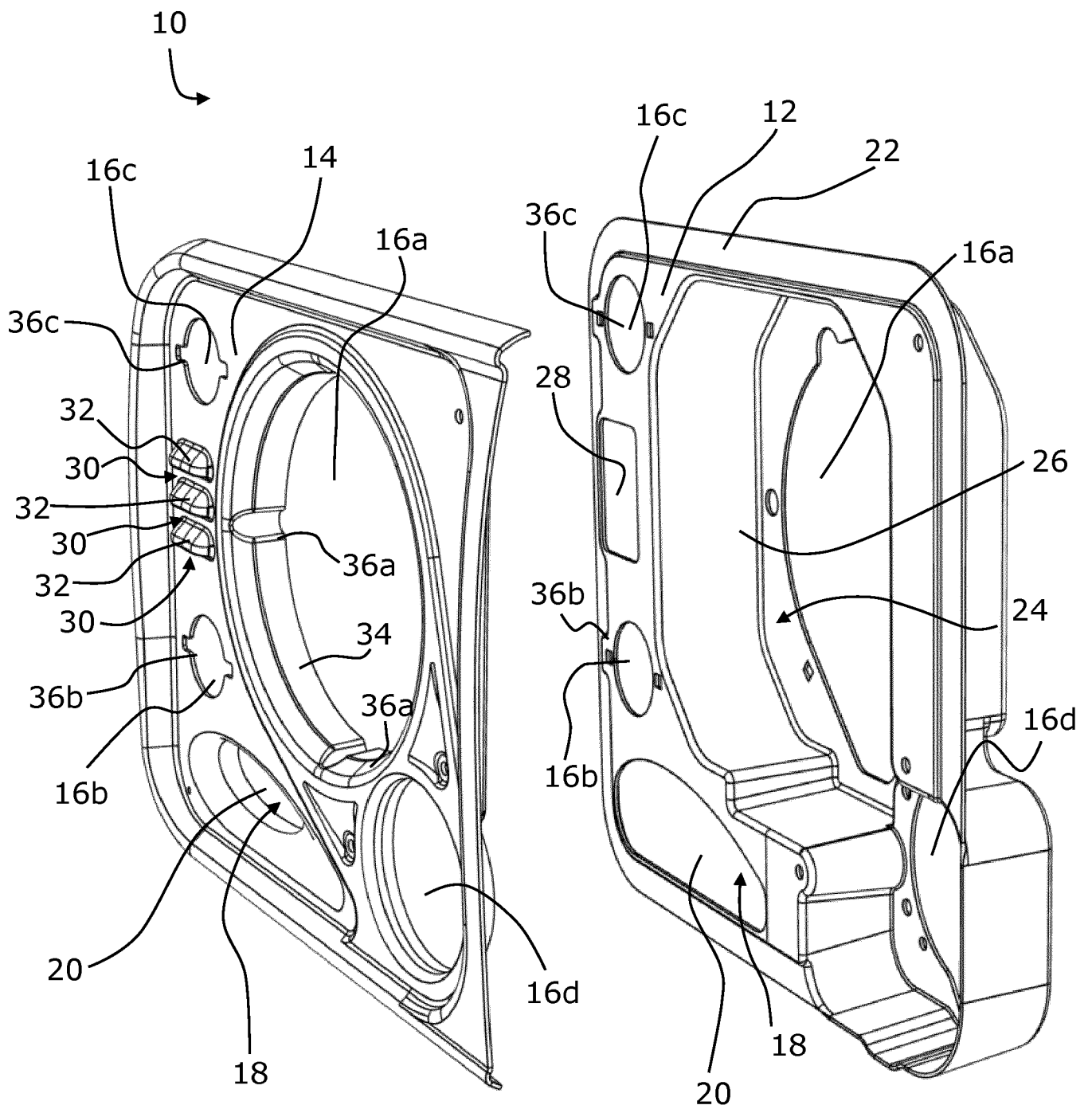


Fig. 1

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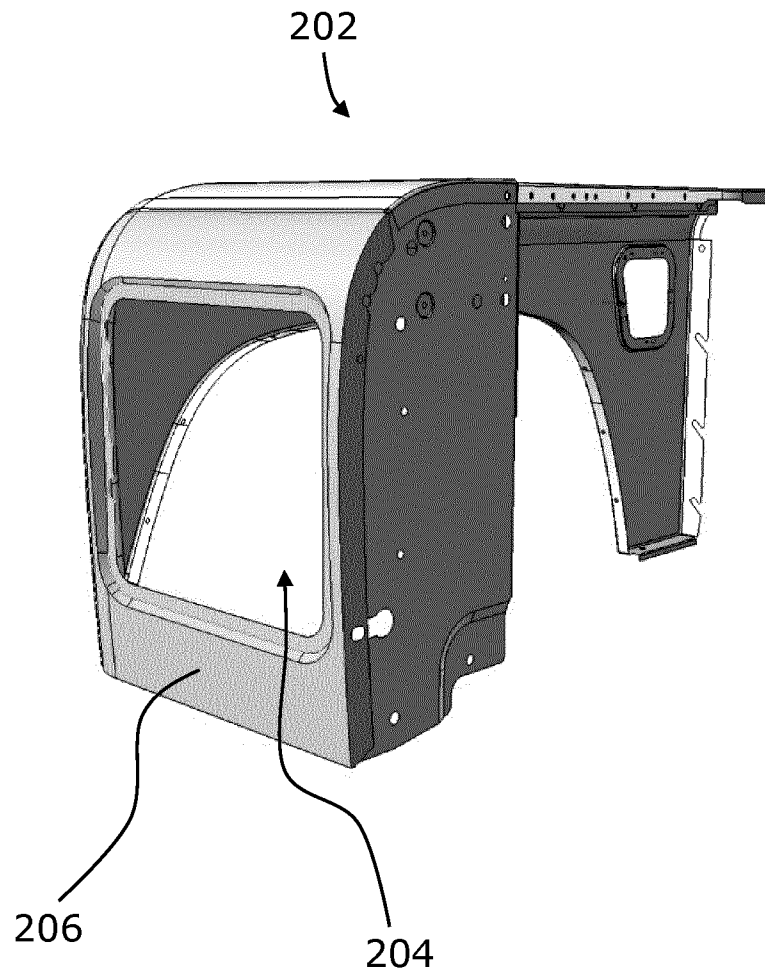


Fig. 2

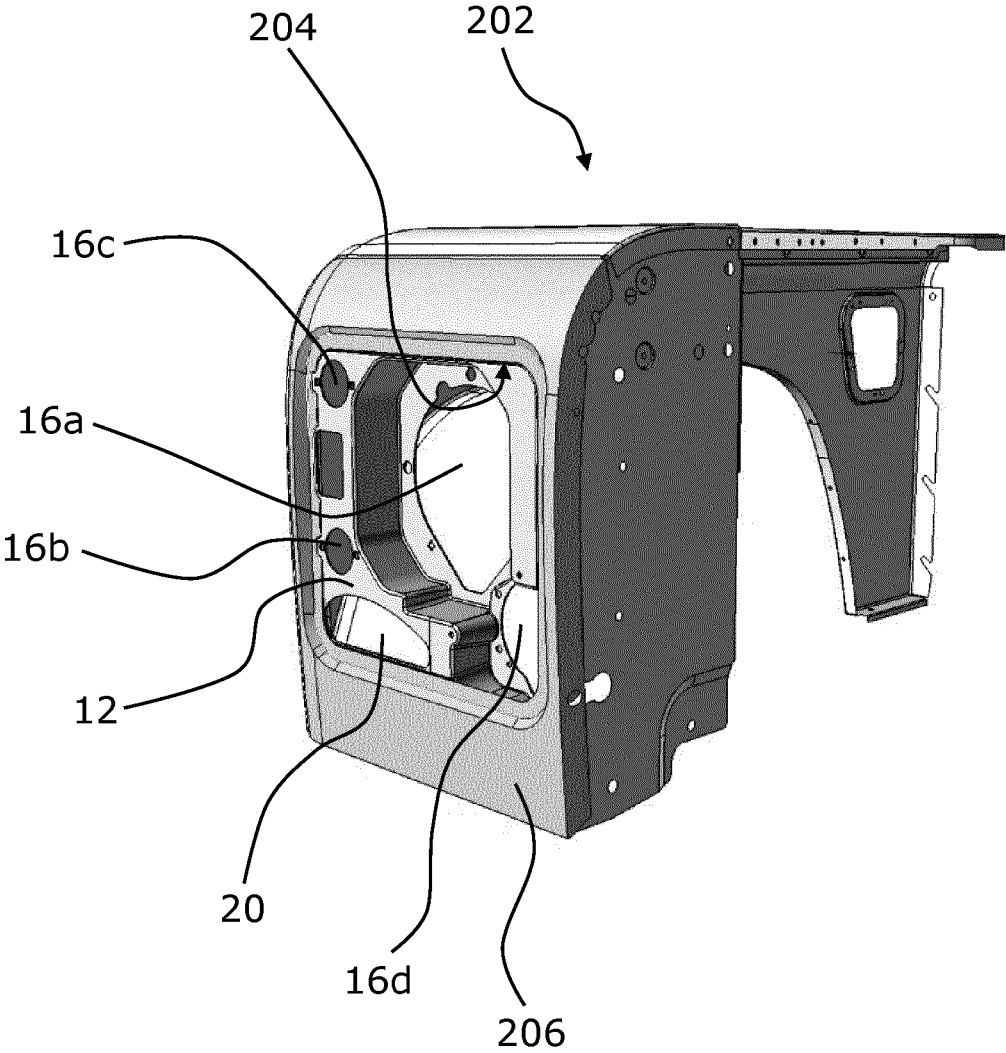


Fig. 3

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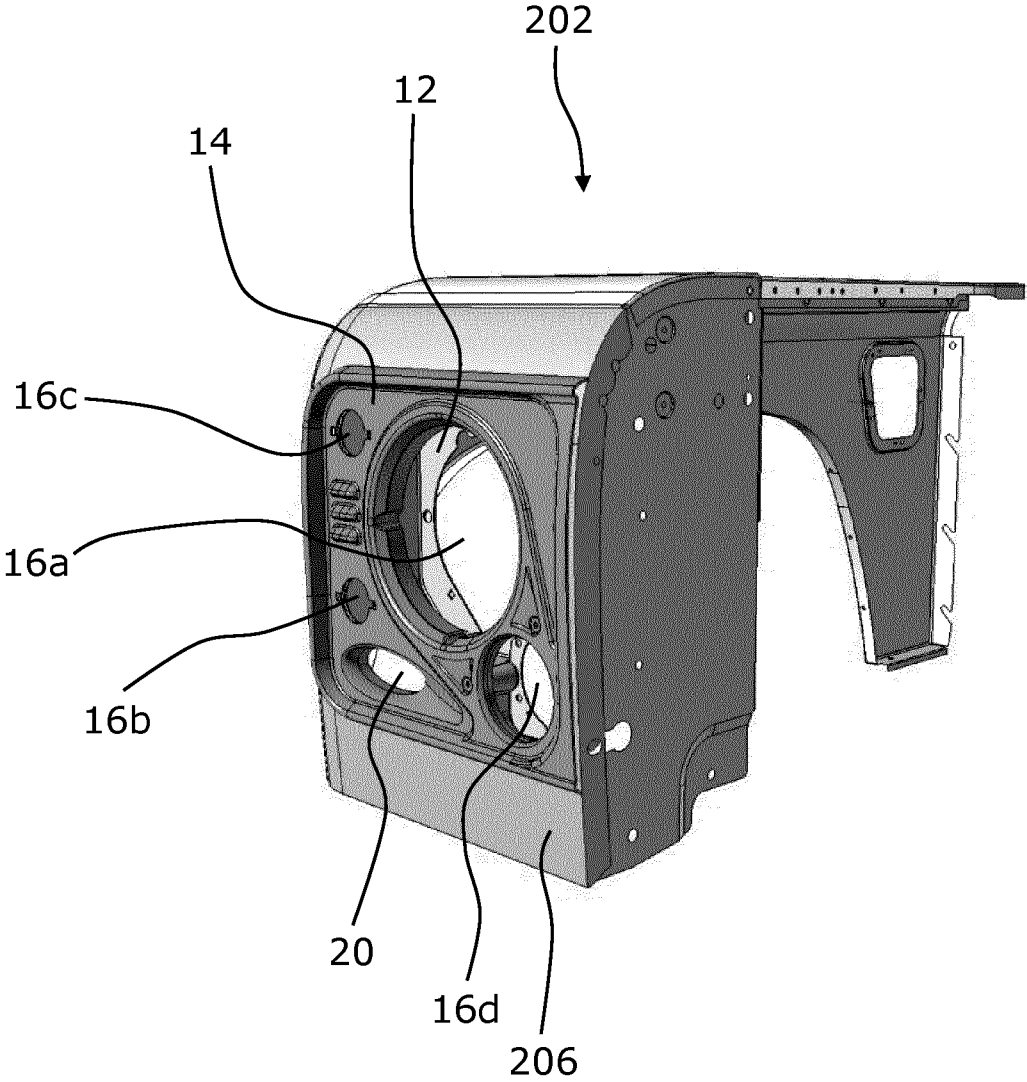


Fig. 4

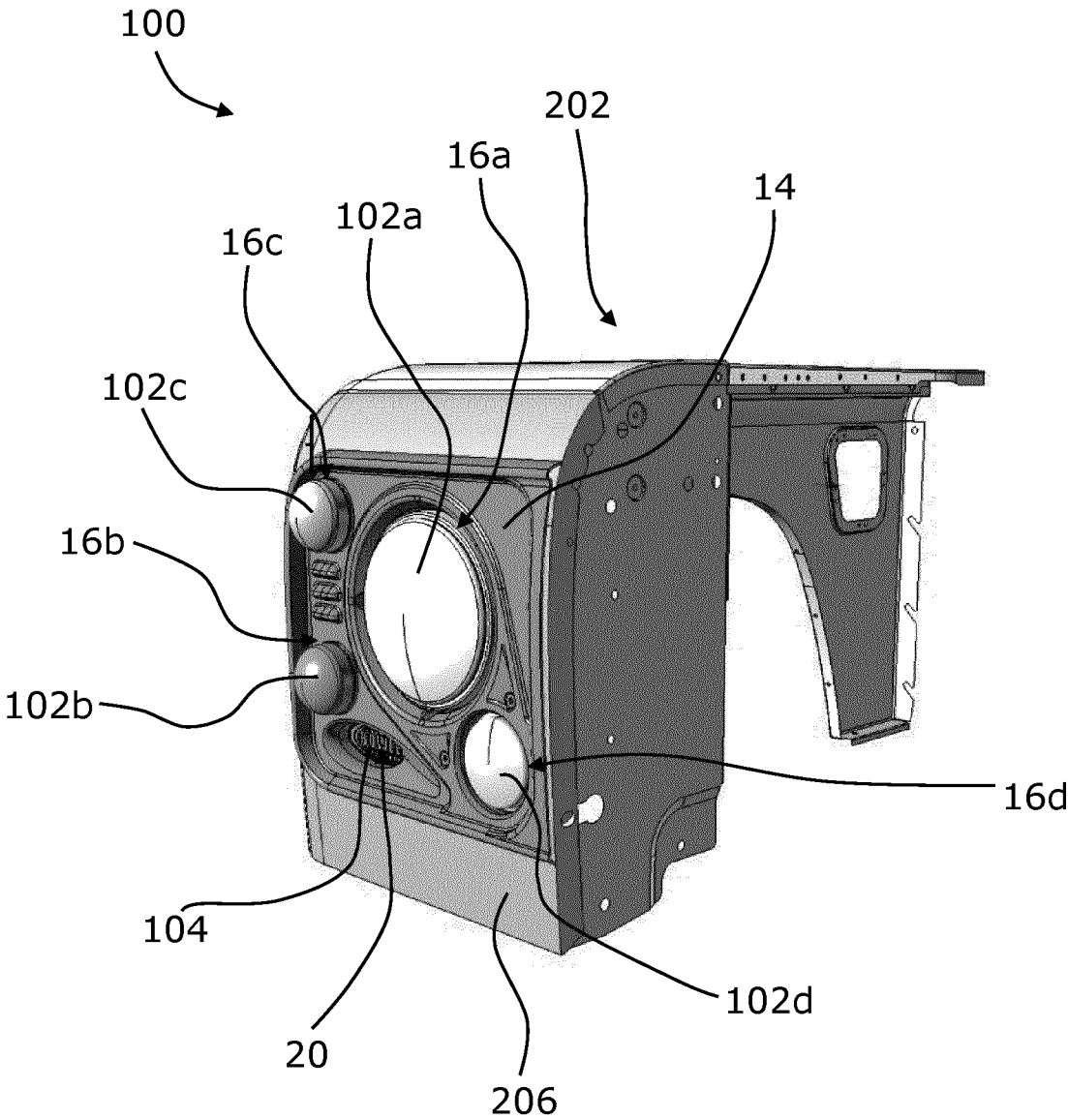


Fig. 5

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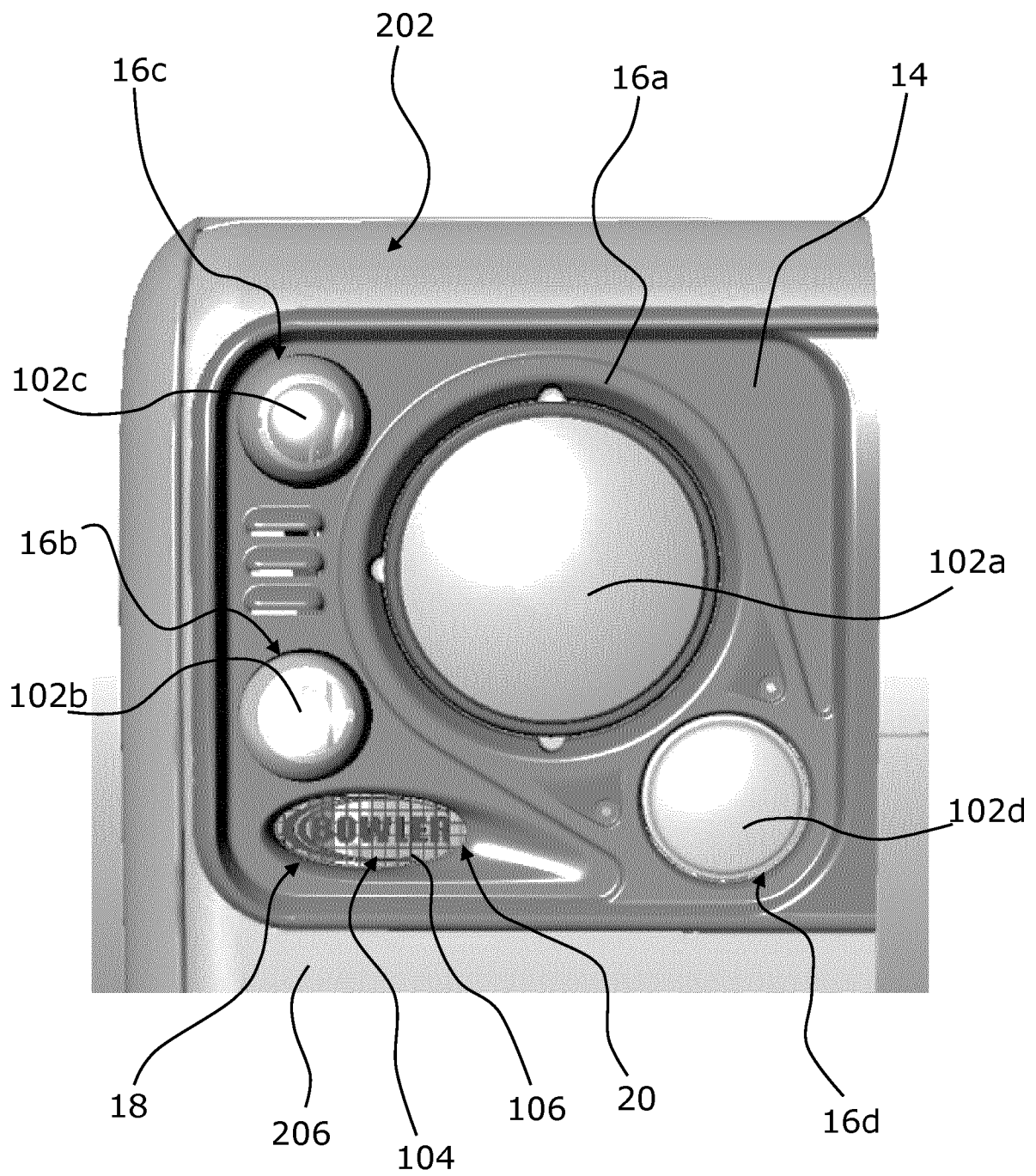


Fig. 6

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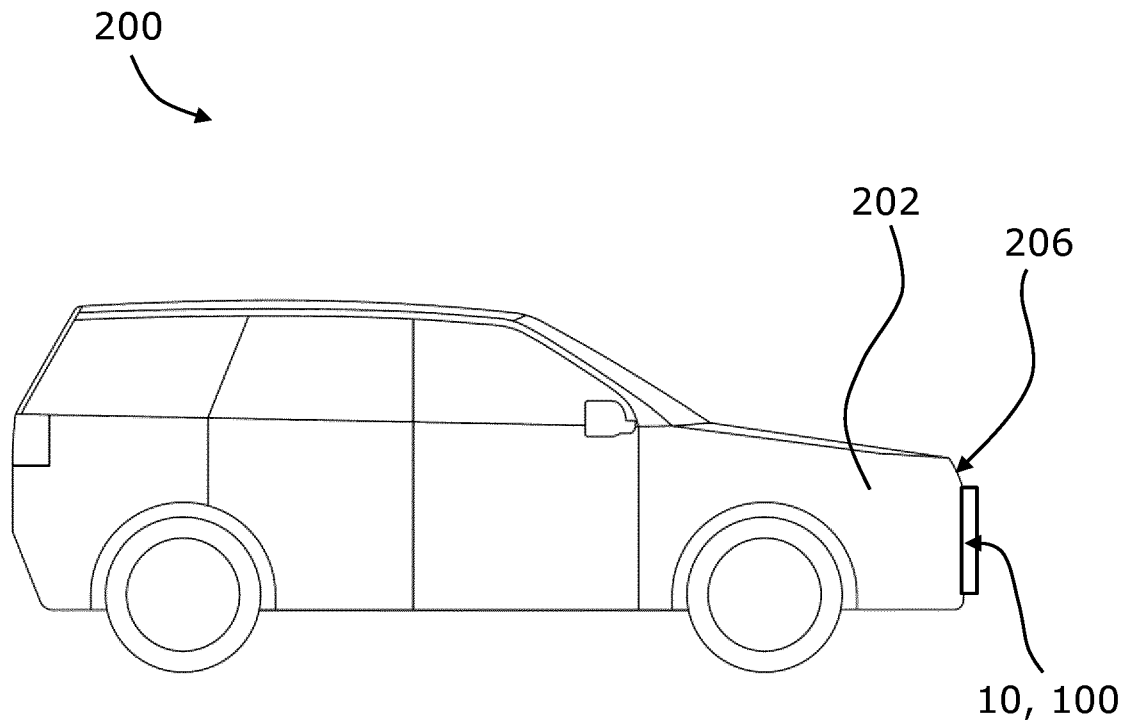


Fig. 7

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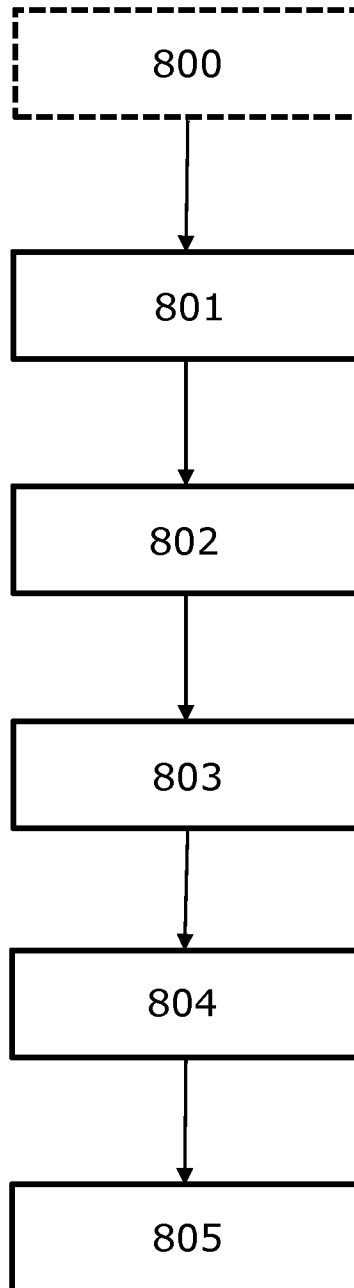


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/053836

A. CLASSIFICATION OF SUBJECT MATTER INV. B60Q1/04 B60Q1/26 B60Q5/00 B62D25/16 ADD. B60Q1/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) B60Q B62D B60R Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 3 021 927 A3 (RENAULT SAS [FR]) 11 December 2015 (2015-12-11) the whole document -----	1, 2, 6, 9, 12-14
X	EP 3 686 629 A1 (KOITO MFG CO LTD [JP]) 29 July 2020 (2020-07-29) paragraphs [0021] - [0023] figure 5 -----	1, 2, 4, 6-10, 12, 14, 15
X	US 4 636 922 A (TAKIMOTO HIROSHI [JP] ET AL) 13 January 1987 (1987-01-13) A the whole document -----	1-3, 6-9, 12-15 5, 11
X	EP 1 213 208 B1 (PLASTIC OMNIUM CIE [FR]) 6 October 2004 (2004-10-06) paragraphs [0029] - [0035] figures 1, 2 ----- -/-	1, 2, 5-7, 9, 11-15
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 18 March 2024		Date of mailing of the international search report 24/04/2024
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Aubard, Sandrine

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2024/053836

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	DE 10 49 252 B (DAIMLER BENZ AG) 22 January 1959 (1959-01-22) figure 1 -----	1, 4, 9, 10
X	US 6 361 197 B1 (KATSUMATA TOSHIYUKI [JP] ET AL) 26 March 2002 (2002-03-26) figures 4, 5 -----	1-3, 6-9, 12, 14, 15

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International application No

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