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(54) Motor vehicle light with improved heat transfer

(57) In order to efficiently transfer a heat, which is generated by each light source (2) within a casing (1) of a fog light or any other motor vehicle light, out from said casing (1), the light is furnished with a heat sink (4), which is formed of an internal heat exchanger (41), which consists of a heat conductive material and is arranged within said casing (1), as well as of an external heat exchanger (42), which also consists of a heat conductive material but is located outside of said casing (1). Said heat exchangers (41, 42) are connected with each other in the area of said neck-like narrowed passage (12), into which optionally a light source (2) in the form of a filament bulb can generally be inserted, in such manner that efficient heat transfer at least from the internal heat exchanger (41) towards the external heat exchanger (42) is enabled.

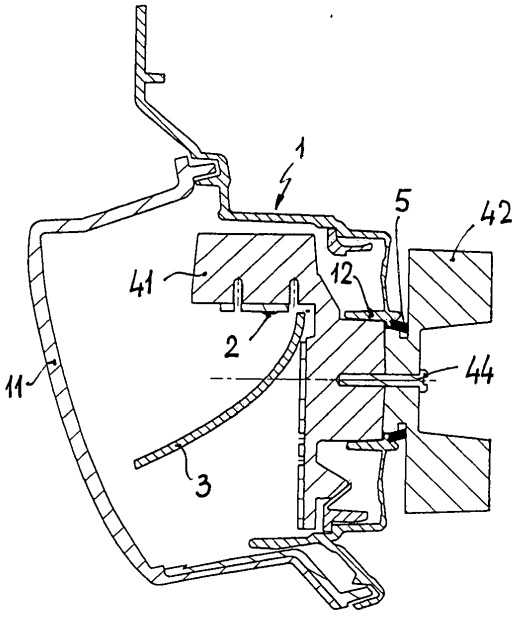


Fig. 1

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Description

[0001] In the field of transporting, the invention belongs to lightning equipment for vehicle, namely to vehicle lights e.g. fog lights, in which a sequence of LEDs (*Light Emitting Diodes*) can be used as a light source.

[0002] The purpose of the invention is to create a fog light or a similar motor vehicle light, in which a heat generated by each light source, which is arranged within a light casing and adapted to cooperate with each belonging reflector, which is also mounted within said light casing, could be efficiently transferred out from said casing, wherein such light should furthermore provide possibility of using either a filament bulb, e.g. a halogen bulb, or light emitting diodes (abbr. LED) together with corresponding electronic circuits as a light source, which is arranged within said casing and is adapted to cooperate with said reflector.

[0003] Lights are known in the prior art, which comprise a light source, which is together with each belonging reflector mounted within a light casing, in which a metallic heat sink is mounted, which is partially located within said casing, but at least a part of it protrudes out from the casing. Said heat sink can be available in the form of a metallic band, but the efficiency of transferring heat from the casing by means of such heat sink is not really very high.

[0004] A light is disclosed in EP 2 291 594 B1, which comprises a casing, in which a light source formed by LEDs with accompanying electronic circuit is mounted. Said light source is mounted on a heat conductive cooling member, the rear surface of which is adapted to cooperate with an external cooling member, namely with a heat receiver which is located outside of said casing. Said light is a relatively simple one and is furnished with a lens and without a reflector and comprises a special casing which is suitable for mounting of LEDs only, but not also for alternatively mounting of a classic filament bulb into the same casing, when desired.

[0005] The present invention refers to a motor vehicle light with improved heat transfer, comprising

- a casing, which preferably consists of a thermoplastic material on the basis of polymers and is on its front side closed with a light permeable wall and is on its rear side furnished with a neck-like narrowed passage, in the area of which said casing is sealed by means of a sealing against intruding of moisture and impurities towards the interior of the casing;
- a light source, which is mounted within said casing and is available either in the form of one or LED or as a filament bulb, in particular a halogen bulb;
- at least one reflector, which is analogously like said light source located within said casing and adapted for redirecting light beams generated by said light source throughout said front wall towards each desired area in front of the light; and
- at least one heat sink, which is adapted for transferring heat from the interior towards the exterior of said casing of the light.

[0006] In accordance with the invention, said heat sink is formed of an internal heat exchanger, which consists of a heat conductive material and is arranged within said casing, as well as of an external heat exchanger, which also consists of a heat conductive material but is located outside of said casing, wherein said heat exchangers are connected with each other in the area of said neck-like narrowed passage, into which optionally a light source in the form of a filament bulb can generally be inserted, in such manner that efficient heat transfer at least from the internal heat exchanger towards the external heat exchanger is enabled.

[0007] The internal heat exchanger and the external heat exchanger are connected with each other in a detachable manner in the area of said passage on the rear side of the light casing, namely by tightly abutting each other, by which the heat transfer between them is ensured.

[0008] The internal heat exchanger can be located in the top area of the casing.

[0009] At least one light source directed towards the reflector can be arranged in the area of the internal heat exchanger.

[0010] Said light source can be arranged in the heat-conductive contact with the internal heat exchanger.

[0011] Said light source can be arranged below the internal heat exchanger.

[0012] At least one light source directed towards the reflector can be arranged above said reflector.

[0013] The invention will be described by means of an embodiment, which is schematically presented in the accompanied drawing (Fig. 1).

[0014] A motor vehicle light is presented in Fig. 1, which comprises a casing 1, which is on its front side closed with a light permeable wall 11 and on its rear side furnished with a narrowed neck-like passage 12, which is generally adapted to receive a socket for a filament bulb, which is functioning as a light source 2 and is optionally assembled with each belonging reflector 3.

[0015] A light source 2 which is located within said casing 1, is optionally a LED-type light source or a sequence of LEDs, and at least one reflector 3 is foreseen within said casing 1 for the purposes of redirecting each generated light beams throughout the aforementioned front wall 11.

[0016] Said casing 1 preferably consists of a thermoplastic material on the basis of polymers and is on its rear side in the area of said passage 12 sealed by means of a sealing 5 for the purposes of preventing moisture and impurities to enter into the casing 1.

[0017] Moreover, said casing 1 is furnished with a heat sink 4, which is intended for transferring heat, which is in addition to desired light generated by the light source 2, towards the exterior of the casing 1.

[0018] The invention provides that said heat transfer

from the interior towards the exterior of the casing 1 is improved in such manner that said heat sink 4 comprises an internal heat exchanger 41 consisting of a heat conductive material and being arranged within the casing 1, as well as an external heat exchanger 42, which also consists of a heat conductive material but is located outside of said casing 1. Said heat exchangers 41, 42 are connected with each other in the area of said passage 12 in such manner that efficient heat transfer at least from the internal heat exchanger 41 towards the external heat exchanger 42 is enabled.

[0019] In a preferred embodiment, said internal heat exchanger 41 and the external heat exchanger 42 are by means of a screw 44 connected with each other in detachable manner in the area of said passage 12 on the rear side of the casing 1, which is adapted for mounting each light source 2, when it is available as a filament bulb, optionally together with a reflector 3, wherein said passage 12 generally also enables access towards the interior of the casing 1, e.g. for the purposes of maintenance or repair. In each case, said internal heat exchanger 41 and the external heat exchanger 42 are mutually interconnected and tightly abut each other, so that appropriate contact is established between them and efficient heat transfer between them is assured.

[0020] In a further embodiment, the internal heat exchanger 41 is located in the top region of the casing 1 in which the temperature is usually the highest. It is also preferred, when at least one light source 2 directed towards the reflector 3 is arranged in the area of the internal heat exchanger 41, in particular that said light source 2 is arranged in a heat-exchanging relationship with said internal heat exchanger 41, preferably below said internal heat exchanger 41.

[0021] In the shown embodiment according to Fig. 1, at least one light source 2 directed towards the reflector 3 is arranged above the reflector 3, so that each light beams generated by said light source 2 are directed towards the reflector 3, where they are redirected throughout the front wall 11 of the casing 1 towards each appropriate area in front of the light.

[0022] Heat generated by the light source 2 is collected within the internal heat exchanger 41 and is then through it as well as through said passage 12 transferred towards the external heat exchanger 42.

[0023] Those skilled in the art will understand that each of the previously mentioned heat exchangers 41, 42 can be furnished with ribs or corrugated, perforated, shaped in the form of a grid-like or in any other manner for the purposes of enlarging its surface area.

Claims

1. Motor vehicle light with improved heat transfer, comprising

   - a casing (1), which preferably consists of a thermoplastic material on the basis of polymers and is on its front side closed with a light permeable wall (11) and is on its rear side furnished with a neck-like narrowed passage (12), in the area of which said casing (1) is sealed by means of a sealing (5) against intruding of moisture and impurities towards the interior of the casing (1);
   - a light source (2), which is mounted within said casing (1) and is available either in the form of one or LED or as a filament bulb, in particular a halogen bulb;
   - at least one reflector (3), which is analogously like said light source (2) located within said casing (1) and adapted for redirecting light beams generated by said light source (2) throughout said front wall (11) towards each desired area in front of the light; and
   - at least one heat sink (4), which is adapted for transferring heat from the interior towards the exterior of said casing (1) of the light,

   characterized in that
   said heat sink (4) is formed of an internal heat exchanger (41), which consists of a heat conductive material and is arranged within said casing (1), as well as of an external heat exchanger (42), which also consists of a heat conductive material but is located outside of said casing (1), wherein said heat exchangers (41, 42) are connected with each other in the area of said neck-like narrowed passage (12), into which optionally a light source (2) in the form of a filament bulb can generally be inserted, in such manner that efficient heat transfer at least from the internal heat exchanger (41) towards the external heat exchanger (42) is enabled.

2. Motor vehicle light according to Claim 1, **characterized in that** the internal heat exchanger (41) and the external heat exchanger (42) are connected with each other in a detachable manner in the area of said passage (12) on the rear side of the light casing (1), namely by tightly abutting each other, by which the heat transfer between them is ensured.

3. Motor vehicle light according to Claim 1 or 2, **characterized in that** the internal heat exchanger (41) is located in the top area of the casing (1).

4. Motor vehicle light according to anyone of Claims 1 - 3, **characterized in that** at least one light source (2) directed towards the reflector (3) is arranged in the area of the internal heat exchanger (41).

5. Motor vehicle light according to Claims 4, **characterized in that** said light source (2) is arranged in the heat-conductive contact with the internal heat exchanger (41).

6. Motor vehicle light according to anyone of Claims 1 - 5, **characterized in that** said light source (2) is arranged below the internal heat exchanger (41).

7. Motor vehicle light according to anyone of the preceding Claims, **characterized in that** at least one light source (2) directed towards the reflector (3) is arranged above said reflector (3).

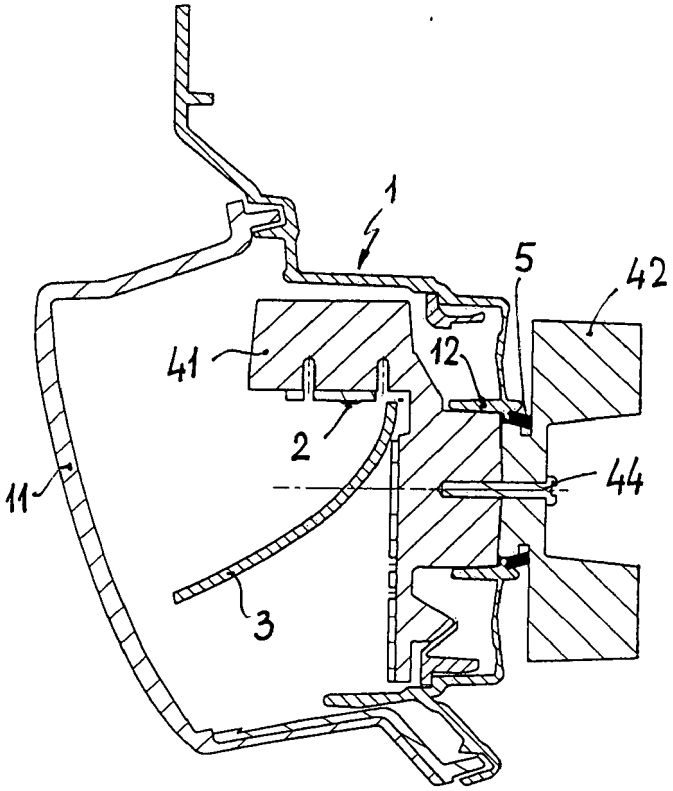


Fig. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 13 00 5075

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 March 2015	Laiou, M

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EUROPEAN SEARCH REPORT

Application Number
EP 13 00 5075

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