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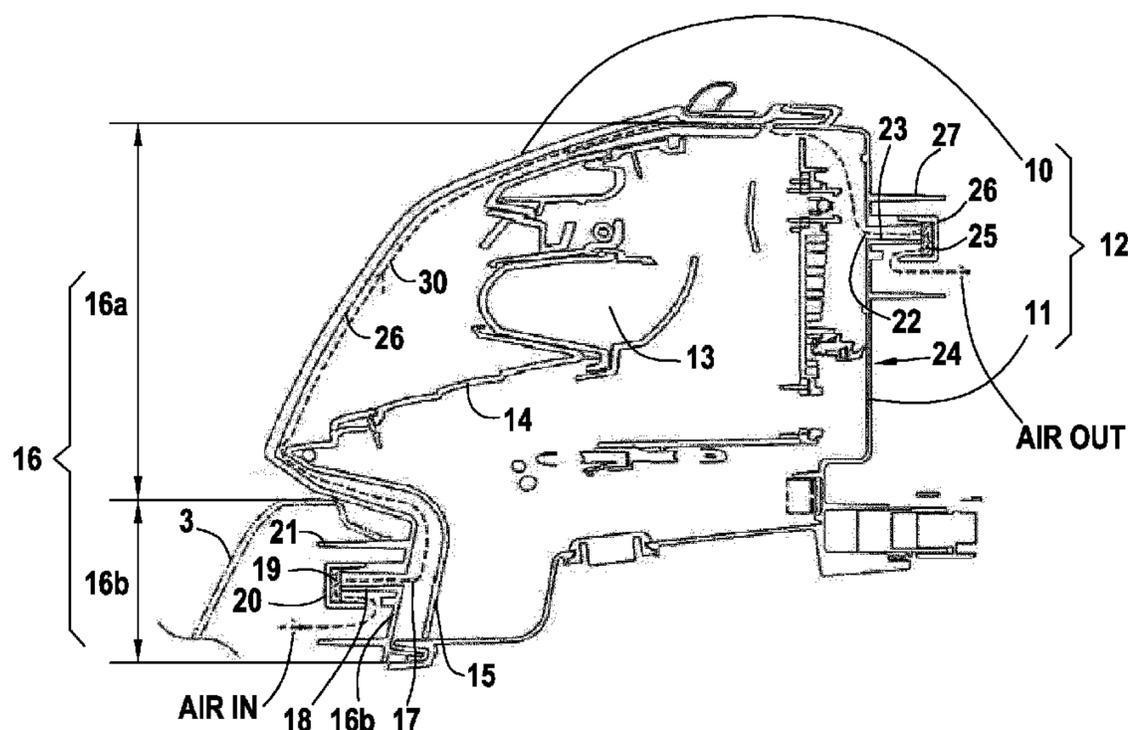
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(54) Title: VEHICLE HEADLIGHT OUTER LENS

[Fig.2]



(57) Abstract: The present invention concerns a vehicle headlight outer lens (10) comprising a front surface (16) and a front ventilation orifice (17) through the front surface (16). Airflow (30) enters a vehicle headlight (5) through a front ventilation orifice (17) in a front surface (16) of the vehicle headlight outer lens (10), so as to ventilate the vehicle headlight (5) and thus prevent condensation and fogging.

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VEHICLE HEADLIGHT OUTER LENS

TECHNICAL FIELD

The disclosure relates to the field of vehicle headlights, and in particular to
5 a vehicle headlight outer lens.

BACKGROUND

To establish an airflow preventing condensation within a vehicle headlight,
it is known, for instance from US Patent 5,562,337, to provide at least one
10 ventilation orifice in a rear shell of a vehicle headlight. However, this
arrangement is relatively inefficient, since the dynamic air pressure on the
moving vehicle cannot then contribute to the airflow.

US Patent 4,747,032 disclosed an alternative arrangement providing a
vacuum within a duct connected to an air outlet of the vehicle headlight to drive
15 the airflow within. This arrangement is however complex and potentially fragile.

SUMMARY

A first object of the disclosure is that of exploiting the dynamic air
pressure due to vehicle travel to drive an airflow preventing condensation
20 within a vehicle headlight.

According to a first aspect of the present disclosure, a vehicle headlight
outer lens comprises a front surface and a front ventilation orifice through the
front surface, so as to be exposed to the dynamic air pressure at the front of
the vehicle in order to drive the airflow into the headlight.

This vehicle headlight outer lens may also comprise a filter fitted onto the
front ventilation orifice, so as to prevent the ingress of foreign objects or liquid,
with the airflow, into the headlight. The filter may be a mesh filter and the
vehicle headlight outer lens may additionally comprise a cap, made e.g. of an
elastomeric material, holding the filter, and/or a baffle projecting outwardly
30 against the filter from the front surface adjacent to the front ventilation orifice.

The vehicle headlight outer lens may also comprise a tubular wall
projecting forwardly from the front surface around the front ventilation orifice,
to protect the front ventilation orifice and facilitate fitting an airtight cap or plug
for testing airtightness of the vehicle headlight casing. The tubular wall may
35 further be used as a datum to ensure the precise location and assembly of

other vehicle elements, and notably of a front bumper, with respect to the vehicle headlight.

The vehicle headlight outer lens may comprise an exposed area, and the front ventilation orifice may be located outside of the exposed area, and in particular below the exposed area, so that the front ventilation orifice impairs
5 neither the appearance of the exposed area, nor the projection of light through the exposed area.

The vehicle headlight outer lens may be made of a polymer material, such as e.g. polycarbonate, facilitating mass production while ensuring good
10 mechanical and optical properties.

A second aspect of the present disclosure relates to a vehicle headlight comprising the vehicle headlight outer lens of the first aspect. This vehicle headlight may also comprise a deflector, located behind the front ventilation orifice, for deflecting, towards a rear surface of the vehicle headlight outer lens,
15 air flowing through the front ventilation orifice, in order to reliably prevent condensation on the rear surface of the vehicle headlight outer lens.

The vehicle headlight may also comprise a rear shell closing against the vehicle headlight outer lens. The rear shell may comprise a rear ventilation orifice, to let out the airflow from the headlight, and/or be made of a polymer
20 material, such as e.g. polypropylene, to facilitate mass production while ensuring good mechanical properties.

A third aspect of the present disclosure relates to a vehicle front fascia comprising the vehicle headlight of the second aspect. This vehicle fascia may further comprise a bumper, which may in conceal the front ventilation orifice.
25 Alternatively, however, the front ventilation element may be concealed by a different element of the vehicle front fascia.

A fourth aspect of the present disclosure relates to a vehicle comprising the vehicle headlight of the second aspect or even the vehicle front fascia of the third aspect.

A fifth aspect of the present disclosure relates to a method of ventilating a
30 vehicle headlight, wherein airflow enters the vehicle headlight through a front ventilation orifice in a front surface of a vehicle headlight outer lens. The airflow may be deflected towards a rear surface of the vehicle headlight outer lens by a deflector located behind the front ventilation orifice, and/or exit the vehicle

headlight through a rear ventilation orifice in a rear shell of the vehicle headlight.

The above summary of some example embodiments is not intended to describe each disclosed embodiment or every implementation of the invention. In particular, selected features of any illustrative embodiment within this specification may be incorporated into an additional embodiment unless clearly stated to the contrary.

BRIEF DESCRIPTION OF THE DRAWINGS

10

The invention may be more completely understood in consideration of the following detailed description of an embodiment in connection with the accompanying drawings, in which:

- FIG. 1 is a perspective view of an automotive vehicle;
- 15 – FIG. 2 is a cut view of a vehicle headlight according to the present invention;
- FIG. 3 is a front view of the vehicle headlight of FIG. 2; and
- FIG. 4 is a rear view of the vehicle headlight of FIG. 2.

20

While the invention is amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit aspects of the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, 25 equivalents, and alternatives falling within the scope of the invention.

DETAILED DESCRIPTION

For the following defined terms, these definitions shall be applied, unless a different definition is given in the claims or elsewhere in this specification:

30

“Vehicle headlight” refers to a lighting device adapted for use in a vehicle, and in particular an automotive vehicle, for lighting an area in front of the vehicle and/or signaling the vehicle’s presence to other road users in front of the vehicle.

35

“Vehicle headlight outer lens” refers to a clear front cover for a vehicle headlight, which may have a refracting element or not.

“Vehicle front fascia” refers to a set of front-end components of a vehicle, and in particular an automotive vehicle. It may comprise, for example, a couple of headlights, a front bumper and a grille.

As used in this specification and the appended claims, the singular forms
5 “a”, “an”, and “the” include plural referents unless the content clearly dictates otherwise. As used in this specification and the appended claims, the term “or” is generally employed in its sense including “and/or” unless the content clearly dictates otherwise.

The terms “front”, “rear” and “behind” should be understood with
10 reference to a vehicle forward travel direction.

The following detailed description should be read with reference to the drawings in which similar elements in different drawings are numbered the same. The detailed description and the drawings, which are not necessarily to scale, depict an illustrative embodiment and are not intended to limit the scope
15 of the invention. The illustrative embodiment depicted is intended only as exemplary. Selected features of any illustrative embodiment may be incorporated into an additional embodiment unless clearly stated to the contrary.

FIG. 1 illustrates an automotive vehicle 1, which may in particular be a
20 four-wheeled road vehicle. The front end of this automotive vehicle 1 may be formed by a vehicle front fascia 2 comprising a bumper 3, a grille 4 and headlights 5.

FIGS. 2 to 4 illustrate one of the headlights 5. This headlight 5 may
25 comprise a vehicle headlight outer lens 10 and a rear shell 11 closing against the vehicle headlight outer lens 10 to form a vehicle headlight casing 12. To facilitate mass production at low cost, while ensuring good mechanical properties, both the vehicle headlight outer lens 10 and a rear shell 11 may be made of polymer materials, wherein the vehicle headlight outer lens 10 may in particular be made of polycarbonate, which has excellent optical and
30 mechanical properties, whereas the rear shell 11 may in particular be made of polypropylene. Other materials, polymer or otherwise, may nevertheless be alternatively contemplated, depending on technical requirements. Within this vehicle headlight casing 12, the vehicle headlight 5 may further comprise a lamp 13, a reflector 14 and a deflector 15. The reflector 14 and deflector 15
35 may be integrally formed in a single monolithic part, and they may be both be

made of polymer material, wherein the reflector 14 may receive a reflective coating.

As can be seen in FIGS. 2 and 3, the front surface 16 of the vehicle headlight outer lens 10 may comprise an exposed area 16a, configured to be outwardly exposed and possibly comprising one or more refracting elements, but also a hidden portion 16b, configured to be hidden behind another element of the vehicle front fascia 2 such as e.g. the bumper 3. This hidden portion 10b may be located below the exposed area 10a. The vehicle headlight outer lens 10 may further comprise one or more front ventilation orifices 17, which may be located in this hidden portion 10b, outside the exposed area 10a. For each front ventilation orifice 17, the vehicle headlight outer lens 10 may also comprise a baffle 18, projecting outwardly from the front surface 16 and adjacent to the corresponding front ventilation orifice 17, a filter 19 covering the corresponding front ventilation orifice 17, and a cap 20 holding the filter 19 against the baffle 18. The filter 19 may in particular be a mesh filter, whereas the cap 20 may in particular be made of an elastomeric material, to ensure a good elastic fit onto the front ventilation orifice 17.

Moreover, as can also be seen in FIGS. 2 and 3, the front surface 16 of the vehicle headlight outer lens 10 may further comprise, within the hidden portion 16b, a tubular wall 21 around each front ventilation orifice 17. This tubular wall 21 may be in contact with another element of the vehicle front fascia 2, such as e.g. the bumper 3, and serve as a datum for correctly positioning this other element of the vehicle front fascia 2 with respect to the headlight 5 during assembly.

As can be seen in FIGS. 2 and 4, the rear shell 11 may also comprise one or more rear ventilation orifices 22. For each rear ventilation orifice 22, the rear shell 11 may also comprise a baffle 23, projecting outwardly from a rear surface 24 of the rear shell 11 and adjacent to the corresponding rear ventilation orifice 22, a filter 25 covering the corresponding rear ventilation orifice 22, a cap 26 holding the filter 25 against the baffle 23, and a tubular wall 27 around the rear ventilation orifice 22. The filter 25 may also be a mesh filter, whereas the cap 26 may also be made of an elastomeric material, to ensure a good elastic fit onto the rear ventilation orifice 22.

Within the vehicle headlight casing 12, the deflector 15 may in particular be located behind the one or more front ventilation orifices 17, and oriented so

as to deflect air coming through the one or more front ventilation orifices 17 towards a rear surface 26 of the vehicle headlight outer lens 10, in particular behind the exposed area 16a of the front surface 16.

In operation, forward travel of the automotive vehicle 1 may cause a dynamic air pressure on the vehicle front fascia 2. This dynamic air pressure may drive airflow 30 around the baffle 18, and through the filter 19 and front ventilation orifice 17, into the vehicle headlight casing 12. This airflow 30 may then be deflected by deflector 15 towards the rear surface 26 of the vehicle headlight outer lens 10, so as to circulate over this rear surface 26, behind the exposed area 16a, towards the rear shell 11, where it may exit the vehicle headlight casing 12 through the one or more rear ventilation orifices 22 and corresponding filters 25. This method of ventilating the vehicle headlight 5 may thus prevent condensation and fogging on the rear surface 26 of the vehicle headlight outer lens 10, and in particular behind the exposed area 16a of the front surface 16, by ensuring this airflow 30 over this rear surface 26.

Those skilled in the art will recognize that the present invention may be manifested in a variety of forms other than the specific embodiments described and contemplated herein. Accordingly, departure in form and detail may be made without departing from the scope of the present invention as described in the appended claims.

CLAIMS

1. Vehicle headlight outer lens (10) comprising a front surface (16) and a front ventilation orifice (17) through the front surface (16).
- 5 2. Vehicle headlight outer lens (10) according to claim 1, also comprising a filter (19) fitted onto the front ventilation orifice (17).
3. Vehicle headlight outer lens (10) according to claim 2, also comprising a cap (20) holding the filter (19).
4. Vehicle headlight outer lens (10) according to claim 3, also
10 comprising a baffle (18) projecting outwardly against the filter (19) from the front surface (16) and adjacent to the front ventilation orifice (17).
5. Vehicle headlight outer lens (10) according to any one of claims 1 to 4, also comprising a tubular wall (21) projecting forwardly from the front surface (26) around the front ventilation orifice (17).
- 15 6. Vehicle headlight outer lens (10) according to any one of claims 1 to 5, wherein the front surface (16) comprises an exposed area (16a), and the front ventilation orifice (17) is located outside of the exposed area (16a).
7. Vehicle headlight outer lens (10) according to claim 6, wherein the front ventilation orifice (17) is located below the exposed area (16).
- 20 8. Vehicle headlight outer lens (10) according to any one of claims 1 to 7, made of a polymer material.
9. Vehicle headlight outer lens (10) according to any one of claims 1 to 8, made of polycarbonate.
10. Vehicle headlight (5) comprising the vehicle headlight outer lens (10)
25 according to any one of claims 1 to 9.
11. Vehicle headlight (5) according to claim 10, also comprising a deflector (15), located behind the front ventilation orifice (17), for deflecting, towards a rear surface (26) of the vehicle headlight outer lens (10), air flowing through the front ventilation orifice (17).
- 30 12. Vehicle headlight (5) according to claim 11, also comprising a rear shell (11) closing against the vehicle headlight outer lens (10).
13. Vehicle headlight (5) according to claim 12, wherein the rear shell (11) comprises a rear ventilation orifice (22).
14. Vehicle headlight (5) according to any one of claims 12 or 13,
35 wherein the rear shell (11) is made of a polymer material.

15. Vehicle headlight (5) according to claim 14, wherein the rear shell is made of polypropylene.

16. Vehicle front fascia (2) comprising the vehicle headlight (5) according to any one of claims 10 to 15.

5 17. Vehicle front fascia (2) according to claim 16, also comprising a bumper (3) concealing the front ventilation orifice (17).

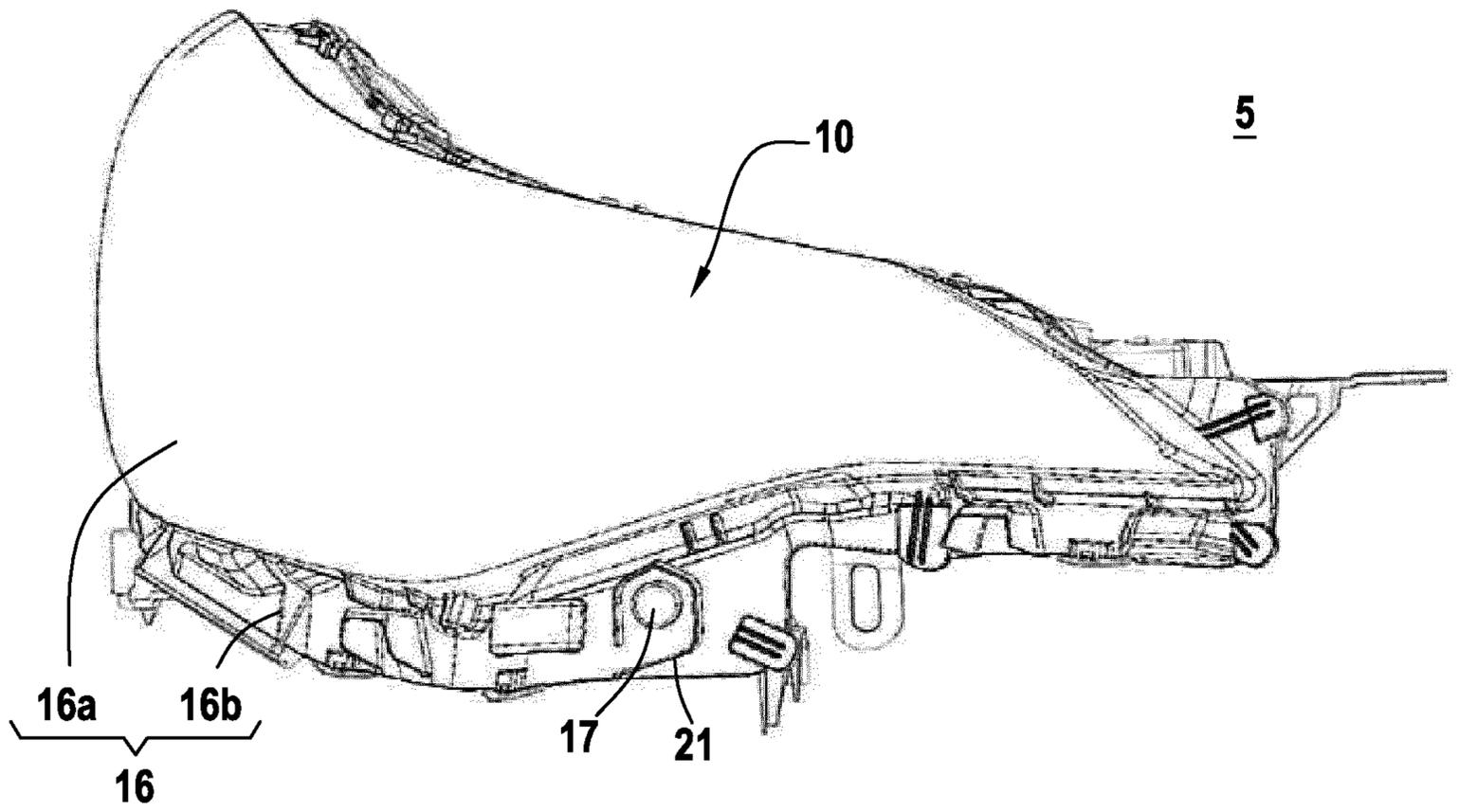
18. Vehicle (1) comprising the vehicle headlight (5) according to any one of claims 10 to 15.

10 19. Method of ventilating a vehicle headlight (5), wherein airflow (30) enters the vehicle headlight (5) through a front ventilation orifice (17) in a front surface (16) of a vehicle headlight outer lens (10).

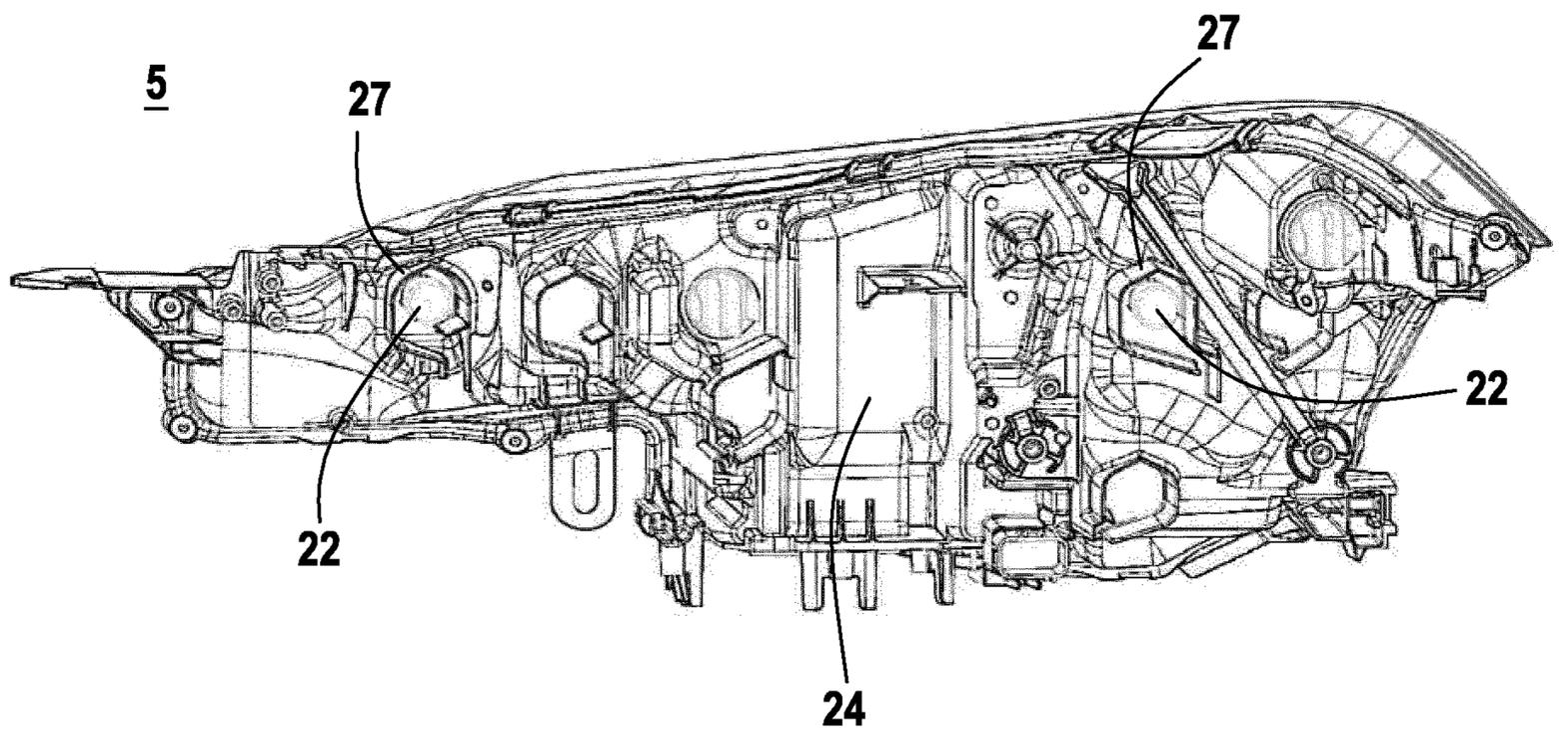
15 20. Method of ventilating a vehicle headlight (5) according to claim 19, wherein the airflow (30) is deflected towards a rear surface (26) of the vehicle headlight outer lens (10) by a deflector (15) located behind the front ventilation orifice (17).

21. Method of ventilating a vehicle headlight (5) according to any one of claims 19 or 20, wherein the airflow (30) exits the vehicle headlight (5) through a rear ventilation orifice (22) in a rear shell (11) of the vehicle headlight (5).

[Fig.3]



[Fig.4]



INTERNATIONAL SEARCH REPORT

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| International application No PCT/EP2019/084962 |
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A. CLASSIFICATION OF SUBJECT MATTER
 INV. F21S45/33
 ADD.
 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)
 F21S
 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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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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
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- "&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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