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## (54) DAMPING DEVICE FOR TRUNK LID

(57) The present disclosure provides a damping device for a trunk lid, the damping device comprising a stopping member fixed on the trunk lid of a motor vehicle, a trunk sill for cooperating with the stopping member and a stopping member support fixed on a body of the motor vehicle for supporting the trunk sill, the stopping member being provided with a damping hole in which an elastic damping member for reducing the shock caused by closing the trunk lid is fixed, wherein the stopping member is further provided with a positioning concave part shrinking towards the interior of the stopping member, and the trunk sill is provided with a positioning convex part corresponding to the positioning concave part, the positioning concave part and the positioning convex part being sized in such a way that when the trunk lid is completely closed, the positioning convex part completely fills the positioning concave part. A motor vehicle comprising the damping device for the trunk lid according to the present disclosure is further provided.

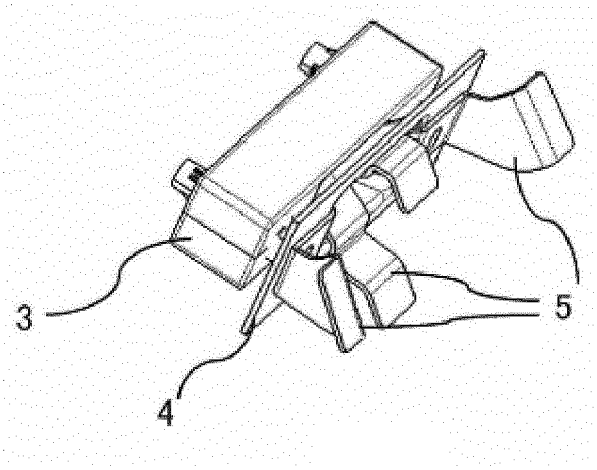


Fig.2

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## Description

### FIELD OF THE PRESENT DISCLOSURE

**[0001]** The present disclosure relates to a damping device for a trunk lid.

### BACKGROUND OF THE PRESENT DISCLOSURE

**[0002]** Motor vehicles, specifically small size motor vehicles (for example, sedan cars) are generally equipped with a trunk (also called as boot) for depositing the luggage and/or the cargo. The trunk is opened or closed by pivoting a trunk lid about a trunk lid shaft so as to deposit or take out the luggage and/or the cargo. As the trunk lid contacts a trunk sill, a shock is generated, which has a bad effect on both the whole structure of the motor vehicle and the riding experience of the passengers in the motor vehicle. Thus, the trunk lid is generally equipped with a stopping member, and the trunk sill is equipped with a corresponding stopping member support in order to reduce the shock caused by the opening and closing of the trunk lid.

**[0003]** The Patent Application DE 19953448A1 discloses a stop absorber to be mounted between a first automobile part and a second automobile part. The stop absorber is provided with a fastening element having a head for fastening it to the first automobile part, and the fastening element is movably linked with a contact element to contact the second automobile part. The distance between the contact element and the first automobile part can be adjusted. A spring element exerts a restoring force between the fastening element and the contact element. It should be noted that the spring element is a single member relative to base body and the contact element, and the stop absorber can only reduce the shock in a special direction.

**[0004]** The Patent Application US 20050093342A1 discloses an overslam bumper for a vehicle tailgate. This bumper can absorb the shock caused by closing the tailgate so as to avoid excessive insertion of the tailgate into the body of the vehicle, and can effectively avoid the disalignment of the tailgate. It should be noted that the tailgate is mainly used in the heavy vehicle such as a truck, and additionally, the bumper cannot avoid the displacement of a projection in an undesired direction.

**[0005]** It may be realized that in the prior art, the damping device for the trunk lid can only reduce the shock when closing the trunk lid, but cannot maintain the trunk lid stable after closing the trunk lid. That is to say, it cannot reduce the shock and possible displacement at the contact surface between the trunk lid and the trunk sill.

### SUMMARY OF THE PRESENT DISCLOSURE

**[0006]** The objective of the present disclosure is to overcome the above-mentioned defects existing in the prior art. Specifically, the objective of the present disclosure is to reduce the shock when closing the trunk lid and maintain the trunk lid stable after closing the trunk lid.

**[0007]** In order to achieve the above objective, the present disclosure provides a damping device for a trunk lid, the damping device comprising a stopping member fixed on the trunk lid of a motor vehicle, a trunk sill for cooperating with the stopping member and a stopping member support fixed on a body of the motor vehicle for supporting the trunk sill, the stopping member being provided with a damping hole on a first surface facing the trunk sill, and an elastic damping member for reducing the shock when closing the trunk lid being fixed in the damping hole, wherein the stopping member is provided with a positioning concave part shrinking towards the interior of the stopping member on the first surface, and the trunk sill is provided with a positioning convex part corresponding to the positioning concave part and shrinking towards the exterior of the trunk sill on a second surface facing the stopping member, the positioning concave part and the positioning convex part being sized in such a way that when the trunk lid is completely closed, the lateral inclined surfaces of the positioning convex part respectively abut against the lateral inclined surfaces of the positioning concave part so as to prevent the stopping member and therefore the trunk lid from displacing in any direction on the first surface or the second surface.

**[0008]** According to a preferred embodiment of the present disclosure, the positioning concave part is of a trapezoid or a truncated cone shape.

**[0009]** According to a preferred embodiment of the present disclosure, the positioning convex part is of a trapezoid or a truncated cone shape.

**[0010]** According to a preferred embodiment of the present disclosure, the stopping member is made of plastic.

**[0011]** According to a preferred embodiment of the present disclosure, the elastic damping member is cylindrical and made of a rubber material.

**[0012]** According to a preferred embodiment of the present disclosure, the trunk sill is made of a metal material.

**[0013]** According to a preferred embodiment of the present disclosure, the stopping member support is a metal-made plate having a plurality of positioning ends and a middle part thereof being projected outwards to support the positioning convex part of the trunk sill, and the plurality of positioning ends can be firmly fixed to the body of the motor vehicle.

**[0014]** According to a preferred embodiment of the present disclosure, the damping hole is a threaded hole, and the elastic damping member is provided with threads for cooperating with the threaded hole so as to be fixed in the threaded hole by screwing.

**[0015]** According to a preferred embodiment of the present disclosure, the damping device comprises a plurality of stopping members parallel to each other and fixed on the trunk lid of the motor vehicle, and the trunk sill is provided on the second surface with a plurality of posi-

tioning convex parts corresponding to a plurality of positioning concave parts of the plurality of stopping members.

**[0016]** The present disclosure further discloses a motor vehicle comprising the damping device for the trunk lid according to the present disclosure.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0017]** The present disclosure will be explained by reference to the following description of the illustrative embodiments taken in conjunction with the accompanying drawings:

Fig. 1 is a schematic view showing a damping device for a trunk lid according to the present disclosure when the trunk lid is in a closed condition;

Fig. 2 is an enlarged schematic view showing the damping device of Fig.1;

Fig.3 is a schematic view showing a stopping member of the damping device of Fig.1;

Fig.4 is a schematic view showing the assembly of a trunk sill and a stopping member support of the damping device of Fig.1;

Fig.5 is a sectional view of the damping device of Fig.1; and

Fig.6 is a side view of the damping device of Fig.1.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0018]** Fig. 1 is a schematic view showing a damping device for a trunk lid according to the present disclosure when the trunk lid is in a closed condition. As shown in Fig.1, the damping device 1 comprises a stopping member 3 fixed on a trunk lid 2 of a motor vehicle and a trunk sill 4 for cooperating with the stopping member 3. It should be noted that although two stopping members 3 are illustrated in the embodiment as shown in Fig.1, one, three or more than three stopping members 3 are also involved in the scope of the present disclosure.

**[0019]** Fig. 2 is an enlarged schematic view of the damping device of Fig.1. As shown in Fig.2, the damping device 1 further comprises a stopping member support 5 fixed on a body (not shown) of the motor vehicle to support the trunk sill 4. The stopping member support 5 is a metal-made plate having a plurality of positioning ends (e.g., four positioning ends in this embodiment), and the plurality of positioning ends can be firmly fixed to the body of the motor vehicle.

**[0020]** Fig.3 is a schematic view showing the stopping member of the damping device of Fig.1. As shown in Fig.3, the stopping member 3 is provided with damping holes 8 and a positioning concave part 9 on a first surface 7 facing the trunk sill 4, and an elastic damping member 10 for reducing the shock caused by closing the trunk is fixed in the damping hole 8. It should be noted that in this embodiment, although the positioning concave part 9 is positioned between the two damping holes 8, the relative position of the damping holes 8 and the positioning concave part 9 is not limited. For example, the positioning concave part 9 may also be positioned on one side of the damping holes 8. In this embodiment, the positioning concave part 9 has a trapezoid shape, but the shape of the positioning concave part 9 is not limited. For example, the positioning concave part 9 may also has a truncated cone shape.

**[0021]** Fig.4 is a schematic view showing the assembly of the trunk sill and the stopping member support of the damping device of Fig.1. As shown in Fig.4, the trunk sill 4 is provided with a positioning convex part 6 corresponding to the positioning concave part 9 on a second surface 11 facing the stopping member 3. The projecting middle portion of the stopping member support 5 can cooperate with the positioning convex part 6 of the trunk sill 4 and support the positioning convex part 6. The plurality of positioning ends (e.g., four positioning ends in this embodiment) can be firmly fixed to the body of the motor vehicle so as to transmit part of shock caused by closing the trunk to the body of the motor vehicle, and increase the strength of the trunk sill 4. In this embodiment, the positioning convex part 6 has a trapezoid shape, but the shape of the positioning convex part 6 is not limited. For example, the positioning convex part 6 may also has a truncated cone shape.

**[0022]** Fig.5 is a sectional view of the damping device of Fig.1. As shown in Fig.5, the damping hole 8 is a threaded hole, and the elastic damping member 10 is provided with threads for cooperating with the threaded hole so as to be fixed into the damping hole 8 by screwing. Compared with the single spring independent of the elastic damping member in the prior art, the structure of the elastic damping member 10 of the present disclosure is more compact and durable.

**[0023]** Fig.6 is a side view of the damping device of Fig.1. As shown in Fig.6, the damping device of the present disclosure can reduce the shock in a direction (e.g., direction 1) perpendicular to the first surface 7 or the second surface 11 when the trunk lid is closed. As shown in Figs.5 and 6, the positioning concave part 9 and the positioning convex part 6 are sized in such a way that when the trunk lid 2 is completely closed, the lateral inclined surfaces of the positioning convex part 6 respectively abuts against the lateral inclined surfaces of the positioning concave part 9 so as to prevent the stopping member 3 and therefore the trunk lid 2 from displacing in any direction (e.g., direction 2) on the first surface 7 or the second surface 11. Therefore, the damping device of the present disclosure can maintain the trunk lid 2 stable after closing the trunk lid 2, that is to say, the damping device can reduce the shock and possible displacement

of the trunk lid 2 in any direction (e.g., direction 2) at the contact surface between the trunk lid 2 and the trunk sill 4.

**[0024]** The present disclosure is not limited to the above-described embodiments in any form, and may be freely changed within the scope of the claims.

## Claims

1. A damping device (1) for a trunk lid (2), the damping device (1) comprising a stopping member (3) fixed on the trunk lid (2) of a motor vehicle, a trunk sill (4) for cooperating with the stopping member (3), and a stopping member support (5) fixed on a body of the motor vehicle for supporting the trunk sill (4), the stopping member (3) being provided with a damping hole (8) on a first surface (7) facing the trunk sill (4), and an elastic damping member (10) for reducing the shock caused by closing the trunk lid (2) being fixed in the damping hole (8), wherein the stopping member (3) is provided with a positioning concave part (9) shrinking towards the interior of the stopping member (3) on the first surface (7), and the trunk sill (4) is provided with a positioning convex part (6) corresponding to the positioning concave part (9) and shrinking towards the exterior of the trunk sill (4) on a second surface (11) facing the stopping member (3), the positioning concave part (9) and the positioning convex part (6) being sized in such a way that when the trunk lid (2) is completely closed, the lateral inclined surfaces of the positioning convex part (6) respectively abut against the lateral inclined surfaces of the positioning concave part (9) so as to prevent the stopping member (3) and therefore the trunk lid (2) from displacing in any direction on the first surface (7) or the second surface (11).

2. The damping device according to claim 1, wherein the positioning concave part (9) is of a trapezoid or a truncated cone shape.

3. The damping device according to any one of the preceding claims, wherein the positioning convex part (6) is of a trapezoid or a truncated cone shape.

4. The damping device according to any one of the preceding claims, wherein the stopping member (3) is made of plastic.

5. The damping device according to any one of the preceding claims, wherein the elastic damping member (10) is cylindrical and made of a rubber material.

6. The damping device according to any one of the preceding claims, wherein the trunk sill (4) is made of a metal material.

7. The damping device according to any one of the preceding claims, wherein the stopping member support (5) is a metal-made plate having a plurality of positioning ends and a middle part thereof being projected outwards to support the positioning convex part (6) of the trunk sill (4), and wherein the plurality of positioning ends are capable of being firmly fixed to the body of the motor vehicle.

8. The damping device according to any one of the preceding claims, wherein the damping hole (8) is a threaded hole, and the elastic damping member (10) is provided with threads for cooperating with the threaded hole so as to be fixed in the threaded hole (8) by screwing.

9. The damping device according to any one of the preceding claims, wherein the damping device (1) comprises a plurality of stopping members (3) parallel to each other and fixed on the trunk lid (2) of the motor vehicle, and the trunk sill (4) is provided on the second surface (11) with a plurality of positioning convex parts (6) corresponding to a plurality of positioning concave parts (9) of the plurality of stopping members (3).

10. A motor vehicle comprising the damping device (1) for the trunk lid according to any one of the preceding claims.

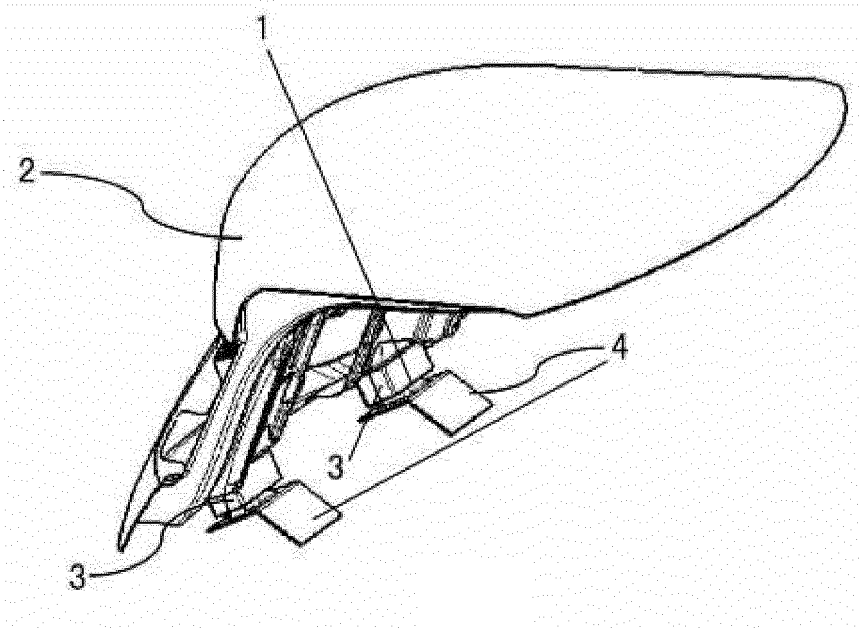


Fig.1

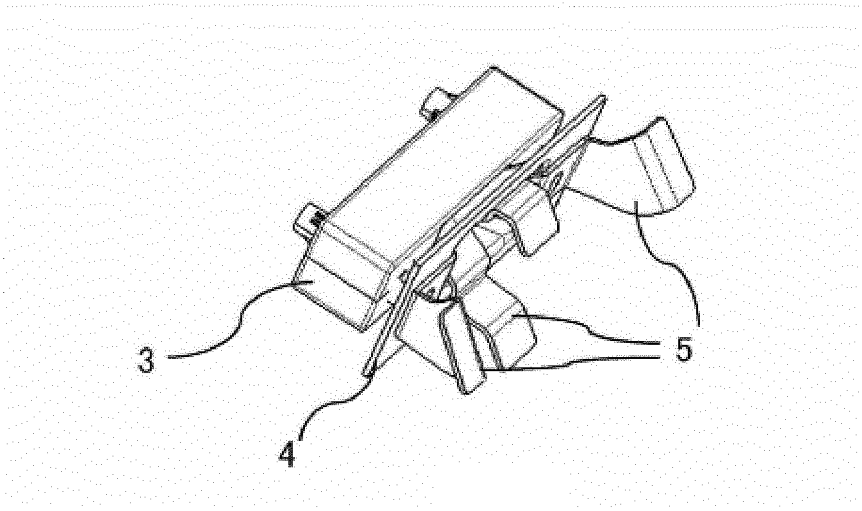


Fig.2

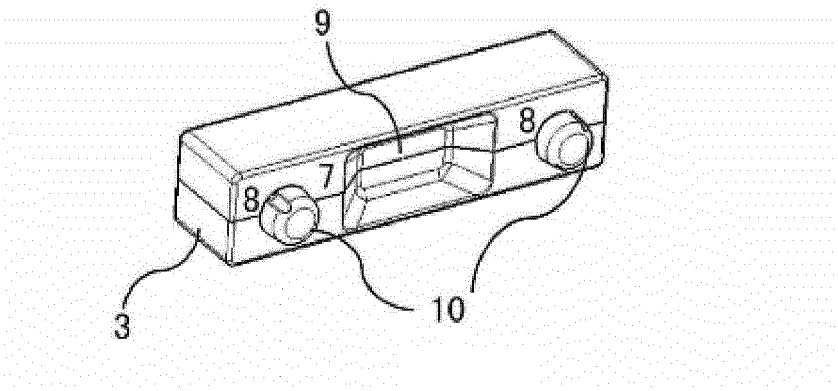


Fig.3

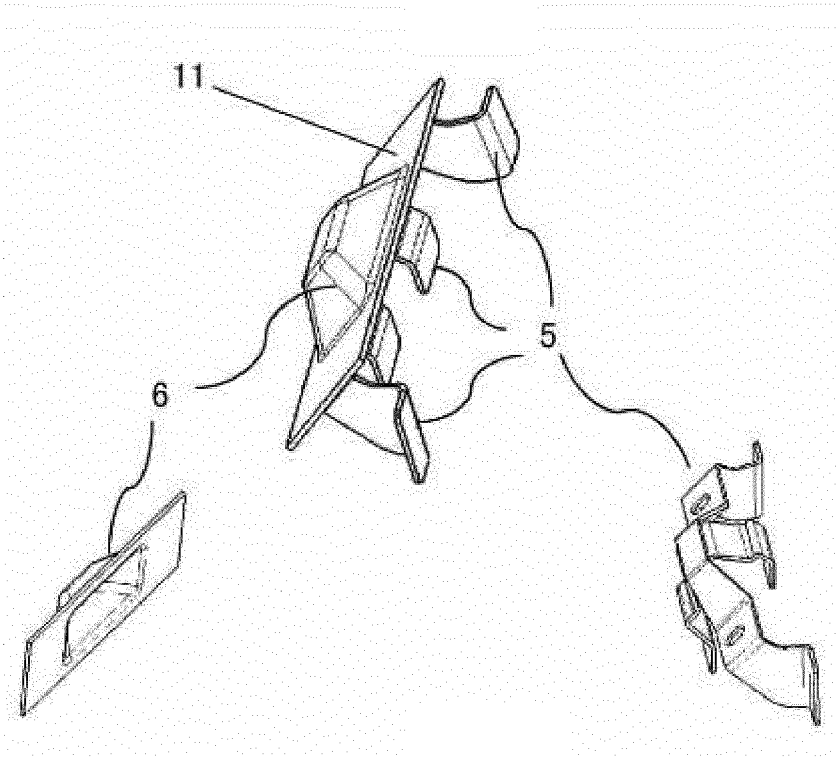


Fig.4

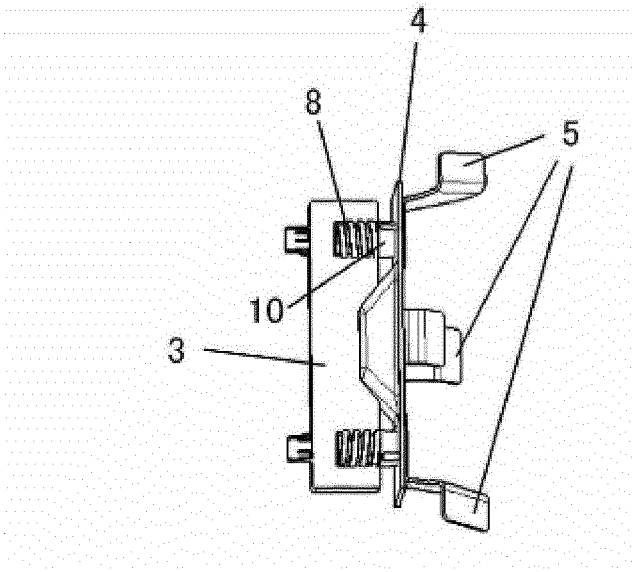


Fig.5

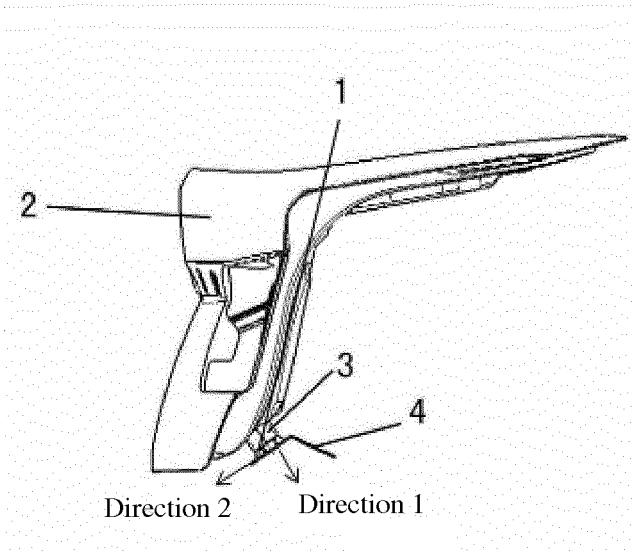


Fig.6

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# EUROPEAN SEARCH REPORT

Application Number
EP 16 16 7911

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| Y | DE 88 14 958 U1 (ADAM OPEL AG) 16 February 1989 (1989-02-16) * page 3, line 26 - line 36; figures 1-4 * | 1-10 | INV. E05F5/02 ADD. E05F7/04 |
| Y | US 6 206 455 B1 (FAUBERT ROBERT J [US] ET AL) 27 March 2001 (2001-03-27) * abstract; figure 8 * | 1-10 | |

TECHNICAL FIELDS SEARCHED (IPC)
E05F

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 12 September 2016 | Berote, Marc |

CATEGORY OF CITED DOCUMENTS

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 16 7911

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12-09-2016

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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| DE 8814958 U1 | 16-02-1989 | NONE | |
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

## REFERENCES CITED IN THE DESCRIPTION

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- US 20050093342 A1 **[0004]**