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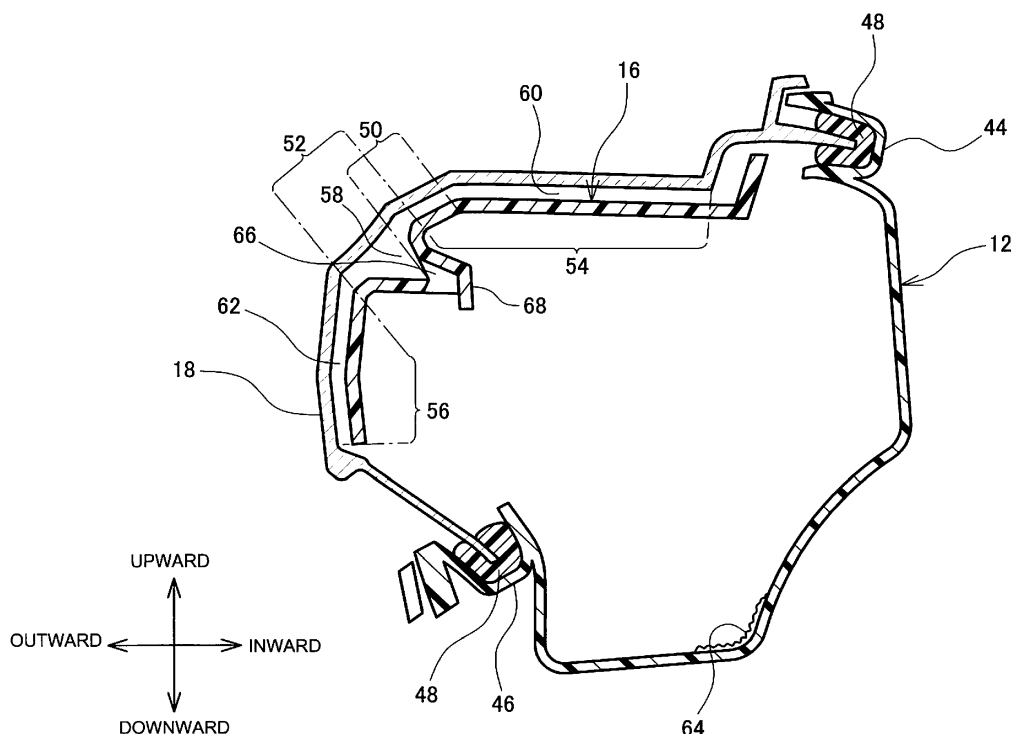
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(54) **VEHICLE LIGHTING FIXTURE**

(57) This disclosure relates to preventing fogging of an outer lens in a vehicle lighting fixture equipped with an extension. The vehicle lighting fixture includes an extension (16) installed around a lamp (14), an outer lens (18) which covers the extension (16) on an outer side thereof, a housing (12) which covers the extension (16) on an inner side thereof, and an air vent (66) formed in the extension (16). The extension (16) has first regions

(an upper region (54) and a lower region (56)) and a second region (a valley region (52)) adjacent to the first regions, in which the first regions and the second region are located at different distances from the outer lens (18), and the air vent (66) is formed in the second region (52) which is located at a greater distance from the outer lens (18).



**FIG. 6**

**Description**

## TECHNICAL FIELD

**[0001]** The present disclosure relates to a vehicle lighting fixture, and more particularly, to a structure of an extension installed around a lamp.

## BACKGROUND

**[0002]** Motor vehicles are equipped with vehicle lighting fixtures, such as headlights and taillights. In the vehicle lighting fixtures, lamps are housed in housings which are recessed inward into holes defined in bodies of the vehicles. Openings of the housings facing toward the outside of the bodies are covered with outer lenses, and light emitted from the lamps is projected from the motor vehicles through the outer lenses. The vehicle lighting fixtures include spaces enclosed by the outer lenses and the housings, in which moisture in air may be condensed depending on the structure of the spaces or on atmospheric conditions, resulting in fogging of the outer lenses.

**[0003]** To prevent such problematic fogging, various techniques have conventionally been suggested. For example, Patent Document 1 (JP 2004-119198 A) and Patent Document 2 (JP 2012-003958 A) describe that the fogging of an outer lens is prevented by designing internal geometries of a housing in a vehicle lighting fixture so as to constitute a structure to adjust a flow of air. Patent Document 1 (JP 2004-119198 A) discloses a structure to prevent fogging of the outer lens employed in the vehicle lighting fixture (motor vehicle lamps) including two lamps which are adjacent to each other and used with different frequencies. Patent Document 1 (JP 2004-119198 A) describes a conventional problem in that because the temperature of a region equipped with a lamp for high beam lighting that is less frequently used tends to become lower than that of a region equipped with a lamp for low beam lighting that is more frequently used, air becomes stagnant in the region equipped with the lamp for high beam lighting, which causes the outer lens to easily get fogged. To address the conventional problem, Patent Document 1 (JP 2004-119198 A) suggests a structure in which a baffle plate is installed between the lamp for low beam lighting and the lamp for high beam lighting to eliminate stagnation of air.

**[0004]** In a vehicle lighting fixture (vehicle headlamp) disclosed in Patent Document 2 (JP 2012-003958 A), a region where a driving beam lamp (also referred to as a high beam lamp) is installed is separated by a partition plate from a region where a pass-by beam lamp (also referred to as a low beam lamp) is installed. In this way, air is caused to flow from a region on a side where the lamp being lit to a region on a side where the lamp remains off, which prevents dew condensation from occurring, and in turn, prevents fogging of the outer lens.

## CITATION LIST

## PATENT LITERATURE

5 **[0005]**

Patent Document 1: JP 2004-119198 A

Patent Document 2: JP 2012-003958 A

10 **[0006]** In general, a design component referred to as an extension is installed around a lamp in a vehicle lighting fixture. The extension is designed to close an opening of a housing in the vicinity of the lamp, and is covered together with the lamp by an outer lens. There has been  
15 a problem to be solved in connection with the design of the extension as described below. That is, when the extension is exposed to sunlight, a space having a temperature lower than that of an adjacent space is created depending on the shape, conditions of a coating, or other  
20 features of the extension, between the extension and the outer lens. When such a space having the lower temperature is present, moisture in air that has flowed from the adjacent space into the space having the lower temperature is often condensed, which easily causes fogging  
25 of the outer lens.

**[0007]** It is an object of the present disclosure to prevent fogging of an outer lens in a vehicle lighting fixture equipped with an extension.

30 **SUMMARY**

**[0008]** The present disclosure is characterized by including an extension installed around a lamp, an outer lens which covers the extension on an outer side thereof, a housing which covers the extension on an inner side  
35 thereof, and an air vent formed in the extension, the air vent allowing a space between the outer lens and the extension to communicate with a space between the housing and the extension.

40 **[0009]** In one embodiment, the extension includes a first region and a second region adjacent to the first region, the first region and the second region being located at different distances from the outer lens, in which a distance from the outer lens to the second region is greater  
45 than a distance from the outer lens to the first region, and the air vent being formed in the second region.

**[0010]** In one embodiment, the second region is depressed inward relative to the first region.

50 **[0011]** In one embodiment, the extension includes a first region and a second region adjacent to the first region, the first region and the second region being warmed at different rates by sunlight, wherein the second region is less apt to be warmed by sunlight, and the air vent is formed in the second region.

55 **[0012]** In one embodiment, the extension has a reflective region in which a reflection treatment is applied to a surface on an outer lens side of the extension, and a non-reflective region adjacent to the reflective region, the non-

reflective region having no reflection treatment is applied to the surface on the outer lens side of the extension, and the air vent being formed in the reflective region.

**[0013]** In one embodiment, the extension has a light shielding structure configured to block light which is emitted from the lamp into the housing and propagates toward the air vent.

**[0014]** In one embodiment, an antifog coating is applied to an inner surface of the outer lens.

**[0015]** In one embodiment, the vehicle lighting fixture further includes a ventilation hole formed in the housing, the ventilation hole allowing a space between the housing and the extension to communicate with a space outside the housing.

**[0016]** In one embodiment, an inner surface of the housing includes a light diffusing surface which is configured to irregularly reflect light incident thereon.

**[0017]** According to the present disclosure, it is possible to prevent the outer lens from getting fogged in the vehicle lighting fixture equipped with the extension.

#### BRIEF DESCRIPTION OF DRAWINGS

**[0018]** Embodiments of the present disclosure will be described based on the following figures, wherein:

FIG. 1 shows a perspective view of a vehicle lighting fixture together with a motor vehicle on which the vehicle lighting fixture is mounted;

FIG. 2 shows a perspective view of the vehicle lighting fixture from which an outer lens and an extension are removed:

FIG. 3 shows a perspective view of the extension;

FIG. 4 shows a cross section view taken along line AA indicated in FIG. 3:

FIG. 5 shows a cross section view taken along line BB indicated in FIG. 4;

FIG. 6 shows a cross section view taken along line CC indicated in FIG. 4;

FIG. 7 shows a perspective view of a region around an air vent;

FIG. 8 shows a perspective view of the air vent viewed from inside;

FIG. 9 is a diagram showing the region around the air vent, and

FIG. 10 shows a cross section view of a vehicle lighting fixture according to another embodiment.

#### DESCRIPTION OF EMBODIMENTS

**[0019]** A vehicle lighting fixture according to an embodiment of this disclosure will be described with reference to the drawings. As used herein, terms representing an outward direction and an inward direction indicate a

direction from the body of a motor vehicle toward the outside and a direction from the outside toward the inside of the body of the motor vehicle, respectively. Further, terms of above and below, right and left, and front and rear are used for indicating positions and orientations viewed from the vehicle lighting fixture along a light radiating direction. In the embodiments described below in which the vehicle lighting fixture is employed as a headlight of a motor vehicle, positions above and below, right and left of, and front and rear of the vehicle lighting fixture coincide with positions above and below, right and left of, and front and rear of an occupant of the motor vehicle.

**[0020]** FIG. 1 shows the vehicle lighting fixture according to an embodiment of this disclosure together with a motor vehicle on which the vehicle lighting fixture is mounted. The vehicle lighting fixture includes a lamp for nighttime driving 14 (hereinafter referred to as a nighttime lamp 14), a housing 12, an extension 16, and an outer lens 18. The nighttime lamp 14 is housed with its light radiating direction being directed forward in the housing 12 which is inwardly depressed into a hole defined in a body 20. The extension 16 is installed around the nighttime lamp 14. An opening of the housing 12 facing the outside of the body 20 is covered with the extension 16 which is covered on its outer side with the outer lens 18. Light emitted from the nighttime lamp 14 is radiated through the outer lens 18 to the outside of the motor vehicle.

**[0021]** FIG. 2 shows a perspective view of the vehicle lighting fixture from which the outer lens 18 and the extension 16 are removed. The housing 12 is formed in the shape of a boat which is deformed so as to conform to a curved contour of a body front portion. The housing 12 has, on its inner surface, an uneven shape which is projected and depressed in accordance with layout of components installed in the vehicle lighting fixture.

**[0022]** An inwardly swollen region is formed in a forward left region of the housing 12, in which a first auxiliary lamp hole 22 and a second auxiliary lamp hole 24 are formed so as to be situated side by side along a vertical direction in a front surface of the inwardly swollen region. Auxiliary lamps, such as a clearance lamp and a blinker lamp, are fixed in the first auxiliary lamp hole 22 and the second auxiliary lamp hole 24.

**[0023]** The housing 12 has, in its rear region, a main lamp hole 26. The nighttime lamp is fixed in the main lamp hole 26. For the nighttime lamp, a lamp which can function as both a low beam lamp and a high beam lamp may be used. A bottom wall of the housing on a rear side of the main lamp hole 26 12 is designed to constitute a part of a cylindrical shape extending rearward. The design is intended to secure a space for accommodating components in a region corresponding to the rear side of the main lamp hole 26 on the outside of the housing 12.

**[0024]** Ventilation holes 32 are defined in both a further front surface of the swollen region on the forward left region and a wall surface on a rear side, for allowing an internal space of the housing 12 to communicate with a

space outside the housing 12. With the ventilation holes 32 it is possible to prevent air contained in the vehicle lighting fixture from expanding at high temperatures, to thereby exert mechanical stress on the components in the vehicle lighting fixture. However, in some cases, such as a case where clearances are defined between component attachment holes and components, ventilation is provided between the internal space of the housing and the space outside the housing 12 by the clearances or the like. In these cases, the ventilation holes 32 may not necessarily be provided.

**[0025]** FIG. 3 shows a perspective view of the extension 16. In FIG. 3, the nighttime lamp 14 is also illustrated together with the extension 16. The extension 16 is formed in the shape of a boat for closing the opening of the housing 12 shown in FIG. 2, and includes a hole into which the nighttime lamp 14 is inserted and projections and depressions which are provided for ornamental purposes.

**[0026]** A frontal lamp hole 34, into which the nighttime lamp 14 is inserted, is formed in a front surface of the extension 16. A cylindrical structure 36 extending along a front and rear direction is formed around the frontal lamp hole 34, and a frontal auxiliary lamp hole 38 which allows light from the auxiliary lamp to pass through is formed in a region on the left of the cylindrical structure 36. An edge 50 projecting in the shape of a bank is formed above and on the left of a region in which the frontal lamp hole 34, the cylindrical structure 36, and the frontal auxiliary lamp hole 38 are formed. The edge 50 extends from a rear portion to a front portion on an upper side of the extension 16. Then, the edge 50 is, at its forward end, turned back on itself so as to surround the frontal auxiliary lamp hole 38, and further extends to a position below the cylindrical structure 36. A region projected in the shape of a cliff is formed from the position below the cylindrical structure 36 to the upper side of the rear portion.

**[0027]** FIG. 4 shows a cross section view taken along line AA indicated in FIG. 3 (hereinafter referred to as an AA cross section). FIG. 5 shows a cross section view taken along line BB indicated in FIG. 4 (hereinafter referred to as a BB cross section), and FIG. 6 shows a cross section view taken along line CC indicated in FIG. 4 (hereinafter referred to as a CC cross section). It should be noted that in the cross section views of FIGs. 4 to 6, the outer lens 18 which covers a front region (an outer region) of the extension 16 and the housing 12 which covers a rear region (an inner region) of the extension 16 are also illustrated together with the extension 16.

**[0028]** In the AA cross section shown in FIG. 4, the housing 12 extends from a rear portion to a front portion shifted to the left while being bent at positions corresponding to the components to be installed. The ventilation hole 32 is provided in a rear part of the housing 12. As indicated by a dotted dashed line, the nighttime lamp 14 is fixed to the main lamp hole 26 in the housing 12. A head part of the nighttime lamp 14 is projected forward from the frontal lamp hole 34 formed in the extension 16.

**[0029]** In the AA cross section, the extension 16 is warped leftward while extending from the rear end to a front portion, and forms a right side of a side wall of the cylindrical structure 36. The extension 16 further extends from a position on an inner side of the side wall of the cylindrical structure 36 to a front portion shifted to the left, defines the frontal lamp hole 34, and again extends obliquely forward and to the left. After extending to a certain point, the extension 16 is bent forward to form a left side of the side wall of the cylindrical structure 36. Then, the extension 16 defines the frontal auxiliary lamp hole 38 in a front region on the left side of the cylindrical structure 36, and further extends obliquely forward and to the left until reaching the end on the left side. The edge 50 is projected forward in a region from the side wall of the cylindrical structure 36 to the left end.

**[0030]** Further, in the AA cross section, the outer lens 18 extends forward from its rear end along the contour of the extension 16 while shifting to the left toward a forward end. Right and left ends of the outer lens 18 are brought into contact with right and left edges of the housing 12. An inner surface of the outer lens 18 may be applied with an antifog coating to prevent a fog.

**[0031]** As shown in the BB cross section of FIG. 5, an upper edge portion and a lower edge portion of the housing 12 include upper and lower lens receiving grooves 44 and 46 formed in the shape of a letter U which is open toward the outside. An upper edge of the outer lens 18 is inserted into the upper lens receiving groove 44 and fixed thereto by means of an adhesive agent 48. A lower edge of the outer lens 18 is inserted into the lower lens receiving groove 46 and fixed thereto by means of the adhesive agent 48. The outer lens 18 has a curved surface which is bulged outward between the upper lens receiving groove 44 and the lower lens receiving groove 46.

**[0032]** In the BB cross section, the housing 12 extends downward from the upper lens receiving groove 44, followed by extending oblique downward while constituting a forwardly bulged curve. A space below the forwardly bulged curve corresponds to a space on the rear side of the nighttime lamp. Then, the housing 12 further extends toward the outside, and is, at a certain point, bent to extend upward until reaching the lower lens receiving groove 46.

**[0033]** In the BB cross section, the extension 16 extends downward from its upper end while slanting outward, followed by extending outward, and forms the edge 50 in the shape of a letter V projected outward. Sharing a portion from the top to a lower end of the edge 50, the extension 16 forms a valley region 52 in the shape of a letter V projected inward, and is subsequently bent downward to extend downward until reaching its lower end.

**[0034]** As shown in FIG. 5, a distance from the valley region 52 to the outer lens 18 is greater than a distance from an upper region 54 located above the valley region 52 to the outer lens 18. Further, the distance from the valley region 52 to the outer lens 18 is also greater than

a distance from a lower region 56 located below the valley region 52 to the outer lens 18. In other words, an upper space 60 sandwiched between the upper region 54 and the outer lens 18 is narrower than a valley space 58 sandwiched between the valley region 52 and the outer lens 18. Similarly, a lower space 62 sandwiched between the lower region 56 and the outer lens 18 is narrower than the valley space 58. It should be noted that the distance between each region of the extension 16 and the outer lens 18 is defined, for example, as an average value of lengths of vertical line segments drawn from points on the region to an inner surface of the outer lens 18 along a direction vertical to the inner surface. Alternatively, the distance may be defined as the length of a vertical line segment drawn from a point of the barycenter of each region defined on the extension 16 to the inner surface of the outer lens 18 along the direction vertical to the inner surface. Further alternatively, the distance may be defined as a maximum value among lengths of vertical line segments drawn from points on each region defined on the extension 16 to the inner surface of the outer lens 18 along the direction vertical to the inner surface.

**[0035]** As described above, because the upper space 60 and the lower space 62 are narrower than the valley space 58, temperatures of the upper space 60 and the lower space 62 tend to easily become higher than the temperature of the valley space 58 when the vehicle lighting fixture is exposed to sunlight. In general, air flows from a space having a higher temperature toward a space having a lower temperature. Therefore, when the vehicle lighting fixture is exposed to sunlight, air exhibits a strong tendency to flow from both the upper space 60 and the lower space 62 toward the valley space 58. In addition, when the air that has flowed into the valley space 58 is cooled, moisture in the air will be condensed, which easily causes the outer lens 18 to get fogged. Further, in a case where the antifog coating is applied to the inner surface of the outer lens 18, a certain component contained in the antifog coating may be dissolved in the condensed moisture, and the inner surface of the outer lens 18 may be soiled with the dissolved component.

**[0036]** Given these circumstances, as shown in the CC cross section of FIG. 6, an air vent 66 is formed in the extension 16 to allow a lens side space between the outer lens 18 and the extension 16 to communicate with a housing side space between the extension 16 and the housing 12. The air vent 66 is designed to direct moist air from the lens side space into the housing side space when a temperature difference arises between the lens side space and the housing side space, and accordingly prevent the outer lens 18 from getting fogged. The CC cross section is taken at a position slightly shifted to the left from a position at which the BB cross section is taken, and shows the structure which is almost identical to the structure shown in the BB cross section other than the structure around the air vent 66.

**[0037]** In the CC cross section, the extension 16 extends downward from its upper end while slanting out-

ward, followed by extending outward, forms the edge 50 in the shape of the letter V projected outward, and then extends into the housing 12 until reaching a lower end within the housing 12. A portion of the extension 16 extends outward again over an interstice between that portion and a region of the extension 16 extending from the edge 50 into the housing 12, and is subsequently bent downward to extend below until reaching the lower end. The air vent 66 is formed between the region of the extension 16 extending from the edge 50 into the housing 12 and the portion of the extension 16 extending outward again. A region of the extension 16 extending from an upper edge of the air vent 66 into the housing 12 constitutes a part of a light shielding structure 68 which will be described below.

**[0038]** FIG. 7 shows a perspective view of a region around the air vent 66. The perspective view is an enlarged view showing a portion encircled by a dotted dashed circle 40 indicated in FIG. 3. The air vent 66 of a rectangular shape which is elongated in a lateral direction is formed in a deepest region of a lower inclined surface of the edge 50; i.e. a deepest region of an upper inclined surface of the valley region 52. FIG. 8 shows the region illustrated in FIG. 7 in a perspective view which is viewed from an inner side of the region. The air vent 66 is covered on its inner side with the light shielding structure 68. The light shielding structure 68 has a front wall 72, a rear wall 74, a top plate 76, and an inner wall 78. An outer edge of the front wall 72 is in contact with a forward end of the air vent 66, and an outer edge of the rear wall 74 is in contact with a rear end of the air vent 66. An outer edge of the top plate 76 is in contact with an upper end of the air vent 66, and front and rear edges of the top plate 76 connect with an upper edge of the front wall 72 and an upper edge of the rear wall 74, respectively. An upper edge of the inner wall 78 connects with an inner edge of the top plate 76, and front and rear edges of the inner wall 78 connect with an inner edge of the front wall 72 and an inner edge of the rear wall 74, respectively. The inner wall 78 is extended downward beyond the front wall 72 and the rear wall 74. In this way, the front wall 72, the rear wall 74, the top plate 76, and the inner wall 78 constitute the light shielding structure 68 in the shape of a hood which is open both in an outward direction and in a downward direction, and is configured to cover the air vent 66 on its inner side. The light shielding structure 68 blocks optical paths of light propagating toward the air vent 66 from every location within the housing. In this way, the light shielding structure 68 is configured to block light which is emitted from the nighttime lamp into the housing, and propagates toward the air vent 66 within the housing.

**[0039]** FIG. 9 shows an enlarged view of a region around the air vent 66 in the CC cross section. Referring to FIG. 9, a phenomenon occurring in the vehicle lighting fixture will be described. When the vehicle lighting fixture is exposed to sunlight, because the upper space 60 and the lower space 62 are both smaller than the valley space

58, temperatures of the upper space 60 and the lower space 62 are apt to become higher than that of the valley space 58. The higher temperatures of the upper space 60 and the lower space 62 than the temperature of the valley space 58 cause air to flow from both the upper space 60 and the lower space 62 toward the valley space 58 as indicated by arrows 70. Meanwhile, because sunlight cannot reach a space inside the housing 12, the space inside the housing 12 tends to have a temperature lower than that of the valley space 58. The temperature of the space inside the housing 12 that is lower than the temperature of the valley space 58 causes the air having flowed from the upper space 60 and the lower space 62 into the valley space 58 to further flow through the air vent 66 into the housing 12.

**[0040]** The ventilation hole 32 (shown in FIG. 4) formed in the housing 12 connects the space inside the housing 12 to a space outside the housing 12. In this way, air is allowed to flow easily within the housing 12, which encourages a phenomenon in which air flows from the upper space 60 and the lower space 62 into the valley space 58, and then further flows through the air vent 66 into the housing 12.

**[0041]** According to the above-described structure, the air having entered the valley space 58 further flows through the air vent 66 into the housing 12. This hampers moisture in the air from condensing in the valley space 58, and accordingly prevents fogging of the outer lens 18. Further, when the antifog coating is applied to the inner surface of the outer lens 18, the above-described structure reduces the possibility that a particular component contained in the antifog coating may be dissolved in the condensed moisture, thereby soiling the outer lens 18.

**[0042]** As shown in FIGs. 4, 6, 8, and 9, because the air vent 66 is covered on its inner side with the light shielding structure 68, light emitted from the nighttime lamp 14 into the housing 12 is blocked by the light shielding structure 68 before reaching the air vent 66. This can prevent light, which is emitted from the nighttime lamp 14 into the housing 12, from leaking out of the vehicle lighting fixture.

**[0043]** In addition to the above-described structure, a light diffusing surface may be formed on an inner surface of the housing 12. The light diffusing surface may be a surface on which fine asperities are formed by surface texturing, honing, or other processing. Light incident upon the light diffusing surface undergoes irregular reflection, which avoids causing light emitted from the nighttime lamp 14 into the housing 12 to be reflected only toward the air vent 66. In this embodiment, as shown in FIGs. 5 and 6, a light diffusing surface 64 is formed around an inner corner of a bottom surface of the housing 12.

**[0044]** As has been described above, in the vehicle lighting fixture according to this embodiment, the extension has a first region and a second region adjacent to the first region, which are located at different distances from the outer lens 18, and in the extension, the air vent

66 is provided in the second region which is located at a greater distance from the outer lens 18. The above-described upper region 54 and the lower region 56 correspond to the first region, and the valley region 52 corresponds to the second region (see FIG. 6). In a case where the inner surface of the outer lens has a planer shape or a gently curved shape, the second region may be a region which is depressed inward relative to the first region, and the air vent may be provided in the region depressed inward.

**[0045]** In addition to the extension 16 shown in FIG. 3, there are various extensions for the vehicle lighting fixture, and some of the extensions may have an uneven shape in which projections and depressions are defined in accordance with ornamental designs. When the inner surface of an outer lens has a planer shape or a gently curved shape, the air vent may be provided in an inwardly depressed region of a typical extension having an uneven shape. Alternatively, when the inner surface of the outer lens has an outwardly depressed region, the air vent may be provided in a region of the extension opposed to the depressed region of the outer lens.

**[0046]** FIG. 10 shows a cross section view of a vehicle lighting fixture according to another embodiment. The cross section view of FIG. 10 corresponds to the CC cross section in the previous embodiment. The same components as those of the previous embodiment shown in FIGs. 1 to 9 are designated by the same reference numerals as those of the previous embodiment, and the descriptions related to the components will be simplified. In the vehicle lighting fixture of this embodiment, an extension 90 does not have any edge or any valley region, and is designed to have a curved surface which is outwardly swollen. A region constituting the outwardly swollen curved surface has the air vent 66, and the air vent 66 is covered on its inner side with the light shielding structure 68. The extension 90 extends downward from the air vent 66 to a lower end.

**[0047]** A reflection treatment for an ornamental purpose is applied to an outer surface (a surface on an outer lens 18 side) of a reflective region 82 provided around the air vent 66, with a reflective material 80 being deposited on the outer surface of the reflection region 82. The reflection treatment may include metal vapor deposition and coating of a light reflecting paint. The reflection treatment is not applied to an outer surface of non-reflective regions 84 located above and below the reflective region 82, and the surface of the material which forms the extension 90 is exposed.

**[0048]** When a gap between the extension 90 and the outer lens 18 is maintained constant, a reflective space 86 sandwiched between the reflective region 82 and the outer lens 18 and a non-reflective space 88 sandwiched between the non-reflective region 84 and the outer lens 18 have a characteristic feature as described below. That is, when the vehicle lighting fixture is exposed to sunlight, the non-reflective space 88 is more apt to be increased in temperature than the reflective space 86. This is be-

cause the non-reflective region 84 has an emissivity (a rate of radiation) higher than that of the reflective region 82, and therefore absorbs heat easily from sunlight. For this reason, a flow of air exhibits a strong tendency to occur in a direction from the non-reflective space 88 toward the reflective space 86 when the vehicle lighting fixture is exposed to sunlight.

**[0049]** In consideration of this tendency, the air vent 66 is provided in the reflective region 82 in the vehicle lighting fixture shown in FIG. 10. Due to occurrence of the same phenomenon as that described with reference to FIG. 9, air, which has flowed from the non-reflective space 88 into the reflective space 86, further moves through the air vent 66 into the housing 12. This hampers moisture in the air from condensing within the reflective space 86, which contributes to suppression of fogging of the outer lens 18. In addition, when the antifog coating is applied to the inner surface of the outer lens 18, the possibility that a particular component contained in the antifog coating may be dissolved in the condensed moisture, resulting in soiling of the outer lens 18 is reduced.

**[0050]** As described above, the vehicle lighting fixture according to this embodiment, the extension has a first region and a second region adjacent to the first region which are warmed at different rates by sunlight, and, in the extension, the air vent 66 is formed in the second region which is less apt to be warmed. A value indicative of the rate of being easily warmed by sunlight may be the emissivity. The above-described non-reflective region 84 corresponds to the first region, and the reflective region 82 corresponds to the second region. That is, because the reflective region 82 being the second region is less apt to be warmed by sunlight than the non-reflective region 84 being the first region, the air vent 66 is arranged in the reflective region 82.

**[0051]** It should be noted that two regions which are warmed at different rates may be, in addition to the above-described pair of the reflective region 82 and the non-reflective region 84, two regions coated with paints of different color. In general, a region coated with paint of a pale color is less apt to become warm than a region coated with a paint of a dark color. Accordingly, the air vent may be formed in the region coated with the paint of a pale color. Alternatively, the two regions which are warmed at different rates may be two regions formed of different materials whose emissivities differ from each other, or two regions applied with different surface treatments (such as matte finishing or glossy finishing).

**[0052]** In the above, the vehicle lighting fixture has been described with reference to the example in which the vehicle lighting fixture is used as a headlight on the right side of a motor vehicle. A headlight on the left side of the motor vehicle has a structure which is mirror symmetrical to the headlight on the right side. In addition to the headlights, the vehicle lighting fixture according to this disclosure may be implemented as other lighting fixtures, such as a taillight and a fog lamp.

**[0053]** In the above description, the extension used as

a design component has been described. There are some extensions functioning as a reflector which is configured to reflect light from a lamp to a forward region. This disclosure may be implemented as the extension functioning as the reflector.

## Claims

1. A vehicle lighting fixture, comprising:
  - an extension (16, 90) installed around a lamp (14);
  - an outer lens (18) which covers the extension (16, 90) on an outer side thereof;
  - a housing (12) which covers the extension (16, 90) on an inner side thereof; and
  - an air vent (66) formed in the extension (16, 90), wherein
  - the air vent allows a space between the outer lens (18) and the extension (16, 90) to communicate with a space between the housing (12) and the extension (16, 90).
2. The vehicle lighting fixture according to Claim 1, wherein:
  - the extension (16, 90) has a first region (54, 56) and a second region (52) adjacent to the first region (54, 56) which are located at different distances from the outer lens (18);
  - a distance from the outer lens (18) to the second region (52) is greater than a distance from the outer lens (18) to the first region (54, 56); and
  - the air vent (66) is formed in the second region (52).
3. The vehicle lighting fixture according to Claim 2, wherein the second region (52) is depressed inward relative to the first region (54, 56).
4. The vehicle lighting fixture according to Claim 1, wherein:
  - the extension (16, 90) has a first region (84) and a second region (82) adjacent to the first region (84) which are warmed at different rates by sunlight;
  - the second region (82) is less apt to be warmed by sunlight than the first region (84); and
  - the air vent (66) is formed in the second region (82).
5. The vehicle lighting fixture according to Claim 1, wherein:
  - the extension (16, 90) has a reflective region (82) in which a reflection treatment is applied to a surface on an outer lens (18) side of the extension (16, 90), and a non-reflective region (84) adjacent to the reflective region (82), the non-

reflective region (84) having no reflection treatment applied to the surface on the outer lens (18) side of the extension (16, 90); and the air vent (66) is formed in the reflective region (82).

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6. The vehicle lighting fixture according to any one of Claims 1 to 5, wherein the extension (16, 90) comprises a light shielding structure (68) which is configured to block light emitted from the lamp (14) into the housing (12) and propagating toward the air vent (66). 10
7. The vehicle lighting fixture according to any one of Claims 1 to 6, wherein an antifog coating is applied to an inner surface of the outer lens (18). 15
8. The vehicle lighting fixture according to any one of Claims 1 to 7, further comprising a ventilation hole (32) which is formed in the housing 12 to allow a space between the housing (12) and the extension (16, 90) to communicate with a space outside the housing (12). 20
9. The vehicle lighting fixture according to any one of Claims 1 to 8, wherein an inner surface of the housing (12) includes a light diffusing surface (64) which causes irregular reflection of light incident onto the inner surface. 25

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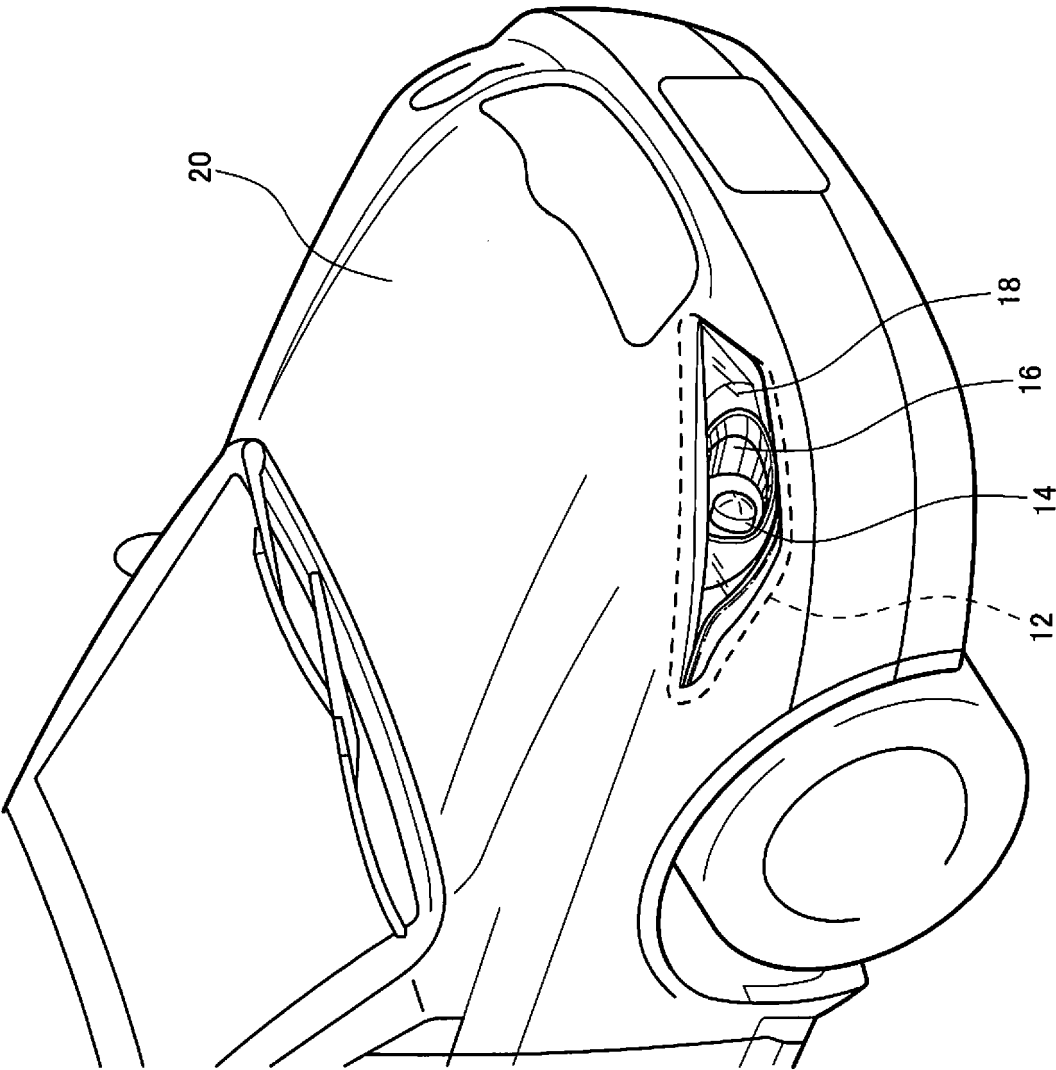


FIG. 1

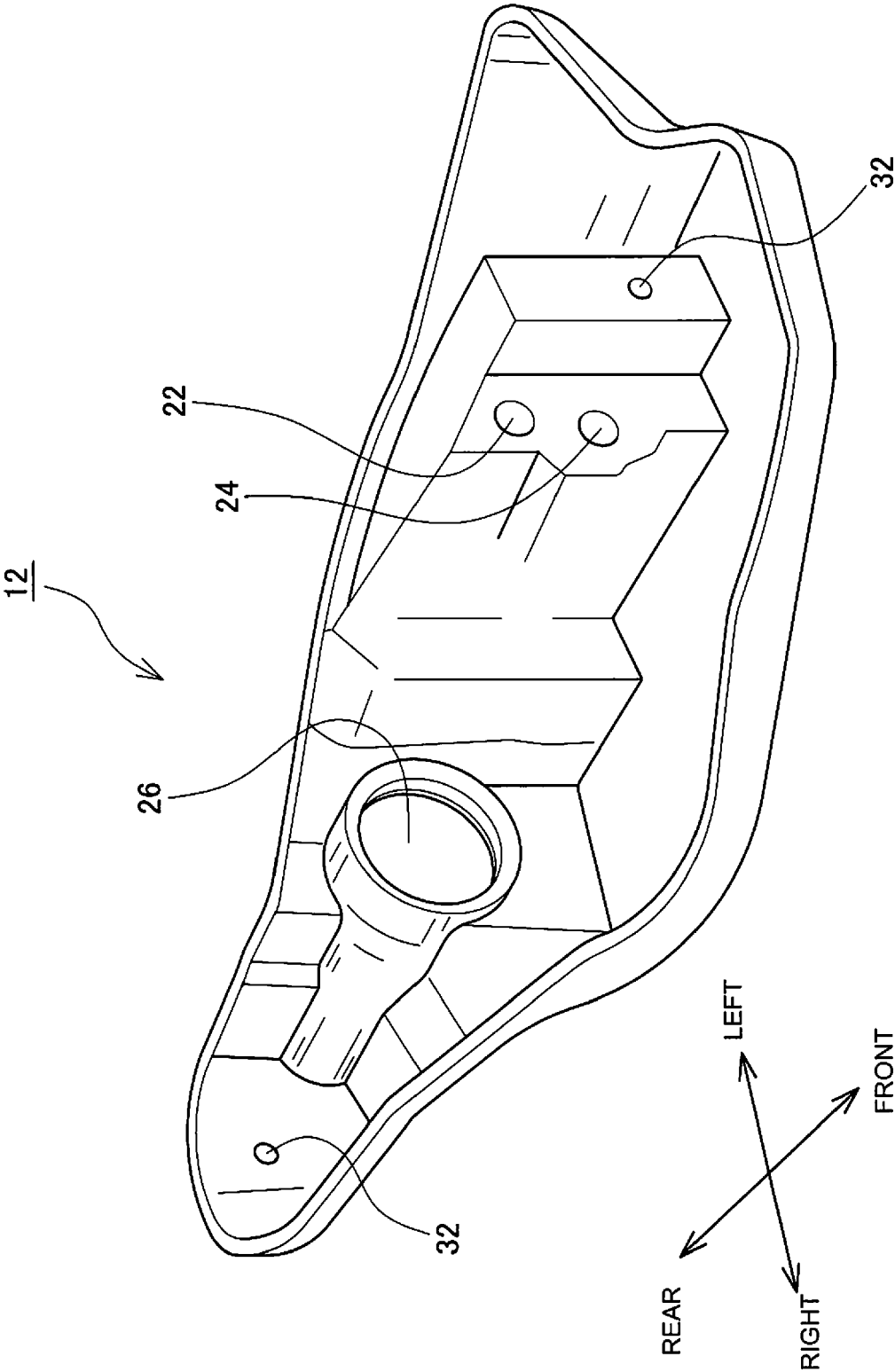


FIG. 2

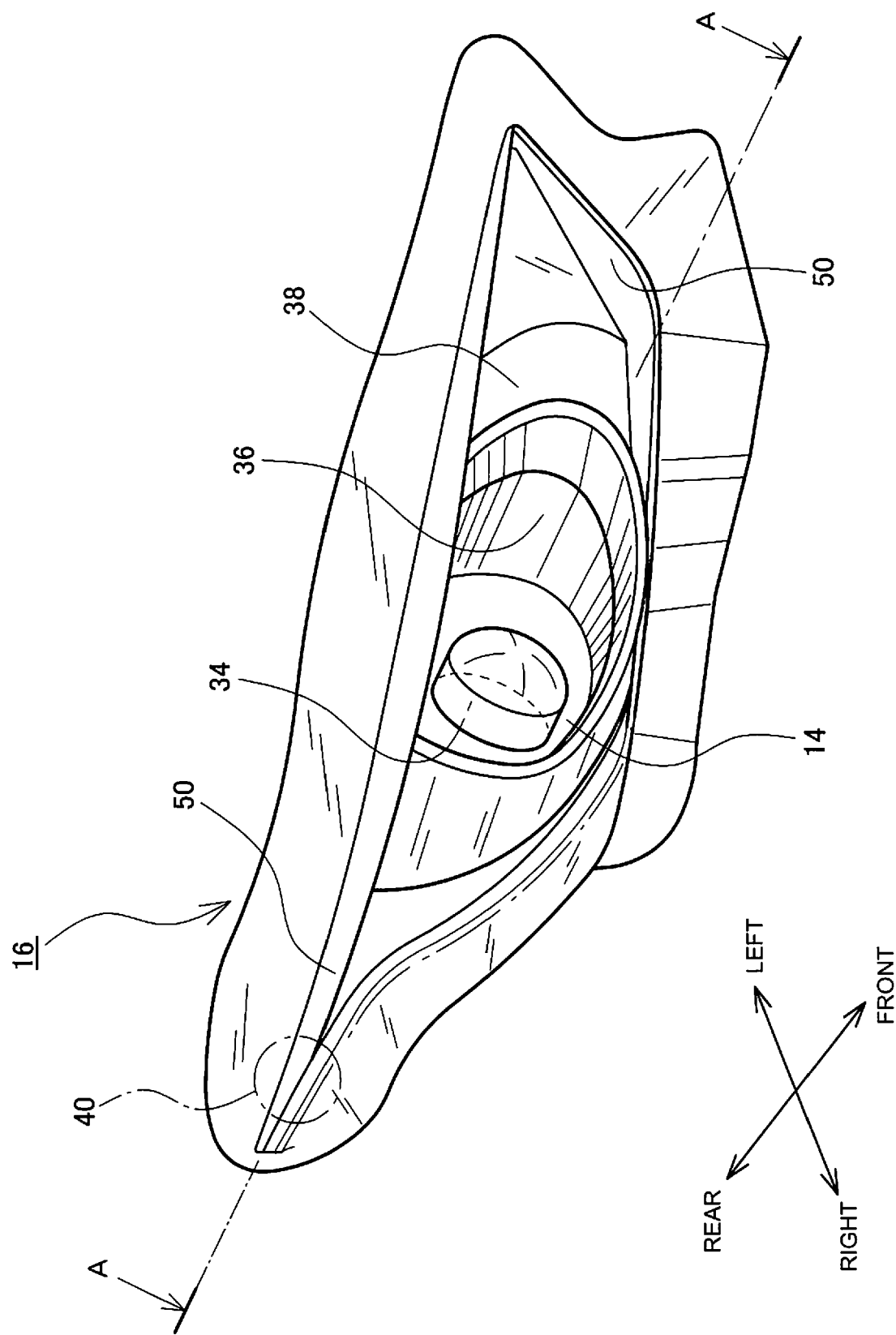


FIG. 3

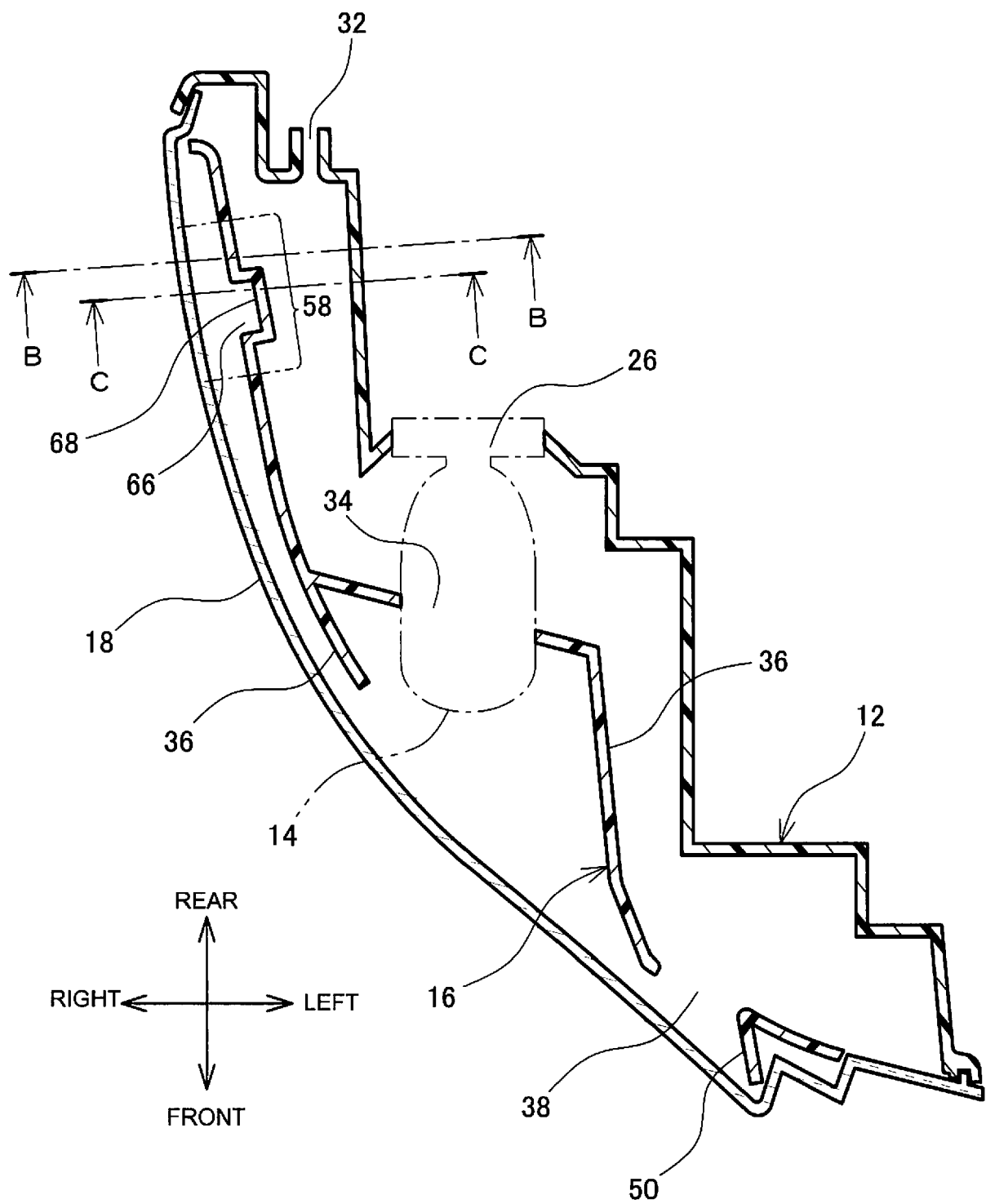


FIG. 4

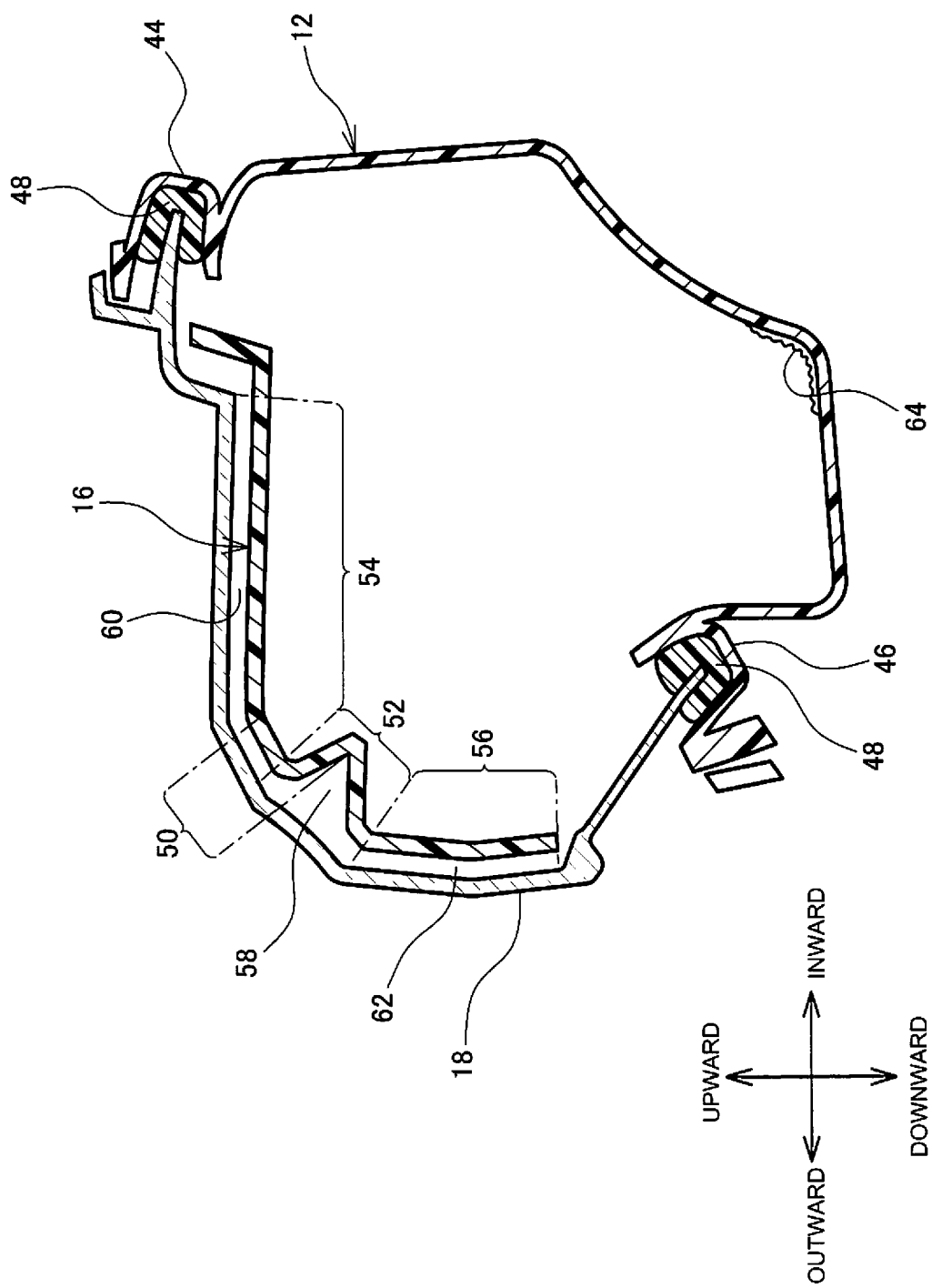


FIG. 5

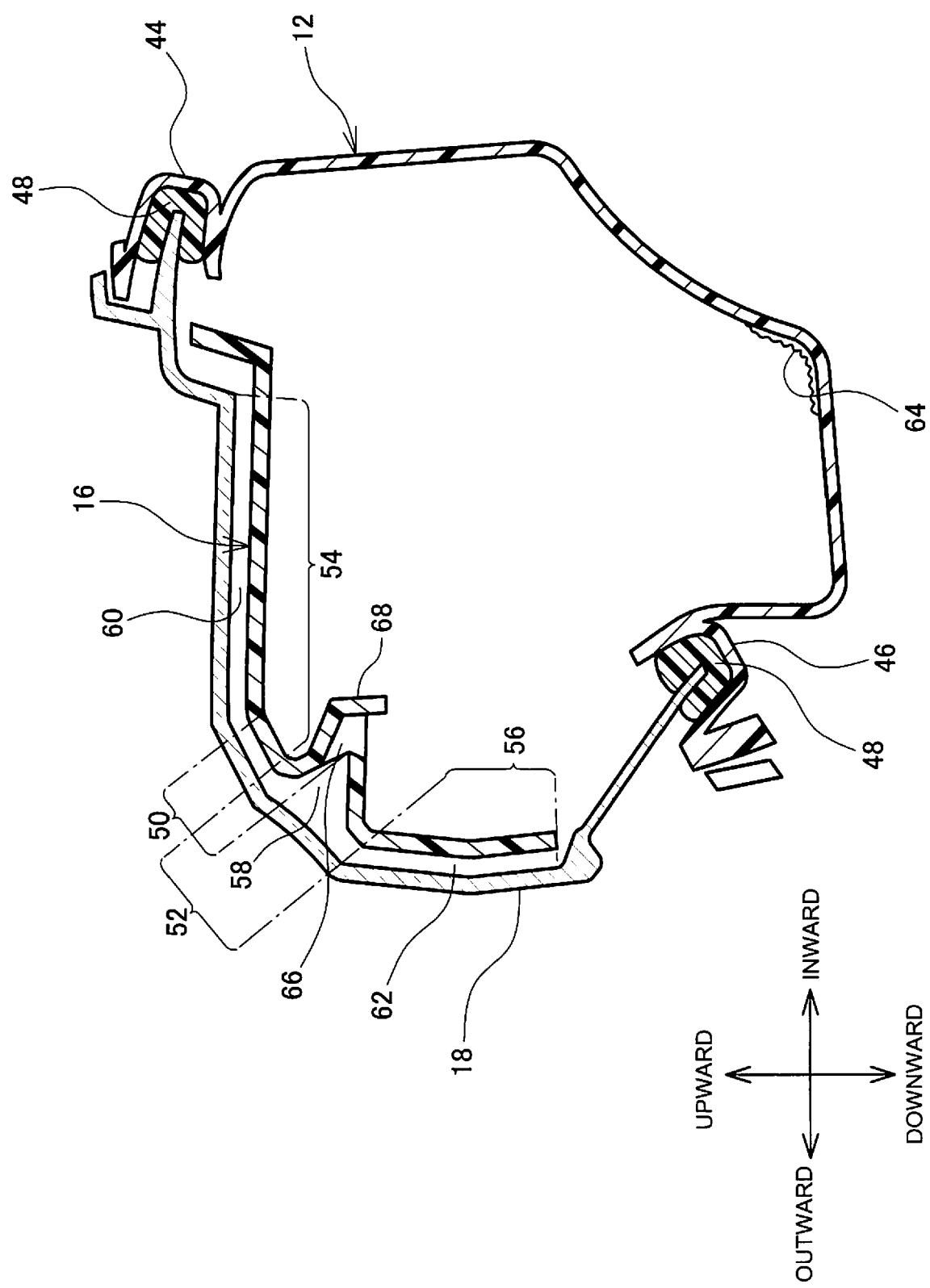


FIG. 6

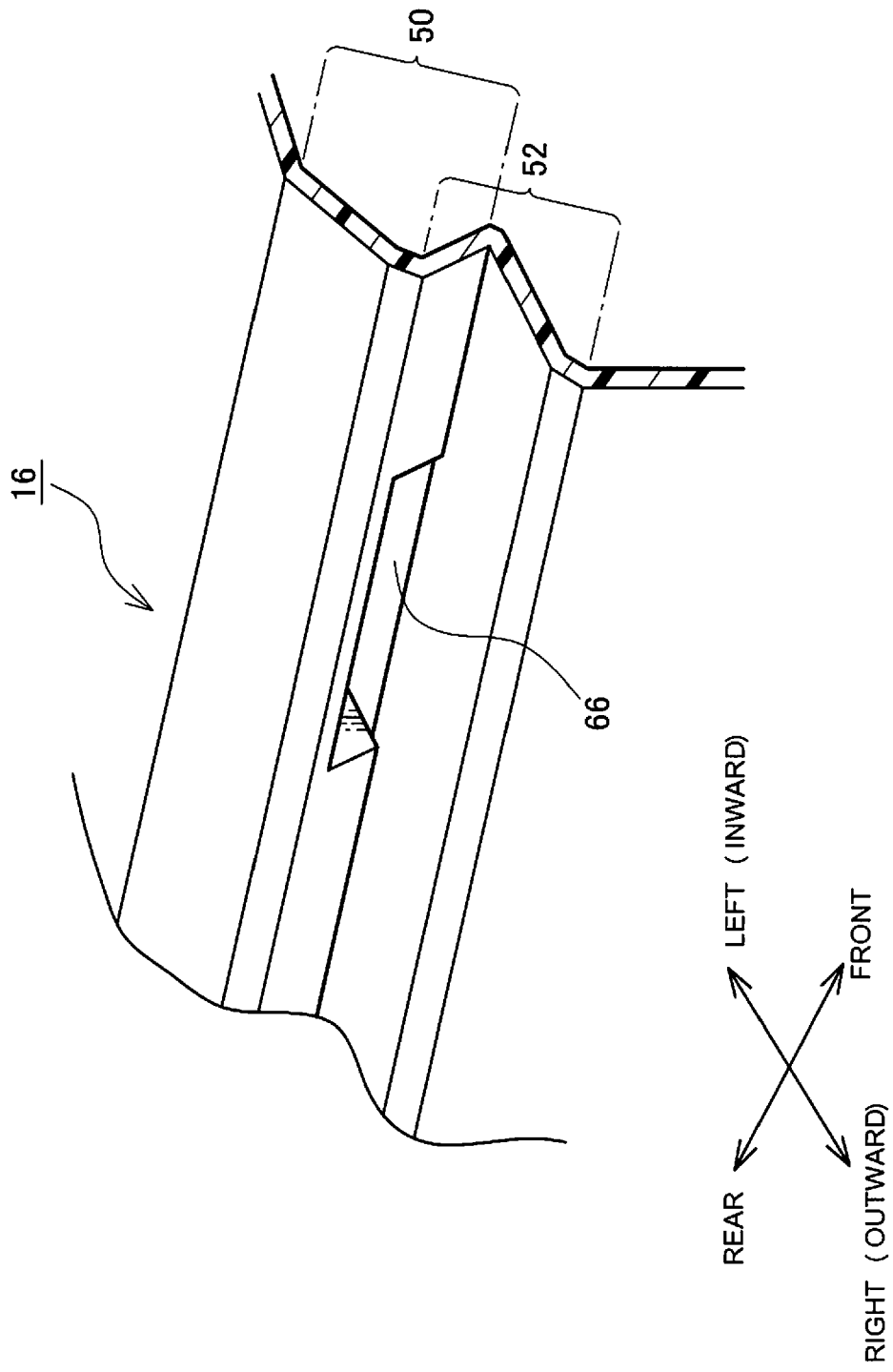
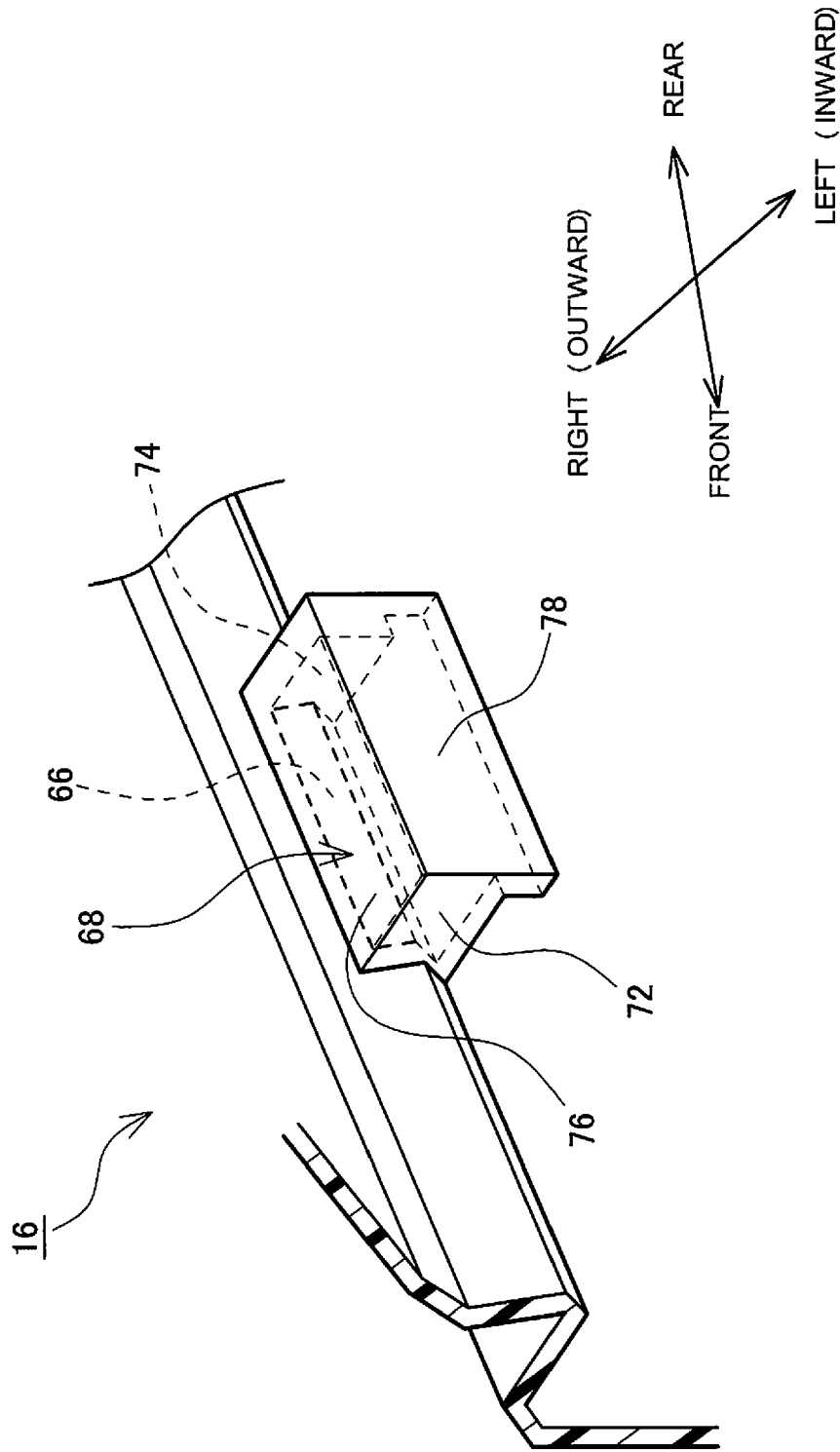


FIG. 7



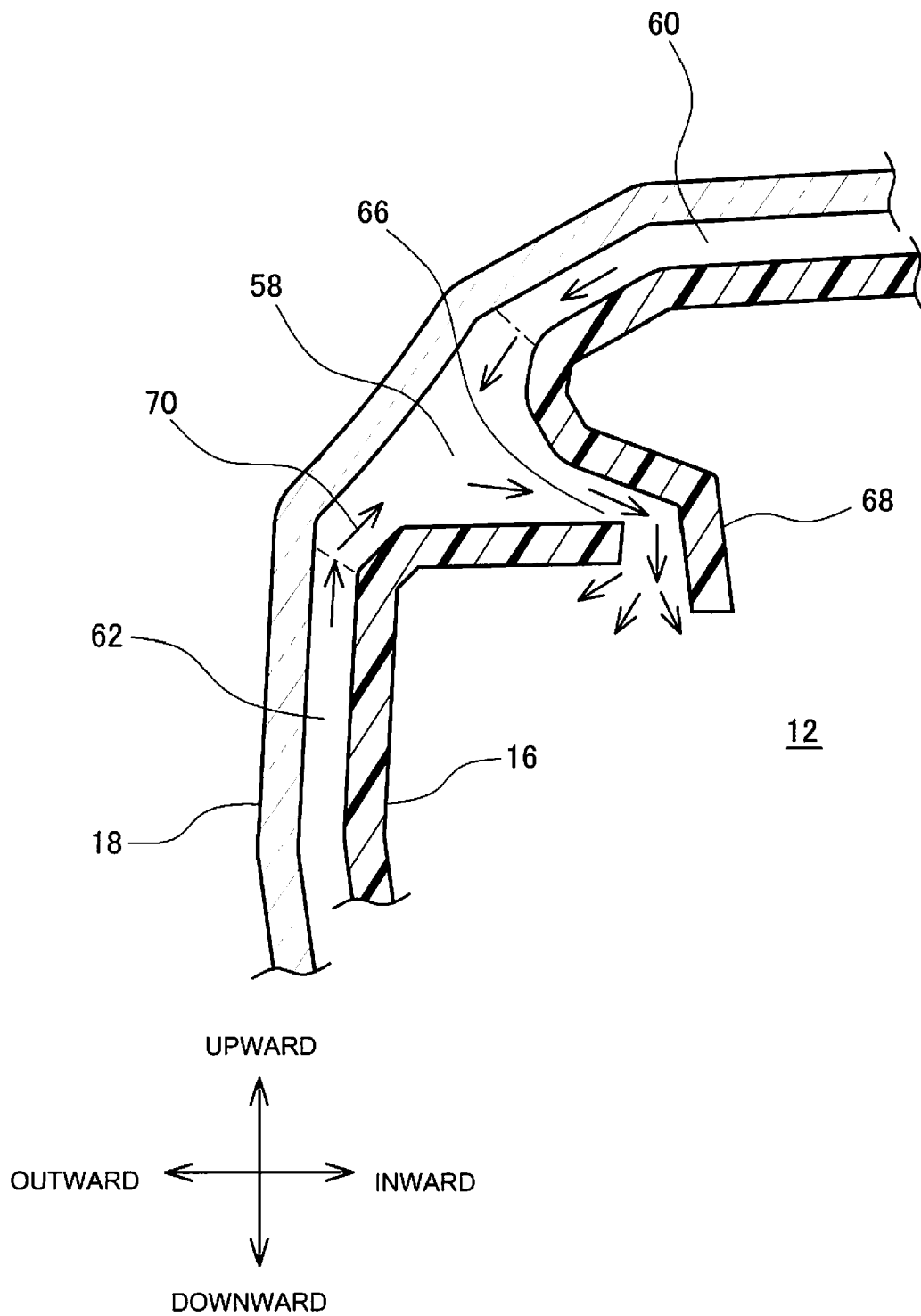


FIG. 9

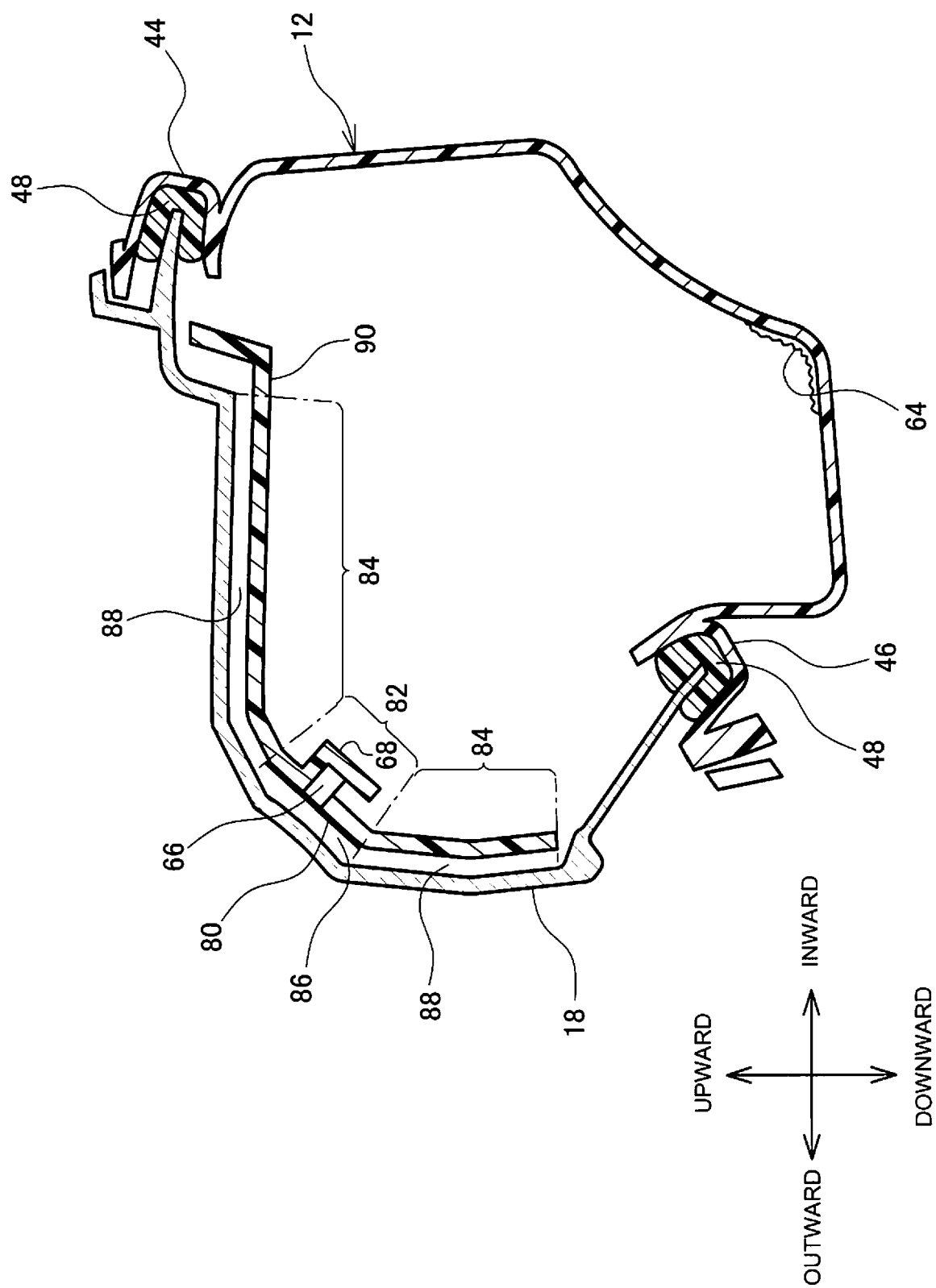


FIG. 10



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30-07-2019

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