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(71) Applicant (for all designated States except US): **RIETER TECHNOLOGIES AG** [CH/CH]; Schlosstalstrasse 43, CH-8406 Winterthur (CH).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GODANO, Phillippe** [FR/CH]; Oberer Deutweg 12D, CH-8400 Winterthur (CH). **SIMON, David** [FR/FR]; Appartement 722, 42 rue des Chantier, F-78000 Versailles (FR).

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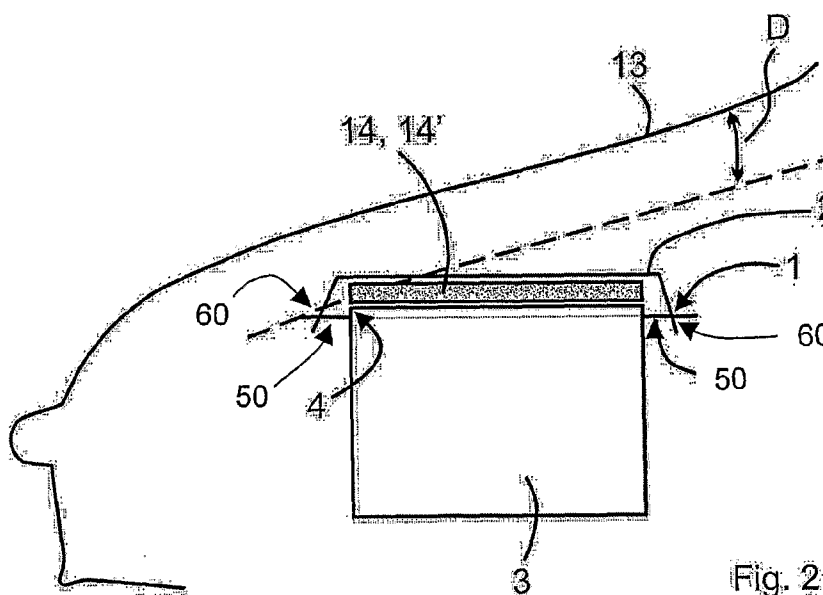


Fig. 2

(57) Abstract: The invention concerns a vehicle top engine cover mount (1) to securely connect a top engine cover (2) to a vehicle engine (3), which engine (3) creates crash relevant hard points (4), wherein said mount (1) at least partly is compliant for reducing the vibration-coupling between the engine (3) and the top engine cover (2), and wherein the mount (1) comprises a first mechanically coupling element (50) to be arranged at a sidewall of the engine (3) and a corresponding second mechanically coupling element (60) to be arranged at the top engine cover (2), wherein said first and second coupling elements (50, 60) are releasably coupled in a position in which said mount (1) is arranged sidewise of the engine (3) and below the crash relevant hard points (4) created by the engine (3). Also, the invention relates to such a vehicle top engine cover (2).

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Vehicle top engine cover mount and a respective cover

The present invention is concerned with a vehicle top engine cover mount to securely connect a top engine cover to a vehicle engine. In addition, the invention relates to such a top engine cover.

Top engine covers are placed above a vehicle's engine for acoustic and design reasons and are well known in the art. Such top covers commonly comprise a rather rigid carrier layer and a sound absorbing foam or fibres layer. It is known to equip the top engine cover with vertical mounts for fixing the cover to the engine. Known examples of such top engine covers are disclosed e.g. in FR 2 879 537 or FR 2 852 901. Unfortunately, these and all other commonly known mount designs have poor acoustic properties being unable to satisfyingly reduce the transmission of vibration to the top engine cover. A further top engine cover is described in FR 2 851 973. This engine cover, which is designed for deformation and destruction in case of a crash, does not reveal any mounts at all. In general, the known top engine cover mounts are not satisfying because of their extensive space consuming dimensions and the fact that these mounts are acting as so-called hard points, i.e. they restrict the space between the engine bonnet and the engine or aggregates on top of the engine.

It is therefore an object of the present invention to design a vibration-decoupling top engine cover mount which allows an easy attaching and removing of the engine cover for exchange and/or maintenance work. It is a further object of the invention to design a top engine cover mount, which allows to increase the hard point free space between the engine bonnet and the hard points created by the top engine cover mounts. Likewise, it is an object of the present invention to design a respective top engine cover.

These objects are achieved by a vehicle top engine cover mount comprising the features of claim 1. Said objects are also achieved by a vehicle top engine cover according to the features of claim 14.

It is a one advantage of the present invention that a very effective vibration-decoupling between the top engine cover from the engine can be achieved, especially for the vibrations in the sidewise pointing direction of the mount – in contrast to the state-of-the-art spherical rubber vibration-decoupling element. The stiffness of the compliant vibration-decoupling element according to the invention can be also selectively reduced in the z-direction (the most important for sound radiation) by thinning the walls of the rubber element / interface in the vertical direction (see Fig. 10 below). Because the compliant rubber vibration-decoupling elements are not directly mounted on the top side of the top engine cover (low stiffness), but on its sides (high stiffness), for the same rubber mount stiffness the vibration-decoupling effect of the mount is higher.

Another special advantage of the present invention is the possibility to remove all hard points between the top engine cover and the engine. All top engine cover mounts can be arranged sidewise with respect to the engine. Thus, the relevant remaining hard points result from the engine itself, and not any more from the engine and the mounts.

In an advantageous embodiment of the invention the first and second coupling element comprise either a stud or an interface interacting with said stud, respectively, wherein the stud and the interface preferably form a releasable snap-fit. Thus, the mounting and demounting is achieved in an easy but elegant way. It is understood that either the stud or the interface is attached to the top engine cover while the corresponding element (interface or stud) is attached to the vehicle engine.

Preferably, said at least one stud is orthogonally arranged to the snap-fit mounting direction. Such a construction allows an easy mounting and de-mounting and renders a very stable connection between the first and second coupling element. In general, said angle of the stud may be advantageously arranged ± 45 degrees in z-direction with respect to a horizontal plane.

Advantageously, said mount comprises a vibration-decoupling element having compliant portions or made of said compliant material, which is preferably a flexible or elastic material in order to decouple said engine and said engine cover.

Several alternative or complementary embodiments of said vibration-decoupling element are preferred: One is an embodiment of the mount, in which the vibration-decoupling element is part of the stud. A rubber hose may be mounted on said stud. Said stud may have a flexible and/or elastic portion. Also, said interface may have a flexible and/or elastic portion.

According to a especially preferred embodiment of the invention, said first coupling element or said corresponding second coupling element is fixed at a sidewardly declining flange of the engine cover, whereas said second coupling element or said first coupling element is fixed at a sidewall of the engine. In this way, the sidewise arrangement of the mount with respect to the engine is realized in a very efficient but easy way. It is advantageous to arrange the coupling element, which is provided at the side flange of the engine cover, at an inward wall of said flange. According to an alternative, the respective coupling element may be arranged at the rim of the said side flange.

Preferably, the interface comprises an open slit and one bearing cavity to form a mono-step snap-fit. Alternatively, two bearing cavities may be provided, which are spaced from each other and are preferably aligned to allow a one-directional movement of the corresponding coupling element when be-

ing pushed. The two bearing cavities are separated by a dual-step snap-fit distance in order to form a dual snap-fit.

According to a preferred embodiment, said interface comprises a lip-like structure, preferably made of rubber, to take up said stud. Said lip-like structure may comprise a hollow profile, hollow spaces, holes, single or multiple struts, or a combination of several of these structures.

The interface may advantageously comprise a bendable element, an insert, and/or an elastic material in order to increase the vibration-decoupling. Especially, rubber may serve as a material for struts. In a special embodiment, rubber struts are separated by hollow spaces. In a crash, the struts around the respective stud may fold or bend, thereby allowing the top engine cover to tilt.

The first or second mechanically coupling element, especially said interface, may be integrated in the top engine cover, in particular bonded to the top engine cover by bi-component injection moulding.

The top engine cover according to the invention accommodates at least one second mechanically coupling element of above described cover mount. Preferably, several such second coupling elements are provided and all the second coupling elements are arranged at sidewardly declining flanges of said engine cover.

In order to stand the acting forces, the top engine cover may comprise reinforcements between the upper side of the engine cover and sidewardly declining flanges. Thus, the side flanges accommodating said the second coupling elements cannot break easily.

According to one preferred embodiment, one second coupling element is arranged on each lateral side of the top engine cover. Preferably, these two

second coupling elements are aligned in the lateral direction (y-direction) of the vehicle. Thus, the top engine cover is pivotable around the common axis of both these mounts, wherein this axis is aligned with the y-axis of the vehicle. The provision of such a rotation axis may greatly help to mount and demount a top engine cover in a confined engine bay like the ones in many MPVs (multiple purpose vehicles). The top engine cover does not have to be mounted / dismounted in z-direction, but can be mounted / demounted in a declined position and fixed with the side mounts. Then, the front of the top engine cover may be lowered and fixed at mount(s) provided at the front side of the engine cover and engine.

In a respective embodiment, one or more second coupling elements are arranged at the front side of the top engine cover, but none on the back side. Of course, the corresponding first coupling element(s) are arranged on the engine adjacent to said second coupling element(s).

In a more elaborated embodiment, the lateral mounts may comprise mono-step snap-fits, whereas the front mount(s) may comprise dual-step snap-fit(s). In a pedestrian crash case, such a construction may help to reduce the impact on the pedestrian by moving the top engine cover area near the dual step snap fit(s) downwards, thus allowing the full deformation of the hood structure

The top engine cover is preferably a product made by injection moulding or a thermoforming process. Advantageously, the material may be PP (polypropylene), PA (polyamide), GF (glass fibers), CO (cotton), PES (polyester) or a similar material.

The top engine cover may comprise a passive pedestrian crash energy-absorbing pad, in particular a honeycomb material, a foam or an embossed sheet. Also, the top engine cover may comprise an acoustic absorber. Such a sound energy-absorbing pad may comprise thermo-formable foam or an

injected foam or a felt or felt assembly, wherein the felt in particular comprises cotton, GF or PES material.

In general, according to one preferred embodiment, the invention consists of a mount comprising at least one stud (as a preferred embodiment of a mechanically coupling element), wherein the studs are arranged horizontally instead of vertically, and having their tips below the hard points of the engine. The corresponding second mechanically coupling elements, especially said interfaces, are preferably integrated in the side flanges of the top engine cover and are preferably realized by an open slit with flexible walls and with a bearing cavity to locate the stud. A further slit and a further bearing cavity may be added on top of the previous one for achieving a dual-step snap-fit such that the top engine cover is bent downward in a pedestrian crash case. With the absence of studs between the upper surface of the engine and the top engine cover a space free of hard points is created. This space can be used for an acoustic and/or crash energy-absorbing pad. It is understood that the flexible walls of the slit can be realized with any elastic material and/or with an appropriate geometry of the slits wall. This elastic material may consist either of a separate insert or of a bi-component injection moulding part. Alternatively, the studs may be coated with an elastic material. Furthermore the studs may simply extend in a horizontal direction or may have a L-shape with the tip portion extending in a vertical direction.

Further embodiments of the top engine cover mount and the top engine cover according to the invention comprise the features of the dependant claims.

The invention is described in more detail by the following and with reference to the drawings, wherein:

Fig. 1 shows a schematic sectional view of an engine bay with a top engine cover mounted in accordance with the state of the art;

- Fig. 2 shows a schematic sectional view of an engine bay with a top engine cover mounted in accordance with the invention;
- Fig. 3a shows a schematic sectional view of an engine bay with a top engine cover mounted in accordance with a further embodiment of the invention;
- Fig 3b shows a schematic top view of the embodiment shown in Fig 3a;
- Fig. 4 shows a schematic sectional view of a mono-step vibration-decoupling interface, seen onto the front face of the stud;
- Fig. 4a shows the embodiment of Fig. 4 in a sectional view from the side (along A-A);
- Fig. 5 shows a schematic sectional view of a dual-step vibration-decoupling interface, seen onto the front face of the stud;
- Fig. 5a shows the embodiment of Fig. 5 in a sectional view from the side (along A-A);
- Fig. 6 shows a schematic sectional view of a further embodiment of a mono-step decoupling interface, seen towards the front face of the stud;
- Fig. 7 shows a schematic sectional view of a further embodiment of a dual-step decoupling interface, seen towards the front face of the stud;
- Fig. 8a shows a schematic sectional view of a further embodiment of a dual-step decoupling interface with a hidden stud (along B-B of Fig. 8b);

Fig. 8b shows the embodiment of Fig. 8a in a sectional view from above (along A-A);

Fig. 9a shows a schematic sectional view of a further embodiment of a dual-step decoupling interface with a hidden stud arranged at the top engine cover (along B-B of Fig. 9b);

Fig. 9b shows the embodiment of Fig. 9a in a sectional view from above (along A-A);

Fig. 10a shows a schematic longitudinal sectional view of a preferred embodiment of a bendable decoupling interface;

Fig. 10b shows a schematic cross sectional view (along A-A) of the embodiment shown in Fig. 10a;

Fig. 11a shows a schematic side view of a rotatable top engine cover, and

Fig. 11b shows the embodiment of Fig. 11a in top view and two magnified views of mounts, seen towards each respective front face of the stud.

The schematic sectional view of an engine bay as shown in Fig. 1 illustrates the geometric arrangement of known vehicle's engine top covers. The engine bay underneath a motor bonnet 13 of a conventional motor vehicle accommodates an engine 3. This engine 3 comprises on its topside various aggregates, in particular an air filter or an intake pipe. An engine top cover 2 is mounted on top of the engine 3. First mechanically coupling elements 50 comprising vertical studs are carrying this engine top cover 2 via suitable second mechanically coupling elements 60. Preferred embodiments comprise an additional acoustic package 14 in between the top cover 2 and the

engine 3 and its aggregates. In case of a pedestrian impact the available space for deformations is defined by the distance D between the motor bonnet 13 and the hard points 4 of the mounts 1. This free space is sometimes used for crash absorbing elements, in particular passive crash absorbing elements made of a bendable material as well as for active crash absorbing elements such as air bags.

Fig. 2 schematically shows the arrangement of the mounts 1 and the top engine cover 2 in accordance with the invention. This figure makes clear that the first and second decoupling elements 50, 60 are arranged sidewise of the vehicle's engine 3 and have their tip below the hard points 4 of the engine 3. Therewith the deformation distance D between the bonnet 13 and the hard point(s) 4 is substantially increased compared to the distance D of the state of the art arrangements. One advantage of this construction is that the increase of the deformation distance D allows achieving a HIC-value (Head Injury Criteria) of less than 1000 and even less than 800. Various embodiments of the top engine cover mount 1 will be described in more details later on. Since the crash energy absorbing pad 14 and/or the sound energy absorbing pad 14' comprise compressible, i.e. elastic material, these pads 14, 14' may be arranged between the top engine cover 2 and the engine 3 without reducing the deformation distance D.

Fig. 3a schematically shows the arrangement of several mounts 1 with first and second coupling elements 50, 60 according to another preferred embodiment. Here, two mounts 1 are arranged on lateral sides (alongside) of the engine 3 and one mount 1 is arranged at the front side of the engine 3. All of the mounts 1 have their tip below the hard points 4 of the engine 3. The two mounts 1, which are arranged alongside, define a rotational axis and form a pivot, which allows the engine cover 2 to be pivoted around this axis. This is illustrated more clearly in Fig. 3b. It is advantageous to use a mount 1 at the front side with a dual-step snap-fit (see Figure 5), whereas the mounts

1 at the lateral sides preferably are mono-step snap fits for providing a defined and stable rotation axis.

In especially preferred embodiments (see Figures 4-8, 11), the first coupling elements 50 comprise studs 5, which are affixed at the engine body with screws (wherein the screw may be integrated within the first coupling element 50). Also, an L-shaped metal part may be used to fix the stud 5 to the engine body. Other alternatives are possible, too. The second coupling elements 60 preferably comprise corresponding interfaces 6, which preferably are construed as snap-fits, which preferably are part of the engine cover 2.

Of course, in a vice versa construction, the studs 5 may be part of the second coupling elements (and part of the engine cover 2), while the interfaces 6 with the snap-fits may be part of the first coupling elements and to be affixed to the engine 3 (see Fig. 9).

Fig. 4 illustrates a suitable interface 6 with a releasable snap-fit, which is integrated into a side flange 2a of the top engine cover, wherein the side flange 2a extends downwardly from an outer edge of the cover's topside 2b. The interface 6 comprises a slit 8 and a bearing cavity 9. A stud 5 is fitting closely into the bearing cavity 9. In a preferred embodiment, this slit 8 and the bearing cavity 9 are bordered by a compliant elastic material, which forms a vibration-decoupling element 7. In the shown embodiment, holes 7a in the vibration-decoupling element 7 render the interface 6 compliant for the stud to pass through the narrowest portion of the interface 6. Via the vibration-decoupling element 7, the vibrations generated by the running vehicle's engine 3 are not forthright transferred to the engine cover 2 but substantively attenuated. Due to the flexibility and/or the geometry of the interface 6 and this elastic vibration-decoupling element 7 it is easy to attach and to remove the engine cover 2. This elastic vibration-decoupling element 7 may be formed as an insert 12 to be taken up by a cavity in a side flange 2a of a top

engine cover (see Fig. 10a as an example for an insert) or may be bonded to the engine cover 2 by an injection moulding process.

Fig. 5 illustrates a further embodiment of the interface 6 shown in Fig. 4. The interface 6 of this embodiment is modified to form a releasable dual-step snap-fit. This snap-fit is integrated into a side flange 2a of the engine cover 2 as well and comprises a slit 8 and two bearing cavities 9, 9'. A stud 5 is fitting closely into a first bearing cavity 9. This first bearing cavity 9 communicates with a second bearing cavity 9' via a passage arranged in line with the slit 8. If the engine cover 2 is pushed towards the engine 3, the fixed stud 5 will enter the second cavity 9' through the passage between the first bearing cavity 9 and the second bearing cavity 9'. Preferably, the slit 8, the bearing cavities 9, 9' and the above mentioned passage are bordered by an elastic material, which forms a vibration-decoupling element 7. The transferred vibrations generated by the running vehicle's engine 3 to the engine cover 2 are substantially attenuated therewith. Due to the flexibility and/or the geometry of the interface 6 and this elastic vibration-decoupling element 7 it is easy to attach and to remove the engine cover 2.

Fig. 6 illustrates a further embodiment of a suitable interface 6 forming a releasable mono-step snap-fit. This interface 6 is integrated into the engine cover 2 and may be formed as an insert or may be bonded to the engine cover 2 by an injection moulding process. This interface comprises a slit 8 with a bearing cavity 9 in its interior. Compliant flexible snap-fit portions 10 ensure an easy attaching of the insert 6 to the stud 5 and an easy removing of the insert 6 from the stud 5. This facilitates the handling of the engine cover 2 in case of maintenance work. In addition, resilient portions are acting as vibration-decoupling element 7.

A modified embodiment of the interface 6 is shown in Fig. 7. This interface 6 comprises a slit 8 and two cavities 9, 9', which form a releasable dual-step snap-fit. These cavities 9, 9' are communicating with each other via a pas-

sage, which is arranged in line with the slit 8. Both cavities comprise compliant flexible snap-fit portions 10 to ensure an easy attaching of the insert 6 to and an easy removing of the insert 6 from the stud 5. These flexible snap-fit portions 10 facilitate the handling of the engine cover 2 in case of maintenance work. Additional compliant resilient portions are acting as vibration-decoupling element 7. In case that the engine cover 2 is pushed towards the engine 3 the fixed stud 5 will enter the second cavity 9' through the passage between the first and the second bearing cavity leading to a displacement of the engine cover 2 by a given distance d.

Fig. 8a and 8b show another embodiment according to the invention with a dual-step snap-fit interface 6 with only one slit 8 provided at the downwardly facing side of the interface 6. Here, the end of the stud 5 is hidden inside the cavity 9 such that the stud 5 is not visible from the outside.

Fig. 9a and 9b show a still further embodiment of a dual-step decoupling interface with a hidden stud 5. However, in this embodiment the stud 5 is attached or incorporated, e.g. bonded, to the side flange 2a of the top engine cover, whereas the interface 6 is fixed to a sidewall of the engine 3. In this embodiment, the slit 8 of the interface 6 opens upwardly in order to receive the stud 5.

Fig. 10a and 10b illustrate another preferred embodiment of an interface 16 in accordance with the invention. This interface 16 comprises a lip-like structured insert 12, which is provided with a slit 8 to accommodate a stud 5. This insert 12 comprises several elastic struts 11, which are designed to elastically move in case that the engine cover 2 is pushed against the stud 5. Preferably, the stud 5 comprises a compliant vibration-decoupling element 7, which may consist of a flexible portion or of an elastic portion, in particular a rubber hose.

The rubber vibration-decoupling insert 12 is clipped on the top engine cover 2. By thinning of the struts 11 of the decoupling element in the z-direction, one increases the vibration-decoupling in this direction. This design can be used to achieve a rotation of the top engine cover 2 in combination with double snap-fit vibration-decoupling elements. The stud 5 may also show a shape with a changing cross section in order to position accurately the top engine cover 2 in the direction of the stud 5. In order to increase the vibration insulation, one can increase the diameter the stud 5 to increase its bending stiffness. The stud 5 is preferably made of a steel, a rubber or a composite material.

Fig. 11a and 11b display another advantageous embodiment according to the invention. Fig. 11b shows a dual-step snap-fit at the front mount 1 and two mono-step snap-fits at the lateral mounts 1. Here, the mono-step snap-fit interfaces 6 at the engine's lateral side open horizontally, whereas the dual-step snap-fit interface 6 to the engine's front open vertically. Thus, the top engine cover 2 may be slantedly pushed in direction A to couple the first and second coupling elements 50, 60, e.g. studs 5 and interfaces 6, 16. Then, the top engine cover 2 is rotated according to rotational movement B about axis Y to bring the cover 2 into its final position. This embodiment has the advantage to be easily mountable and demountable in constrained and narrow engine bays, which can be found, e.g., in MPVs.

The figures show exemplary embodiments of the invention. Other constructions within the claims are possible. For example, the first and second mechanically coupling elements 50, 60 may comprise other geometries than a linear stud 5 with an enlarged ball-shaped end.

The advantages of the present invention are evident for the man skilled in the art and are to be seen in the removal of the hard points created by the top engine cover mounts, in the increase of the deformation distance and

therewith the increase of the crash absorption capabilities and in the improved vibration and sound attenuation.

Claims

1. Vehicle top engine cover mount (1) to securely connect a top engine cover (2) to a vehicle engine (3), which engine (3) creates crash relevant hard points (4), wherein said mount (1) at least partly is compliant for reducing the vibration-coupling between the engine (3) and the top engine cover (2), and wherein the mount (1) comprises a first mechanically coupling element (50) to be arranged at a sidewall of the engine (3) and a corresponding second mechanically coupling element (60) to be arranged at the top engine cover (2), wherein said first and second coupling elements (50, 60) are releasably coupled in a position in which said mount (1) is arranged sidewise of the engine (3) and below the crash relevant hard points (4) created by the engine (3).
2. Vehicle top engine cover mount (1) in accordance with claim 1, characterized in that said first or second coupling element (50, 60) comprises a stud (5) and said second or first coupling element (60, 50) comprises an interface (6;16) interacting with said stud (5).
3. Vehicle top engine cover mount (1) in accordance with claim 2, characterized in that the mount (1) forms a releasable snap-fit.
4. Vehicle top engine cover mount (1) in accordance with claim 2 or 3, characterized in that the angle of said stud (5) is arranged +/- 45 degrees in z-direction with respect to a horizontal plane, wherein the axis of the stud (5) is preferably arranged orthogonally to the mounting direction.
5. Vehicle top engine cover mount (1) in accordance with claims 1 to 4, characterized in that said mount (1) comprises a compliant vibration-

- decoupling element (7; 11), which is a portion or a material being flexible or elastic, in order to decouple said engine (3) and said engine cover (2).
6. Vehicle top engine cover mount (1) in accordance with claim 5, characterized in that said vibration-decoupling element (7; 11) is construed according to at least one of the following embodiments: rubber hose mounted on said stud (5), flexible and/or elastic portion of said stud (5), flexible and/or elastic portion (11) of said interface (6; 16).
 7. Vehicle top engine cover mount (1) in accordance with one of the preceding claims, characterised in that said first coupling element (50) or said corresponding second coupling element (60) is fixed at a side-wardly declining flange (2a) of the engine cover (2), whereas said second coupling element (60) or said first coupling element (50) is fixed at a sidewall of the engine (2).
 8. Vehicle top engine cover mount (1) in accordance with one of the preceding claims, characterised in that said interface (6) comprises an open slit (8) and one bearing cavity (9) in order to form a mono-step snap-fit (10), or two bearing cavities (9, 9') spaced from each other by a dual-step snap fit distance (d) in order to form a dual snap fit (10).
 9. Vehicle top engine cover mount (1) in accordance with one of the preceding claims, characterised in that said interface (6; 16) comprises a lip-like structure, preferably made of rubber, to take up said stud (5).
 10. Vehicle top engine cover mount (1) in accordance with claim 9, characterised in that the lip-like structure (6; 16) comprises at least one of the following geometries: a hollow profile; hollow spaces; holes; single or multiple struts.

11. Vehicle top engine cover mount (1) in accordance with one of the preceding claims, characterised in that the interface (6; 16) comprises at least one of the following elements: an elastically bendable element (11); an insert (12); an elastic material in order to increase the vibration-decoupling, in particular rubber struts.
12. Vehicle top engine cover mount (1) in accordance with one of the preceding claims, characterised in that the first or second coupling element (50, 60) is integrated in the top engine cover (2), in particular bonded to the top engine cover (2) by bi-component injection moulding.
13. Vehicle top engine cover mount (1) in accordance with one of the preceding claims, characterised in that the stiffness of the compliant vibration-decoupling element (11) is selectively reduced in the z-direction by thinner elastic walls (11), which predominantly run in the vertical direction, compared to walls (11), which predominantly run in horizontal directions.
14. Vehicle top engine cover (2) comprising at least a second mechanically coupling element (60) of a vehicle top engine cover mount (1) in accordance with one of the preceding claims.
15. Top engine cover (2) in accordance with claim 14, characterised in that several second coupling elements (60) of said top engine cover mounts (1) are provided, all being arranged at sidewardly declining flanges (2a) of said engine cover (2).
16. Top engine cover (2) in accordance with claim 14 or 15, characterised in that the top engine cover (2) comprises reinforcements between the upper side (2b) of the engine cover (2) and sidewardly declining flanges (2a).

17. Top engine cover (2) in accordance with one of the claims 14 to 16, characterised in that one second coupling element (60) is arranged on each lateral side of the top engine cover (2).
18. Top engine cover (2) in accordance with claim 17, characterised in that said two second coupling elements (60) are aligned in the lateral direction (y-direction) of the vehicle and that the top engine cover (2) is pivotable around their common axis (y-axis in lateral direction).
19. Top engine cover (2) in accordance with one of the claims 14 to 18, characterised in that one or more second coupling elements (60) are arranged at the front side of the top engine cover (2), but none at its back side.
20. Top engine cover (2) in accordance with one of the claims 14 to 19, characterised in that the top engine cover (2) is a product made by one of an injection moulding or a thermoforming process.
21. Top engine cover (2) in accordance with one of the claims 14 to 20, characterised in that the top engine cover (2) is a product made of PP (polypropylene), PA (polyamide), GF (glass fibers), CO (cotton), PES (polyester) or a similar material.
22. Top engine cover (2) in accordance with one of the claims 13 to 21, characterised in that the top engine cover (2) comprises a passive pedestrian crash energy absorbing pad (14), in particular a honeycomb material, a foam or an embossed sheet.
23. Top engine cover (2) in accordance with one of the claims 14 to 22, characterised in that the top engine cover (2) comprises a sound energy absorbing pad (14'), in particular a thermo-formable foam or an

injected foam or a felt or felt assembly, wherein the felt in particular comprises cotton, GF or PES material.

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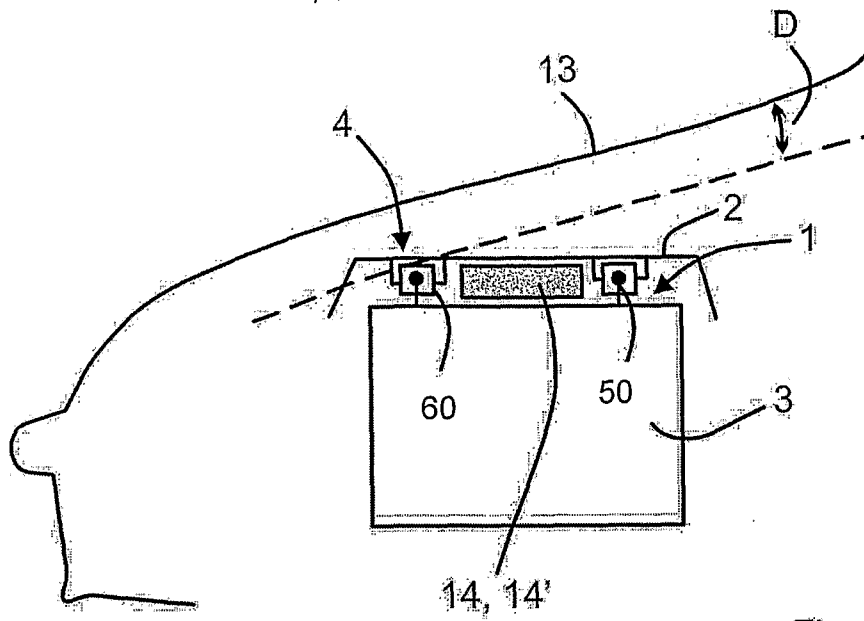


Fig. 1

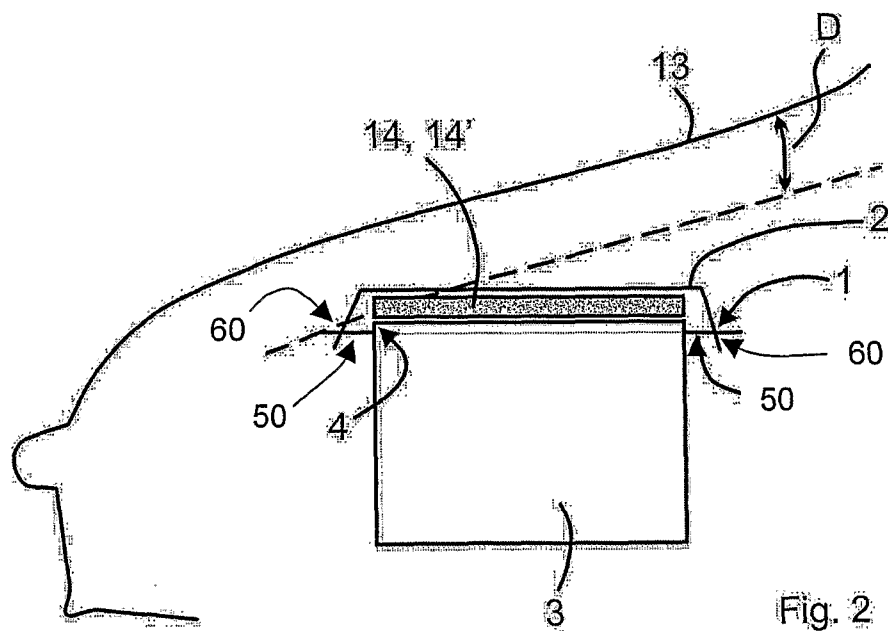
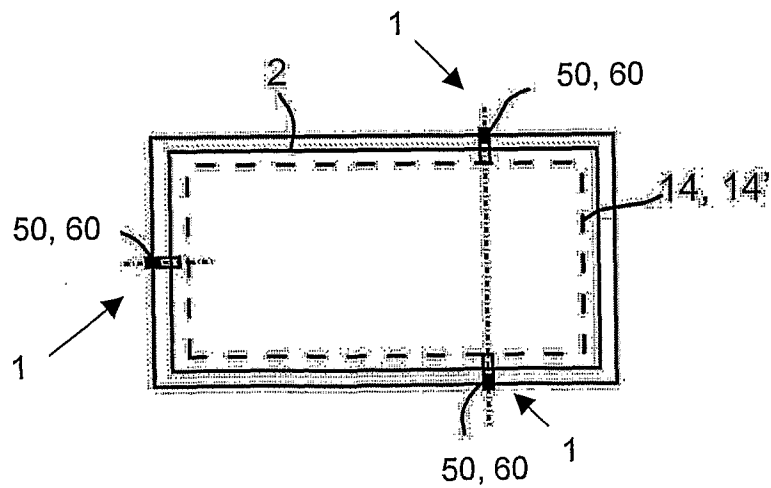
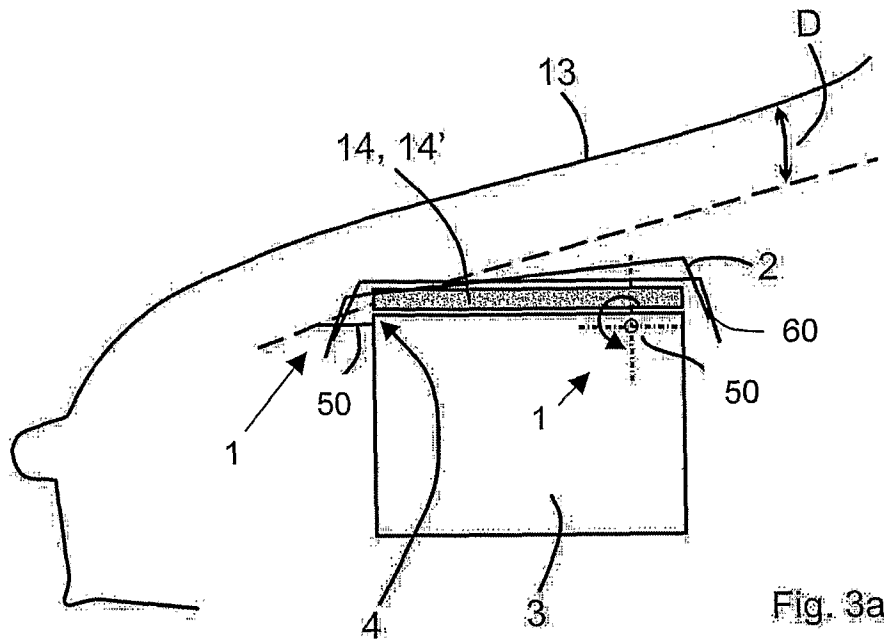
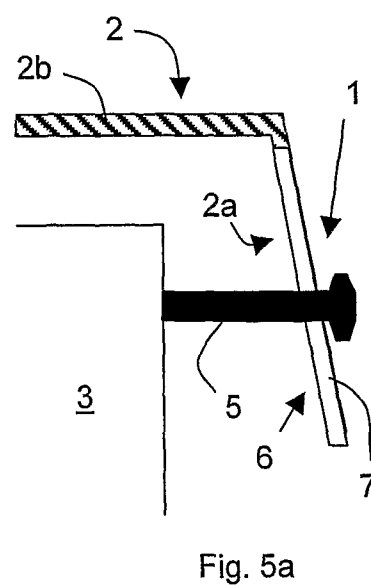
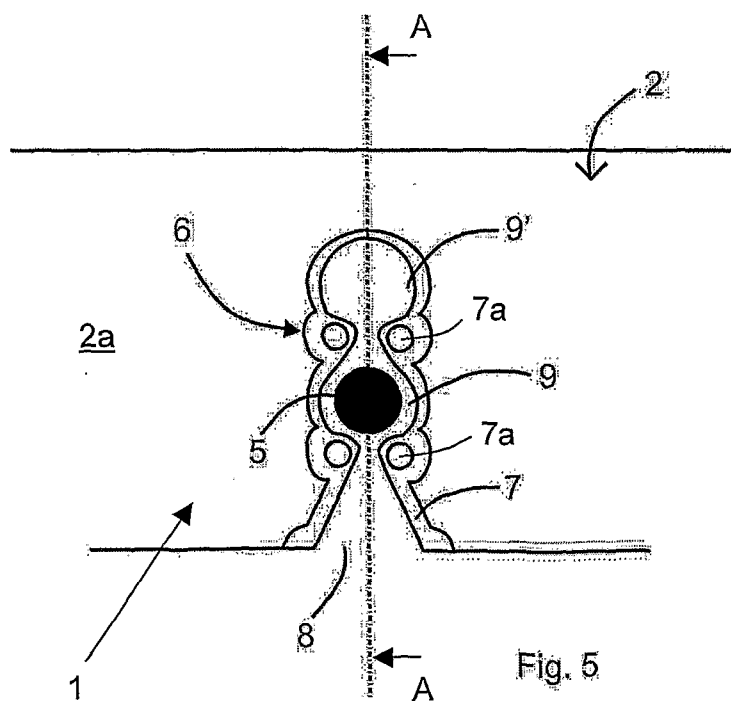
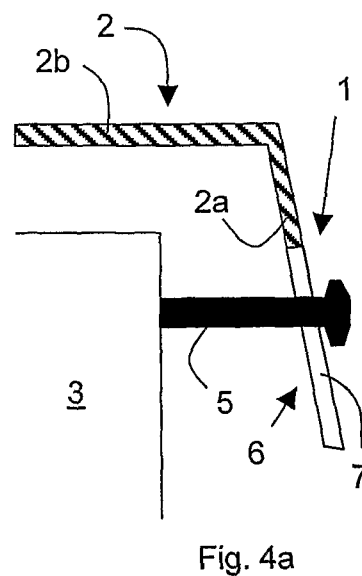
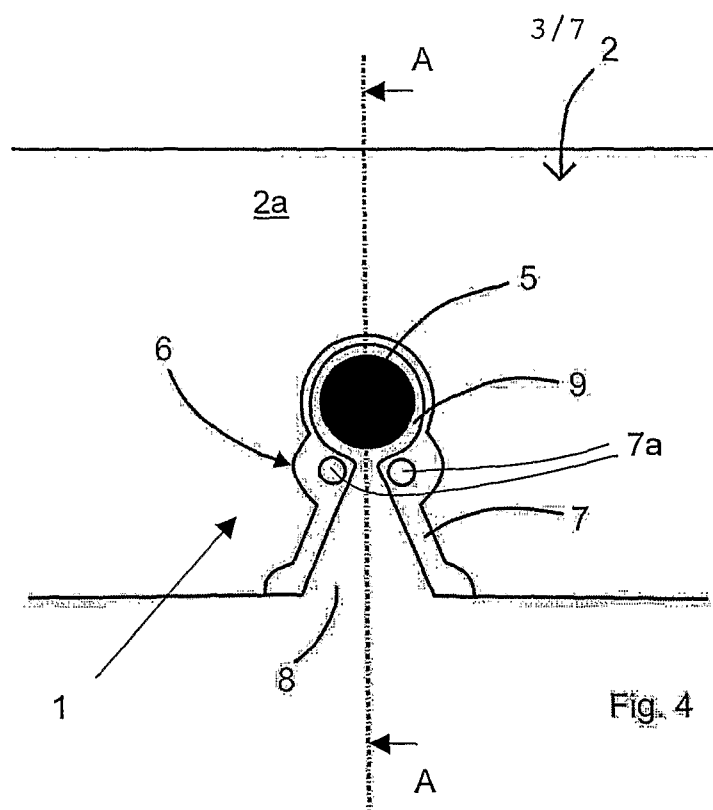


Fig. 2

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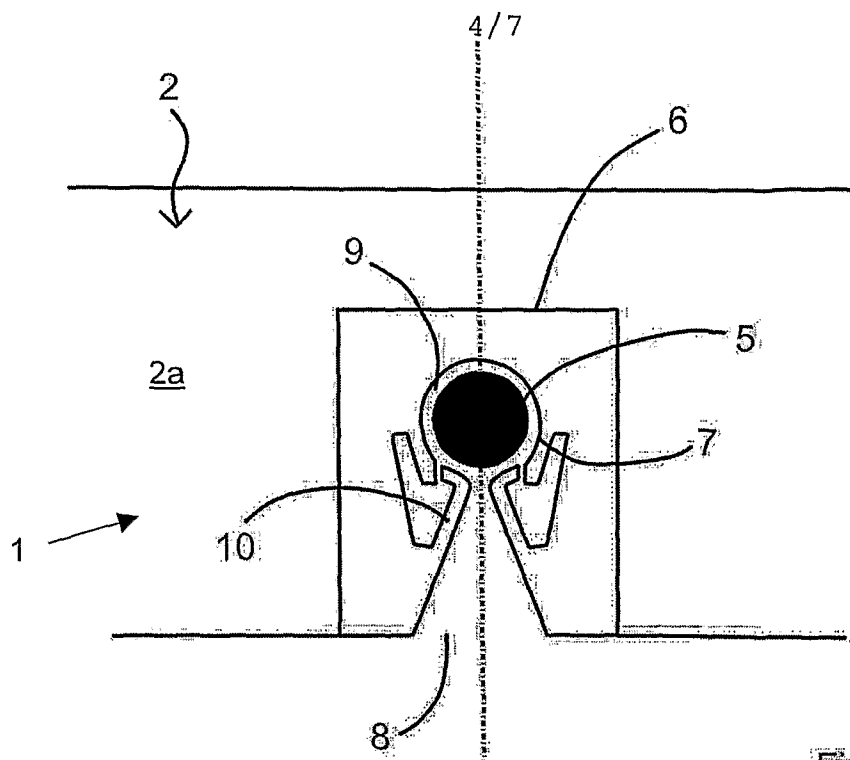


Fig. 6

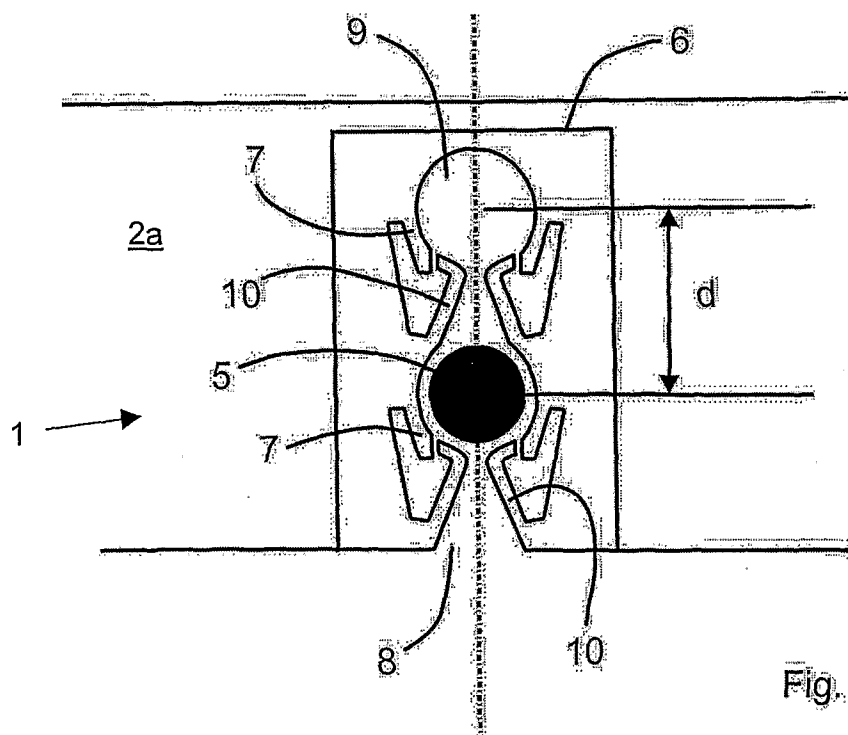
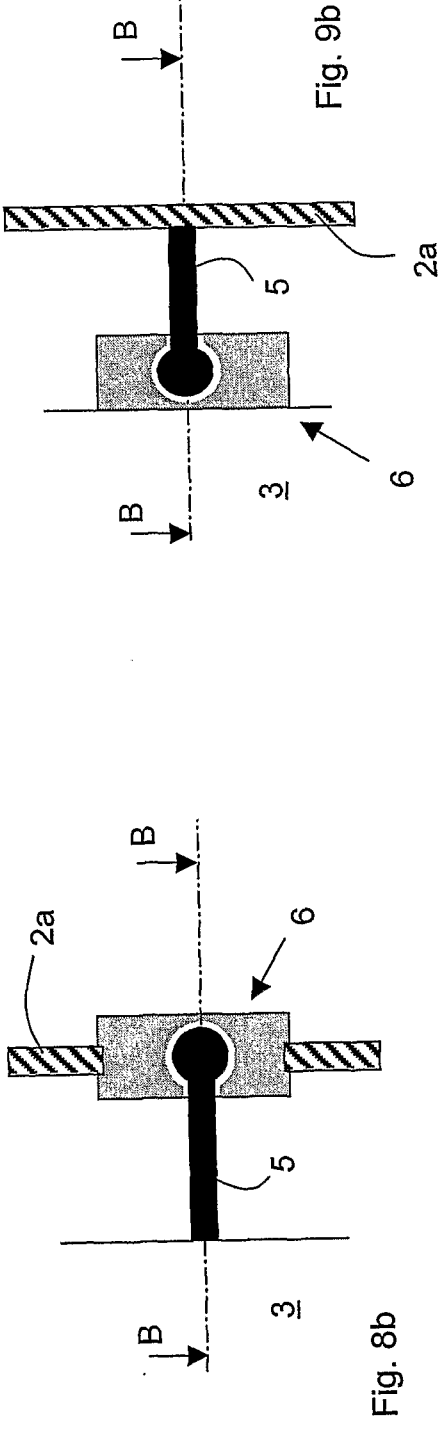
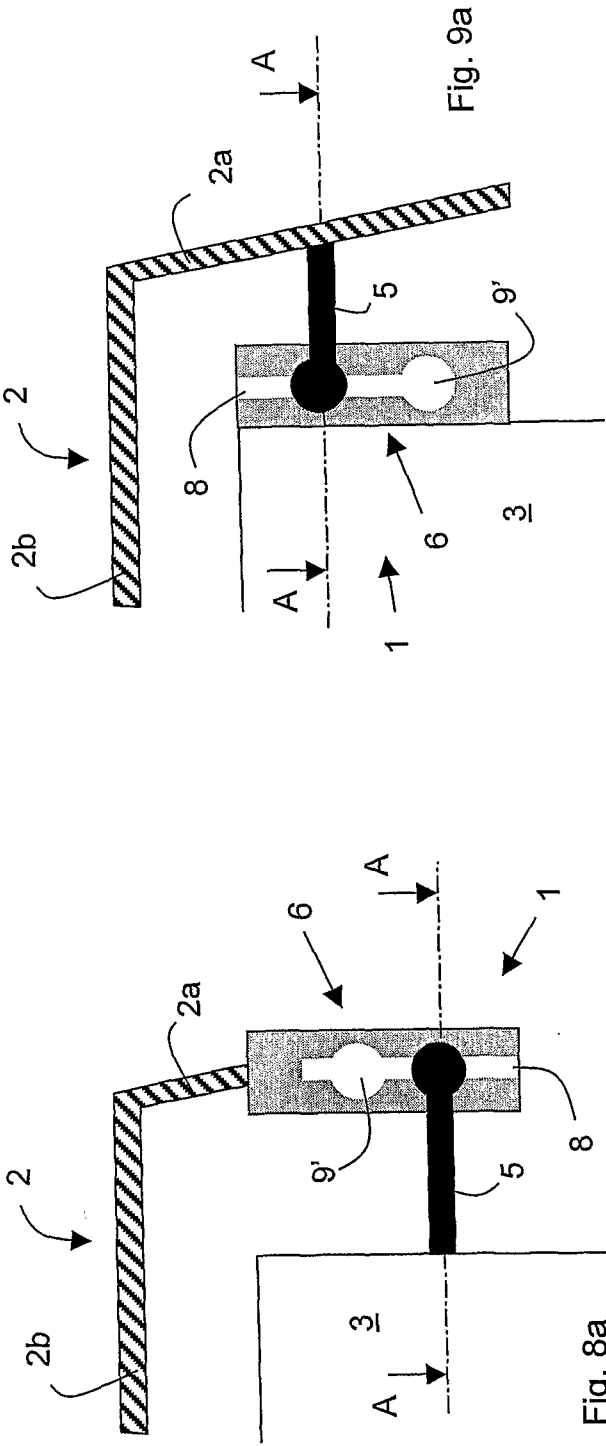
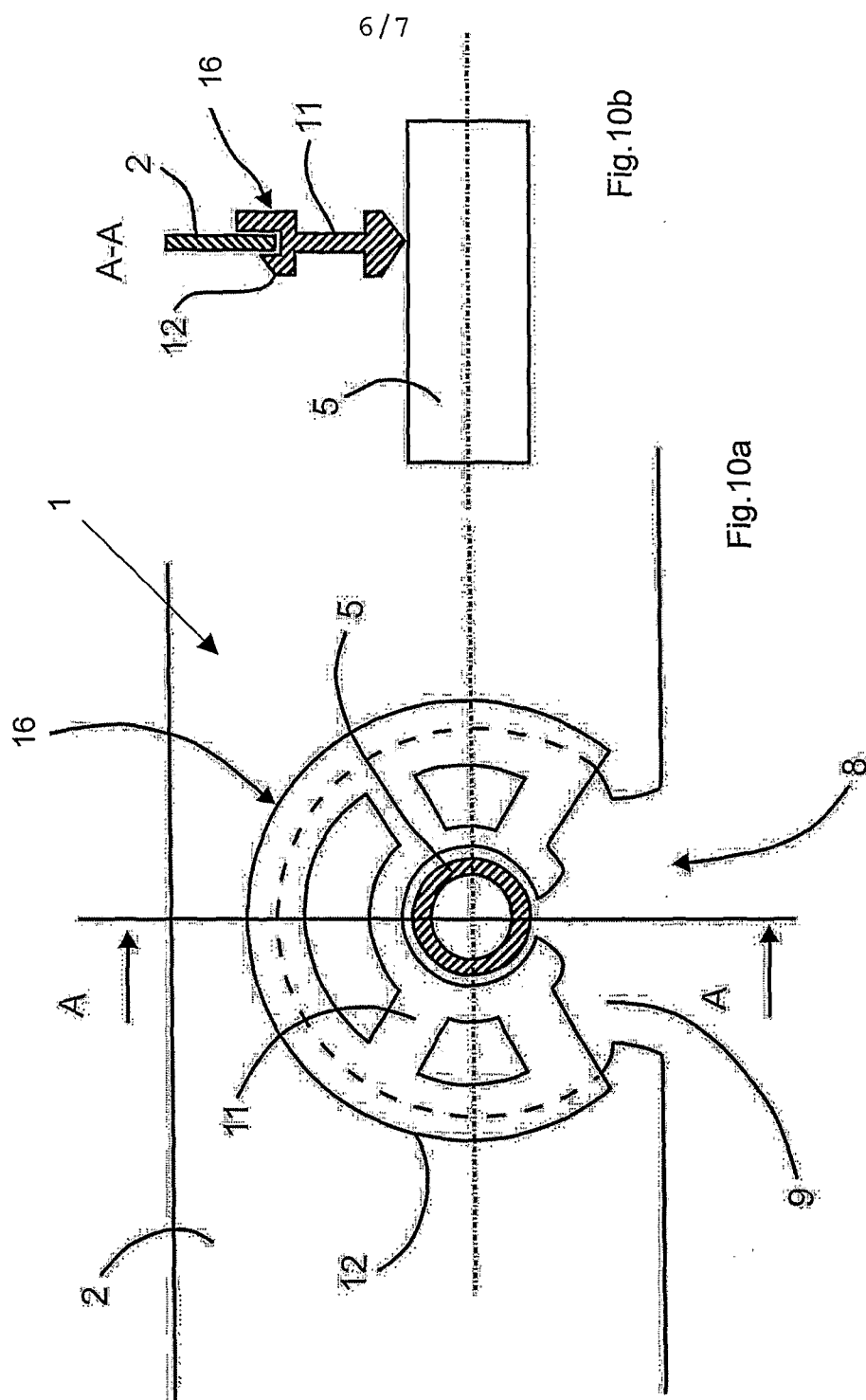
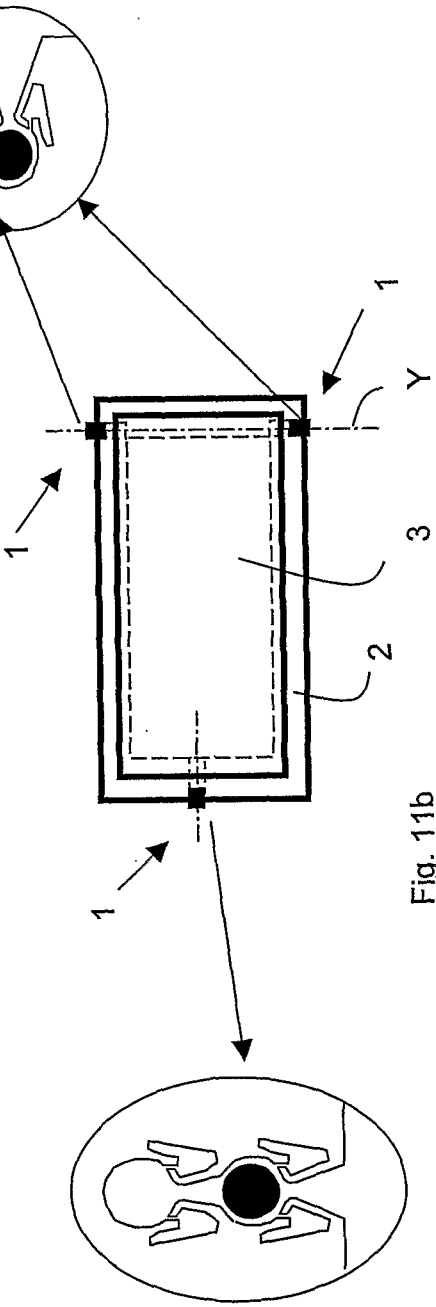
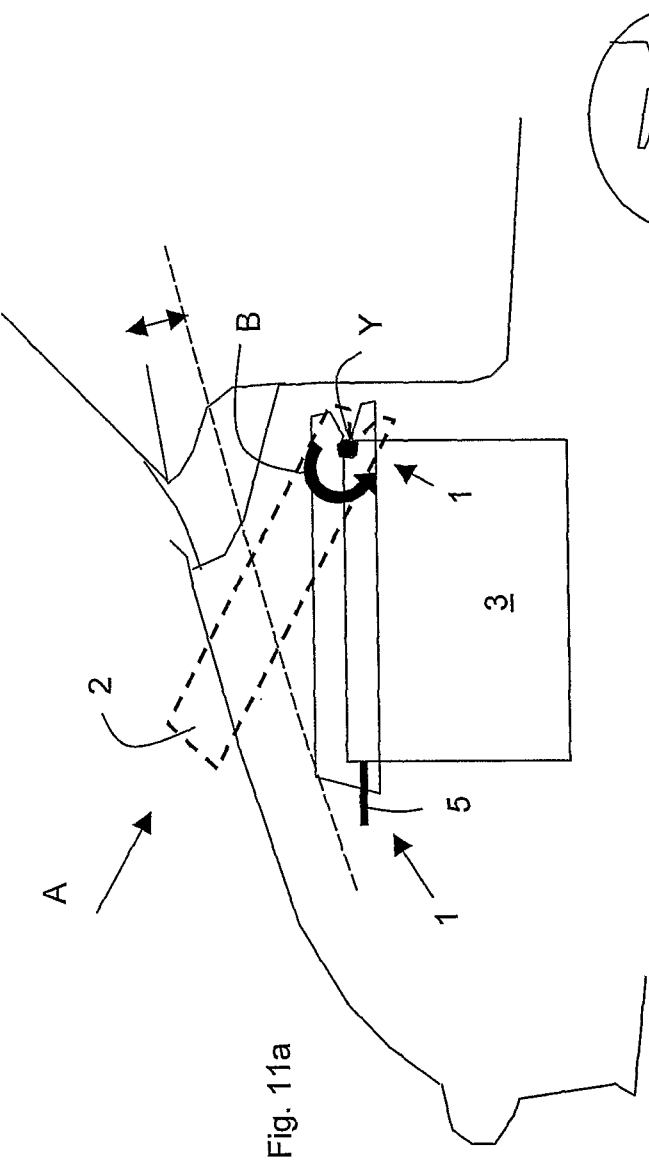


Fig. 7







INTERNATIONAL SEARCH REPORT

International application No

PCT/CH2008/000294

A. CLASSIFICATION OF SUBJECT MATTER

INV. B60R21/34 F02B77/13 B60R13/08

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)

B60R F02B

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 practical, 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.
P,X	WO 2007/132103 A (RENAULT SA [FR]; LAHAYE BELEN [FR]) 22 November 2007 (2007-11-22) the whole document	1-3,5-7, 14
X	US 2005/217634 A1 (NONOGAKI HARUHIKO [JP] ET AL) 6 October 2005 (2005-10-06) the whole document	1-23
X	EP 1 695 872 A (RENAULT SA [FR]) 30 August 2006 (2006-08-30) paragraphs [0041] - [0043] figures 9,9A,9B	1,14
A	FR 2 851 973 A (CERA [FR]) 10 September 2004 (2004-09-10) cited in the application the whole document	1
	-/--	

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

8 September 2008

Date of mailing of the international search report

17/09/2008

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

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INTERNATIONAL SEARCH REPORT

International application No

PCT/CH2008/000294

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 10 2004 054274 A1 (MANN & HUMMEL GMBH [DE]) 11 May 2006 (2006-05-11) paragraphs [0015], [0016]; figures 10g, 11e, 11f -----	1
A	US 2004/187838 A1 (NONOGAKI HARUHIKO [JP] ET AL) 30 September 2004 (2004-09-30) the whole document -----	1
A	FR 2 852 901 A (WOCO INDUSTRIETECHNIK GMBH [DE]) 1 October 2004 (2004-10-01) cited in the application the whole document -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/CH2008/000294

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007132103 A	22-11-2007	FR 2901208 A1	23-11-2007
US 2005217634 A1	06-10-2005	CN 1676897 A	05-10-2005
		DE 102005014535 A1	27-10-2005
		JP 2005290996 A	20-10-2005
EP 1695872 A	30-08-2006	FR 2882540 A1	01-09-2006
FR 2851973 A	10-09-2004	NONE	
DE 102004054274 A1	11-05-2006	EP 1809519 A1	25-07-2007
		WO 2006051072 A1	18-05-2006
		JP 2008518842 T	05-06-2008
US 2004187838 A1	30-09-2004	NONE	
FR 2852901 A	01-10-2004	DE 10314220 A1	21-10-2004