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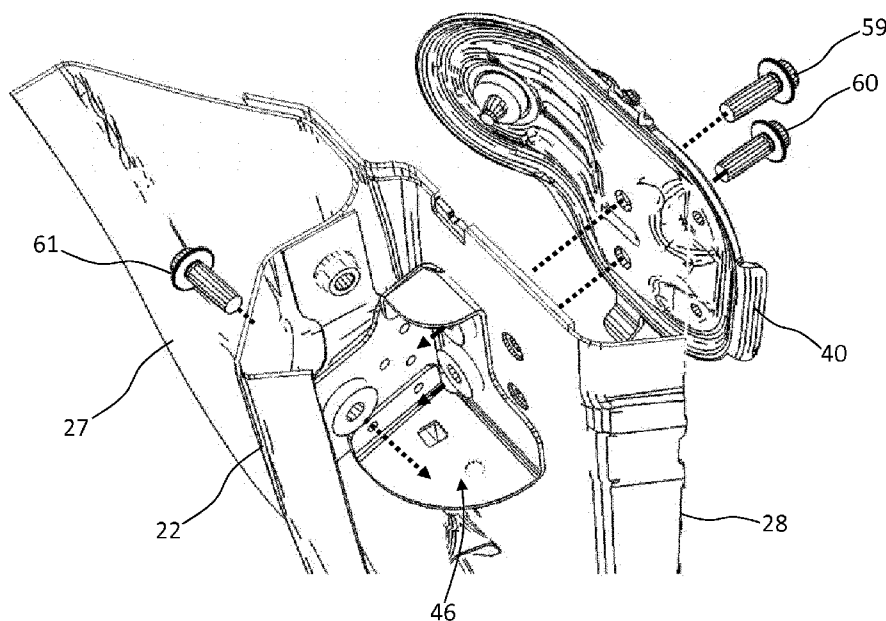


Fig. 8

(57) Abstract: A seat belt connection (39), comprising a seat belt connection member (40) and a bracket (46), for a pillar (14) of a vehicle, wherein the pillar (14) has a plurality of walls defining a hollow space there between, a front wall (28) faces generally towards the front of the vehicle, wherein the member comprises a plate element (41) and a seat belt guide (43) located at one end thereof, the plate element (41) being fixable to the bracket (46) through the front wall (28) wherein the bracket (46) comprises a rigid element arranged to translate forces from the member to one or more of the plurality of pillar walls when the connection is installed in a vehicle and under tension from a seat belt attached to the seat belt guide (43).



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SEAT BELT ANCHOR

TECHNICAL FIELD

- 5 The present disclosure relates to a seat belt anchor and particularly, but not exclusively, to a third row anchor and a vehicle incorporating such an anchor. Aspects of the invention relate to a connection member and to a vehicle.

BACKGROUND

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Seat belts are provided in vehicles to restrain occupants in the event of a sudden braking event or accident. In some markets, legislation requires that these are provided for each seating position in a vehicle intended for a vehicle occupant to occupy. Some larger vehicles have the internal space to house a third row of seats which are generally disposed at or near the rear of the vehicle, when provided. Some vehicle designs are intended to provide the third row as an option, because without the third row, the vehicle can still carry around five occupants and have a much larger luggage space than is the case when the third row of seats is installed.

- 20 Seat belt anchorages or anchors are often provided in or secured to the vehicle body shell. The location of the or each seat belt anchorage relative to the seating positions provided in the vehicle are typically dictated by legislation for a given market, and the location of each anchorage should be optimised to provide comfort for the seat belt user. Most seat belts are of the three-point variety, where two lower anchors are provided on the floor of the vehicle (or lower part of the seat) to secure a lap-belt, and a single shoulder anchor or upper anchorage is usually provided in a side pillar of the vehicle body, to secure a shoulder belt passing across the passenger's body from the opposite lower anchor. When connected to the vehicle body, the anchor can withstand the forces required of it. However, because they are in the vehicle body, detection of damage may be difficult and secondly repair of such damage may be hard, anchor points on the bodywork also need to be able to withstand the effects of more minor
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- 30

loadings without deformation. As a standard, a loading approaching 1.5 tonnes is taken as a minimum force required to be absorbed by the anchorage when applied by the seat belt. Loading exceeding 1.5 tonnes applied to the seat belt anchorage via the seat belt is likely only to be occasioned in an accident that will result in significant damage to the vehicle. However, at loadings less than 1.5 tonnes (ECE REGULATION No. 14—SAFETY BELT ANCHORAGES etc.) a vehicle may not be irreparably damaged and yet damage to a seat belt anchorage cannot be permitted for the aforementioned reasons.

10 Seat belt anchorages in vehicle bodies generally involve a welded nut attached to a suitable body panel or wall and into which a bolt can be fixed to secure a seat belt element, such as a D-loop, through which the belt is guided over the user's shoulder in use; a seat belt reel; or a fixed clasp for releasable connection of a buckle of the belt. Such a nut invariably requires some reinforcement to meet the requirements of ECE
15 Regulation 14 (or equivalent standard). The degree of reinforcement depends to some extent on the direction of the potential loading. Steel, or aluminium, panels, out of which vehicle bodies tend to be made, have great strength when formed into box sections. They are capable of accepting substantial loads when these are applied in shear. However, when forces are applied orthogonally to the plane of a panel, deformation may result from lower loads. Even when panels are reinforced, the loading
20 is usually such as to apply a peeling load on joints in the sections (assuming these are formed, as is generally the case, by interconnected panels). Reinforcement of a panel might be effected by having a local thickening of the panel where the reinforcement is required, for example by welding another layer of the panel material to the panel
25 around the nut (in the case of interest). Generally, only one such layer can be applied to either side of a panel.

In the case of aluminium panels, welding is impractical as most suitable nuts are made from steel and so are unsuitable for welding to aluminium. Other means of
30 reinforcement involve the use of fillets and braces. These are all satisfactory, but they tend to be installed in a vehicle body shell prior to completion of the Body-in-White

(BIW) stage of manufacture. This is the eponymous stage of vehicle manufacture at which the vehicle body is complete as an assembly of panels and has the requisite environmental proactive coatings applied prior to final paint work application and assembly of vehicle components.

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At this point in manufacture, at least in respect of vehicles that might have a third row, it is unknown which of them will, or will not, have this option. Certainly, it is not desirable to provide yet a further stock-keeping unit for this. Consequently, it would normally be the case that all the reinforcements required of the body shell for an acceptable seat belt anchor would always be provided, for all the seats that might be installed, regardless of whether or not all the vehicles so produced will be destined to have the third row of seats and employ the reinforcement provided.

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Large passenger vehicles such as sports utility vehicles (SUV) or multi-purpose vehicles (MPV), generally have four pillars on each side that connect the roof to the rest of the vehicle bodywork. The A pillar is at the front and, on either side of the vehicle, it surrounds the front windscreen; the B pillar is between the front and rear doors, and acts as a doorjamb for the front doors and hangs the rear doors; the C pillar is behind the rear doors and acts as the jamb for those doors; and the D pillar is in the rear corner of the vehicle and surrounds the rear windscreen which, usually in such vehicles, is in a tailgate. Of course, multiple different options exist and the aforementioned arrangement is merely typical of SUV and/or MPV type vehicles with which the present invention is mostly concerned. However, the arrangement is typical of many other vehicle types.

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Because of the rear tailgate, the D pillar therefore also usually provides a mounting for a seal against which the tailgate closes. The pillars A to D are generally hollow box sections made by welding together two or more pressed metal panels. The shapes involved can be complex, but there is a limit to the extent to which such panels can be pressed and shaped prior to welding. Generally D pillars are formed from three panels welded together, often in a somewhat triangular section in places. Indeed, it is often

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found that, at the point where it is desirable to provide an upper seat belt anchorage, the section of the D pillar may be quite close to a right-angle triangle where the first side, the hypotenuse, is formed by the external body panel, a second side forms part of the opening frame for the tailgate, and the third side completes the pillar section and
5 faces towards the front of the vehicle.

It should incidentally be noted, that use of these geometric descriptions in this specification are approximate and for illustration only, and do not represent the precise shape of the components being described.

10

Pillars should have as large a cross-sectional area as possible, to increase their strength and resistance to torsion and bending. Consequently, while it would in theory be possible to align the third panel in a more parallel relation with respect to the first panel, this would reduce the cross-sectional area of the pillar and undermine the
15 fundamental purpose of the pillar. However, having the third panel face the front is disadvantageous since the forces may cause more damage. Significant reinforcement features may then be required to resist panel deformation for a given the direction of force applied via the seat belt to a seat belt anchor connected to the third panel. The seat belt cannot be connected to the second face, because it is framing the tailgate
20 and, for reasons explained below, is actually outside the vehicle. The first, hypotenuse panel cannot be employed, as it forms the external surface of the vehicle and its orientation with respect to the seat belt may not be appropriate.

Another issue relates to the nature of the third row of seats and their intended use. In
25 some vehicles the third row is intended for use on a short term or temporary basis. In these situations the users will tend to be children and/or elderly or smaller passengers. As a result the load may be less and the load requirements may be different from a vehicle having a fully used third row. In addition, as the passengers may be smaller a more flexible belt anchor may be needed having more degrees for freedom, to fit
30 comfortably and safely.

US 9,254,817 describes a third row anchor capable of solving at least some of the problems associated above. However, the shape and form of this anchor prevents its use in some applications.

- 5 The present invention has been devised to mitigate or overcome at least some of the above-mentioned problems and provide a seat belt anchor that addresses the issues mentioned above.

SUMMARY OF THE INVENTION

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According to an aspect of the present invention there is provided a seat belt connection, comprising a seat belt connection member and a bracket , for a pillar of a vehicle, wherein the pillar has a plurality of walls defining a hollow space there between, a front wall faces generally towards the front of the vehicle , wherein the member comprises a plate element and a seat belt guide located at one end thereof, 15 the plate element being fixable to the bracket through the front wall; wherein the bracket comprises a rigid element arranged to translate forces from the member to one or more of the plurality of pillar walls when the connection is installed in a vehicle and under tension from a seat belt attached to the seat belt guide.

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Optionally, the pillar may comprise a drain channel.

Optionally, the rigid element may comprise three orthogonal elements in the approximate form of a half cube.

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In an embodiment, the first orthogonal element is adapted to be located on the reverse of the front wall.

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In an embodiment, the second orthogonal element is adapted to be positioned on the reverse side of part of the drain channel.

In an embodiment, the third orthogonal element connects the first and second orthogonal elements at a base thereof to strengthen the bracket.

5 Optionally, the connection is arranged such that the translated forces from the member are transmitted into at least one of the orthogonal elements of the bracket when the connection is installed in a vehicle and under tension from a seat belt attached to the seat belt guide.

10 Optionally, the connection (39) establishes load transfer "T" piece, and when the connection (39) is installed in a vehicle and under tension from a seat belt (44) attached to the seat belt guide (43), the load transfer "T" piece is actuated by the seat belt (44) causing the plate element (41) attached to the front wall, to transfer load through bracket (46) , in use, to a front face of the pillar against the front wall (28).

15 Optionally, the member is resiliently flexible, whereby movement of the member caused by tension applied to the seat belt guide is partly absorbed by elastic deformation of the member.

20 Optionally, the bracket comprises a plurality of captive nuts to fix the bracket to the member.

Optionally, the member comprises a plurality of apertures, through each of which a bolt is adapted to pass, in use, and be threaded in a captive nut on the bracket.

25 Optionally, the drain channel comprises an aperture, through which a bolt is adapted to pass, in use, and be threaded in a captive nut on the bracket.

Optionally, the seat belt guide is connected to the member via an articulated eye.

30 Optionally, the member comprises a tag and a third hand fix screw adapted to hold the seat belt connection member in place when it is being fitted.

According to an aspect of the present invention there is provided a vehicle comprising a pillar supporting a roof of the vehicle, the pillar having a front wall facing generally towards the front of the vehicle, and a side wall, and a seat belt connection according to an aspect of the present invention, wherein a seat belt is secured to the seat belt connection.

In an embodiment, the pillar is hollow comprising a plurality of walls defining a hollow space there between for receiving a bracket to fix a seat belt connection member to the vehicle.

Optionally, the vehicle includes apertures for accommodating the fixing of the seat belt connection member to the bracket.

Optionally, the vehicle comprises a drain channel through which part of the bracket can be fixed to the vehicle.

Optionally, the hollow pillar is a rear, roof supporting, pillar of the vehicle, and in which: the back wall constitutes a rear wing, or rear wing supporting member, of the vehicle; and/or the side wall constitutes a part of a rear tailgate frame.

Optionally, the pillar has a substantially triangular section.

Optionally, the pillar when assembled and ready for structural reception of the seat belt connection, is part of the BIW stage of vehicle construction.

In an embodiment, the vehicle comprises a tailgate horizontally pivoted to the roof at the back of the vehicle.

Within the scope of this application it is expressly intended that the various aspects, embodiments, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular the individual

features thereof, may be taken independently or in any combination. That is, all embodiments and/or features of any embodiment can be combined in any way and/or combination, unless such features are incompatible. The applicant reserves the right to change any originally filed claim or file any new claim accordingly, including the right to
5 amend any originally filed claim to depend from and/or incorporate any feature of any other claim although not originally claimed in that manner.

BRIEF DESCRIPTION OF THE DRAWINGS

10 One or more embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a rear view of the body shell of a vehicle incorporating a seat belt anchor in accordance with an embodiment of the present invention;

15 Figure 2 is a cross-sectional view of a pillar through II-II, in accordance with an embodiment of the present invention;

Figure 3 is detailed view of a seat belt connection from inside the vehicle in accordance with an embodiment of the present invention;

Figure 4 is further view of a seat belt connection from inside the vehicle in accordance
20 with an embodiment of the present invention;

Figure 5 is a detailed view of part of figure 1 in accordance with an embodiment of the present invention;

Figure 6 is a view of a seat belt connection member in accordance with an embodiment of the present invention;

25 Figure 7 is a view of a bracket in accordance with an embodiment of the present invention;

Figure 8 is an assembly view of a seat belt connection in accordance with an embodiment of the present invention;

Figure 9 is an assembled view of a seat belt connection in accordance with an
30 embodiment of the present invention;

Figure 10 is a further assembled view of a seat belt connection in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION

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Figure 1 is a schematic representation of a vehicle body shell 10 approaching its body-in-white (BIW) stage of manufacture. Figure 1 is a rear view of the vehicle which, in this case, is a large “sports utility” type of passenger vehicle, commonly known as an SUV. It has a large passenger compartment 12 capable of accommodating three rows of passenger seats. A second row of seats 11a is shown along with the position for a third row of seats 11b. The type of vehicle to which this invention relates is such that the third row of seats is usually provided as an optional arrangement dependent on the requirements of the customer.

15 The vehicle 10 has a roof 18 supported by pillars 14 from the main bodywork 15. The pillars may be hollow or solid in construction. Where the pillars are hollow in construction they are formed by a plurality of interconnecting walls. Between the roof and body-work, framed by the pillars (only the rear ones of which are visible in the drawings) are window and door apertures, such as a rear aperture 13. The type of vehicle to which the present invention relates is generally that which has a large rear aperture 13 to be closed by a tailgate (not shown) which is usually hinged to the roof 18. Other types of closure may be used as required.

Where the third row of seats is provided, requisite safety belts must also be provided. Since the third row of seats will always be at the rear of the vehicle, the shoulder seat belt harness anchor point for such seats finds its structural location to the vehicle most conveniently in the rear pillar 14, often referred to as the D pillar.

The construction of modern vehicles is well known and generally employs shaped steel or aluminium panels or walls joined together to form hollow box structures that provide rigidity and strength. The present invention is no exception and the D pillar 14

is conveniently constructed from 3 separate walls forming a substantially triangular structure as shown in Figure 2, which defines a hollow space 21 there between.

A back wall 16 also constitutes a rear wing (not shown) or at least a support for a rear wing of the vehicle. The back wall 16 is connected, at a weld seam 20, to a side wall 22 as shown in Figure 2. The side wall 22 also forms a panel 26 that encloses the rear aperture 13. A front wall 28 of the D pillar 14 is welded to both the side wall 22 at a seam 30 and to the rear wall 16 along a seam 32. Thus the D pillar 14 is formed by three joined walls into the substantially triangular structure and hollow space 21 mentioned above. Only the front wall 28 is internal to the vehicle.

The panel 26 presents an externally facing edge 17 that surrounds the aperture 13 and defines a drain channel 27 and is employed to seat a U-shaped seal (not shown) against which the tailgate when fitted may be seated. The panel 26 and side wall 22, along with the back wall 16 are external of the vehicle.

Pillars, such as the D pillar 14, are provided with the largest cross-sectional area possible, so that they have the greatest rigidity and resistance to torsion and bending. Although it is feasible to reduce the inclusive angle between walls 16 and 28, this would serve to reduce its rigidity. Consequently, the front wall 28 faces almost directly forwards with respect to the front of the vehicle, as shown by the arrow F in Figure 2. As a result of this arrangement, if a seat belt anchor is fixed directly to the face of the front wall 28 of the D pillar 14, then that face would require substantial reinforcement. Not only would the pull (in the direction of the arrow F) of a seat belt in the event of an accident be in the direction of minimum strength of the front wall 28, it would also serve to peel apart the joints 30, 32, again in a direction where they are weakest. Panels are well known to have their maximum strength in the plane in which they lie (shear), and this also true of joints. The maximum strength of the front wall 28 in respect of the applied load is actually in a direction orthogonal to the arrow F.

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According to the present invention a seat belt connection 39 is provided which provides an anchor point for an optional third row of seats. The seat belt connection comprises a seat belt connection member 40 and a bracket 46. The vehicle may include two such seat belt connections 39, one on either side of the vehicle 10.

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The seat belt connection member 40 comprises a plate element 41 which is adapted to be attached to the front wall 28 of the D pillar as shown in Figure 3 and 4. The plate element 41 has one dimension longer than the other. In the example shown, the longer dimension is substantially horizontal and the shorter substantially vertical and
10 the plate is substantially ovoid, although other shapes would be equally appropriate.

The seat belt connection member 40 includes an articulated eye 42 which is adapted to receive an articulated seat belt guide 43 through which a seat belt 44 may be passed. The articulated eye 42 is located at one end of the plate element 41, closest to
15 the side window corresponding to the side of the vehicle to which the seat belt connection member 40 is attached. The articulated eye 42 allows multiple degrees of freedom of movement for the articulated seat belt guide 43. This ensures that the ultimate position of a seat belt 44 is optimal for the user of the relevant seat.

20 To be comfortable for the user a seat belt should lie over one shoulder of the user and extend directly rearwardly from the shoulder. This is often not possible because there is generally no suitable anchor point directly behind either shoulder of a passenger. Accordingly, a compromise is generally required which sometimes leads to passenger discomfort if the seat belt should slip off the shoulder. A feature of the present
25 invention is that user comfort is increased by addition of the articulated seat belt guide 43.

As shown in Figure 3 one end of a seat belt 44 is attached to a retractor 45 which can allow the seat belt 44 to be deployed and retracted when required. The seat belt 44
30 passes through the articulated seat belt guide 43. The other end of the seat belt 44 includes a latch plate or buckle (not shown) which is engageable with a latch (not

shown) which is usually secured either directly or indirectly to the floor of the vehicle forming a further anchor point for the seat belt.

Figure 5 shows the details of the opposite side of the front wall 28 (i.e. the externally facing parts of the D pillar) indicating the position of the bracket 46 which is adapted to fix the seat belt connector member 40 to the vehicle and to distribute some of the forces from any tension imparted by the articulated seat belt guide 43. The drain channel 27 is also shown which also provides access for a fixing point for the bracket 46. Drain channel 27 is sealed as a result of the clamp load of fixing 61 to the face of the drain channel 27. The drain channel 27 can be accessed from the exterior of the vehicle and is used to make one of the fixings for the bracket 46 to the vehicle. The drain channel 27 allows any water to drain away from the tailgate opening in the event of rain or the like. The details of the bracket 46 will be described in greater detail below.

Figure 6 shows the seat belt connection member 40 in more detail, showing the articulated eye 42 and articulated seat belt guide 43. Two bolt holes 47 are shown and are adapted to receive bolts (not shown in Figure 6) that fix the seat belt connection member 40 to the front wall 28. In an embodiment a tag 48 is provided on a lower edge of the seat belt connection member 40 to clip the same to the vehicle. A third hand fix screw 49 is located at an upper edge of the seat belt connection member 40 to hold the same in position. Both the tag 48 and the third hand fix screw 49 are used to hold the seat belt connection member 40 in place when it is being fitted by an operator. The seat belt connector 40 is made from for example hot dip galvanised, high strength low-alloy steel.

The bracket 46 is shown in more detail in Figure 7. The bracket 46 is a rigid element comprising three orthogonal elements 50, 51 and 52 in the approximate form of a half cube. The orthogonal elements may be made from mild steel or any other appropriate material. The first orthogonal element 50 includes two captive nuts 53 adapted to receive bolts (not shown) when the seat belt connection member 40 is attached to the

- vehicle. The first orthogonal element 50 is adapted to be located on the reverse of the front wall 28. The second orthogonal element 51 is adapted to attach to a part of the reverse side of the side wall 22 and has a captive nut 54 adapted to receive a bolt (not shown) from the drain channel 27. The third orthogonal element 52 connects the first and second orthogonal elements 50 and 51 at the base thereof to strengthen bracket 46. A fourth element 55 connects the upper edges of the first and second orthogonal elements 50 and 51. The elements 50, 51, 52 and 55 are connected to one another via suitable spot welding points shown as circles, one of which is indicated as part 56. The bracket 46 may optionally include a further high strength steel interface bracket 57 adapted to receive a ball spigot (not shown) in a further captive nut 58. The bracket 57 contains a fixing which is used as the fixing point of the tailgate spigot. Having the tailgate spigot fixing point and seat belt fixing points on the same sub-assembled bracket helps assembly in the body shop.
- One feature of the present invention is that it is relatively easy to attach the seat belt connection 39 to the vehicle as can be seen with reference to Figure 8. As previously indicated the seat belt connection member 40 is initially positioned by means of tag 48 and the third hand fix screw 49 (not shown in this figure) to hold the seat belt connection member 40 in place when it is being fitted by the operator. Bolts 59 and 60 are introduced from the interior of the vehicle and tightened into the corresponding captive nuts 53 on the bracket 46. A further bolt 61 is introduced through a hole (not shown) from part of the drain channel 27 in side wall 22 and tightened into the corresponding captive nut 54.
- A primary benefit of the present invention is that the bracket 46 of the seat belt connection 39 is connected to the side wall 22 of the pillar 14 so that the primary forces experienced (when the seat belt connected to the seat belt connection member 40 is tensioned) are in the plane of the side wall 22 (i.e., in the direction of the arrow F in Figure 2). This is in the direction of maximum strength of the side wall 22. As a result, the degree of reinforcement required to the side wall 22 may be reduced. It will be appreciated that the seat belt connection 39 provides a load transfer "T" piece. As

a load reaction is experienced by movement, in direction A, of the seatbelt 44 (not shown) the connection member 40 causes the load to be transferred through the bracket 46 into shear at bolt 61 as shown by arrow B and to be transferred through a cantilever about the region where the plate 41 is fixed to the bracket 46 to the front wall 28 in the direction shown by arrow C. Thus the load is transferred to the D post section via the bolt 61 and rivets associated therewith (not shown). The effect of this is to dissipate the forces from any tension on the seat belt 44 into the walls of the D pillar via the bracket 46. When the seat belt connection member 40 presses against the front wall 28 of the D pillar some of the forces on the front wall 28 are applied by the bracket 46 in a direction which is orthogonal to the front wall 28 (as shown in Figure 10). As a result, the force is applied at a point 63 (see Figure 10) directly adjacent to the connection of the front wall 28 to the back wall 16. Thus the force is primarily absorbed as a shear in the plane of the back wall 16. Furthermore, the force applied to the joint 32 is also in shear, rather than having a peeling effect as would be the case if the force was in the opposite direction. Finally, a part of the load imposed by the tension on the seat belt would be absorbed by deflection of the seat belt connection member 40 itself,.

Referring to Figure 10 the details of the forces are shown. The seat belt 44 (not shown in figure 10) is pulled in direction A by any movement of a user relative to the seat when the seat belt 44 is attached. The pull forces of arrow A are transferred in the directions of arrows B and C as will now be explained in more detail. The bolt and captive nut assembly 61, 54 in side wall 22 (not shown in figure 10) transfers load (shown by arrow B) into shear on the side wall 22 of the drain trough 27 (not shown in figure 10). The bolt 61 which passes through the side wall 22 also gives added strength and acts as a fail-safe. In addition, as the belt 44 is pulled the connection member 40 applies a counter force on bracket 46 into the structure (as shown by arrow C). This has the effect of a stop or buffer. The connection member 40 includes a rolled edge 63 to prevent the connection member 40 piercing the body work when the forces are dissipated.

A second primary benefit of the arrangement of the present invention is that the strength of the connection is largely supplied by the seat belt connection 39 itself and its parts and geometry. Accordingly, when the option is selected not to employ a third row of seats the requisite strength is not unnecessarily provided in the BIW bodywork.

- 5 That is to say, the requisite structure of the BIW bodywork is little different to what it would necessarily be even if the third row of seats and the requisite seat belt anchor was never required. Consequently there is little redundancy of structure.

- 10 A third primary benefit of the present invention is the ease with which the seat belt connection member 40 can be fitted to the vehicle. A single operative can attach the seat belt connection member 40 without having to get into difficult positions or to use complex tools or procedures.

- 15 Many modifications may be made to the above examples without departing from the scope of the present invention as defined in the accompanying claims.

CLAIMS

1. A seat belt connection, comprising a seat belt connection member and a
5 bracket, for a pillar of a vehicle, wherein the pillar has a plurality of walls defining a
hollow space there between, a front wall faces generally towards the front of the
vehicle, wherein the member comprises a plate element and a seat belt guide located
at one end thereof, the plate element being fixable to the bracket through the front
wall; wherein the bracket comprises a rigid element arranged to translate forces from
10 the member to one or more of the plurality of pillar walls when the connection is
installed in a vehicle and under tension from a seat belt attached to the seat belt guide.
2. A connection as claimed in claim 1, wherein the pillar comprises a drain
channel.
- 15 3. A connection as claimed in claim 1 or claim 2, wherein the rigid element
comprises three orthogonal elements in the approximate form of a half cube.
4. A connection as claimed in claim 3, wherein the first orthogonal element is
20 adapted to be located on the reverse of the front wall.
5. A connection as claimed in claim 3 or claim 4, wherein the second orthogonal
element is adapted to be positioned on the reverse side of part of the drain channel.
- 25 6. A connection as claimed in any one of claims 3 to 5, wherein the third
orthogonal element connects the first and second orthogonal elements at a base
thereof to strengthen the bracket.
7. A connection as claimed in of any one of claims 3 to 6, wherein the connection
30 is arranged such that the translated forces from the member are transmitted into at

least one of the orthogonal elements of the bracket when the connection is installed in a vehicle and under tension from a seat belt attached to the seat belt guide.

8. A connection as claimed in any preceding claim, wherein the connection establishes a load transfer "T" piece, and when the connection is installed in a vehicle and under tension from a seat belt attached to the seat belt guide, the load transfer "T" piece is actuated by the seat belt causing the plate element attached to the front wall, to transfer load through bracket, in use, to a front face of the pillar against the front wall.

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9. A connection as claimed in claim 8, wherein the connection member is resiliently flexible, whereby movement of the member caused by tension applied to the seat belt guide is partly absorbed by elastic deformation of the member.

10. A connection as claimed in any preceding claim, wherein the bracket comprises a plurality of captive nuts to fix the bracket to the member.

11. A connection as claimed in claim 10, in which said member comprises a plurality of apertures, through each of which a bolt is adapted to pass, in use, and be threaded in a captive nut on the bracket.

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12. A connection as claimed in claim 10 or claim 11, wherein the drain channel comprises an aperture, through which a bolt is adapted to pass, in use, and be threaded in a captive nut on the bracket.

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13. A connection as claimed in any preceding claim, wherein the seat belt guide is connected to the member via an articulated eye.

14. A connection as claimed in any proceeding claim, wherein the member comprises a tag and a third hand fix screw adapted to hold the seat belt connection member in place when it is being fitted.

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15. A vehicle comprising a pillar supporting a roof of the vehicle, the pillar having a front wall facing generally towards the front of the vehicle, and a side wall, and a seat belt connection as claimed in any preceding claim, wherein a seat belt is secured to
5 the seat belt connection.

16. A vehicle as claimed in claim 15, wherein said pillar is hollow comprising a plurality of walls defining a hollow space there between for receiving a bracket to fix a seat belt connection member to the vehicle.

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17. A vehicle as claimed in claim 15 or claim 16, wherein the vehicle includes apertures for accommodating the fixing of the seat belt connection member to the bracket.

18. A vehicle as claimed in any of claims 15 to 17, comprising a drain channel through which part of the bracket can be fixed to the vehicle.

19. A vehicle as claimed in any of claims 15 to 18, wherein the hollow pillar is a rear, roof supporting, pillar of the vehicle, and in which: the back wall constitutes a rear
20 wing, or rear wing supporting member, of the vehicle; and/or the side wall constitutes a part of a rear tailgate frame.

20. A vehicle as claimed in claim 19, wherein the pillar has a substantially triangular section.

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21. A vehicle as claimed in claim 19 or claim 20, wherein the pillar when assembled and ready for structural reception of the seat belt connection, is part of the BIW stage of vehicle construction.

22. A vehicle as claimed in any of claims 19 to 21, wherein a tailgate is horizontally pivoted to the roof at the back of the vehicle.

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23. A seat belt connection substantially has hereinbefore described, with reference to the accompanying drawings.

- 5 24. A vehicle substantially has hereinbefore described, with reference to the accompanying drawings.

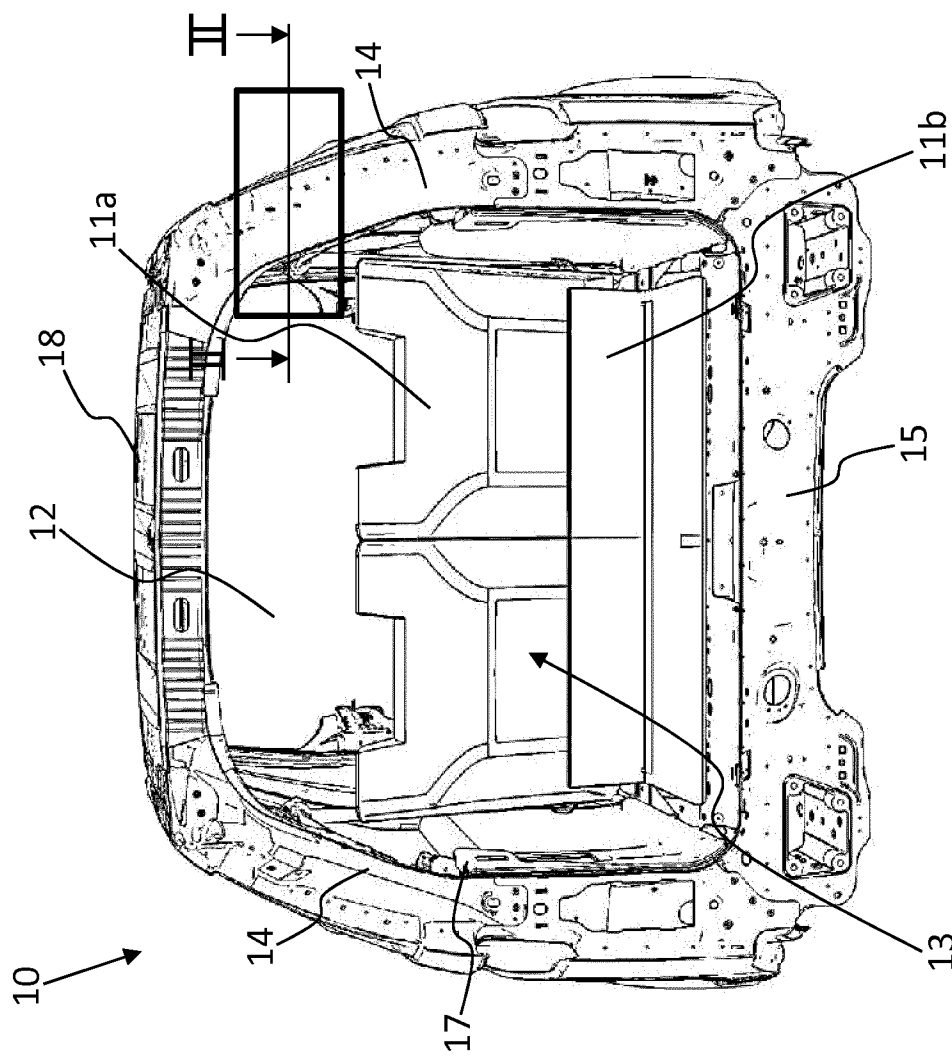


Fig. 1

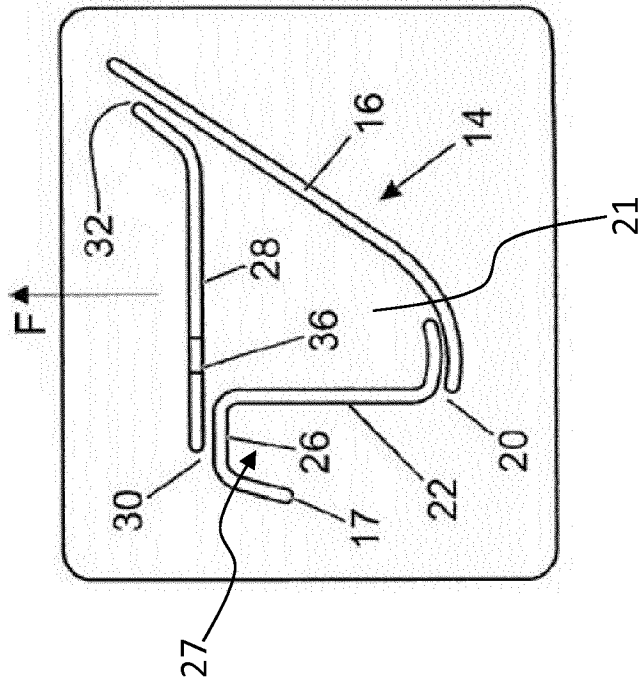


Fig. 2

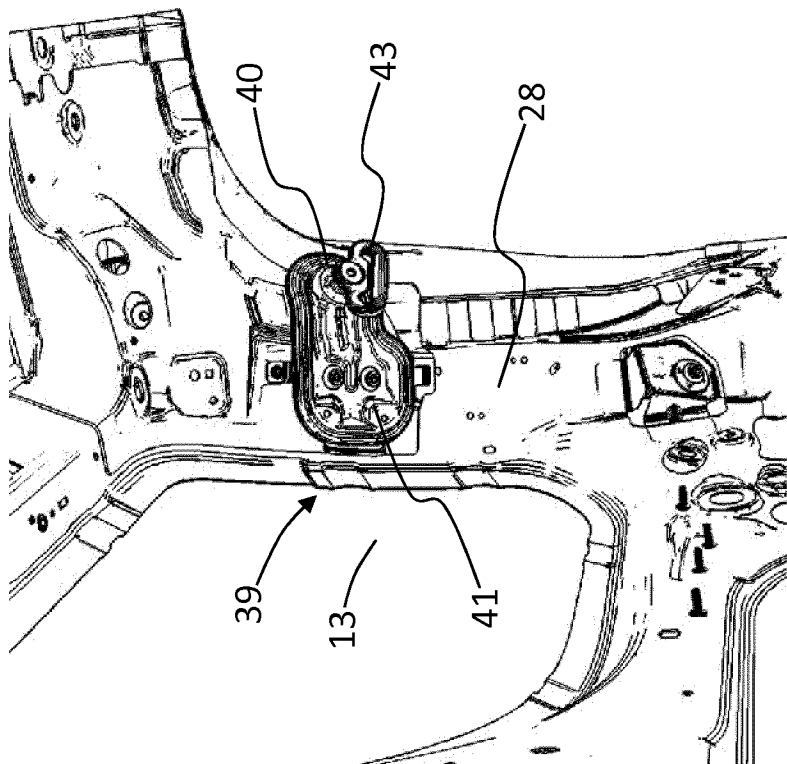


Fig. 4

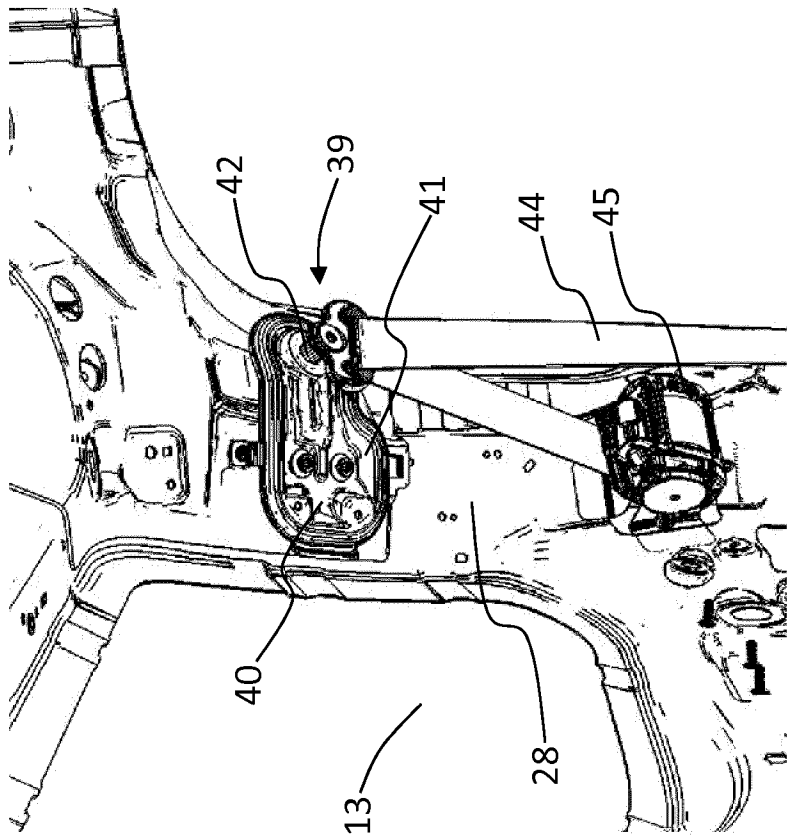


Fig. 3

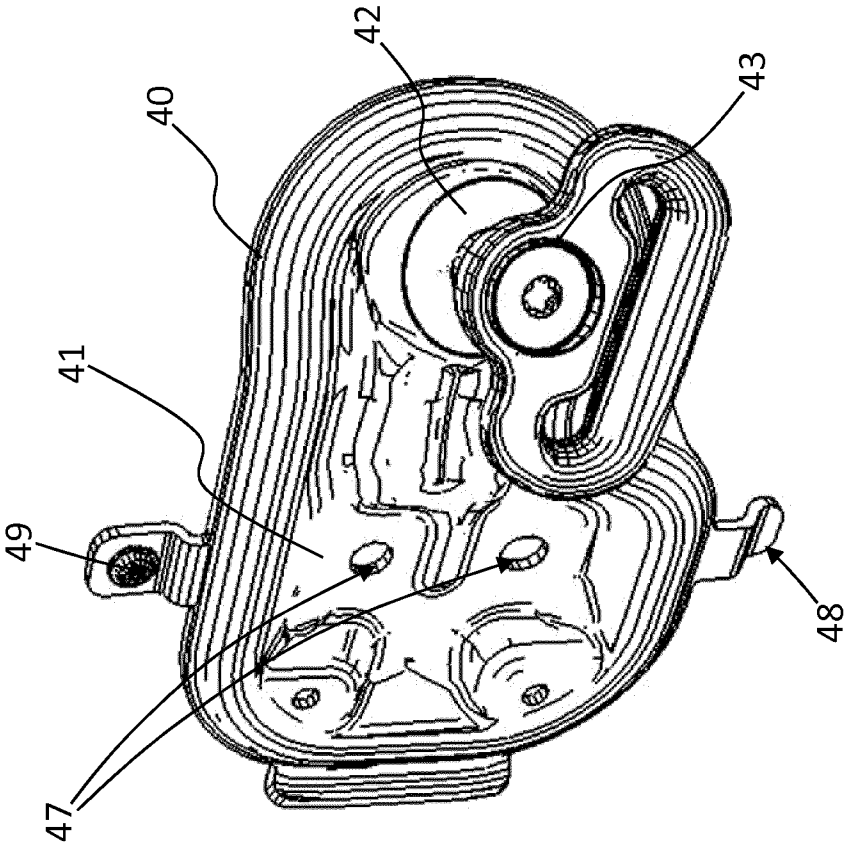


Fig. 6

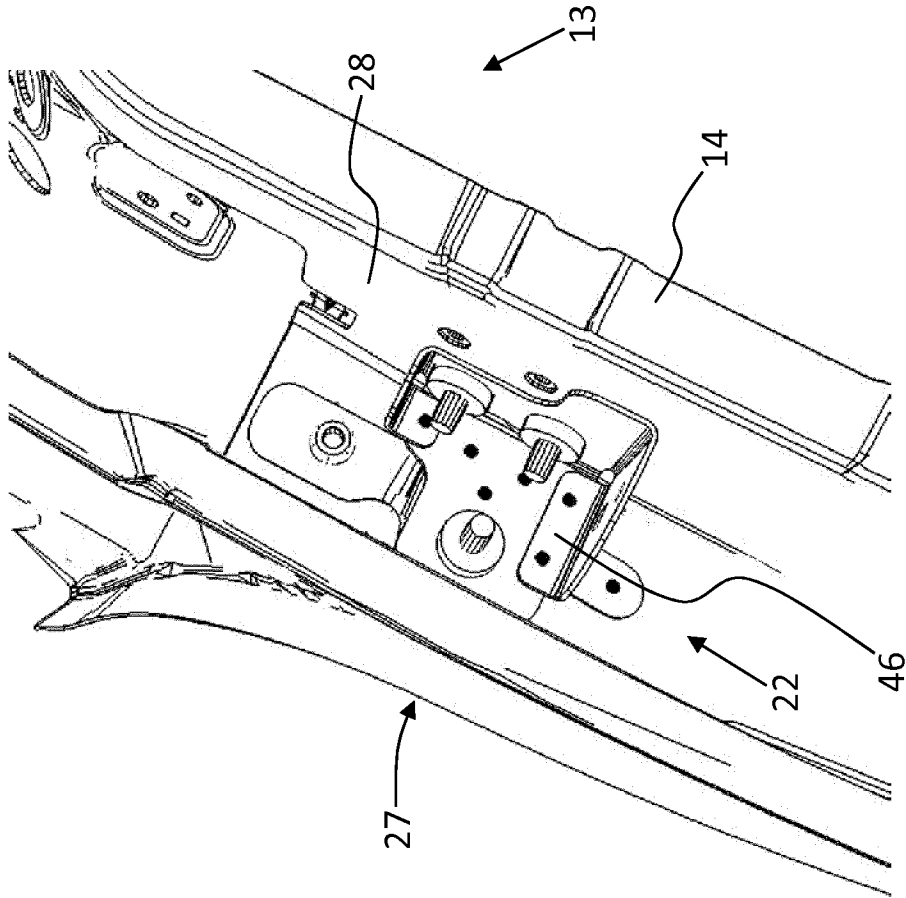


Fig. 5

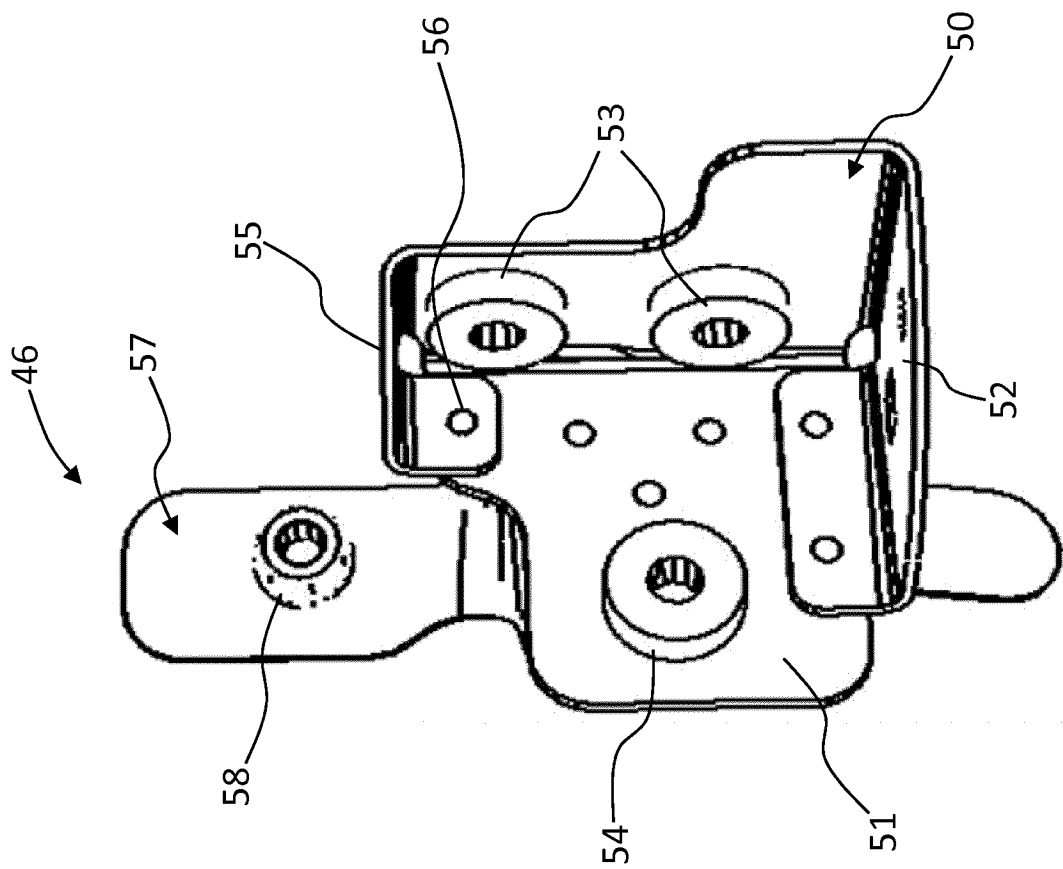


Fig. 7

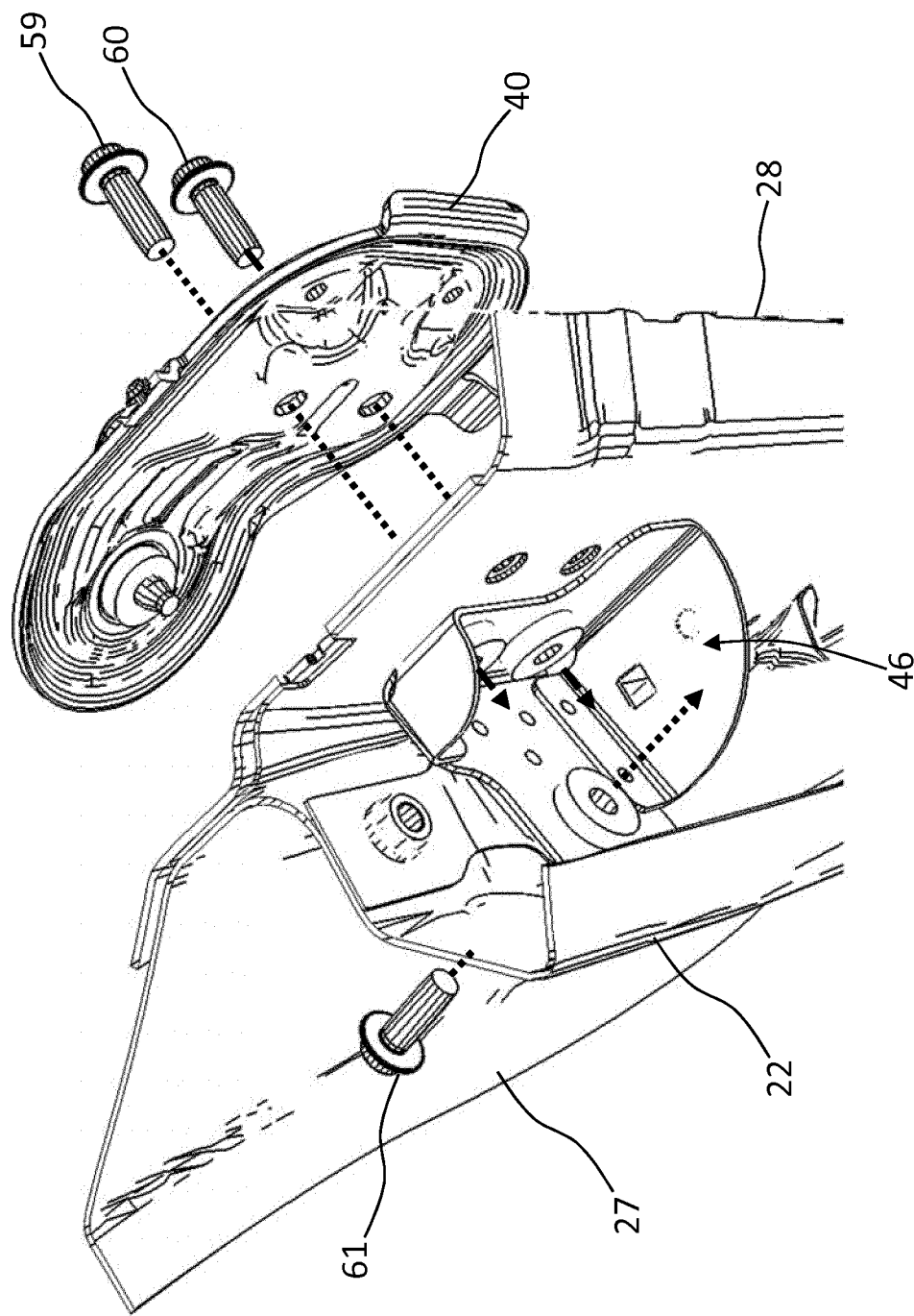


Fig. 8

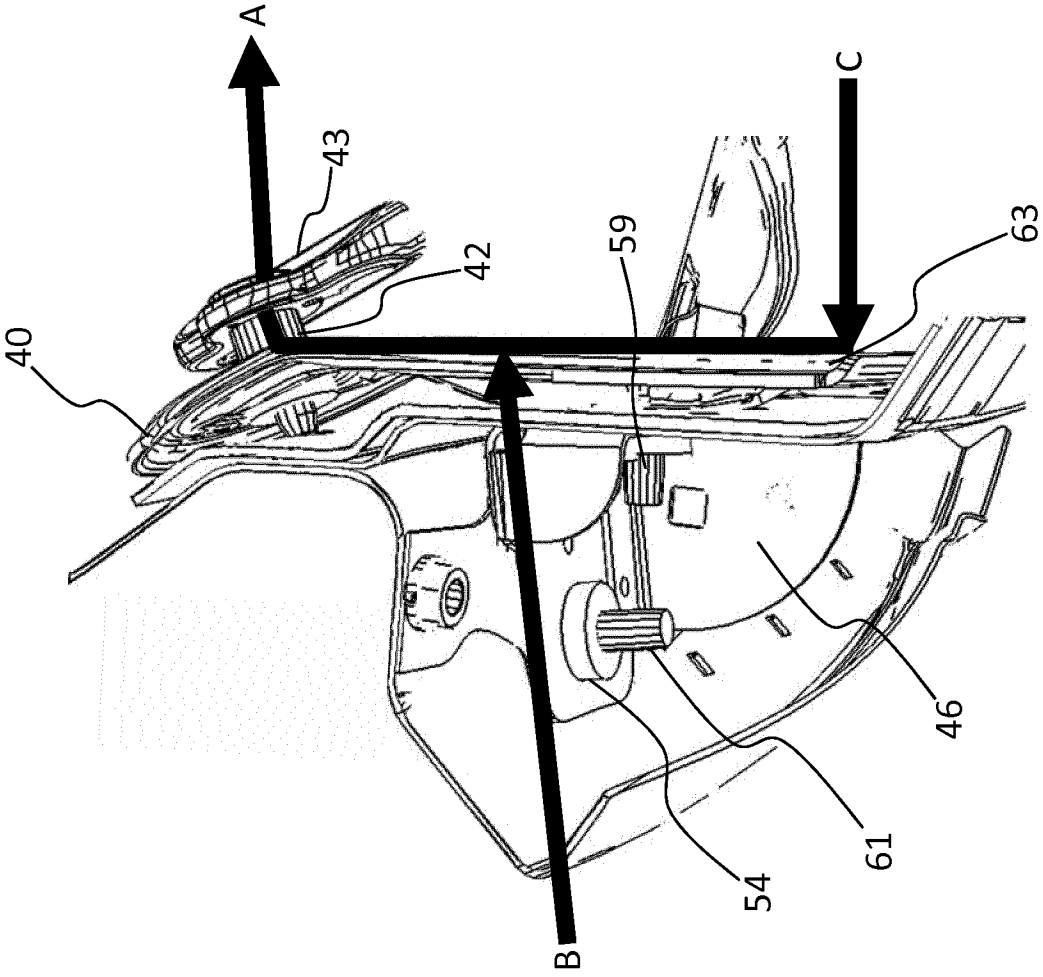


Fig. 10

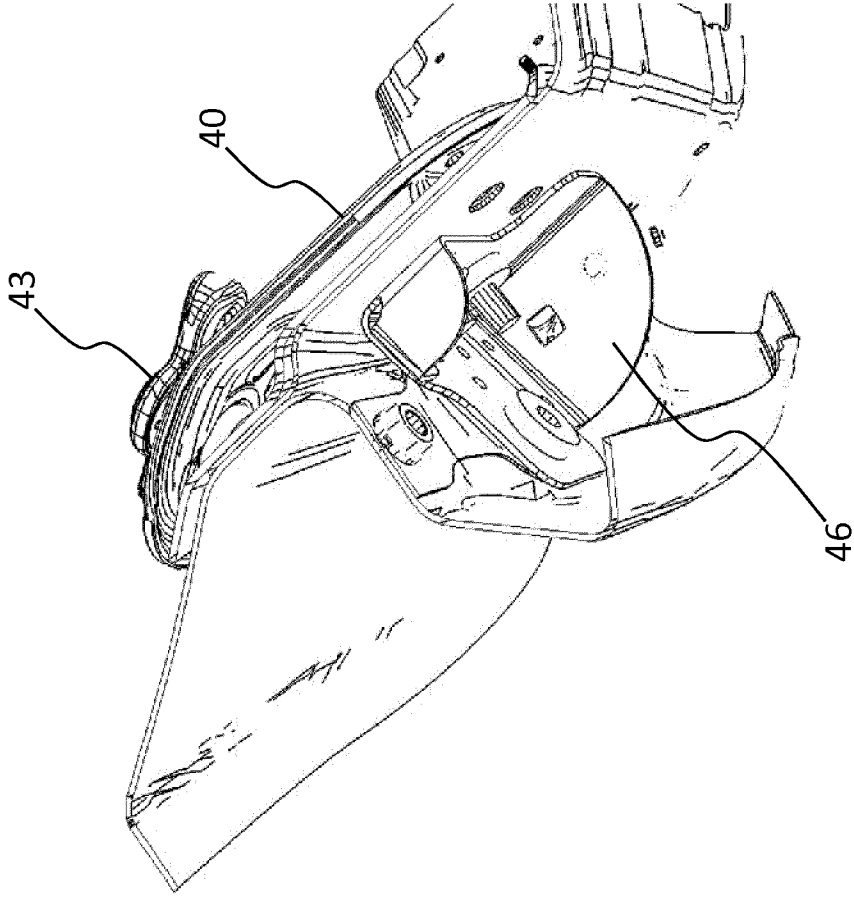


Fig. 9

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/074215

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60R22/18 B60R22/24
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)
B60R

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)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 470 619 A (IMAJYO HIDEYUKI [JP] ET AL) 11 September 1984 (1984-09-11)	1,15-22
Y	abstract	2
A	figures 1-4	3-14,23,24
	column 3, line 30 - line 44	
	column 3, line 55 - line 68	
	claim 1	

A	US 9 254 817 B2 (JAGUAR LAND ROVER LTD [GB]) 9 February 2016 (2016-02-09)	1-24
	cited in the application	
	the whole document	

A	US 4 222 609 A (ANDERSSON ARNE) 16 September 1980 (1980-09-16)	1,15
	abstract	
	figure 4	
	claim 1	

	-/-	



Further documents are listed in the continuation of Box C.



See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

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"&" document member of the same patent family

Date of the actual completion of the international search

29 November 2017

Date of mailing of the international search report

07/12/2017

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/074215

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 31 40 270 A1 (AUTOFLUG GMBH [DE]) 28 April 1983 (1983-04-28) page 9, paragraph 1 figure 1 -----	2

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2017/074215

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