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(54) **HEAT SINK AND METHOD FOR MAKING IT**

(57) A method for making a heat sink (1) for a light (10) of a vehicle comprising the step of producing a body (11) by die casting, comprising an aluminium and/or magnesium alloy.

The method comprises the step of anodising said body (11) to create a surface layer of oxide to protect against corrosive phenomena.

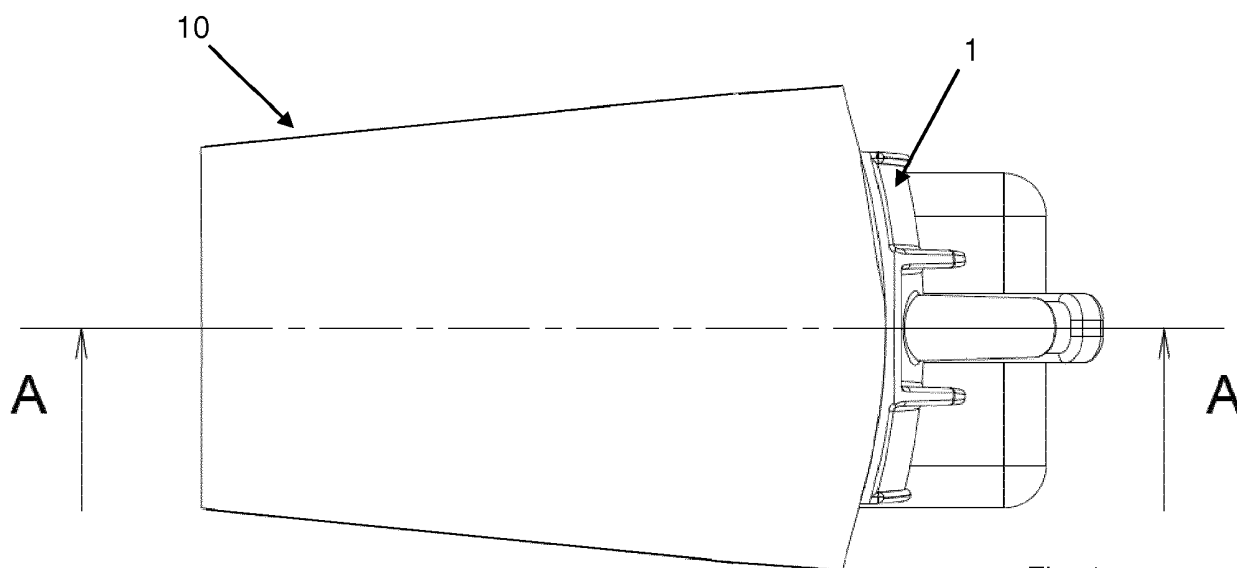


Fig. 1

Description

[0001] The present invention relates to a heat sink for a light of a vehicle and a method for making it.

[0002] The heat sink enables the heat transmitted (mainly by radiation and conduction) by the lamp of the light, when it is on, to be dissipated by convection. In the absence of this component the high temperatures could cause premature breakage of the lamp and therefore the need for more frequent replacements. This particularly occurs in countries with a mild or hot climate where the environmental temperature alone cannot compensate for the overheating. The heat sink is arranged under the bonnet, behind the light.

[0003] Usually the heat sink comprises a fin pack to facilitate heat exchange with the surrounding air.

[0004] A drawback of such constructional solution is connected with the fact that when the air comes into contact with the heat sink, the latter is corroded which then penalises heat exchange. The situation is particularly serious in marine locations where the air that is rich in salt accelerates the corrosive process.

[0005] In order to overcome this drawback, limiting the effects of corrosion, it is known to resort to specific materials that are particularly resistant to the phenomenon. On this point, it is already known to make the heat sink from an aluminium and magnesium alloy with an increasingly low copper content. However, this makes the production costs high, since the base material needs to be selected carefully. Furthermore, the modest quantities of material with undesired characteristics introduced into the melting furnace could compromise the quality of much larger quantities of the base material.

[0006] In this context, the technical task that is the basis of the present invention is to propose a heat sink and a method for making it that overcome the above-mentioned drawbacks of the prior art.

[0007] In particular, it is an object of the present invention to provide a heat sink and a method for making it that can offer high resistance to corrosion while limiting production costs.

[0008] The technical task set and the objects specified are substantially attained by a heat sink and a method for making it, comprising the technical characteristics as set out in one or more of the accompanying claims. Further characteristics and advantages of the present invention will more fully emerge from the indicative, and therefore non-limiting, description of a preferred but not exclusive embodiment of a heat sink and a method for realising it, as illustrated in the accompanying drawings, in which:

- figure 1 is a view of a light including the heat sink according to the present invention;
- figure 2 is a sectional view taken along plane A-A of figure 1;
- figures 3 and 4 show perspective views, from different viewpoints, of the heat sink of figures 1 and 2;
- figure 5 shows an alternative solution to that appear-

ing in figure 3.

[0009] The subject matter of the present invention is a heat sink 1 for disposing of the heat generated by the operation of a light 10 of a vehicle. Typically, this is a vehicle for road use, preferably a motor vehicle.

[0010] The heat sink 1 comprises a die-cast body 11. Appropriately, it comprises a metal alloy, preferably an aluminium alloy. Preferably it comprises an aluminium and magnesium alloy. Characteristically the body 11 is anodised. Therefore, it comprises a surface layer of oxide which performs a protective function against corrosive phenomena. In particular, this allows resistance to be offered against the corrosion due to atmospheric agents and more generally to the air with which it comes into contact for being able to exercise its heat dissipation function.

[0011] In the preferred constructional solution the body 11 is monolithic. Appropriately it is finned (see for example the fins 2 highlighted in figure 4).

[0012] The subject matter of the present invention is also a light 10 of a vehicle comprising:

- a light source 3 (for example LED);
- a housing compartment 4 for the light source 3;
- a heat sink 1 having one or more of the previously described technical characteristics; The heat sink 1 is placed at least in part (preferably completely) outside the housing compartment 4 and near the housing compartment 4. In this way it can receive heat from the housing compartment 4 and at the same time yield it to the air outside the compartment 4. In particular, the heat sink 1 (at least a part of the body 11 of the heat sink 1) contributes to defining the housing compartment 4.

[0013] In a particular exemplificative solution the housing compartment 4 is fluid-dynamically sealed. Possibly, at least a part of the body 11 of the heat sink 1 may contribute to the fluid-dynamic seal of the housing compartment 4.

[0014] Appropriately, the body 11 may comprise a positioning seat 7 for the light source 3 (or more precisely for the circuit board thereof, in the case of an LED).

[0015] Further subject matter of the present invention is a vehicle comprising at least one light 10 having one or more of the characteristics described hereinabove.

[0016] Typically, the vehicle is a road vehicle, preferably a motor vehicle. Appropriately, the light 10 is a headlight, used to illuminate the space in front of the vehicle. In fact, these are affected by greater illuminating power and are therefore more sensitive to heat dissipation.

[0017] The subject matter of the present invention is also a method for producing a heat sink 1 for a light 10 of a vehicle. Conveniently, this heat sink 1 has one or more of the characteristics described hereinabove. The method comprises the step of producing a body 11 of the heat sink 1 by die casting, preferably comprising an alu-

minium and/or magnesium alloy (such alloy is preferably based on aluminium and magnesium).

[0018] The die casting production step comprises the step of heating the material in the furnace which will then be introduced into a specific mould. In this way, it may assume the desired shape.

[0019] The method characteristically comprises the step of anodising at least part of (preferably all of) the body 11 to create a surface layer of oxide to protect against corrosive phenomena. For example, the step of anodising the body 11 comprises the step of dipping the body 11 into an electrolytic bath (typically comprising sulphuric acid). An external cathode in contact with the bath and the body 11 (which defines the anode) then constitute an electrolytic cell.

[0020] The method further comprises the step of positioning at least a part of the heat sink 1 outside a housing compartment 4 for the light source 3, and near to said housing compartment 4. The heat sink 1 contributes to defining the compartment 4.

[0021] Appropriately, the compartment 4 is delimited by the heat sink 1 and by an at least partially transparent element 5 that are mutually opposite. The transparent element 5 allows the light to leave the compartment 4 to illuminate the space in front of the vehicle. The element 5 may also be defined as a protective paraboloid.

[0022] As exemplified in figure 5 a paraboloid 6 may be provided inside the compartment 4 which directs the light emitted by the light source 3. Appropriately such a paraboloid 6 is made of metal-plated plastic material. The present invention provides important advantages.

[0023] Above all, it allows excellent resistance to corrosion. In particular, this can be obtained without the need to select the quality of the raw material in a highly restrictive way. This translates into a cost advantage since a wider range of materials can be used.

[0024] The invention as it is conceived is susceptible to numerous modifications, all falling within the scope of the inventive concept characterising it. Further, all the details can be replaced with other technically-equivalent elements. In practice, all the materials used, as well as the dimensions, can be any according to requirements.

Claims

1. A method for making a heat sink (1) for a light (10) of a vehicle comprising the step of producing a body (11) by die casting, comprising an aluminium and/or magnesium alloy;
characterised in that at least a part of said body (11) is anodised to create a surface layer of oxide to protect against corrosive phenomena.
2. The method according to claim 1, **characterised in that** at least a part of said heat sink (1) is positioned outside the housing compartment (4) and near to said housing compartment (4).

3. The method according to claim 2, **characterised in that** said compartment (4) is delimited at least by said heat sink (1) and by an at least partially transparent element (5) mutually opposite.

4. A heat sink for disposing of the heat generated by the operation of a light (10) of a vehicle comprising:

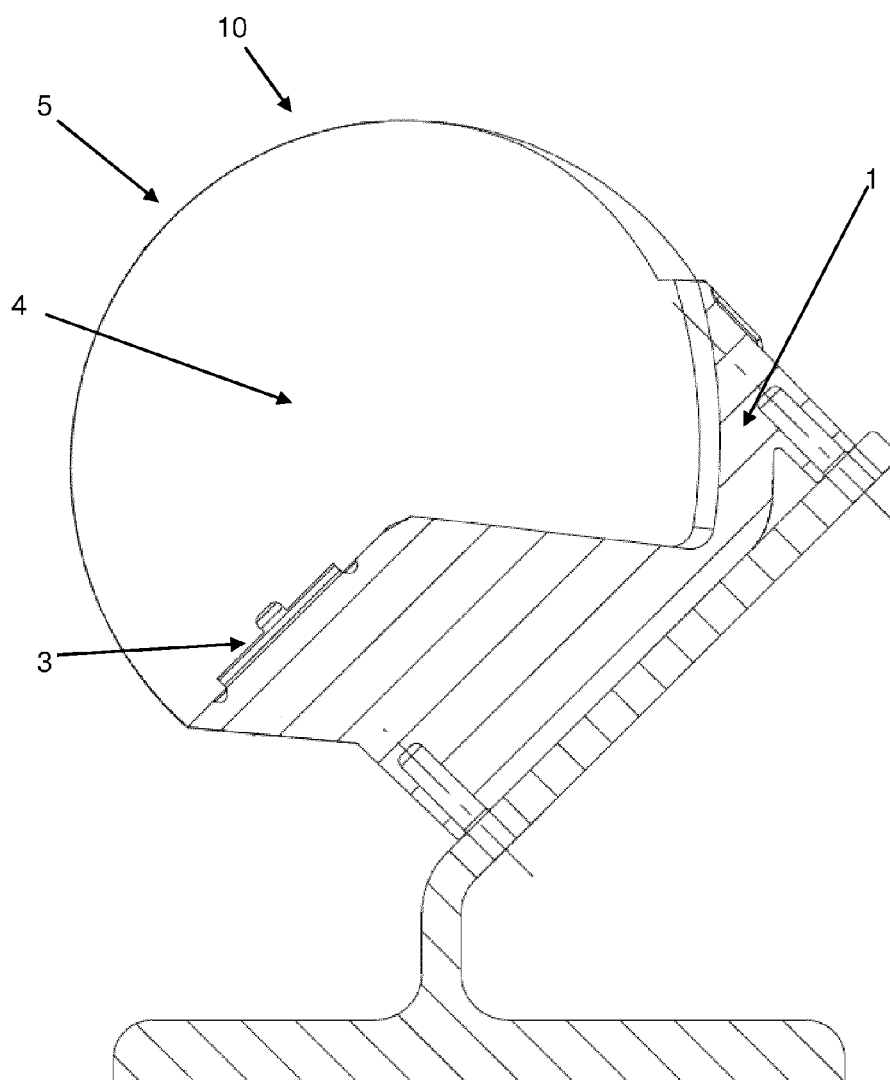
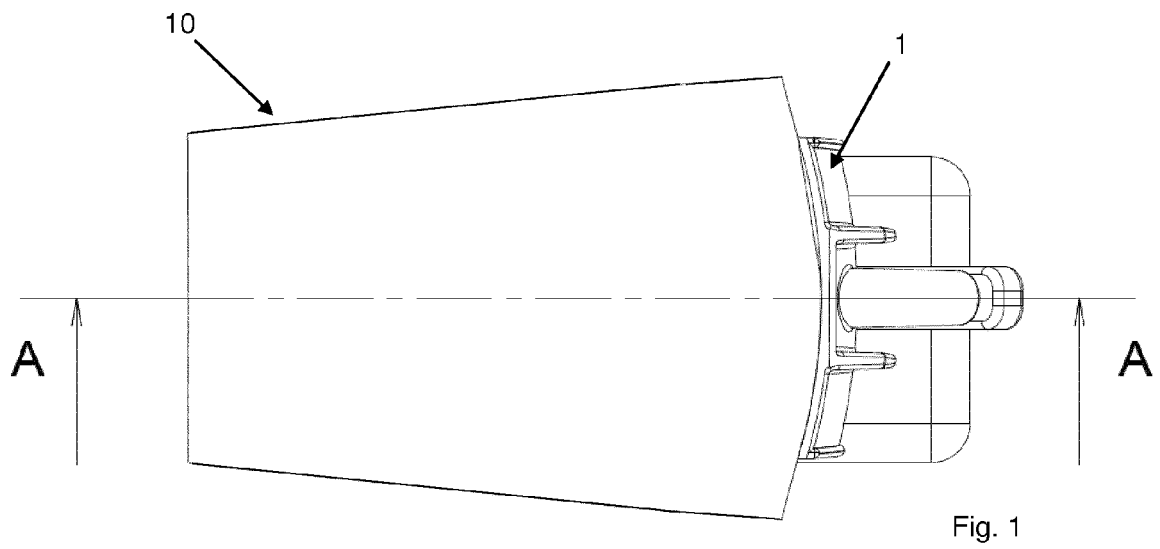
- a die-cast body (11) comprising an aluminium and/or magnesium alloy; **characterised in that** said body (11) is at least partially anodised and comprises a surface layer of oxide that performs a protective function against corrosive phenomena.

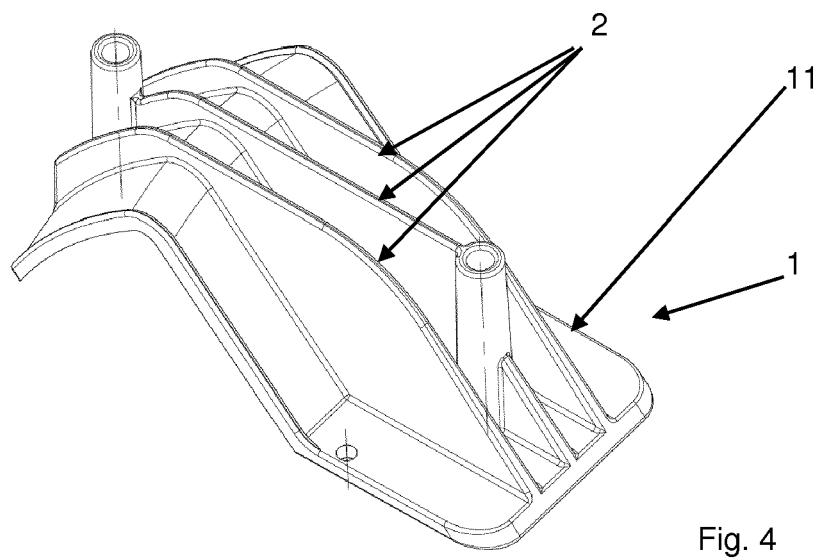
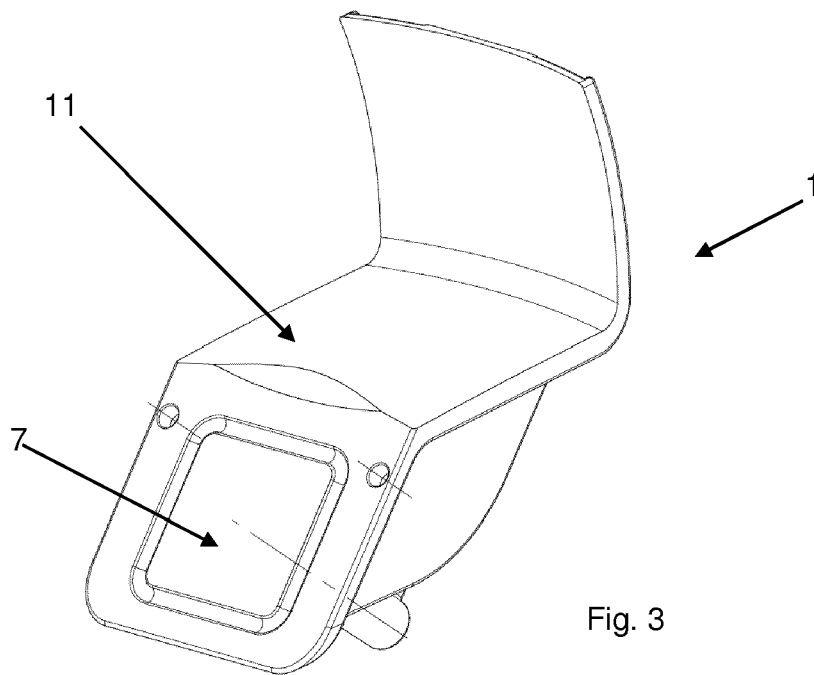
5. The heat sink according to claim 4, **characterised in that** said body (11) is monolithic and finned.

6. A vehicle light comprising:

- a light source (3);
- a housing compartment (4) for the light source (3);
- a heat sink (1) according to claim 4 or 5, said sink being at least partially outside the housing compartment (4) and near the housing compartment (4).

7. A vehicle comprising at least one light according to claim 6.





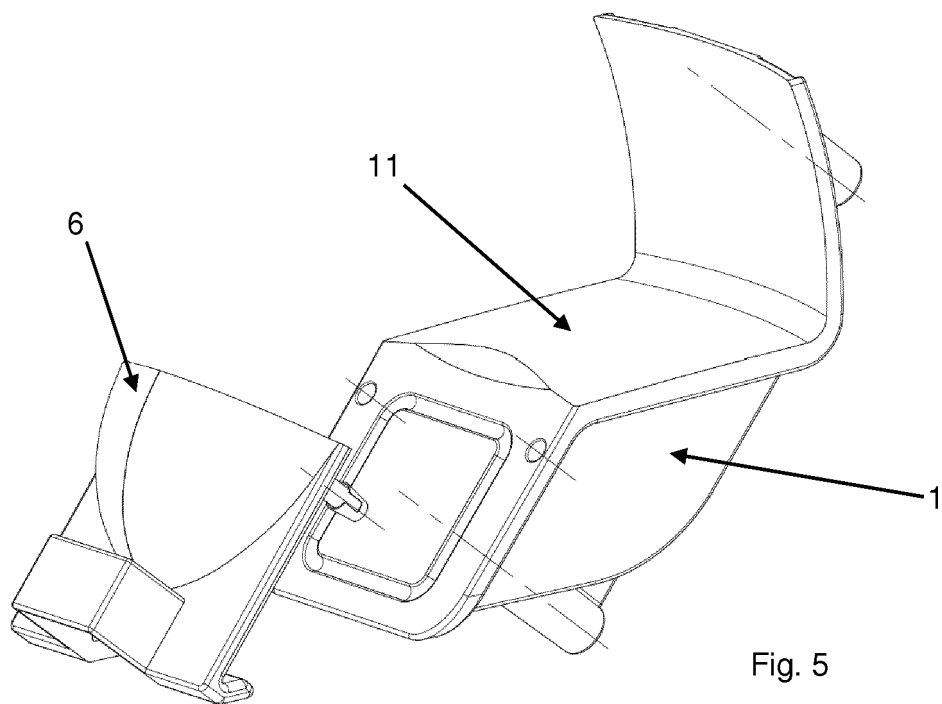


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 17 42 5032

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EPO FORM 1503 03.82 (P04C01)

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			TECHNICAL FIELDS SEARCHED (IPC)
			C25D F21S
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 October 2017	Examiner Le Hervet, Morgan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 42 5032

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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03-10-2017

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