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- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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SYSTEM FOR MOUNTING RADARS ON VEHICLES

Description

[0001] The present invention relates to a system for mounting radars on vehicles that allows the risks of the radar suffering damage in the event of a collision to be minimized.

Background of the Invention

[0002] Current vehicles increasingly make use of safety systems to avoid accidents. For example, the use of radars is known for improving vehicle safety, for instance for detecting distance from other vehicles with a view to adjusting speed or to braking automatically where there is a collision risk.

[0003] Such radars are mounted on the vehicle bodywork by means of mounting systems that comprise a support element for the radar mounted on a securing element that is fastened to the vehicle bodywork.

[0004] One drawback of such known mounting systems is that in the event of a collision in the area where the radars are mounted they can easily be damaged, which makes their subsequent use impossible.

[0005] This is a major drawback because radars are very expensive, with the result that in order to repair such safety systems it is often necessary to use new radars, which significantly increases the repair cost.

[0006] There is therefore a need for a system for mounting radars on vehicles that minimizes the risks of the radars potentially being damaged in the event of a collision, allowing the reuse thereof.

Description of the Invention

[0007] The system for mounting of the invention successfully resolves the aforesaid drawbacks, offering further advantages that will be described below.

[0008] The system for mounting radars on vehicles according to the present invention comprises:

- a securing element that may be secured to the bodywork of a vehicle;
- a support element mounted on said securing element by means of a plurality of mounting points, and comprising a housing for a radar;

and it is characterized in that at least one of said mounting points is a releasable mounting point that separates the support element from the securing element at at least said releasable mounting point.

[0009] According to a first embodiment, said support element comprises four mounting points, two of which are releasable and the other two mounting points are rocking.

[0010] In this first embodiment, said two releasable mounting points are preferably mounted on the lower part of the support element in the position of use of the mounting system, and said two rocking mounting points are mounted on the upper part of the support element in the position of use of the mounting system, or vice versa.

[0011] According to a second embodiment, said support element comprises four mounting points, which are releasable.

[0012] Preferably, each releasable mounting point may be pressure-mounted in a complementary housing of said securing element. For example, said housing may have a V form on a lateral plate of the securing element, or, alternatively, said housing may be placed on a lateral tongue of the securing element.

[0013] For fastening thereof to the bodywork of a vehicle, said securing element may comprise a pair of tabs and holes for screws, and said tabs are preferably arranged in the upper part of the securing element in the position of use thereof, and said holes are arranged in the lower part of the securing element in the position of use thereof.

[0014] Furthermore, said support element may advantageously be mounted so as to rock on said securing element.

[0015] With the system for mounting according to the present invention, the radar moves in the event of a collision, thereby minimizing the risk of its being damaged and allowing its reuse in the event that it has not been damaged.

[0016] Thus, in one aspect, a method is provided for protecting a radar component mounted on a vehicle during a vehicle collision, wherein a mount system of the radar component includes a securing element secured to the bodywork of a vehicle and a support element mounted on said securing element by a plurality of mounting points, the support element including a housing to which the radar component is attached. The method involves: providing at least one mounting point that is a releasable mounting point that permits separation of at least a portion of the support element in a release direction from the securing element at at least said releasable mounting point; arranging the mount system on a part of a vehicle body such that the release direction is oriented inwardly of the part of the vehicle body; and during a collision in which collision contact with the part of the vehicle body occurs from an external side, such contact causing at least the portion of the support element to separate from the releasable mounting point in the release direction to move the radar component away from the collision contact.

[0017] In one implementation, all mounting points of the support element on the securing element are releasable and during the collision an entirety of the support element separates from the securing element. In one variation of such implementation, a first pair of opposed mounting points and a second pair of opposed mounting points are provided.

[0018] In another implementation, at least one mounting point of the support element on the securing element is a rocking mounting point and during the collision the support element pivots relative to the securing element. In one variation of such implementation, a pair of opposed rocking mounting points are provided to define a common rocking axis and a pair of opposed releasable mounting points are provided.

Brief Description of the Drawings

[0019] To enhance comprehension of the text, there are accompanying drawings that schematically and solely by way of non-limiting example show a practical embodiment.

[0020] Figure 1 is a perspective view of a system for mounting radars on a vehicle according to a first embodiment of the present invention;

[0021] Figure 2 is a perspective view of the support element where the radar is placed in said first embodiment of the system for mounting of the present invention;

[0022] Figure 3 is a view in lateral elevation, in section, of the system for mounting radars of the first embodiment of the present invention in the normal position of use thereof;

[0023] Figure 4 is a view in lateral elevation, in section, of the system for mounting radars of the first embodiment of the present invention in the position thereof during a collision;

[0024] Figure 5 is a front perspective view of a system for mounting radars on a vehicle according to a second embodiment of the present invention; and

[0025] Figure 6 is a rear perspective view of a system for mounting radars on a vehicle according to a second embodiment of the present invention.

Description of Preferred Embodiments

[0026] As may be seen from Figure 1, the system for mounting according to the present invention comprises a securing element 1 that is secured to the bodywork of a vehicle (not shown in the Figures). This securing element 1 is secured to the bodywork by means of tabs 8 and holes 9 for screws (not shown).

[0027] According to the position of use shown in the Figures, said tabs 8 are placed in the upper part of the securing element 1 and said holes 9 are located in the lower part of the securing element 1. However, it ought to be pointed out that the securing element 1 may be secured to the bodywork of the vehicle in any suitable way.

[0028] Mounted on said securing element 1 is a support element 2 that acts as support for a radar 5. To that end, the support element 2 comprises a housing 4 for said radar 5. The radar 5 may be secured inside the housing 4 by means of pegs 17, as may be seen in Figure 2.

[0029] The support element 2 is mounted on the securing element 1 by means of a plurality of mounting points 3a, 3b. These mounting points 3a, 3b enable the support element 2 to be totally or partially separated from the securing element 1 in the event of a collision on said system for mounting according to the present invention, minimizing the risk of damage to the radar 5.

[0030] To allow correct orientation of the radar 5, the support element 2 rocks vis-à-vis the securing element 1, for example with a tilt of $\pm 5^\circ$ with respect to a horizontal axis in the mounting position (shown in Figure 3). Tilt is adjusted, for example, by means of a screw 10 located in the front part of the support element 2, as may be seen in Figures 1 and 2.

[0031] According to the first embodiment shown in Figures 1 to 4, said mounting points are of two types: releasable mounting points 3a and rocking mounting points 3b, and in particular two releasable mounting points 3a and two rocking mounting points 3b.

[0032] The releasable mounting points 3a are preferably placed in the lower lateral part of the support element 2, although they could be placed in any other position. Each releasable mounting point 3a comprises a projection 13, defining a neck, which is pressure-housed in a complementary housing 6, the housing 6 being located in a lateral plate 7 of the support element 2.

[0033] According to the embodiment shown, said housing 6 has a V form such that the neck defined by the projection 13 is press-fitted in the narrowest part of said housing 6.

[0034] Meanwhile, the rocking mounting points 3b are placed in the upper lateral part of the support element 2, although they could be placed in any other position. Each rocking mounting point 3b comprises a projection 16 that is housed in a hole 11 located in a tongue 12 of the support element 2.

[0035] In the event of a collision on the system for mounting according to the present invention, the projections of the releasable support points 3a will emerge from their respective housings 6, separating the support element 2 from the securing element 1, and the projections of the rocking support points 3b will turn inside their respective housings. In this way, the support element 2 will rock with respect to the securing element 1, as may be seen from Figure 4, and the pressure that the radar component or sensor 5 has to withstand will be less than if the sensor were mounted on a fixed support element 2.

[0036] Figures 5 and 6 show a second embodiment of the system for mounting according to the present invention.

[0037] For simplicity and clarity, the same reference numbers as in the first embodiment are used in this second embodiment to identify components in common, which will not be described again as they perform the same function in the earlier embodiment.

[0038] The principal difference between this second embodiment and the first embodiment is that all the support points 3a are releasable such that the entire support element 2 moves vis-à-vis the securing element 1 in the event of a collision.

[0039] Figures 5 and 6 show that each support point 3a comprises a projection 13 that is pressure-housed in a complementary housing 14. According to the embodiment shown, this housing 14 is placed in a tongue 15 located on one of the sides of the support element 2. However, it ought to be pointed out that the releasable support points 3a in this second embodiment could have any suitable configuration that allows complete separation of the support element 2 from the securing element 1. They could, for example, have the same configuration as in the first embodiment described above.

[0040] In this way, in the event of a collision, the projections 13 emerge from their housings 14, the support element 2 moving horizontally with respect to the securing element 1 in the mounted position thereof.

[0041] Despite the fact that reference has been made to specific embodiments of the invention, a person skilled in the art of the describe system for mounting is capable of numerous variations and modifications and that all the details mentioned may be replaced by others that are technically equivalent, without departing from the scope of protection defined by the attached claims.

Claims

1. A system for mounting radars on vehicles, which comprises:
 - a securing element (1) that may be secured to the bodywork of a vehicle;
 - a support element (2) mounted on said securing element (1) by means of a plurality of mounting points (3a, 3b), and comprising a housing (4) for a radar (5);characterized in that at least one of said mounting points is a releasable mounting point (3a) that separates the support element (2) from the securing element (1) at at least said releasable mounting point (3a).
2. The system for mounting radars on vehicles as claimed in claim 1, wherein said support element (2) comprises four mounting points, two of which are releasable (3a) and the other two mounting points are rocking (3b).
3. The system for mounting radars on vehicles as claimed in claim 2, wherein said two releasable mounting points (3a) are mounted on the lower part of the support element (2) in the position of use of the mounting system, and said two rocking mounting points (3b) are mounted on the upper part of the support element (2) in the position of use of the mounting system, or vice versa.
4. The system for mounting radars on vehicles as claimed in claim 1, wherein said support element (2) comprises four mounting points, which are releasable (3a).
5. The system for mounting radars on vehicles as claimed in claim 1, 2, or 4, wherein each releasable mounting point (3a) comprises a projection (13) pressure-mounted in a complementary housing (6; 14) of said securing element (1).
6. The system for mounting radars on vehicles as claimed in claim 5, wherein said housing (6) has a V form on a lateral plate (7) of the securing element (1).
7. The system for mounting radars on vehicles as claimed in claim 5, wherein said housing (14) is placed on a lateral tongue (15) of the securing element (1).

8. The system for mounting radars on vehicles as claimed in claim 1, wherein said securing element (1) comprises a pair of tabs (8) and holes (9) for screws for fastening thereof to the bodywork of a vehicle.

9. The system for mounting radars on vehicles as claimed in claim 8, wherein said tabs (8) are arranged in the upper part of the securing element (1) in the position of use thereof, and said holes (9) are arranged in the lower part of the securing element (1) in the position of use thereof.

10. The system for mounting radars on vehicles as claimed in claim 1, wherein said support element (2) is mounted so as to rock on said securing element (1).

11. A method for protecting a radar component mounted on a vehicle during a vehicle collision, wherein a mount system of the radar component includes a securing element secured to the bodywork of a vehicle and a support element mounted on said securing element by of a plurality of mounting points, the support element including a housing to which the radar component is attached, the method comprising:

providing at least one mounting point that is a releasable mounting point that permits separation of at least a portion of the support element in a release direction from the securing element at at least said releasable mounting point;

arranging the mount system on a part of a vehicle body such that the release direction is oriented inwardly of the part of the vehicle body; and

during a collision in which collision contact with the part of the vehicle body occurs from an external side, such contact causing at least the portion of the support element to separate from the releasable mounting point in the release direction to move the radar component away from the collision contact.

12. The method of claim 11 wherein all mounting points of the support element on the securing element are releasable and during the collision an entirety of the support element separates from the securing element.

13. The method of claim 12 wherein a first pair of opposed mounting points and a second pair of opposed mounting points are provided.

14. The method of claim 11 wherein at least one mounting point of the support element on the securing element is a rocking mounting point and during the collision the support element pivots relative to the securing element.

15. The method of claim 14 wherein a pair of opposed rocking mounting points are provided to define a common rocking axis and a pair of opposed releasable mounting points are provided.

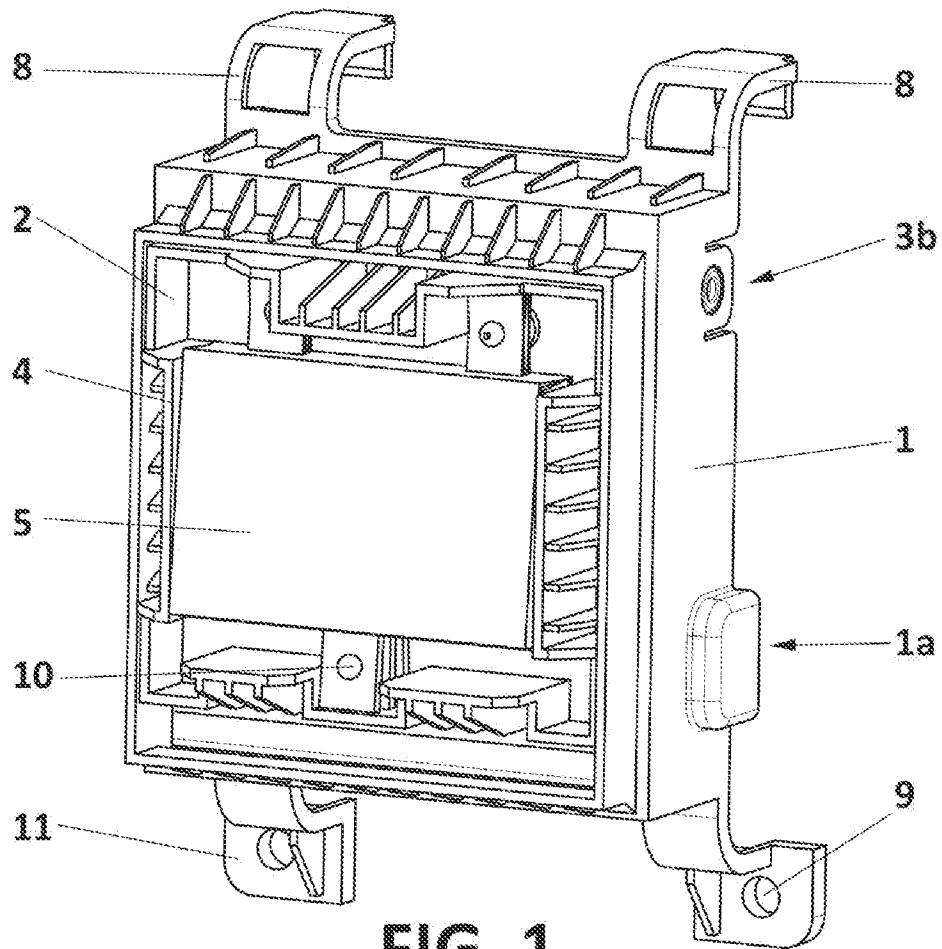


FIG. 1

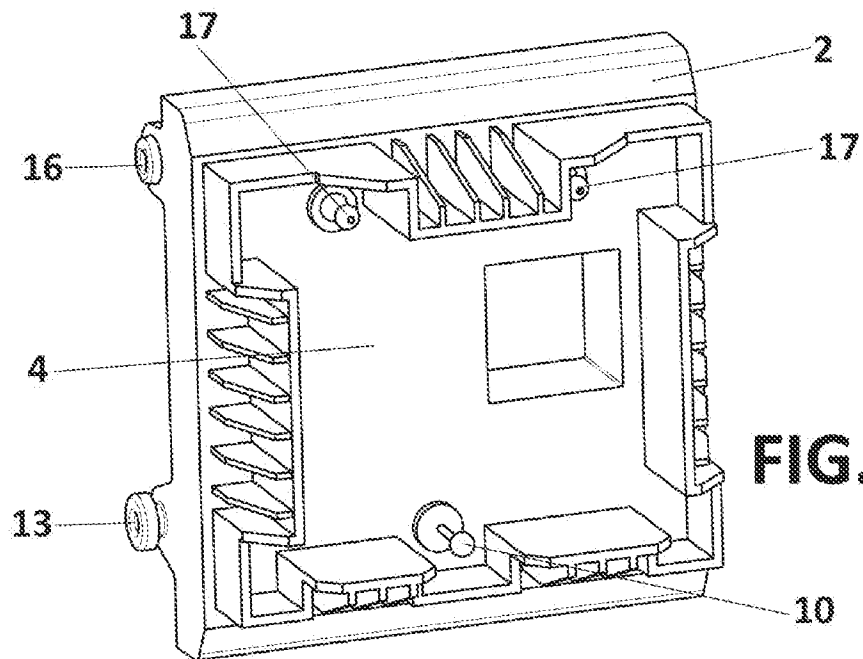


FIG. 2

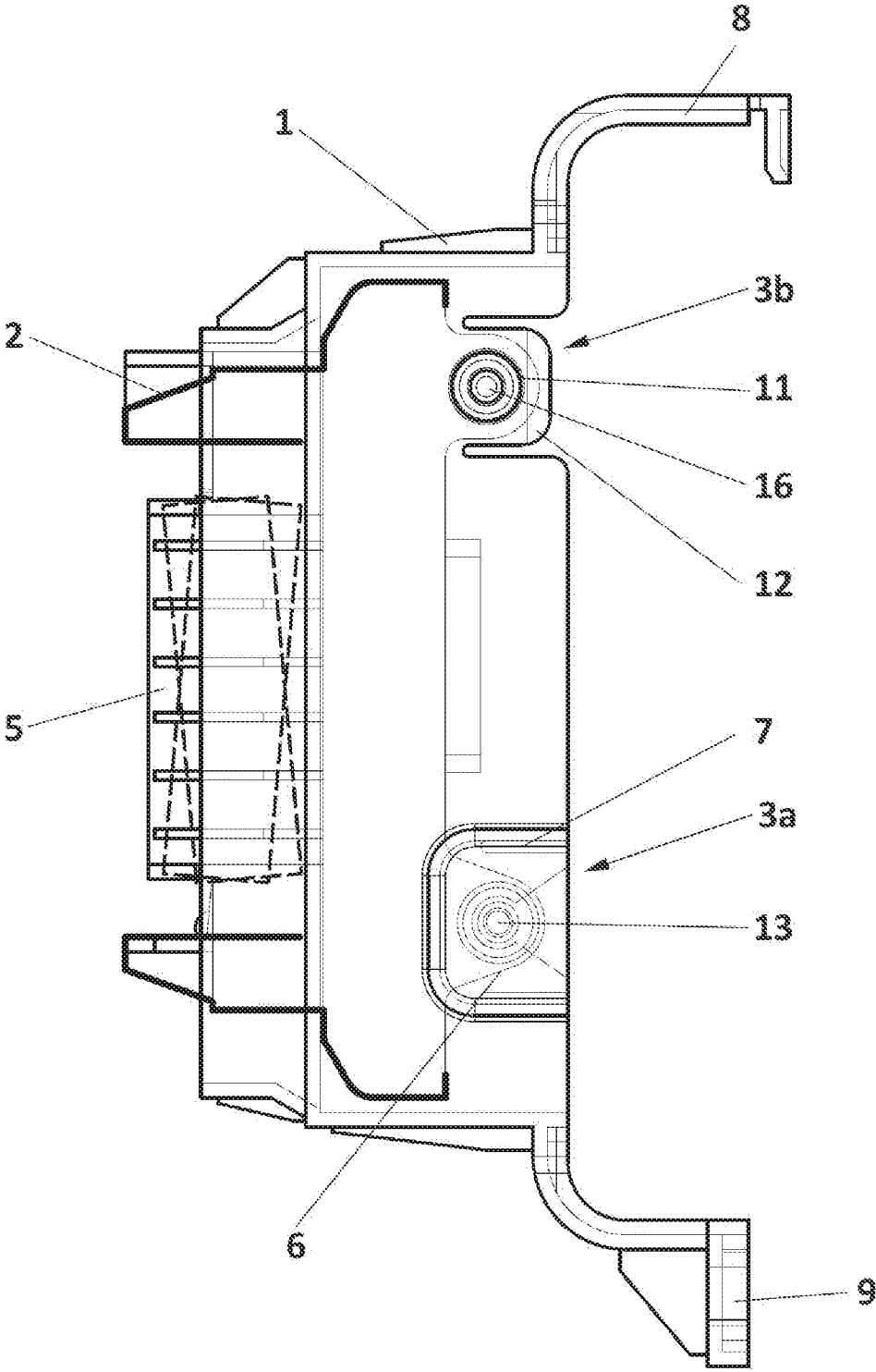


FIG. 3

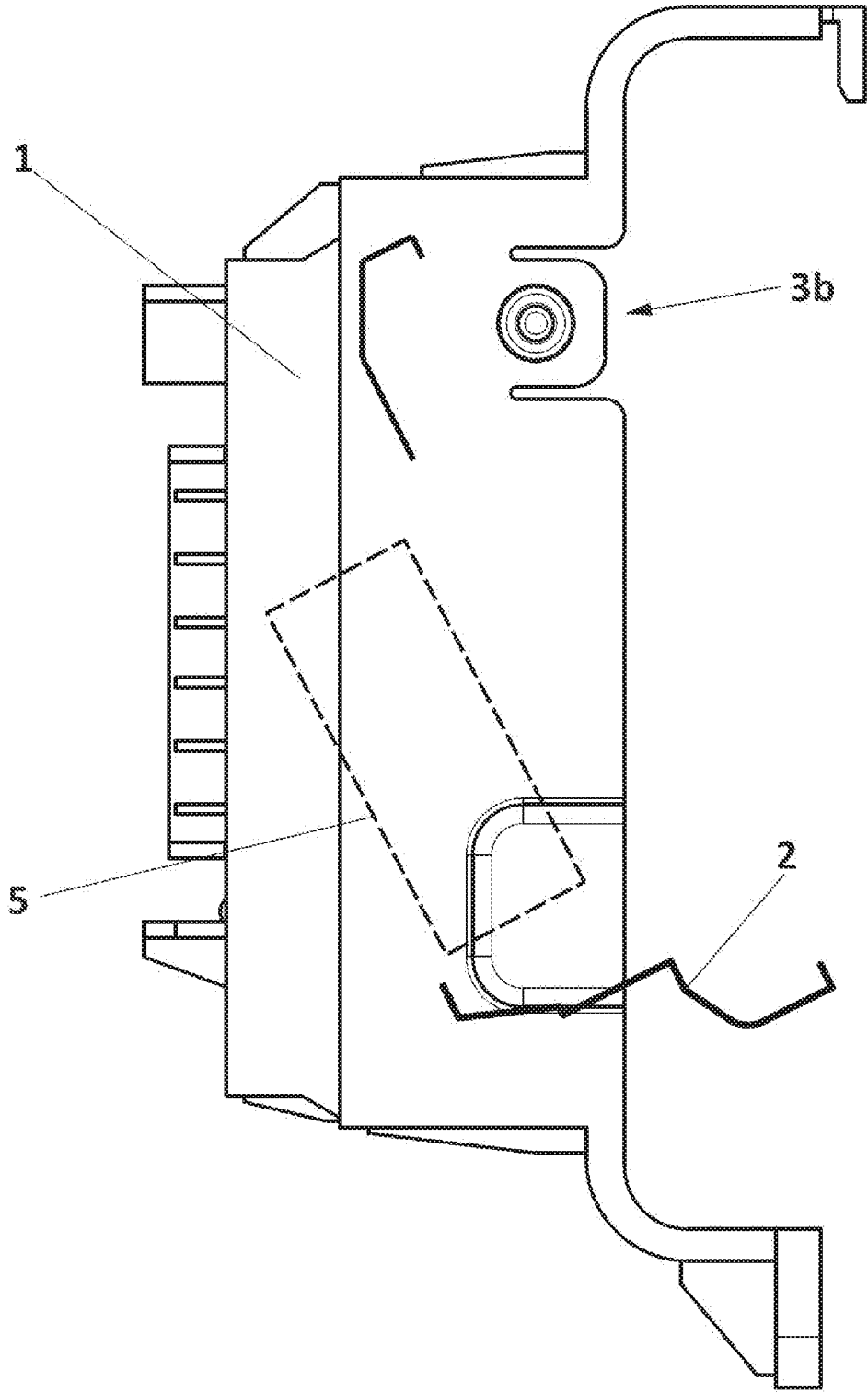


FIG. 4

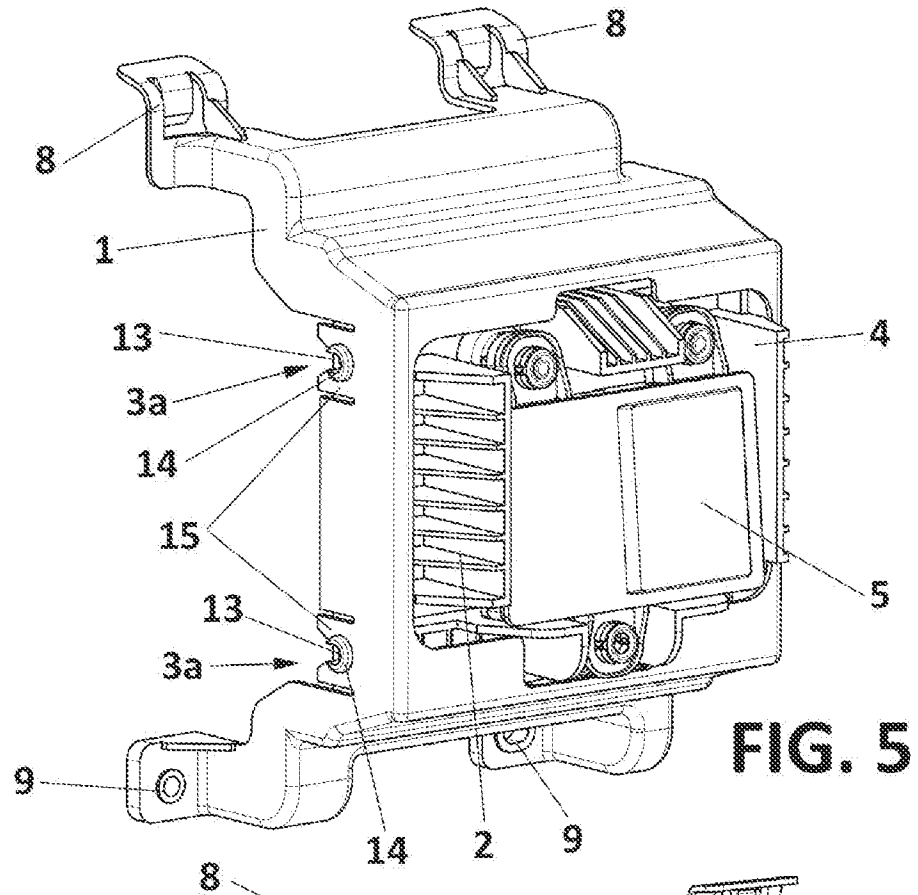


FIG. 5

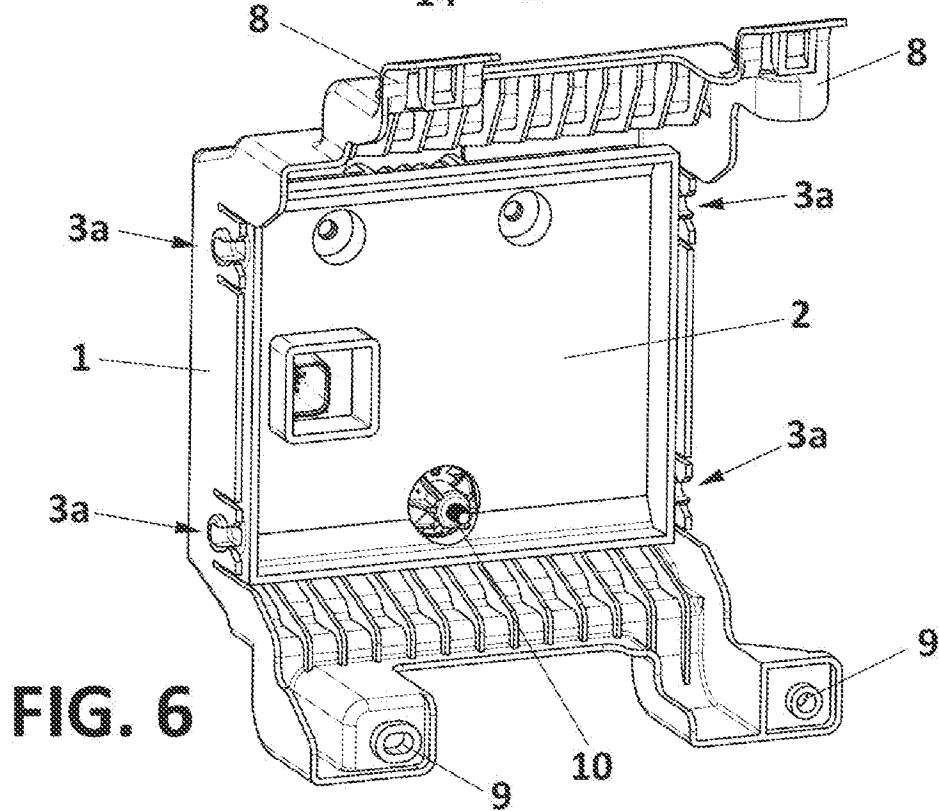


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/030538

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01S7/02 G01S13/93
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)
G01S

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	paragraphs [0003], [0005], [0006], [0046] - [0054]; figures 1-7,14 -----	2-4,10, 13
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Y	paragraphs [0001], [0004] - [0041]; figures 1-7 -----	4,13
X	EP 1 925 947 A1 (FUJITSU TEN LTD [JP]) 28 May 2008 (2008-05-28)	1,4,13
Y	paragraphs [0001], [0004] - [0008], [0010] - [0013]; figures 1A-3 -----	4,13
X	US 2004/017308 A1 (KIKUCHI HAYATO [JP]) 29 January 2004 (2004-01-29) paragraphs [0059] - [0063]; figures 1-8 ----- -/-	1



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	paragraphs [0001], [0003] - [0032]; figures 1-5	2,3,10, 14,15

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International application No

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