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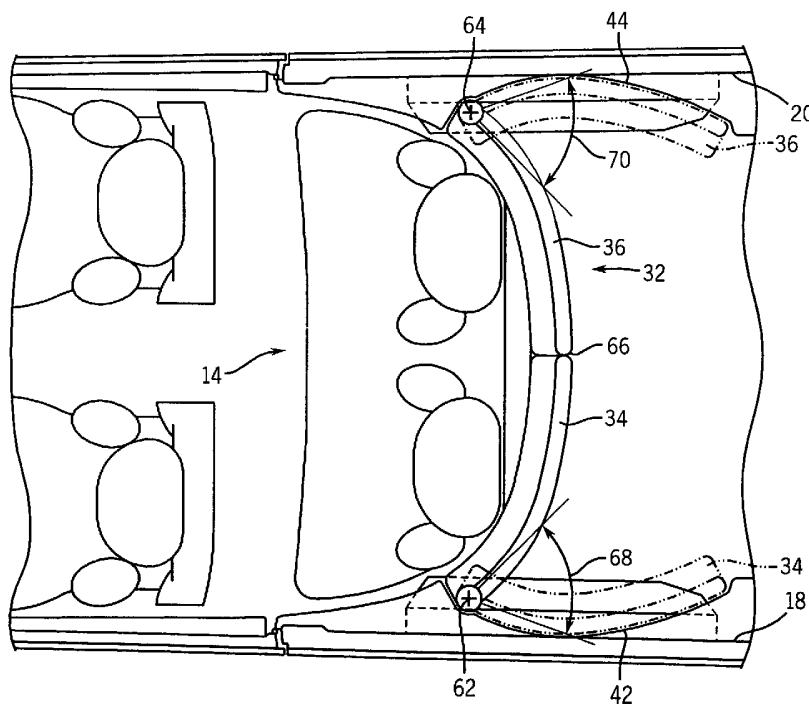
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: VEHICLE SEATING SYSTEM



(57) Abstract: A vehicle seat includes a cushion and a seatback. The seatback is pivotally mounted about a vertical axis (62, 64) such that the seatback is configured to swing from a first position into a second position while the cushion remains stationary.



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VEHICLE SEATING SYSTEM

FIELD OF THE INVENTION

[0001] The present specification relates to a vehicle seat. More specifically, the present specification relates to a vehicle seat having a seatback that swings from an operational to a stowed configuration about a vertical axis.

BACKGROUND OF THE INVENTION

[0002] Conventional vehicle seats typically include a cushion that is mounted to a vehicle floor and a seatback that is coupled to the cushion. Vehicle seats typically have a driving or occupied position and may also have a stowed position intended to increase the cargo capacity of the vehicle. Seats that have a stowed position are typically used as second or third row seats in a vehicle, depending on the overall vehicle configuration.

[0003] Conventional vehicle seats may be placed into a stowed position in a variety of ways, such as by folding the seatback down onto the cushion and tumbling the seat into a recess located in the vehicle floor in front of or behind the vehicle seat that is to be stowed. In other designs, the seat cushion may pivot forward in the vehicle permitting the seatback to be folded into the space formerly occupied by the seat cushion.

[0004] A large cavity may be required in the vehicle floor to stow both the cushion and seatback for those vehicle seats that are tumbled into a stowed position. The large cavity permits the creation of a cargo area having a substantially flush floor. Further, placing the seat into the stowed position and removing the seat from the stowed position can be difficult because of the mass and size of the seat. For example, when removing the seat from a stowed position in a floor cavity, the user may need to bend over to the vehicle floor and manually lift the entire seating apparatus from the cavity and pivot it to its operational configuration.

[0005] A further disadvantage of conventional fold and tumble seats is that they typically have only one operational seating configuration along with the stowed configuration. Even if the seat allows for sliding movement with respect to the vehicle floor, often the seat does not pivot with respect to a vertical axis.

[0006] Accordingly, there is a need for a vehicle seat that may be moved to a stowed configuration but that does not require a large cavity disposed in the floor of the vehicle. Further, there is a need for a vehicle seat that does not require a substantial amount of effort by the user to place the seat into the stowed or back into the operational configuration. Further, it would be desirable to have a vehicle seat that includes multiple seating positions with respect to the interior of the vehicle.

SUMMARY OF THE INVENTION

[0007] An exemplary embodiment relates to a vehicle seat disposed in a vehicle having a first side and a second side. The vehicle seat includes a cushion and a seatback. The seatback is pivotally mounted such that it is configured to swing about a first vertical axis into a stowed position while leaving the cushion in its original position.

[0008] Another exemplary embodiment relates to a method of stowing a vehicle seat having first and second seatback sides. The method includes the steps of unlatching the two seatback sides, swinging the first and second seatback sides about a vertical axis until placed in a stowed position, and flipping a remaining seat cushion into a cavity disposed in a vehicle floor.

[0009] A still further embodiment relates to a seatback for a vehicle seat disposed in a vehicle. The seatback includes a support mounted to the vehicle, a seatback frame mounted to the support, and a pivot mechanism pivotally coupling the support to the vehicle, wherein the pivot axis of the pivot mechanism is vertically disposed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The invention will become more fully understood from the following detailed description, taken in conjunction with the accompanying drawings, wherein like reference numerals refer to like elements, in which:

[0011] FIG. 1 is a perspective view of the interior of a vehicle;

[0012] FIG. 2 is a perspective view of the interior of a vehicle having second row seating disposed in a stowed configuration;

[0013] FIG. 3 is a top view of a vehicle showing multiple locations of second row seats;

[0014] FIG. 4 is a perspective view of a vehicle seat having seatbacks pivotally mounted on a pair of vertical axes;

[0015] FIG. 5 is a side view of two rows of vehicle seating showing both a first configuration and a second stowed configuration;

[0016] FIG. 6 is a top view of a vehicle interior showing a pair of seatbacks in a first configuration and a second stowed configuration;

[0017] FIG. 7 is a perspective view of a vehicle seat;

[0018] FIG. 8 is a side view of a vehicle interior showing a second row of vehicle seats;

[0019] FIG. 9 is a perspective view of a vehicle seat and a pivoting support mechanism;

[0020] FIG. 10 is a side view of two rows of vehicle seating, the second including a child restraint fixture;

[0021] FIG. 11 is a side view of two rows of vehicle seating, the second of which shows a rotatable seat cushion; and

[0022] FIG. 12 is a top view of a vehicle depicting an exemplary seating configuration.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] Referring to FIG. 1, a vehicle 10 may include first row seating 12 and second row seating 14. Vehicle 10 also includes a floor 16 and

a pair of sides 18, 20. A center console 22 may be disposed proximate first row 12 and second row 14.

[0024] Further referring to FIG. 1, second row seating 14 may include a cushion 30 and a seatback 32. Cushion 30 may extend the entire width between sides 18, 20 if second row seating 14 is bench-style seating, or may include a plurality of cushion segments. As depicted in the exemplary embodiment of FIG. 1, seatback 32 includes first and second sides 34, 36 that together comprise seatback 32 extending between sides 18, 20. One or more headrests 38 may be disposed on top of seatback 32.

[0025] Referring to FIG. 2, in an exemplary embodiment, second row seating 14 is configured to be stowed to create greater room for cargo, or to create alternative passenger seating configurations. In the present embodiment, first and second sides 34, 36 of seatback 32 fold into respective vehicle sides 18, 20 and cushion 30 pivots over a step 40 to create a substantially flat cargo bed extending from first row 12 to rear of vehicle 10. First and second vehicle sides 18, 20 may include cavities 42, 44 to receive first and second seatback sides 34, 36 to create a larger cargo area.

[0026] Referring to FIG. 3, first and second sides 34 and 36 are shown as they are folded into vehicle sides 18, 20. First and second sides 34, 36 may be configured to lock into various intermediate positions depending on user needs. Exemplary positions may include a normal occupied driving position and positions suitable for passengers when vehicle 10 is parked. For example, the configuration wherein sides 34, 36 are disposed flush against vehicle sides 18, 20 not only creates a large cargo space but may permit passenger seating by allowing passengers to sit on floor 16 while leaning back against stowed seatback sides 34 or 36. Referring to FIG. 2, a pad 46 disposed on floor 16 may support such an arrangement.

[0027] Referring to FIG. 4, an exemplary embodiment is depicted wherein cushion 30 includes two segments, each corresponding to a seatback side 34, 36. Seatback sides 34, 36 are mounted on respective support structures 50, 52, which are pivotally mounted to vehicle 10 to permit pivotal

movement of seatback sides 34, 36. Rear portion 56 of cushion 30 may be upwardly extending toward seatbacks 34, 36 such that when seatback sides 34, 36 are pivoted away from cushion 30, a L-shaped portion of cushion 30 remains. Because seatback sides 34, 36 do not extend to floor 16, the folding motion into vehicle sides 18, 20 is facilitated due to the smaller size of seatback sides 34, 36. Further, referring to FIG. 5, when cushion 30 is pivoted about a cushion pivot 58 into a stowed position, rear portion 56 supports cushion 30 on floor 16 to create a substantially flat extended floor portion defined by bottom 60 of cushion 30.

[0028] Referring to FIG. 6, in an exemplary embodiment, seatback 32 is curved such that second row seating 14 is configured as a semi-circle. Seatback supports 50, 52 (see FIG. 4) are pivotally mounted at pivots 62, 64 disposed along vehicle sides 18, 20. Seatback first and second sides 34, 36 meet at junction 66 to create seatback 32. The rotating range of motion of seatback sides 34, 36 is depicted by angles 68, 70. The stowed position of seatback sides 34, 36 is shown as seatback sides 34, 36 rest within recesses 42, 44 in vehicle sides 18, 20. Recesses 42, 44 permit a more compact stowed arrangement.

[0029] While seatback 32 is shown in FIG. 6 as having a curved structure, seatback 32 may be designed in a variety of configurations disposed between vehicle sides 18, 20 including a straight segment between sides 18, 20. Further, in the embodiments shown, seatback 32 includes two sides 34, 36, but other configurations are possible, including, but not limited to, a single pivotally mounted segment, or multiple segments that may or may not create a single unit extending between vehicle sides 18, 20.

[0030] Referring to FIG. 7, seatback sides 34, 36 may be secured together with a latch 70 to create a continuous seatback 32. The latched configuration may be used when vehicle 10 is being driven and second row 14 is occupied by passengers. In other embodiments, supports 50, 52 or pivots 62, 64 may include mechanisms configured to lock seatback sides 34, 36 into various positions.

[0031] Referring to FIG. 8, passenger 72 is shown seated in second row 14. Because seatback 32 does not extend to vehicle floor 16 but rather comprises a shorter segment connected to cushion 30, seatback 32 may be folded back without interfering with wheel well 74. Further, because the L-shape of cushion 30 permits the cushion 30 to be rotated to create a substantially flat cargo surface as discussed with respect to FIG. 5, passenger 72 gains leg room as second row 14 is disposed atop step 40, allowing the feet of passenger 72 to rest on a lower portion of floor 16. Although folding seatback 32 is shown as part of second row 14 in the present embodiment, folding seatback 32 may also be used as part of first row seating 12 or third row seating as desired. Further, although seatback 32 is shown as the only portion that folds back into vehicle sides 18, 20, the entire seat including cushion 30 could be designed to fold back into vehicle sides 18, 20 in certain configurations of vehicle 10.

[0032] Referring to FIGS. 7 and 9, seatback sides 34, 36 are pivotally supported on vertical axes 62, 64 as opposed to the more conventional horizontal axis recliner mechanism. To achieve the necessary structural support, supports 50, 52 (see FIGS. 4 and 9) are configured to adequately support seatback sides 34, 36 in a cantilevered fashion. The pivot structure at pivot points 62, 64 may be configured in a variety of ways known in the art, exemplary examples including a structure similar to a seatback recliner but mounted vertically on vehicle sides 18, 20 or a vertically oriented bearing device.

[0033] In the exemplary embodiment depicted in FIG. 9, support 50 extends from pivot 62 to attach to rear of seatback side 34. The extended support 50 permits a greater distance of travel of seatback 34 as seatback 34 is folded from its operational configuration into its stowed configuration. In other embodiments, support 50 and pivot 62 may be integrated into second row seating 14 rather than incorporated into the body structure of vehicle 10.

[0034] Referring to FIG. 10, child restraint 80 may be incorporated into second row seating 14 while seatback 32 is disposed in its

driving configuration and cushion 30 has been rotated to a stowed configuration (see FIG. 5).

[0035] Referring to FIG. 11, rotation of cushion 30 may be accomplished without also stowing seatback 32 in an exemplary embodiment.

[0036] Referring to FIG. 12, the separability of seatback sides 34, 36 permits usage of a portion of second row seating 14 for passenger seating while simultaneously storing cargo, such as the bicycle shown, in vehicle 10 with the other half of second row seating 14 disposed in a stowed configuration.

[0037] While the detailed drawings and specific examples describe exemplary embodiments, they serve the purpose of illustration only. The configurations shown and described may differ depending on the characteristics of the vehicle seating system. Second row seating 14 shown and described is not limited to the precise details disclosed. Furthermore, other substitutions, modifications, changes, and omissions may be made in the design, operating conditions, and arrangement of the exemplary embodiments without departing from the scope of the invention.

WHAT IS CLAIMED IS:

1. A vehicle seat, comprising:
 - a cushion; and
 - a seatback, wherein the seatback is pivotally mounted about a vertical axis such that the seatback is configured to swing from a first position into a second position while the cushion remains stationary.

2. A method of stowing a vehicle seat having a seat cushion and first and second latched seatback sides, comprising the steps of:
 - unlatching the two seatback sides;
 - swinging the first seatback side about a first vertical axis into a first stowed position;
 - swinging the second seatback side about a second vertical axis into a second stowed position; and
 - rotating the seat cushion into a cavity disposed in a vehicle floor.

3. A seatback for a vehicle seat disposed in a vehicle, comprising:
 - a support mounted to the vehicle;
 - a seatback frame mounted to the support; and
 - a pivot mechanism pivotally coupling the support to the vehicle,wherein the pivot axis of the pivot mechanism is vertically disposed.

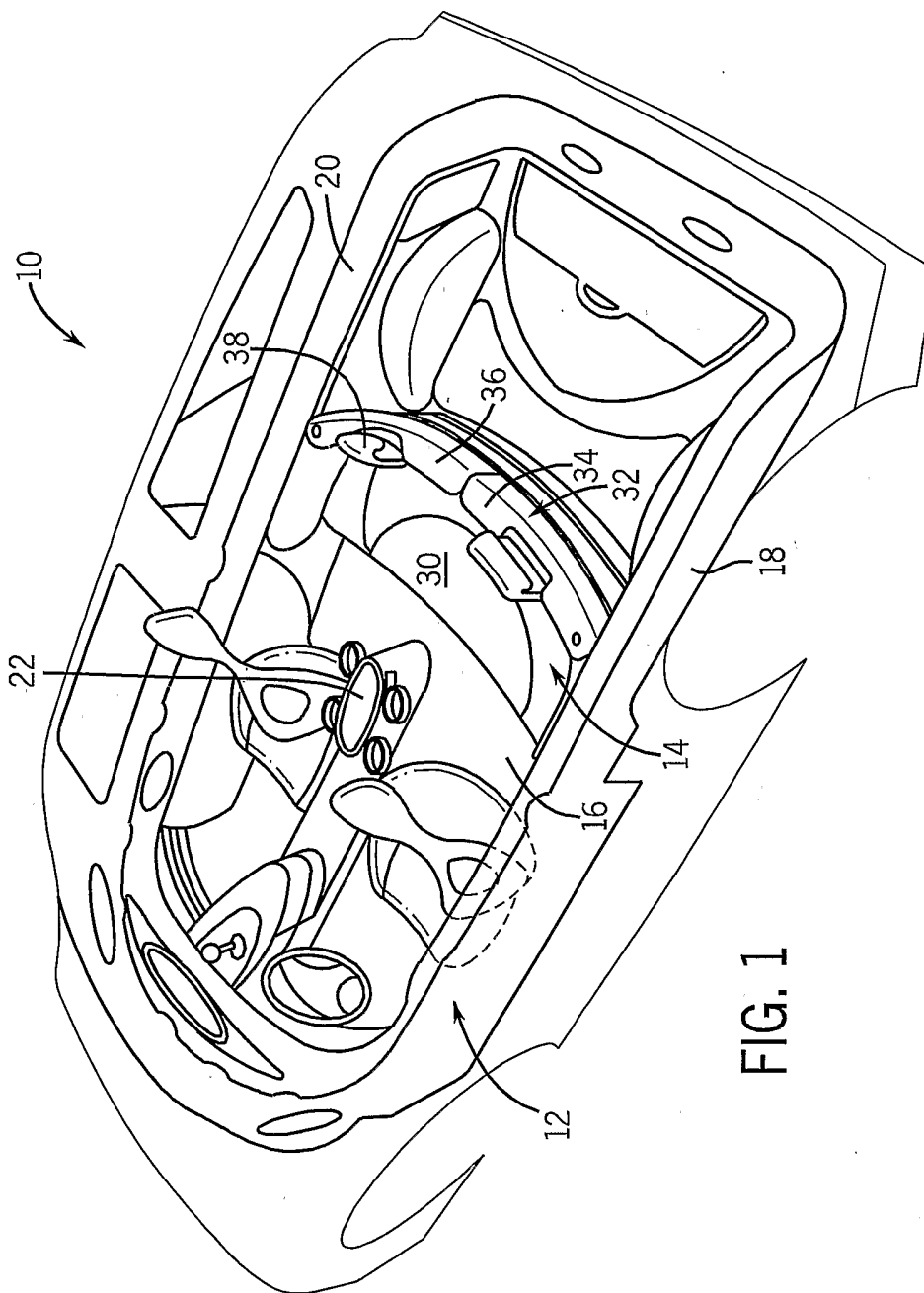


FIG. 1

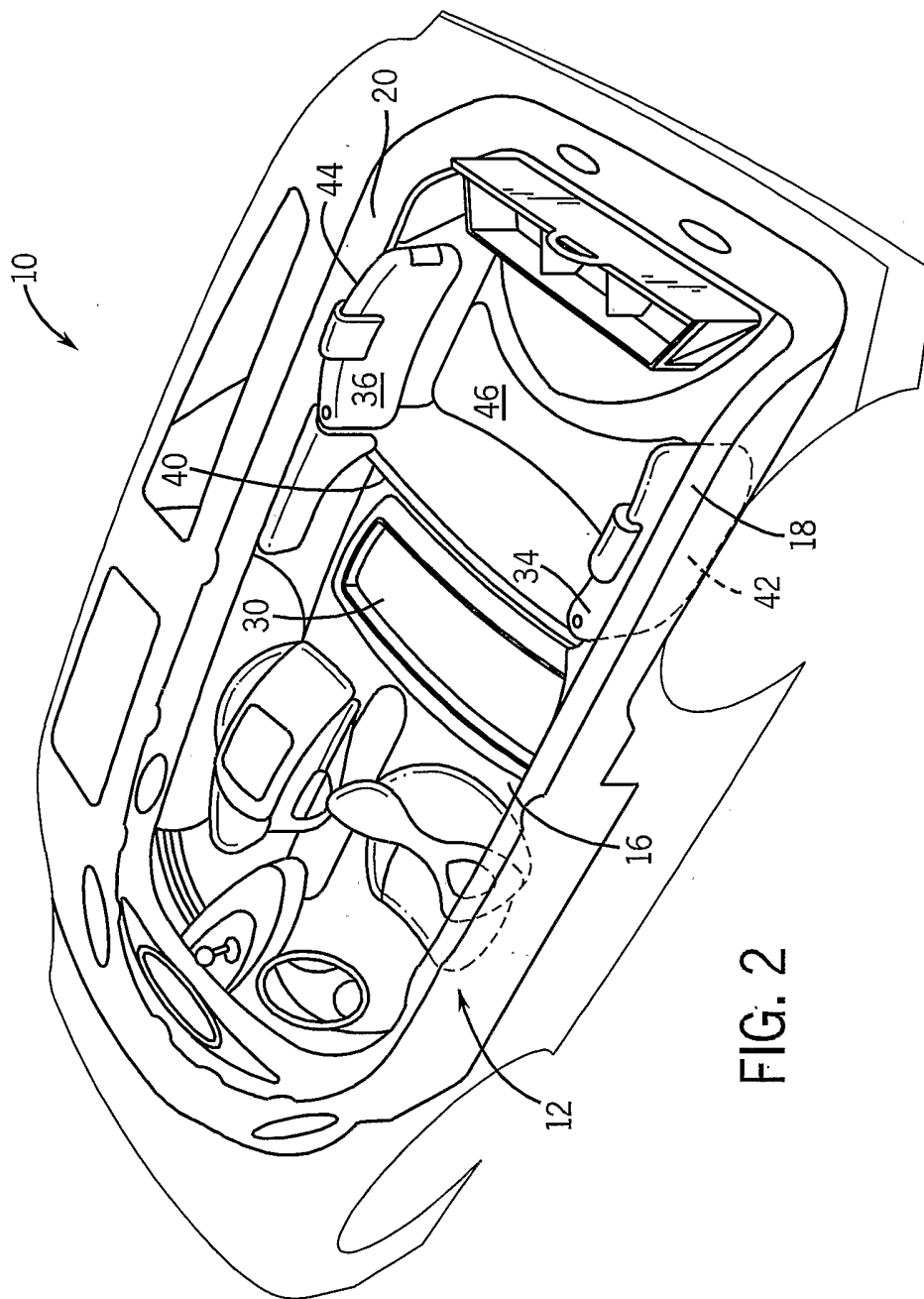


FIG. 2

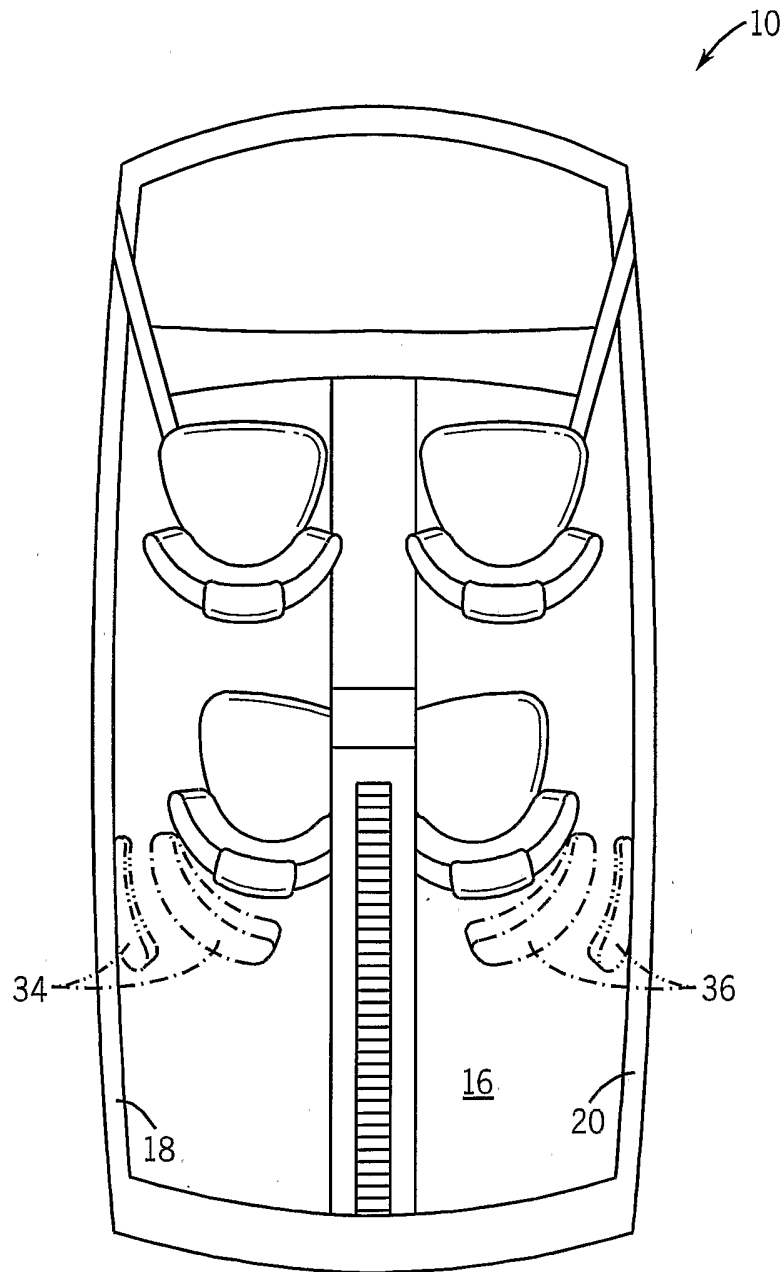
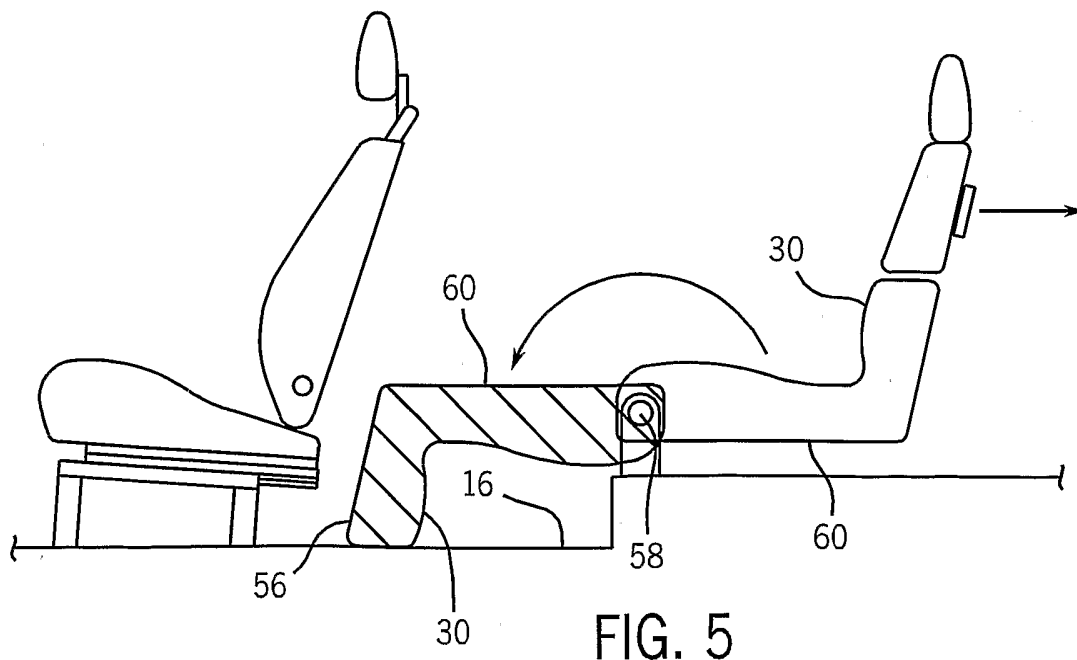
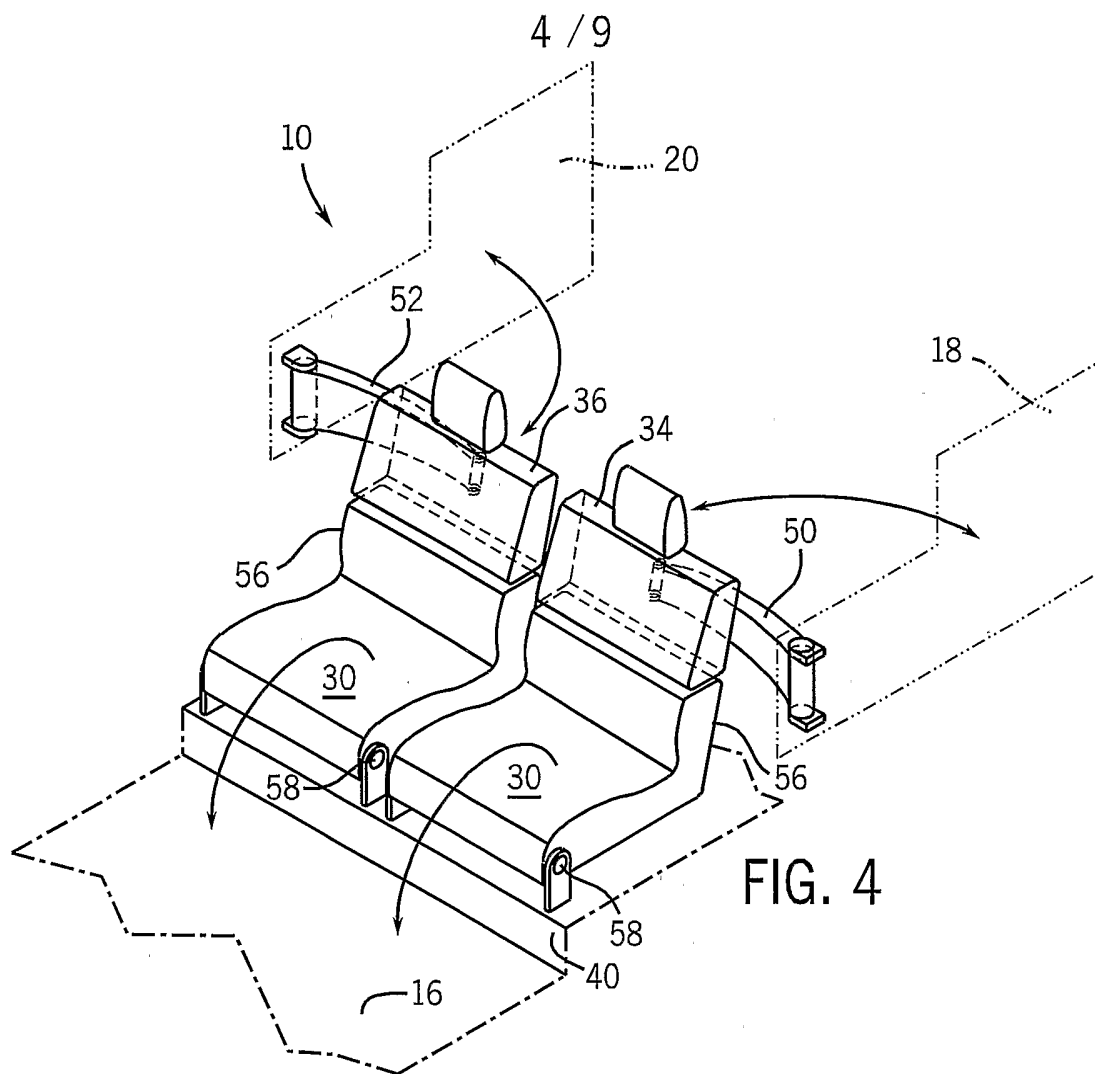


FIG. 3



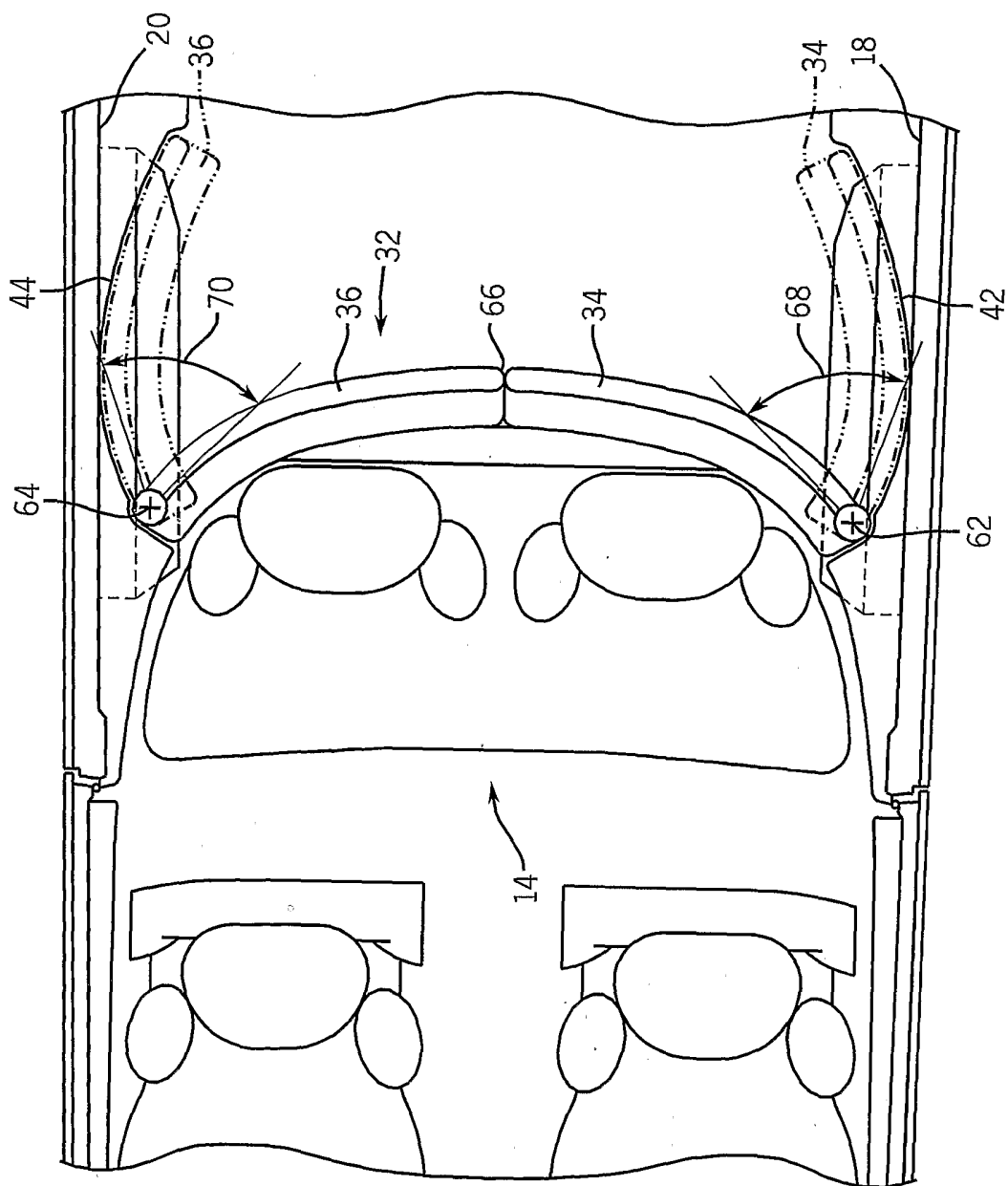


FIG. 6

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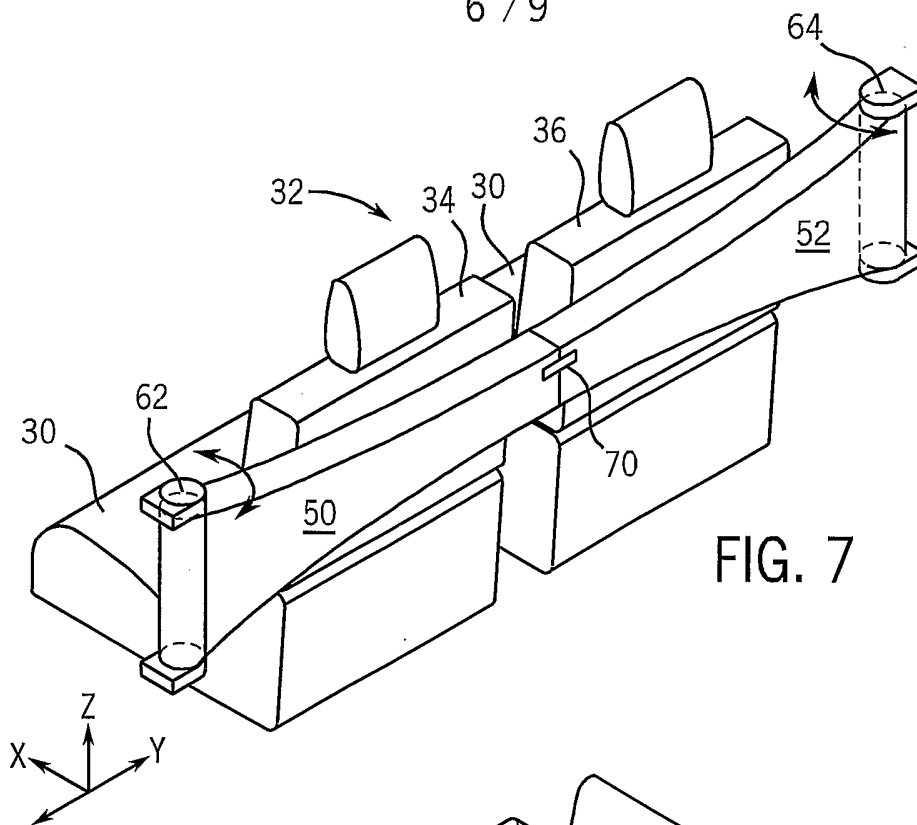


FIG. 7

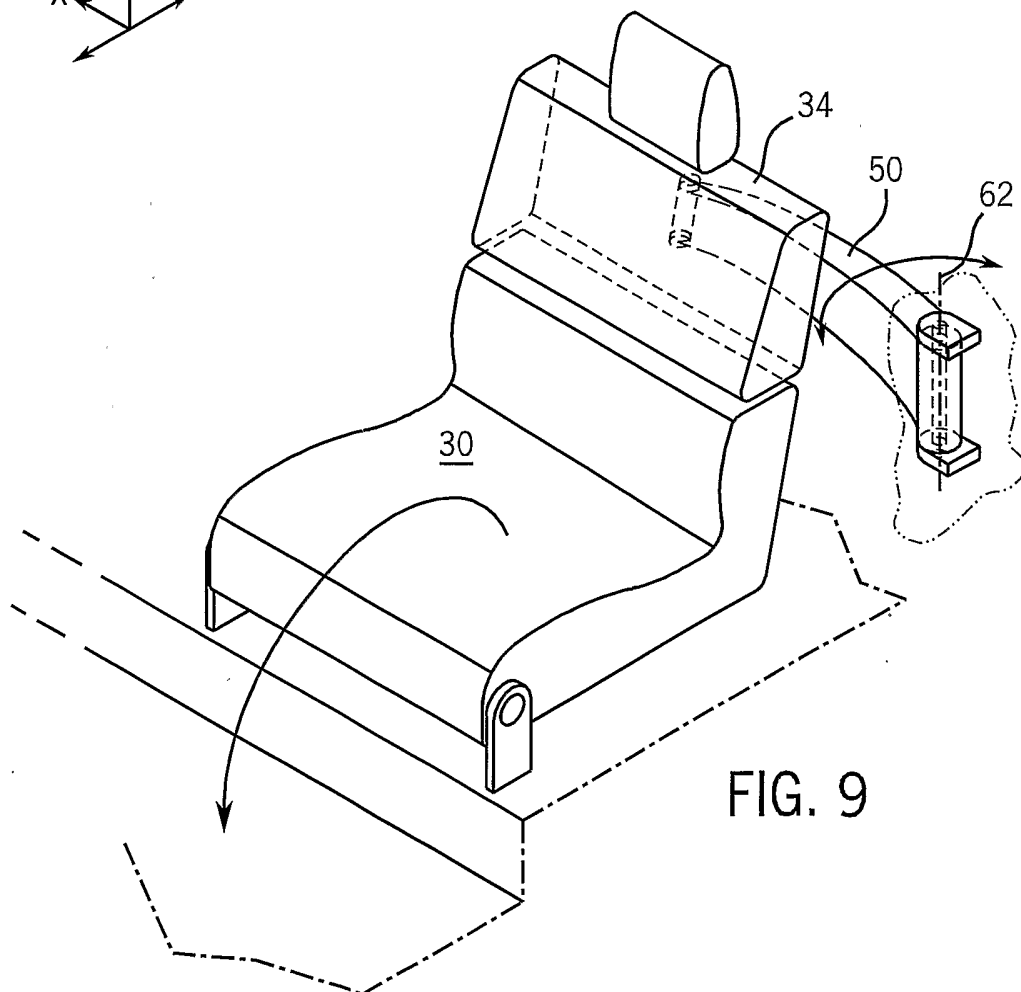


FIG. 9

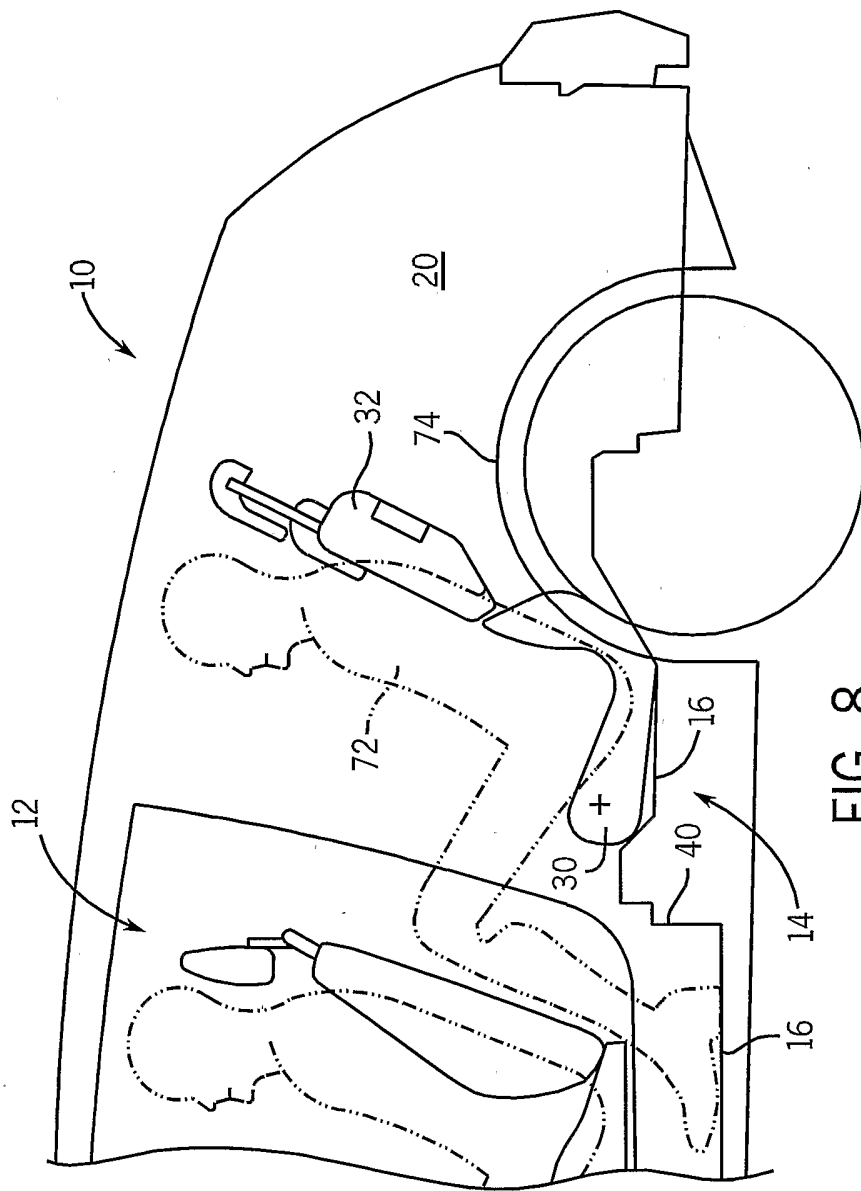
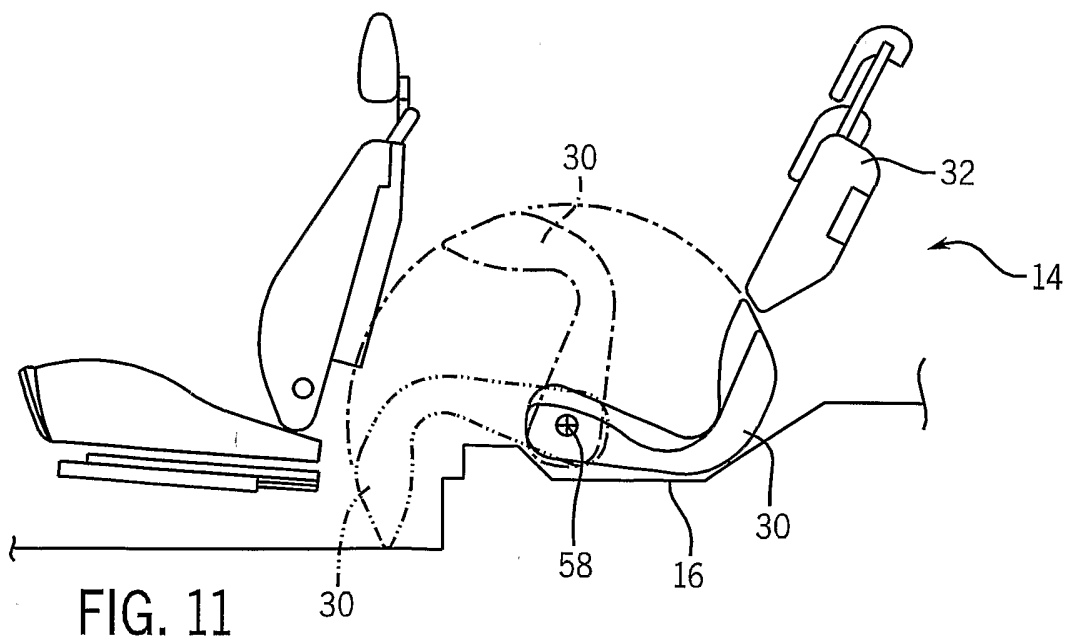
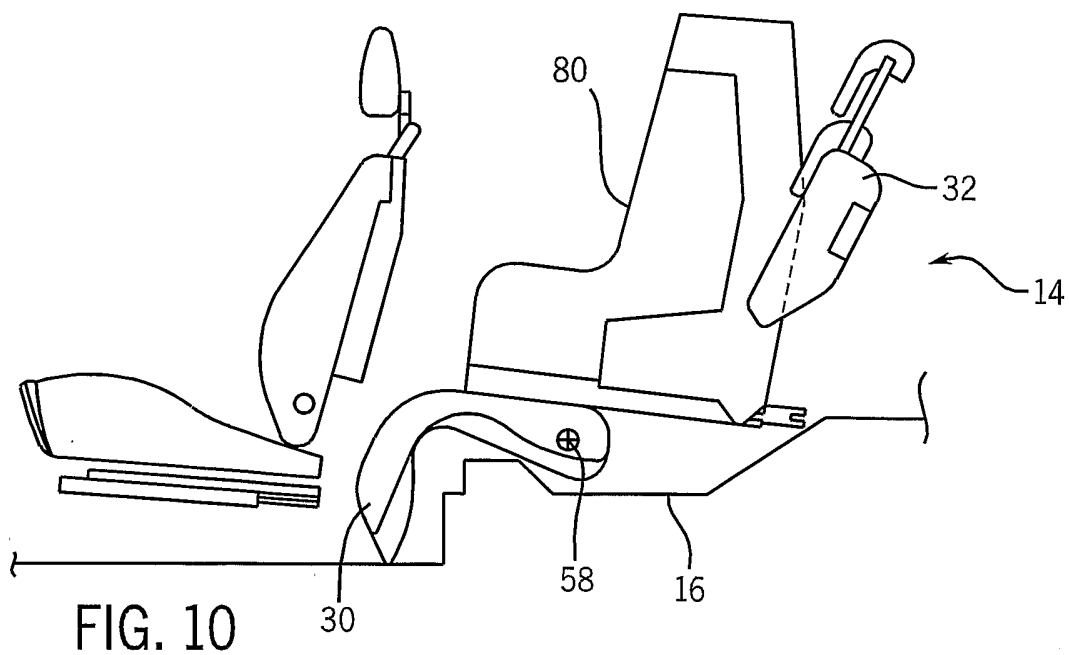


FIG. 8



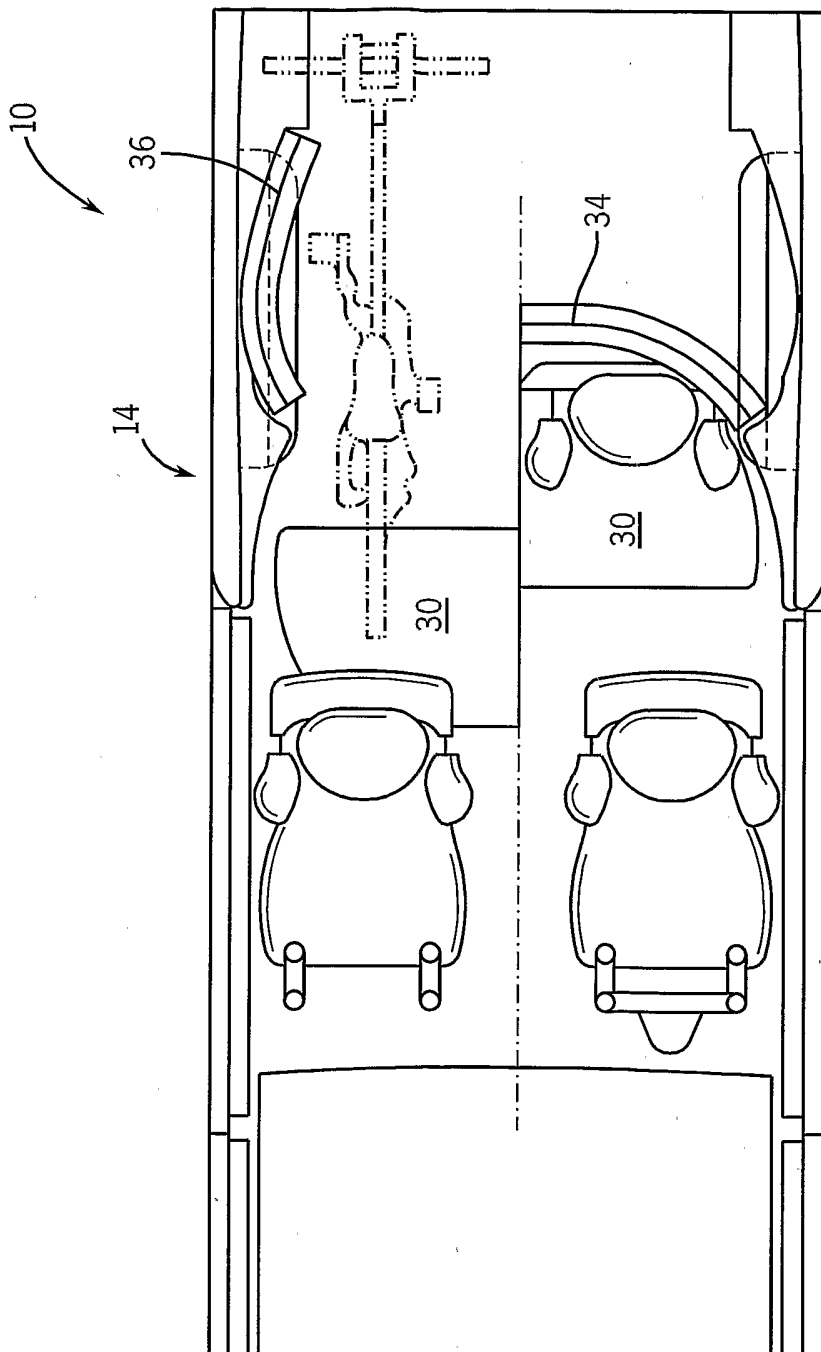


FIG. 12

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/22775

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60N2/36

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)
IPC 7 B60N

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, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 721 869 A (CITROEN SA;PEUGEOT) 5 January 1996 (1996-01-05)	1, 3
A	the whole document	2
A	EP 0 879 733 A (KRAUSS MAFFEI AG) 25 November 1998 (1998-11-25)	
A	DE 35 21 233 A (UTILA GERAETEBAU) 18 December 1986 (1986-12-18)	
A	GB 381 980 A (NEW AVON BODY COMPANY LTD;ALFRED TILT) 20 October 1932 (1932-10-20)	
A	WO 01 05620 A (BRAMBILLA SILVIO ;LEAR CORP (US)) 25 January 2001 (2001-01-25)	
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents:

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- *&* document member of the same patent family

Date of the actual completion of the international search

17 October 2002

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13/11/2002

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/22775

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2 495 520 A (GRIMM GEORGE E) 24 January 1950 (1950-01-24) -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/22775

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2721869	A	05-01-1996	FR 2721869 A1	05-01-1996
EP 0879733	A	25-11-1998	DE 19721086 C1 EP 0879733 A2	19-11-1998 25-11-1998
DE 3521233	A	18-12-1986	DE 3521233 A1	18-12-1986
GB 381980	A	20-10-1932	NONE	
WO 0105620	A	25-01-2001	IT T0990138 U1 WO 0105620 A1	22-01-2001 25-01-2001
US 2495520	A	24-01-1950	NONE	