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(54) **AUTOMOTIVE LIGHTING UNIT**

(57) An automotive lighting unit (1) comprising a lighting assembly (5) capable of backlighting a transparent or semi-transparent portion (3a) of the front half-shell (3); the lighting assembly (5) comprising: a platelike light-guide body (6) made of photoconductive material, which is arranged inside the rear casing (2) with its front sidewall (7) facing said transparent or semi-transparent portion (3a), and with its rear side (8) facing the rear casing (2); and a series of LED diodes (10) which are spaced one side-by-side the other along a reference line that substantially follows the shape of the rear sidewall (8) of the platelike light-guide body (6), which face the rear sidewall (8) so as to direct the light towards the rear sidewall (8), and which are spaced from the rear sidewall (8) of the platelike light-guide body (6) so that the intersection line (f) of the light cones (C) emitted by the LED diodes (10) is located between the rear sidewall (8) of the plate-like light-guide body (6) and the same LED diodes (10).

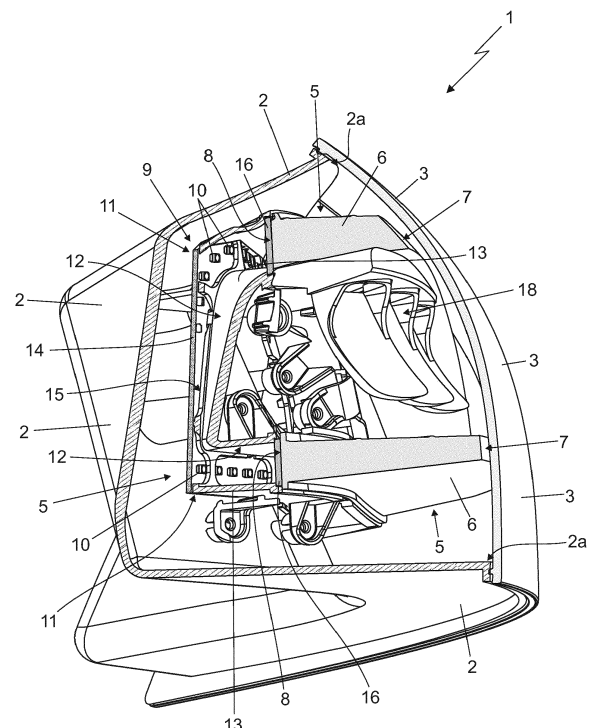


Fig. 2

Description

[0001] The present invention relates to an automotive lighting unit.

[0002] In greater detail, the present invention relates to a taillight for cars and the like, i.e. a lighting apparatus suitable to be located on the rear part of the vehicle body of a car, van, truck, motorcycle or the like, in order to be able to illuminate the area surrounding the vehicle and usually also to indicate the presence and/or the direction of movement of the vehicle.

[0003] Use to which the following description will make explicit reference without however losing generality.

[0004] As is known, taillight for cars and similar vehicles usually comprise: a substantially basin-shaped rear casing, which is structured so as to be stably recessed in a seat specially formed in the rear part of the vehicle body; a front half-shell, which is arranged to close the mouth of the casing so as to emerge outside of the vehicle body, and is usually provided with a plurality of transparent or semi-transparent portions, generally of different colours from each other; and a series of lighting assemblies which are located inside the casing each immediately behind a respective transparent or semi-transparent portion of the front half-shell, so as to be able to back-

light the same transparent or semi-transparent portion of the half-shell.

[0005] Generally each lighting assembly is univocally associated with a specific light signal and is therefore structured so as to be able to emit a light beam which, once came out of the lighting unit through the front half-shell, meets the approval specifications laid down for such a light signal.

[0006] Over the last few years some car manufacturers have chosen to equip their new car models with taillights wherein the front half-shell is provided with at least one annular and ribbon-shaped, transparent or semi-transparent portion that usually surrounds the other transparent or semi-transparent portions of the front half-shell and also demarcates the perimeter of the front half-shell.

[0007] In this type of automotive lighting unit, the annular transparent or semi-transparent portion of the half-shell is backlit by a lighting assembly that comprises: a light-guide sleeve made of photoconductive material and which extends from the bottom of the rear casing up to arrive next to the annular transparent or semi-transparent portion of the half-shell, substantially along the entire length of the same annular portion; and a series of light emitting diodes, traditionally called LED diodes, which are placed in abutment on the rear sidewall of the light-guide sleeve, along the entire length of the rear sidewall, so as to direct the light produced directly into the light-guide sleeve.

[0008] Unfortunately, the backlighting system using the light-guide sleeve and the abutting LED diodes is unable to distribute the light in a sufficiently uniform manner over the whole area occupied by the annular transparent or semi-transparent portion of the front half-shell,

with all the aesthetic problems that this entails.

[0009] In fact, an observer looking at the taillight from a significantly inclined position with respect to the optical axis of the taillight perceives a light signal with a noticeably irregular distribution of the light intensity. In greater detail, the light coming out of the annular transparent or semitransparent portion of the front half-shell is more intense at each LED diode.

[0010] Aim of the present invention is therefore to provide a lighting assembly capable of backlighting the annular transparent or semi-transparent portion of the front half-shell while overcoming the drawbacks listed above.

[0011] In compliance with these aims, there is provided an automotive lighting unit as defined in Claim 1 and preferably, though not necessarily, in any one of the claims dependent thereon.

[0012] The present invention will now be described with reference to the accompanying drawings which illustrate a non-limiting embodiment example, wherein:

- Figure 1 is a perspective view of a rear automotive lighting unit realized according to the teachings of the present invention, with parts in section and parts removed for clarity;
- Figure 2 is a sectioned perspective view of the automotive lighting unit shown in Figure 1;
- Figure 3 is a partially exploded perspective view of one of the lighting assemblies of the automotive lighting unit shown in Figures 1 and 2, with parts removed for clarity;
- Figure 4 is a side view of a part of the lighting assembly shown in Figures 2 and 3, suitably rectified and with parts removed for clarity; whereas
- Figure 5 is a partially exploded perspective view of an alternative embodiment of the lighting assembly shown in Figure 3, with parts removed for clarity.

[0013] With reference to Figure 1, number 1 denotes, as a whole, an automotive lighting unit, i.e. a lighting apparatus specifically adapted to be attached/incorporated in the front or rear part of the vehicle body of a motor vehicle, preferably with the function of illuminating the area surrounding the vehicle and/or with the function of indicating the presence, the stopping, and/or the direction of movement of the vehicle.

[0014] In the example shown, in particular, the automotive lighting unit 1 is preferably structured for being stably recessed into the rear part of the vehicle body of a car or other similar motor vehicle.

[0015] In greater detail, with reference to Figures 1 and 3, the automotive lighting unit 1 firstly comprises: a rigid and preferably made of plastic material, rear casing 2 which is substantially basin-shaped and is preferably structured so as to be at least partially recessed into a seat specifically formed in the rear part of the vehicle body (not shown); and a rigid and preferably made of plastic material, front half-shell 3 which is placed to close the mouth 2a of the rear casing 2, preferably also so as

to emerge, at the same time, outside of the vehicle body.

[0016] In the example shown, in particular, the rear casing 2 is preferably made of an opaque plastic material, preferably via an injection moulding process. The front half-shell 3, on the other hand, is preferably made of a transparent or semi-transparent plastic material, such as for example the polycarbonate or the polymethylmethacrylate, also in this case preferably via an injection moulding process.

[0017] Clearly, in a different embodiment the rear casing 2 could also be structured so as to be simply attached onto the rear part of the vehicle bod (not shown).

[0018] With reference to Figures 1, 2 and 3, the front half-shell 3 is moreover provided with one or more transparent or semi-transparent portions, optionally also coloured; and the automotive lighting unit 1 additionally comprises one or more electrically-powered lighting assemblies, each of which emits light on command and is located inside the rear casing 2 in a position such as to be able to backlight a corresponding transparent or semi-transparent portion of front half-shell 3, preferably separately and independently of the other lighting assemblies.

[0019] In greater detail, the front half-shell 3 is provided with at least one substantially annular-shaped, transparent or semi-transparent portion 3a, and the automotive lighting unit 1 is provided with a corresponding lighting assembly 5 with a substantially annular structure, which is located inside the rear casing 2 beneath the transparent or semi-transparent portion 3a, so as to be directly facing the transparent or semi-transparent portion 3a, and which is structured so as to direct the light produced towards the transparent or semi-transparent portion 3a.

[0020] With reference to Figures 1, 2 and 3, the lighting assembly 5 comprises: a photoconductive-material, platelike body 6, preferably made of transparent plastic material, which is bent over itself so as to form a light-guide tubular sleeve that substantially copies the shape of the transparent or semi-transparent portion 3a of front half-shell 3, and is arranged inside the rear casing 2 with its annular front sidewall 7 locally substantially adjacent to the transparent or semi-transparent portion 3a of front half-shell 3, for the whole length of the transparent or semi-transparent portion 3a, and with its annular rear sidewall 8 facing the bottom of rear casing 2; and a light emitting device 9 with annular structure, which emits light on command, preferably substantially copies the shape of the annular rear sidewall 8 of light-guide sleeve 6, and is located inside the rear casing 2 immediately in front of the annular rear sidewall 8 and preferably directly abutting against the latter, so as to direct the light produced directly towards the annular rear sidewall 8 of light-guide sleeve 6 substantially along the whole length of the same annular rear sidewall 8. This light then propagates inside the body of light-guide sleeve 6 by virtue of the same physical principles that govern the propagation of light inside fibre optic cables, and comes out of the light-guide sleeve 6 through the front annular sidewall 7 of the sleeve directed towards the transparent or semi-transparent

portion 3a of front half-shell 3.

[0021] Preferably, though not necessarily, the annular front sidewall 7 of light-guide sleeve 6 is moreover embossed in order to scatter the light coming out of the sleeve.

[0022] The light emitting device 9, in turn, basically consists of a series of LED diodes 10 (acronym for Light Emitting Diodes), preferably substantially coplanar to one another, which are spaced side-by-side to one another along a closed reference line that substantially follows the shape of the annular rear sidewall 8 of light-guide sleeve 6, and are moreover located inside the rear casing 2 so as to face the annular rear sidewall 8 of light-guide sleeve 6 and be able to direct the light produced towards the annular rear sidewall 8, substantially along the whole length of the annular rear sidewall 8.

[0023] In other words, the LED diodes 10 are arranged along a closed line that substantially copies the shape of the centerline of the annular rear sidewall 8 of light-guide sleeve 6. Preferably the LED diodes 10 are moreover equally spaced along substantially the whole length of the closed reference line, i.e. are arranged at a given and substantially constant distance from one another.

[0024] With reference to Figures 2 and 4, additionally the LED diodes 10 are also spaced apart from the annular rear sidewall 8 of platelike light-guide body 6, so that the intersection line/plane of the light cones c emitted by the LED diodes 10 is located upstream of the annular rear sidewall 8 of light-guide sleeve 6, i.e. between the annular rear sidewall 8 of light-guide sleeve 6 and the LED diodes 10.

[0025] In other words, the LED diodes 10 are placed in front of the annular rear sidewall 8 of light-guide sleeve 6, at a predetermined distance d from the annular rear sidewall 8 such that the intersection line f of the light cones c emitted by the LED diodes 10 is arranged between the annular rear sidewall 8 of light-guide sleeve 6 and the same LED diodes 10.

[0026] More specifically, the LED diodes 10 are preferably located inside the rear casing 2, in front of the annular rear sidewall 8 of light-guide sleeve 6, at a predetermined distance d from the annular rear sidewall 8 the value of which is greater than or equal to a limit value d_0 which is function of the aperture angle β of the light cones c emitted by the various LED diodes 10 and of the average distance or pitch p existing between the various LED diodes 10.

[0027] Where the light cone c emitted by the LED diode 10 corresponds to the solid angle within which conventionally at least 50% of the light energy emitted by the LED diode 10 is concentrated.

[0028] Preferably the limit value d_0 moreover corresponds to the nominal distance locally existing between the LED diodes 10 of the light emitting device 9 and the intersection line f of the light cones c emitted by the same LED diodes 10.

[0029] In greater detail, with particular reference to Figure 4, each LED diode 10 is a Lambertian point light

source that emits at least 50% of the light produced within a light cone *c* having an aperture angle β of a given value preferably ranging between 5° and 60°.

[0030] Consequently, the light cone *c* emitted by each LED diode 10 intersects the light cones emitted by the two immediately adjacent LED diodes 10 at a nominal distance *d* from the LED diodes 10, the value of which is correlated to the aperture angle β of the light cone *c* generated by the LED diodes 10 and the average distance or pitch *p* between the LED diodes 10 by the following mathematical relation:

$$d_0 = \frac{p}{2} \cdot \tan\left(90 - \frac{\beta}{2}\right);$$

where *p* is the value of the average distance or pitch between the LED diodes 10, and β is the value of the aperture angle of the light cone *c* generated by each LED diode 10.

[0031] In an alternative not-shown embodiment, each LED diode 10 could also be coupled to an optical system capable of modifying the aperture angle of the light cone *c* generated by the same LED diode 10. In this case, the aperture angle β of light cone *c* is to be measured downstream of the optical system arranged in abutment on the LED diode 10.

[0032] In the example shown, in particular, the distance *d* between the LED diodes 10 and the annular rear sidewall 8 of the light-guide sleeve 6 is preferably at least 10% greater than the limit value *d*₀.

[0033] In greater detail, with reference to Figures 2, 3 and 4, in the example shown the platelike body 6 forming the light-guide sleeve is preferably made of Plexiglas, polycarbonate or other similar transparent plastic material, preferably via an injection moulding process.

[0034] On the other hand, light emitting device 9 preferably comprises: a series of LED diodes 10 which are preferably substantially coplanar with each other and are spaced side-by-side to one another according to an annular spatial arrangement which substantially copies the shape of the annular rear sidewall 8 of light-guide sleeve 6; and an annular diode-supporting structure 11 that preferably substantially copies the shape of the annular rear sidewall 8 of light-guide sleeve 6, supports/holds up the series of LED diodes 10, and is stably coupled to the body of light-guide sleeve 6 so as to arrange and stably hold the LED diodes 10 in front of the annular rear sidewall 8 of light-guide sleeve 6, at the predetermined distance *d* from the annular rear sidewall 8.

[0035] Preferably the annular diode-supporting structure 11 is moreover shaped so as to form, when coupled to the light-guide sleeve 6, a preferably laterally closed, annular air-gap or chamber 12 which forms an extension of the annular rear sidewall 8 of light-guide sleeve 6 and is adapted to be crossed by the light emitted by the LED diodes 10, before reaching the annular rear sidewall 8.

[0036] Finally, the annular diode-supporting structure

11 is preferably rigidly secured to the rear casing 2, and supports the light-guide sleeve 6.

[0037] In greater detail, with reference to Figures 2, 3 and 4, the diode-supporting structure 11 preferably comprises: an annular spacer element 13 that substantially copies the shape of the annular rear sidewall 8 of light-guide sleeve 6, and is arranged in abutment on the annular rear sidewall 8 of light-guide sleeve 6; and an annular diode carrying board 14 preferably annular in shape, which directly supports the LED diodes 10 and is arranged in abutment on the annular spacer element 13 on the opposite side with respect to the annular rear sidewall 8, so that the LED diodes 10 face the annular rear sidewall 8 of light-guide sleeve 6, at the predetermined distance *d* from the annular rear sidewall 8 of light-guide sleeve 6.

[0038] In addition, the annular spacer element 13 is preferably rigidly secured to the bottom of rear casing 2 and is preferably provided, substantially along the centerline, with an annular pass-through slit which is suitable to form, when the annular spacer element 13 is coupled to the light-guide sleeve 6, an annular air-gap that directly connects the area of the diode carrying board 14 where the LED diodes 10 are located to the annular rear sidewall 8 of light-guide sleeve 6, and is crossed by the light emitted by the LED diodes 10 and directed toward the annular rear sidewall 8 of light-guide sleeve 6.

[0039] In greater detail, with reference to Figures 2, 3 and 4, the annular spacer element 13 has a substantially U-shaped cross-section, and is coupled to the light-guide sleeve 6 so that its upper annular opening matches with the annular rear sidewall 8 of light-guide sleeve 6 along substantially the whole length of annular rear sidewall 8.

[0040] Preferably, the bottom wall of annular spacer element 13, in turn, is provided with a series of through apertures 15 that are suitably dimensioned to allow the light emitted by the LED diodes 10 to penetrate freely inside the annular spacer element 13 and then reach the annular rear sidewall 8; and the diode carrying board 14 is arranged in abutment on the bottom wall of the annular spacer element 13 with the LED diodes 10 aligned to the through apertures 15, so as to be able to direct the light into the annular spacer element 13, towards the annular rear sidewall 8 of light-guide sleeve 6.

[0041] Furthermore the diode carrying board 14 preferably incorporates at least a part of the power and/or control circuits of the LED diodes 10.

[0042] With reference to Figures 2, 3 and 4, in addition the light emitting device 9 preferably also comprises a substantially platelike, light-diffusing filter 16 which is placed to cover the annular rear sidewall 8 of light-guide sleeve 6 and is structured so as to diffuse, preferably substantially uniformly and/or randomly, the light that passes through the light-diffusing filter 16 directed towards the annular rear sidewall 8 of light-guide sleeve 6.

[0043] In greater detail, the platelike light-diffusing filter 16 is preferably interposed between the annular diode-supporting structure 11, or rather the annular spacer el-

ement 13, and the annular rear sidewall 8 of light-guide sleeve 6.

[0044] Therefore the light-diffusing filter 16 is preferably arranged downstream of the intersection line *f* of the light cones *c* emitted by the LED diodes 10.

[0045] In addition, the platelike light-diffusing filter 16 preferably has an annular shape that substantially matches the shape of the annular rear sidewall 8 of light-guide sleeve 6, and is placed to close the upper annular opening of annular spacer element 13.

[0046] The platelike light-diffusing filter 16 furthermore is preferably made of opaline-coloured semi-transparent material, so as to randomly diffuse the light that passes through the light-diffusing filter 16 directed towards the annular rear sidewall 8 of light-guide sleeve 6. Alternatively, the light-diffusing filter 16 may have an embossed surface so as to scatter the light.

[0047] With reference to Figures 1 and 2, preferably the front half-shell 3 is moreover provided with at least a second transparent or semi-transparent portion 3b which is preferably encircled by the annular transparent or semi-transparent portion 3a; and the automotive lighting unit 1 additionally comprises a second lighting assembly 18 which is located inside the rear casing 2, underneath the transparent or semi-transparent portion 3b, so as to directly face the transparent or semi-transparent portion 3b, and which is structured so as to direct the light produced towards the transparent or semi-transparent portion 3b, preferably without also backlighting the annular transparent or semi-transparent portion 3a.

[0048] General operation of the automotive lighting unit 1 is easily inferable from the foregoing description, and therefore requires no further explanations.

[0049] As regards, in turn, lighting assembly 5, experimental tests have shown that the arrangement of the annular rear sidewall 8 of light-guide sleeve 6 downstream of the intersection line *f* of the light cones *c* emitted by the LED diodes 10, makes it possible to backlight the transparent or semi-transparent portion 3a of front half-shell 3 much more uniformly with respect to any other backlighting system currently in use, practically also eliminating the phenomena of lack of homogeneity that the observer normally perceives when observing the transparent or semi-transparent portion 3a.

[0050] It is finally clear that changes and variations may be made to the automotive lighting unit 1 described above without, however, departing from the scope of the present invention.

[0051] For example, with reference to Figure 5, in a different embodiment, instead of having an annular shape, the transparent or semi-transparent portion 3a of front half-shell 3 has a narrow and elongated shape, i.e. it is substantially ribbon-shaped.

[0052] In this case, the platelike light-guide body 6 is shaped so as to form a light-guide plate that substantially copies the shape of the ribbon-shaped transparent or semi-transparent portion 3a of front half-shell 3, and is arranged inside the rear casing 2 with its front sidewall

7 locally substantially adjacent to the transparent or semi-transparent portion 3a of front half-shell 3, along the whole length of the transparent or semi-transparent portion 3a, and with its rear sidewall 8 facing the bottom of rear casing 2.

[0053] In this embodiment, instead of having an annular shape, the light emitting device 9 has an elongated shape that substantially copies the shape of the rear sidewall 8 of platelike light-guide body 6.

[0054] Similarly to the embodiment already described, the LED diodes 10 are placed inside the rear casing 2 at a predetermined distance *d* from the rear sidewall 8 of platelike light-guide body 6, in such a way that the intersection line *f* of the light cones *c* emitted by the LED diodes 10 is located upstream of the rear sidewall 8 of platelike light-guide body 6, i.e. between the rear sidewall 8 of platelike light-guide body 6 and the LED diodes 10.

[0055] In other words, the LED diodes 10 are placed inside the rear casing 2, facing the rear sidewall 8 of platelike light-guide body 6, at a predetermined distance *d* from the rear sidewall 8 the value of which is greater than or equal to the distance *d*₀ between the LED diodes 10 and the intersection line *f* of the light cones *c* emitted by the LED diodes 10.

[0056] In other words, with reference to Figure 5, the light emitting device 9 preferably comprises: a series of LED diodes 10 which are preferably substantially coplanar to one another and are spaced side-by-side to one another along a reference line that substantially copies the shape of the centerline of the rear sidewall 8 of platelike light-guide body 6; and an oblong diode-supporting structure 11 that preferably substantially copies the shape of the annular rear sidewall 8 of platelike light-guide body 6, supports/holds up the LED diodes 10, and is stably coupled to the platelike light-guide body 6 so as to arrange and stably retain the LED diodes 10 in front of the rear sidewall 8 of platelike light-guide body 6, at the predetermined distance *d* from the rear sidewall 8.

[0057] Clearly, also in this embodiment the diode supporting structure 11 is shaped so as to form, when coupled to the platelike light-guide body 6, an oblong and laterally-closed air-gap 12 that forms an extension of the rear sidewall 8 of platelike light-guide body 6 and is adapted to be crossed by the light emitted by the LED diodes 10 before reaching the rear sidewall 8.

[0058] In greater detail, with reference to Figure 5, the diode-supporting structure 11 preferably comprises: an oblong-shaped spacer element 13 which substantially copies the shape of the rear sidewall 8 of platelike light-guide body 6, and is arranged in abutment on the rear sidewall 8 of platelike light-guide body 6; and a substantially ribbon-shaped diode carrying board 14 which directly supports the LED diodes 10 and is arranged in abutment on the elongated spacer element 13 on the opposite side with respect to the rear sidewall 8, so that the LED diodes 10 face the rear sidewall 8 of platelike light-guide body 6, at the predetermined distance *d* from the rear sidewall 8.

[0059] Also in this embodiment, finally, the light emitting device 9 preferably additionally comprises a substantially platelike light-diffusing filter 16, which is placed to cover the rear sidewall 8 of platelike light-guide body 6, preferably downstream of the intersection line f of the light cones c emitted by the LED diodes 10, and is structured so as to diffuse, preferably substantially uniformly and/or randomly, the light which passes through the light-diffusing filter 16 directed towards the rear sidewall 8 of light-guide body 6.

Claims

1. An automotive lighting unit (1) comprising: a substantially basin-shaped, rear casing (2); a front half-shell (3) which is placed to close the opening (2a) of the rear casing (2) and is provided with at least one transparent or semi-transparent portion (3a); and at least a first lighting assembly (5) that emits light on command, and is located inside the rear casing (2) so as to be able to backlight said transparent or semi-transparent portion (3a) of the front half-shell (3); said lighting assembly (5) comprising: a platelike light-guide body (6) made of photoconductive material, which is arranged inside the rear casing (2) with a front sidewall (7) thereof facing said transparent or semi-transparent portion (3a), and with a rear sidewall (8) thereof facing the rear casing (2); and light emitting means (9) which are placed inside the rear casing (2) directly facing the rear sidewall (8) of the platelike light-guide body (6), so as to direct the light produced towards the rear sidewall (8) of said platelike light-guide body (6); the automotive lighting unit (1) **being characterised in that** said light emitting means (9) comprise a series of LED diodes (10) that are spaced side by side along a reference line which substantially follows the shape of the rear sidewall (8) of the platelike light-guide body (6), and are spaced from the rear sidewall (8) of the platelike light-guide body (6) so that the intersection line (f) of the light cones (c) emitted by the same LED diodes (10) is located between the rear sidewall (8) of the platelike light-guide body (6) and said LED diodes (10).
2. Automotive lighting unit according to Claim 1, **characterised in that** the LED diodes (10) are located in front of the rear sidewall (8) of the platelike light-guide body (6), at a predetermined distance (d) from the rear sidewall (8) the value of which is greater than or equal to a limit value (d₀) function of the aperture angle (β) of the light cones (c) emitted by the various LED diodes (10) and of the average distance or pitch (p) existing between the various LED diodes (10).
3. Automotive lighting unit according to Claim 2, **char-**

acterised in that said limit value (d₀) is correlated to the aperture angle (β) of the light cones (c) generated by the LED diodes (10) and to the average distance or pitch (p) existing between the various LED diodes (10) by the following mathematical relation:

$$d_0 = \frac{p}{2} \cdot \tan\left(90 - \frac{\beta}{2}\right);$$

where d₀ is said limit value (d₀); p is the value of the average distance or pitch (p) between said LED diodes (10), and β is the value of the aperture angle (β) of the light cone (c) generated by each LED diode (10).

4. Automotive lighting unit according to Claim 2 or 3, **characterised in that** said predefined distance (d) of the LED diodes (10) from the rear sidewall (8) of the platelike light-guide body (6) is at least 10% greater than said limit value (d₀).
5. Automotive lighting unit according to any one of the preceding claims, **characterised in that** the LED diodes (10) are substantially equally spaced along the whole length of said reference line.
6. Automotive lighting unit according to any one of the preceding claims, **characterised in that** the LED diodes (10) are substantially coplanar with one another.
7. Automotive lighting unit according to any one of the preceding claims, **characterised in that** the transparent or semi-transparent portion (3a) of the front half-shell (3) is substantially annular shaped, and **in that** the platelike light-guide body (6) is bent over itself so as to form a tubular light-guide sleeve which substantially copies the form of said transparent or semi-transparent portion (3a) annular in shape.
8. Automotive lighting unit according to any one of Claims 2 to 7, **characterised in that** the light emitting means (9) additionally comprise a diode supporting structure (11) that supports said series of LED diodes (10), and is stably coupled to the platelike light-guide body (6) so as to arrange and stably maintain said LED diodes (10) in front of the rear sidewall (8) of the platelike light-guide body (6) at said predefined distance (d) from the rear sidewall (8).
9. Automotive lighting unit according to Claim 8, **characterised in that** the diode supporting structure (11) is shaped so as to form, when coupled to the platelike light-guide body (6), an air gap (12) which forms an extension of the rear sidewall (8) of the platelike light-guide body (6) and is suitable to be crossed by the

light emitted by the LED diodes (10) before reaching said rear sidewall (8) .

10. Automotive lighting unit according to Claim 9, **characterised in that** said air gap (12) is laterally closed. 5
11. Automotive lighting unit according to Claim 8, 9 or 10, **characterised in that** said diode supporting structure (11) is rigidly fixed to the rear casing (2) and supports the platelike light-guide body (6). 10
12. Automotive lighting unit according to any one of Claims 8 to 11, **characterised in that** said diode supporting structure (11) comprises: a spacer element (13) that substantially copies the shape of the rear sidewall (8) of the platelike light-guide body (6), and is arranged in abutment on the rear sidewall (8) of the platelike light-guide body (6); and an diode carrying board (14) that directly supports the LED diodes (10) and is placed in abutment on the spacer element (13) on the opposite side with respect to the rear sidewall (8) of the platelike light-guide body (6). 15
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13. Automotive lighting unit according to Claim 12, **characterised in that** the spacer element (13) is provided, substantially along the centerline, with a pass-through slit adapted to form, when the spacer element (13) is coupled to the platelike light-guide body (6), said air gap (12). 25
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14. Automotive lighting unit according to any one of the preceding claims, **characterised in that** the light emitting means (9) additionally comprise a substantially platelike, light-diffusing filter (16) which is placed to cover the rear sidewall (8) of the platelike light-guide body (6), and is adapted to diffuse the light that passes through the same light-diffusing filter (16) directed towards the rear sidewall (8) of the platelike light-guide body (6). 35
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15. Automotive lighting unit according to Claim 14, **characterised in that** the light-diffusing filter (16) is arranged downstream of the intersection line (f) of the light cones (c) emitted by said LED diodes (10). 45
16. Automotive lighting unit according to any one of the preceding claims, **characterized in that** said light cone (c) has an aperture (β) ranging between 5° and 60°, and inside said light cone (c) is concentrated at least 50% of the light energy emitted by said LED diode (10). 50

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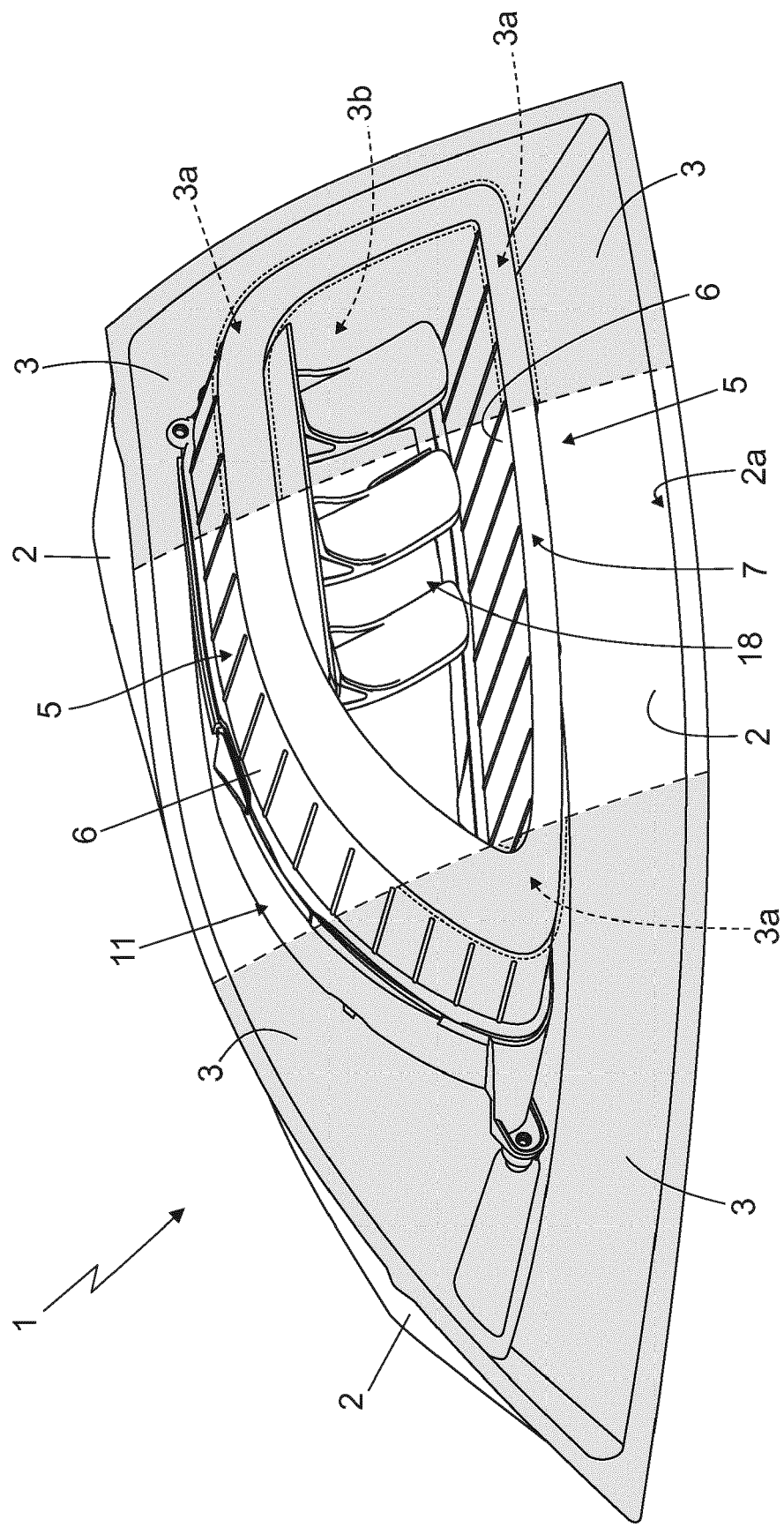


Fig. 1

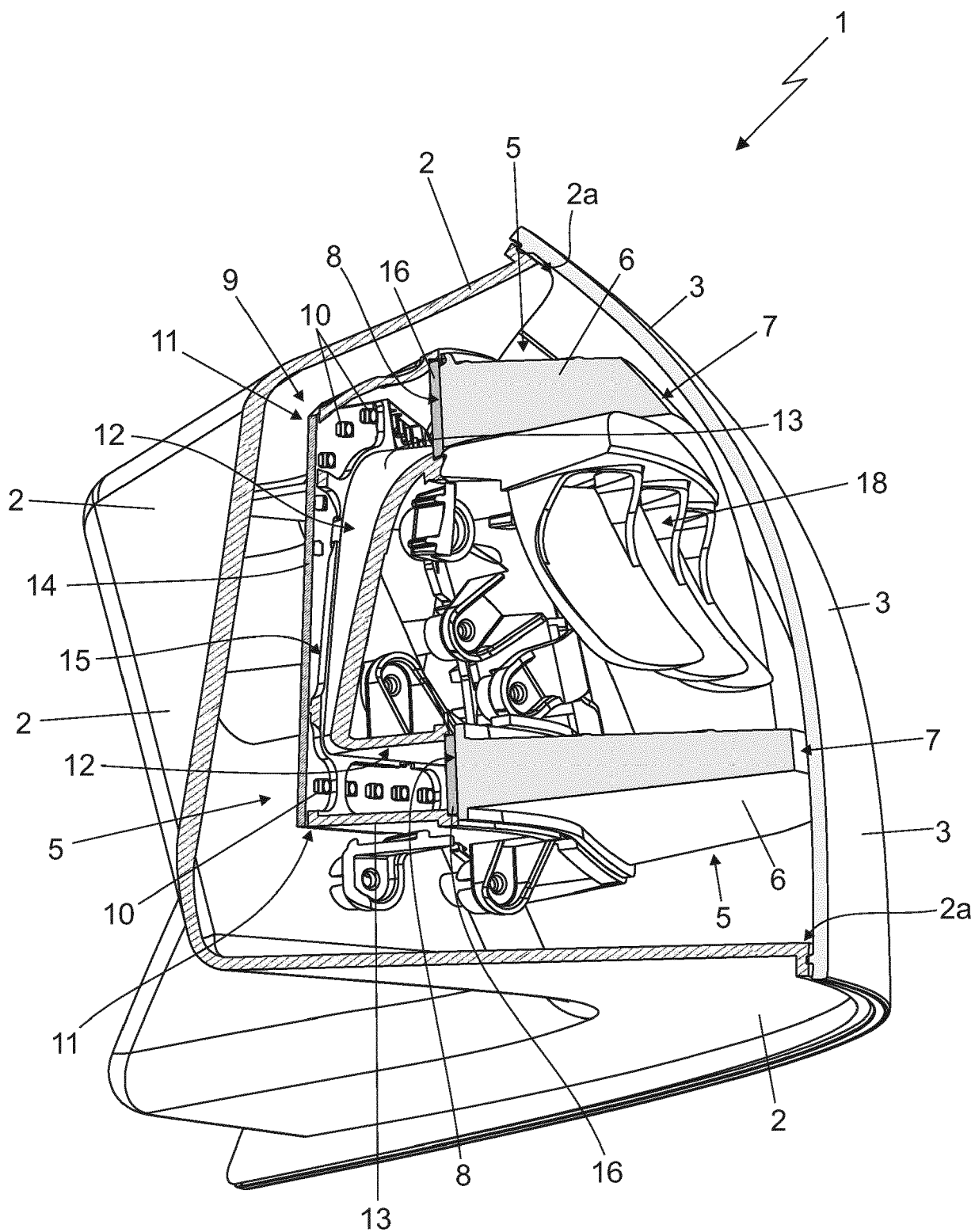


Fig. 2

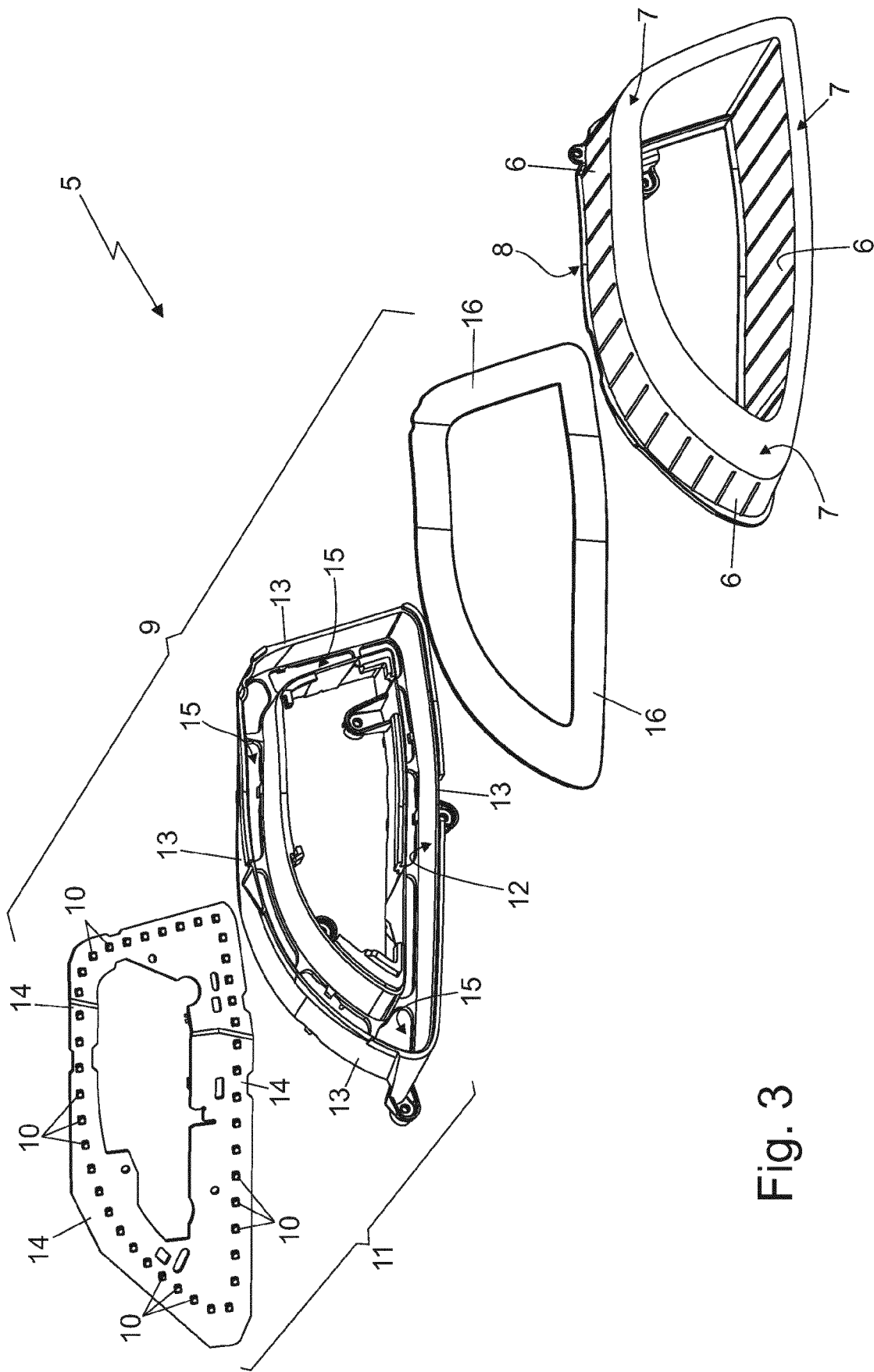


Fig. 3

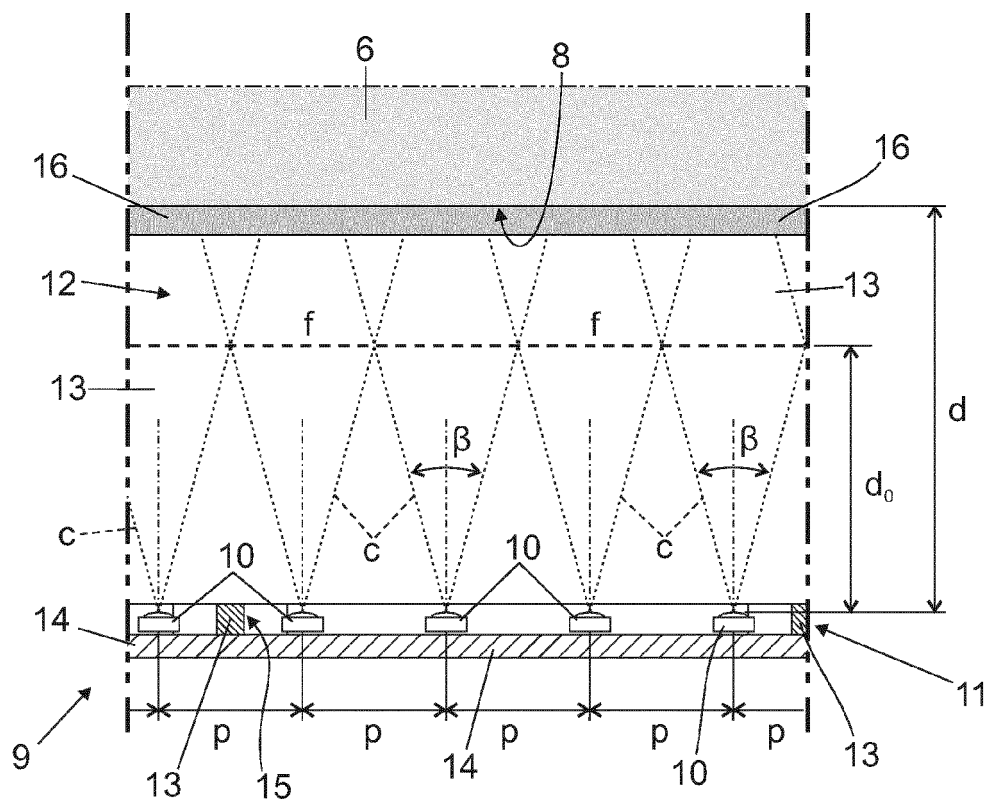


Fig. 4

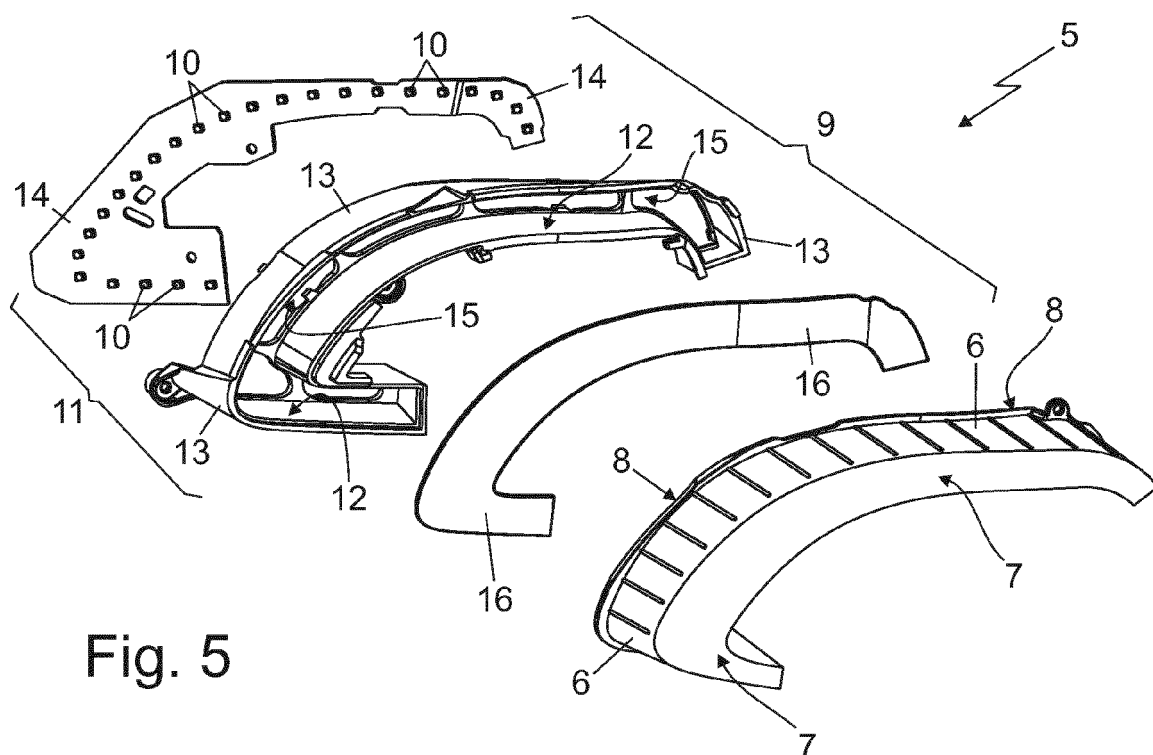


Fig. 5



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