

(21) Application No: 1401696.8

(22) Date of Filing: 31.01.2014

(71) Applicant(s):
Daimler AG
(Incorporated in the Federal Republic of Germany)
Mercedesstrasse 137, D-70327 Stuttgart, Germany

(72) Inventor(s):
Naveen Melinamani

(74) Agent and/or Address for Service:
Hofstetter Schurack & Partner Patent-und
Rechtsanwaltskanzlei, PartG mbB
Balanstraße 57, D-81541 München, Germany

(51) INT CL:
B60R 7/04 (2006.01) **B60N 3/00** (2006.01)

(56) Documents Cited:
GB 2430420 A **DE 102005041935 A1**
JP 2008056017 A

(58) Field of Search:
INT CL **B60R**
Other: **Online: WPI, EPODOC**

(54) Title of the Invention: **Backrest for a vehicle seat and vehicle seat**
Abstract Title: **Vehicle seat backrest**

(57) A backrest 10 for a vehicle seat comprises a support structure 20 and a pocket with an expansion device 22, 26. A first member 22 of the expansion device is fixed to the support structure 20 and a second member 26 of the expansion device is fixed to a main panel 16 of the pocket. A spring element of the expansion device operates to spread the first member 22 and the second member 26 apart from each other to increase the volume of the pocket. The pocket may incorporate a folding table.

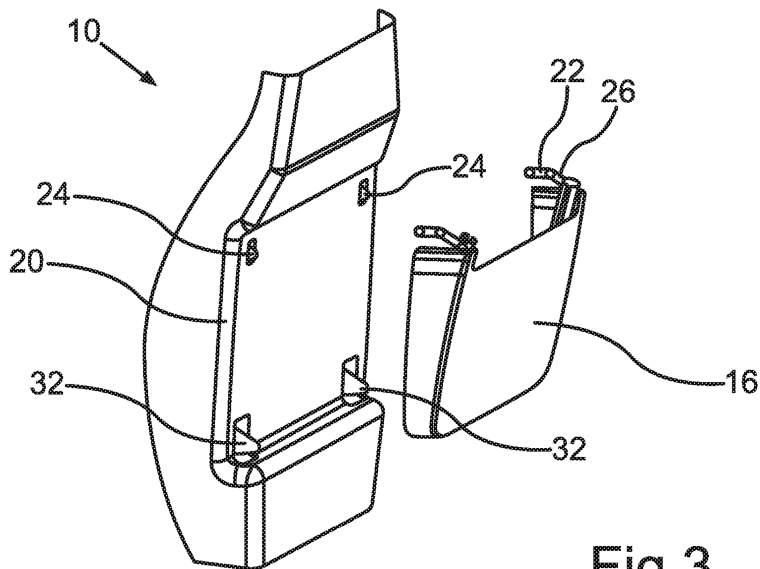


Fig.3

1/8

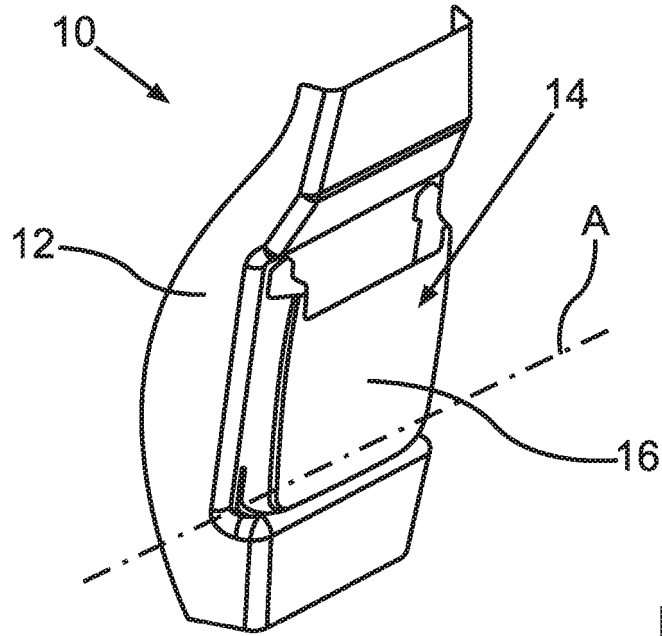


Fig. 1

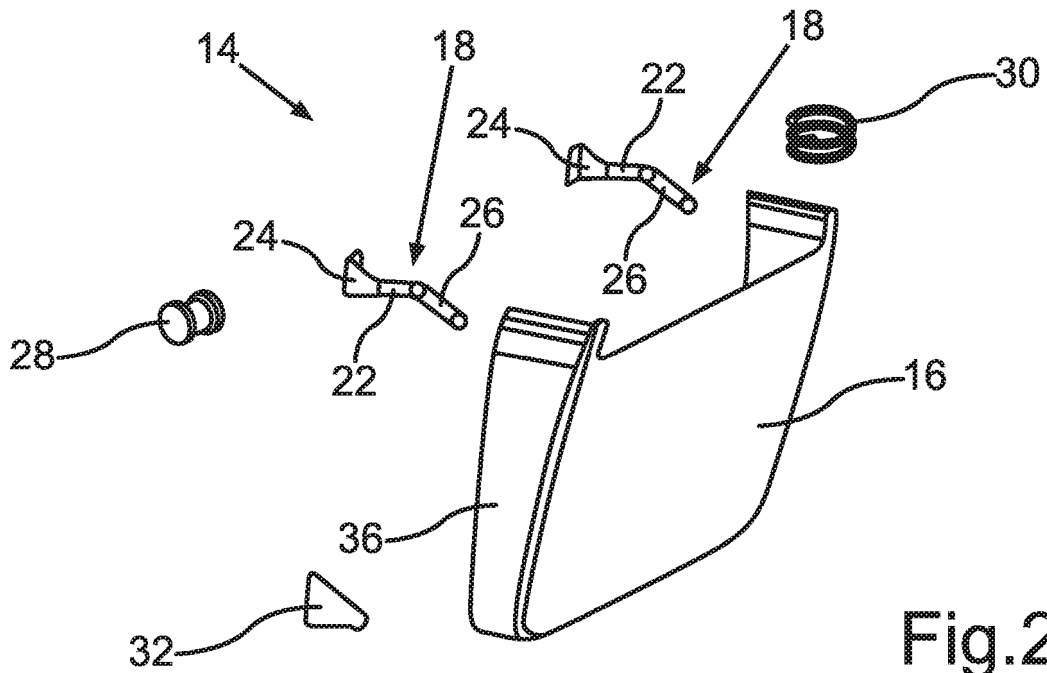


Fig. 2

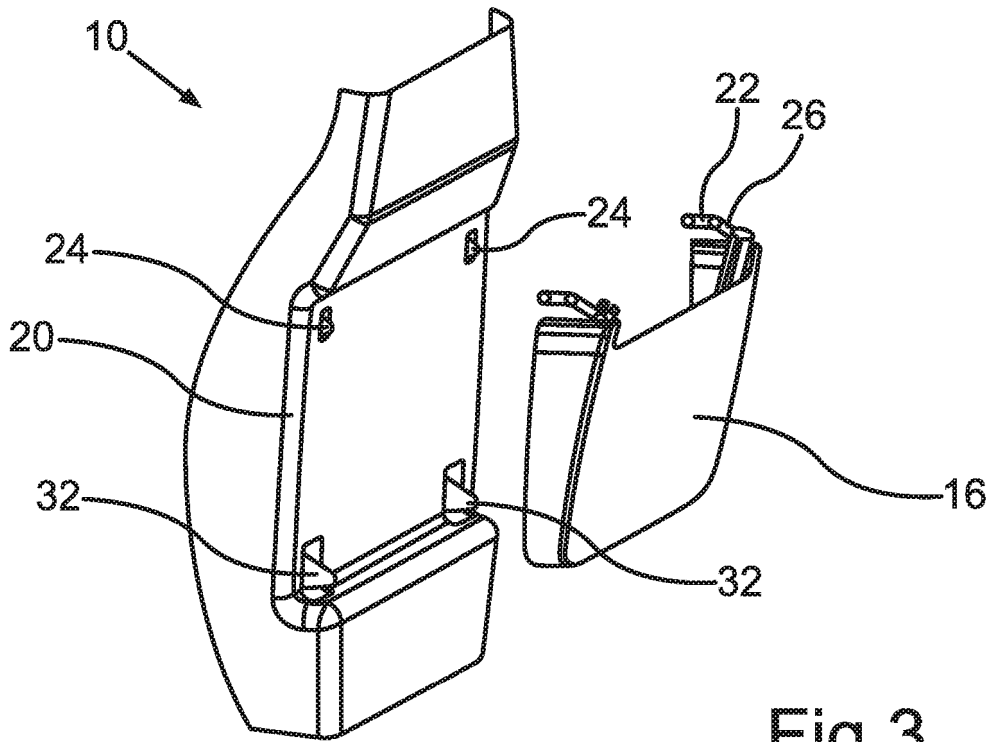


Fig.3

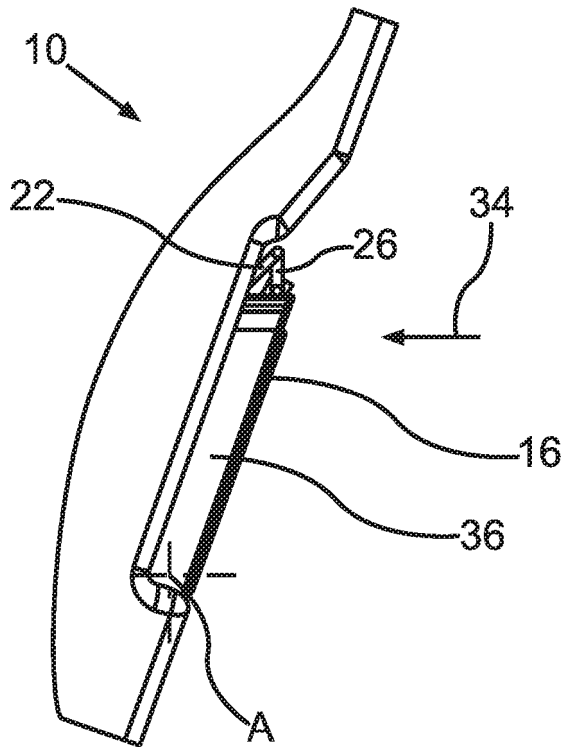


Fig.4

3/8

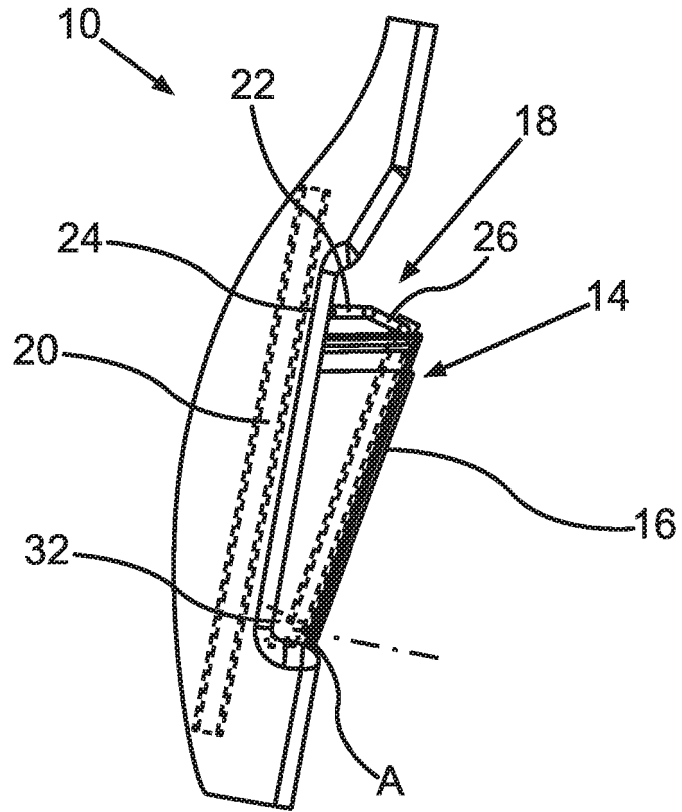


Fig.5

4/8

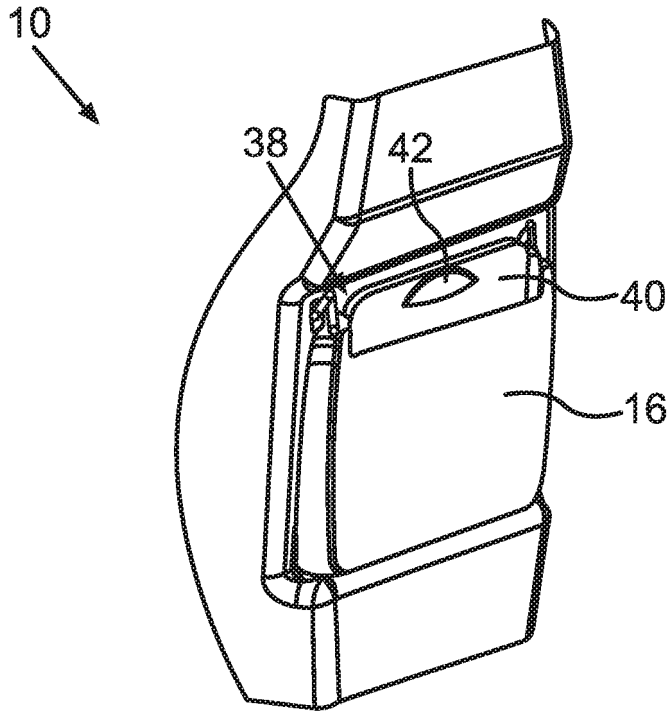


Fig. 6

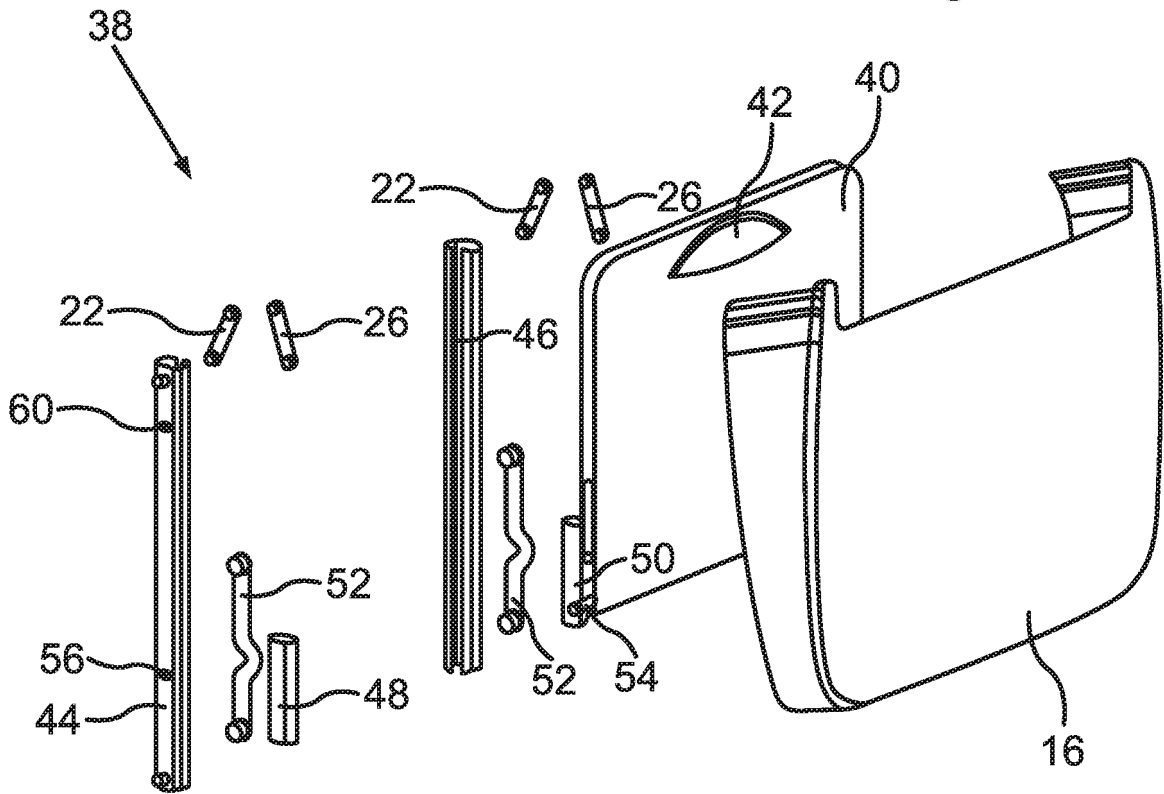


Fig. 7

5/8

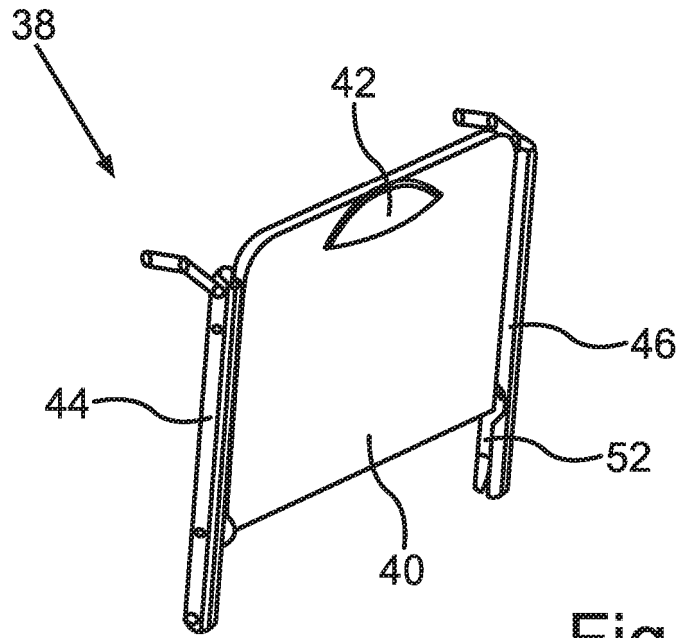


Fig. 8

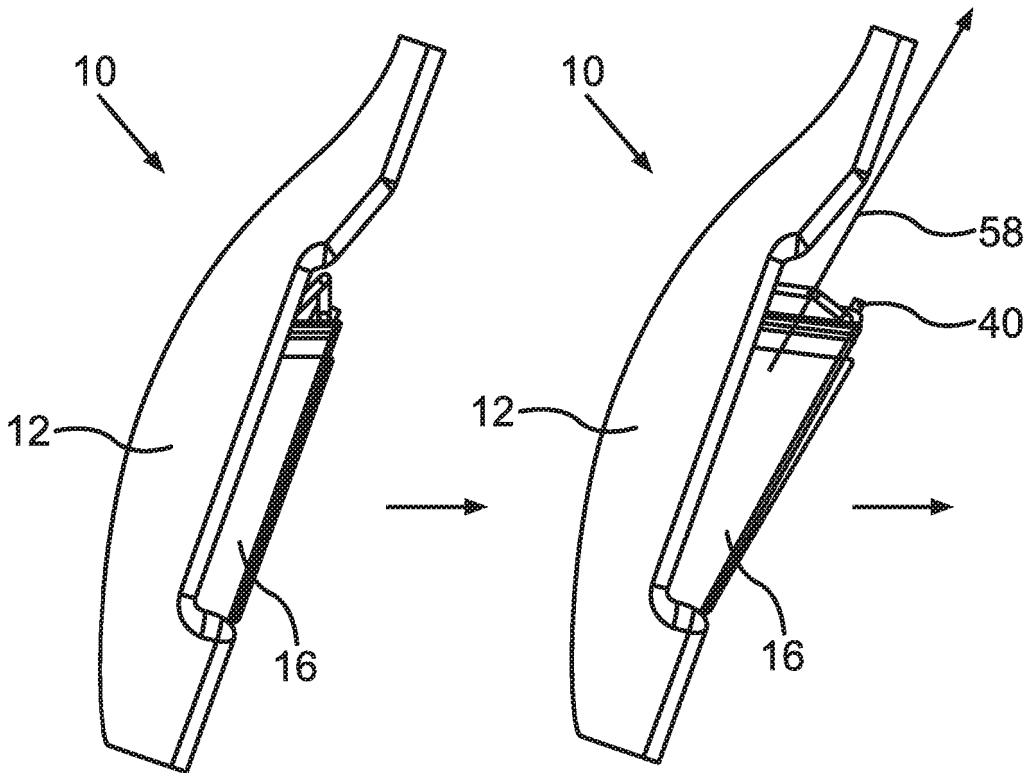


Fig. 9

Fig. 10

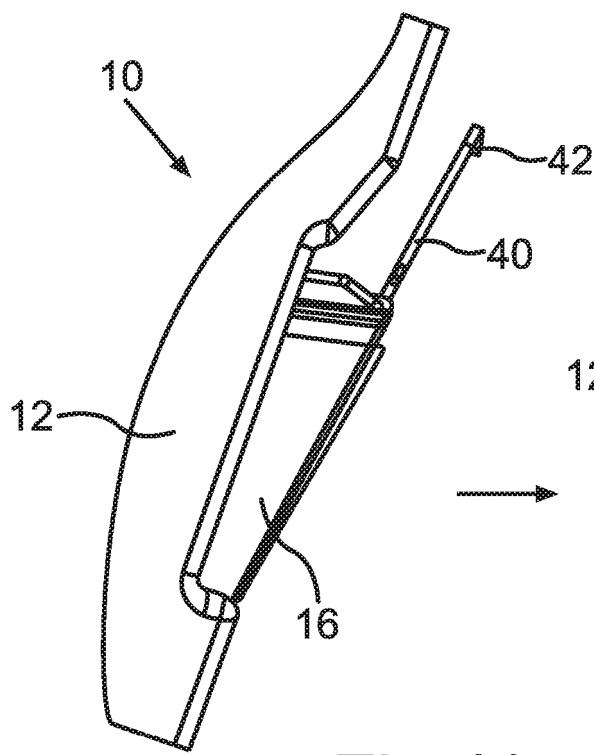


Fig. 11

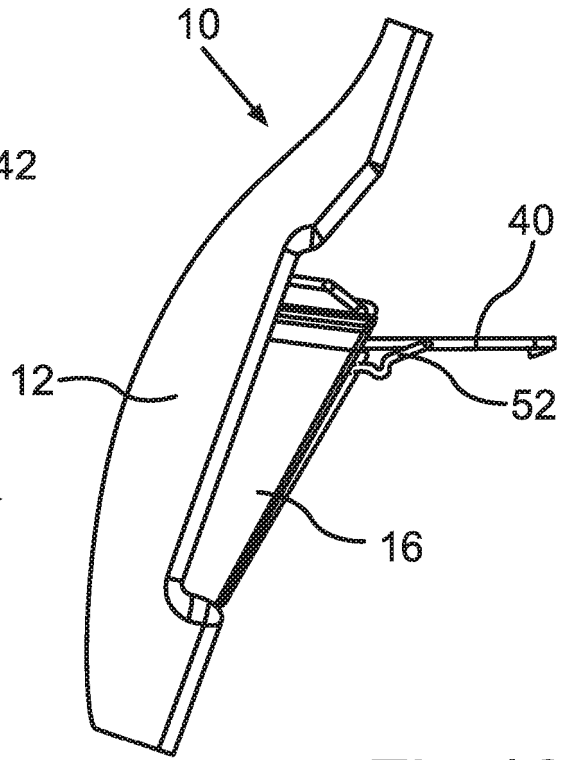


Fig. 12

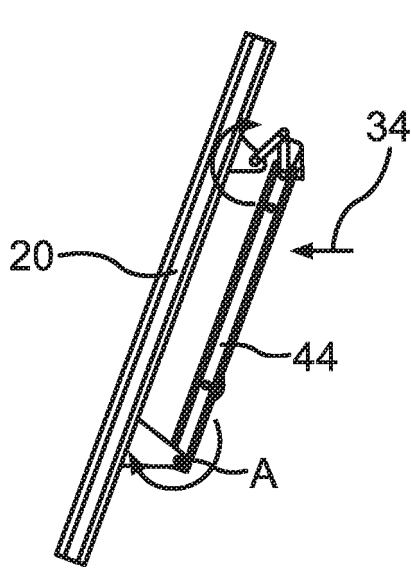


Fig. 13

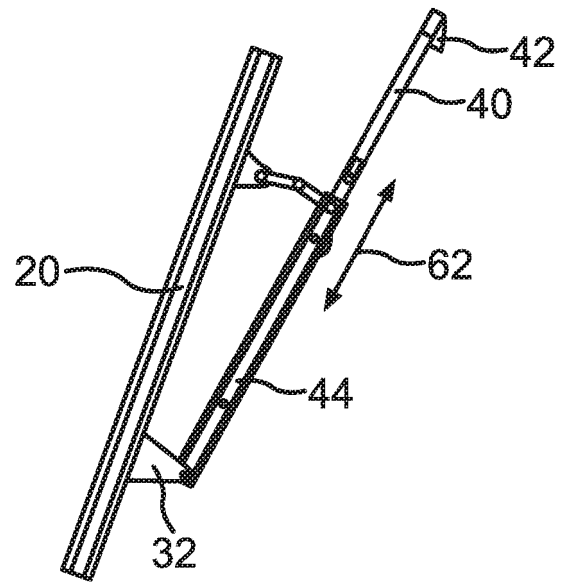


Fig. 14

7/8

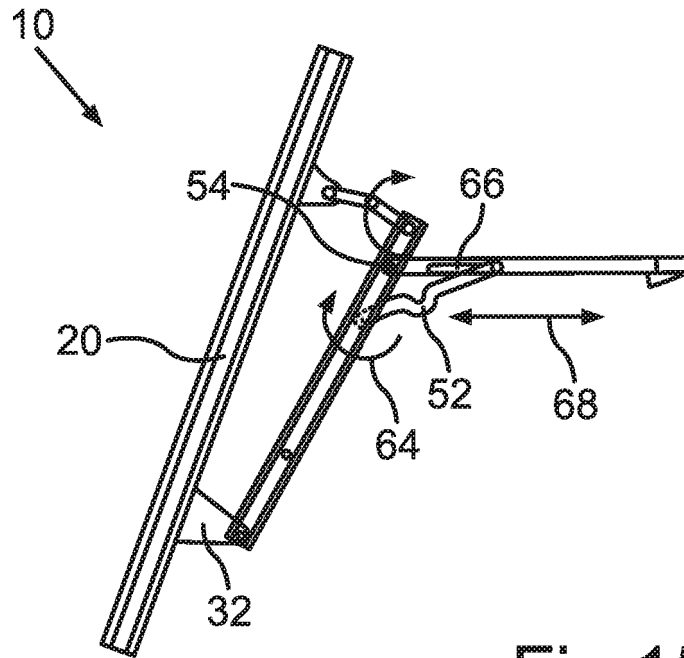


Fig.15

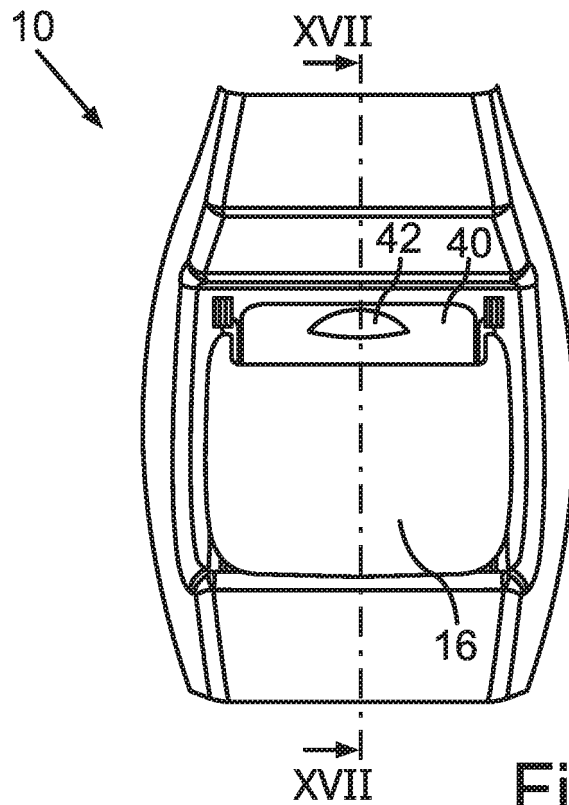


Fig.16

8/8

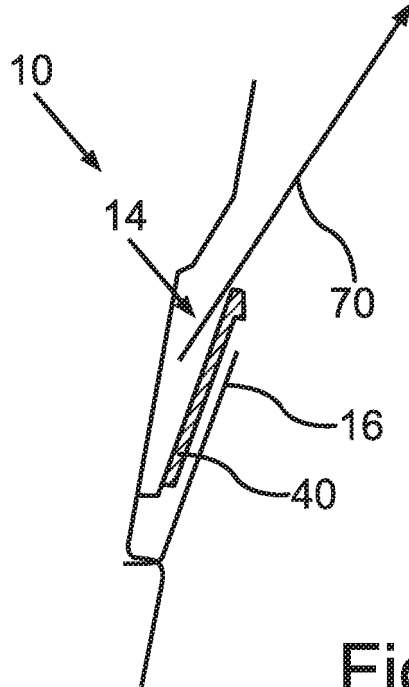


Fig. 17

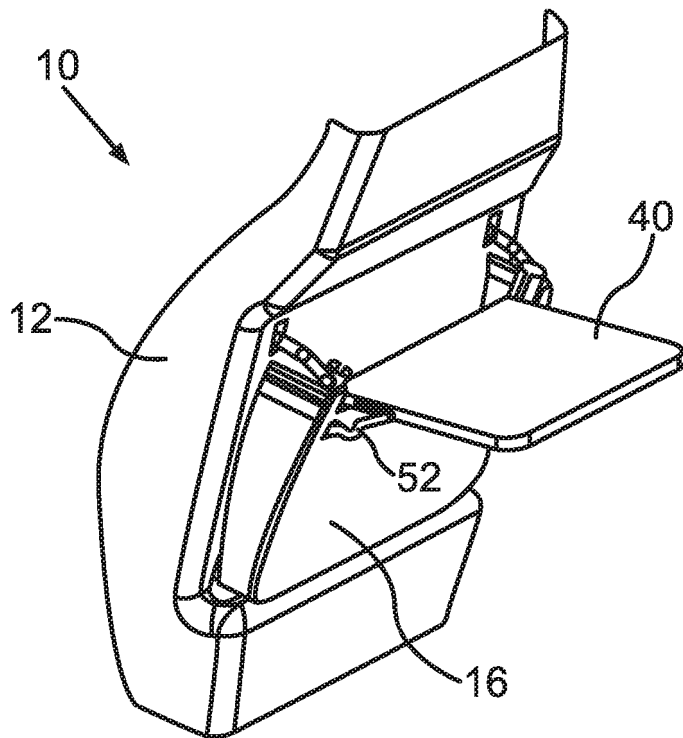


Fig. 18

Backrest for a Vehicle Seat and Vehicle Seat

The invention relates to a backrest for a vehicle seat comprising a support structure and a pocket with an expansion device. The pocket is arranged at a rear side of the backrest. A first member of the expansion device is fixed to the support structure and a second member of the expansion device is fixed to a main panel of the pocket. The invention further relates to a vehicle seat with such a backrest.

Document JP 2008056017 A describes a vehicle seat with a backrest, wherein a pocket is arranged at a rear side of a backrest of the vehicle seat. Within the backrest a support structure is arranged, and a first member of a link mechanism is fixed to the support structure. A second member of the link mechanism is fixed to a bracket holding a rubber string. The rubber string is fixed to a main panel of the pocket. When the main panel of the pocket is pulled away from the support structure in the backrest, the rubber string is stretched and the volume of the pocket is enlarged. If the main panel is pulled further away from the support structure, the link mechanism is expanded or stretched until the first member and the second member are aligned. This further increases the volume of the pocket.

Further, documents DE 10 2005 041 935 A1 and GB 2 430 420 A describe pockets being arranged at a rear side of a vehicle seat's backrest, wherein side portions of the pockets are flexible and thus allow enlarging the volume of the pockets.

Document DE 10 2005 032 450 A1 describes a folding table arrangement for a use in a backrest of a vehicle seat. Linear guides are arranged at the backrest, along which a table top or tray can be pulled towards the top of the backrest. Subsequently the table top can be rotated into a position, in which it provides a flat working surface.

It is an object of the present invention to provide a backrest and a vehicle seat of the initially mentioned kind, which allow for a particularly simple increase of the volume of the pocket.

This object is solved by a backrest having the features of claim 1 and by a vehicle seat having the features of claim 10. Advantageous configurations with convenient further developments of the invention are specified in the dependent claims.

According to the invention a spring element of the expansion device is configured to spread the first member and the second member of the expansion device apart from each other to increase the volume of the pocket. The expansion device is thus spring loaded and therefore particularly easy to operate. Also, by increasing the volume of the pocket more space can be utilized by an occupant of the vehicle for the storage of items within the pocket, for example for the storage of maps or the like. The spring loaded expansion device also provides for increased safety during a crash of a vehicle equipped with a vehicle seat having the backrest according to the invention.

If the occupant of the vehicle wants to utilize more space in the pocket the spring element spreading the second member apart from the first member allows a very simple opening of the pocket in order to increase its volume for maximum space utilization.

In an advantageous embodiment of the invention by pushing the main panel of the pocket towards the support structure of the backrest the pocket is convertible in an expanded state with increased volume. Thus, a simple push concept is implemented which allows for a very simple operation of the mechanism.

It has further proven advantageous, if by pushing the main panel of the pocket in its expanded state towards the support structure of the backrest the pocket is reconvertible in an unexpanded state. Thus, a push-push concept is realized, in which the same movement allows increasing the volume of the pocket and also reconverts the pocket into its unexpanded state if the increased volume is no longer required by the occupant of the vehicle.

Preferably the first member and the second member of the expansion device form an angle of less than 180° in the expanded state of the pocket. This allows for a particularly reliable operation, if the occupant wishes to convert the pocket into its unexpanded state with decreased volume.

A pivot axis for the main panel of the pocket can be provided by a pair of brackets being fixed to a lower part of the support structure. This enables a particularly large increase of the volume of the pocket and a smooth operation.

In an advantageous embodiment the backrest comprises a folding table arrangement. The folding table arrangement comprises a tray which is moveable from a stowage position into a working position. In the stowage position the tray is at least partially hidden in the pocket. In the working position the tray provides a substantially flat working surface. As in the stowage position the tray is hidden in the pocket, the safety during a crash of the vehicle equipped with the backrest is increased. Also, when the tray is in its stowage or non-use condition, the pocket can be used to store documents, magazines and the like. Further, the backrest provides the functionality of a pocket for storing items and of a folding table arrangement comprising the tray which can be utilized for multiple purposes.

Preferably the pocket is provided with a first guide rail and a second guide rail, wherein the tray is moveable from the stowage position into the working position by sliding a first sliding device and a second sliding device arranged on the tray along the first guide rail and the second guide rail respectively. From this intermediate position, in which the tray is slid upwards, the tray can be pivoted into the working position. By such an opening mechanism a particularly good knee clearance for a vehicle occupant who utilizes the tray is achieved. This good knee clearance also provides for a reduced risk of injury during a crash of the vehicle. Also first sliding the tray along the guide rails and then pivoting or folding it towards the occupant provides for a very easy operation in moving the tray into its working position.

It is further advantageous if the tray is provided with locking elements configured to arrest the tray with respect to the guide rails. Herein, two locking elements preferably provide a pivot axis about which the tray is pivotable into its working position. This allows for a particularly easy handling when the tray is brought into the working or use position.

The locking elements can in particular be spring loaded pins which may be unlocked by using a latch or handle provided on the tray. When the spring loaded pins are released, the tray can be lifted or slid along the guide rails.

The main panel of the pocket can in particular be made from a rigid plastic material to create a particularly robust pocket.

The vehicle seat according to the invention comprises a backrest according to the invention. The advantages and preferred embodiments described with respect to the backrest also apply to the vehicle seat according to the invention.

The features and feature combinations mentioned above in the description as well as the features and feature combinations mentioned below in the description of figures and/or shown in the figures alone are usable not only in the respectively specified combination but also in other combinations or alone without departing from the scope of the invention. Thus, implementations not explicitly shown in the figures or explained, but which result and can be generated by separated feature combinations of the explained implementations are also to be considered encompassed and disclosed by the invention.

Further advantages, features and details of the invention are apparent from the claims, the following description of preferred embodiments as well as based on the drawings.

Therein show:

- Fig. 1 a backrest of a vehicle seat in a perspective view, the backrest comprising a pocket on its rear side, wherein a volume of the pocket can be increased;
- Fig. 2 an exploded view of components of the pocket and a link mechanism linking a main panel of the pocket to the support structure within the backrest;
- Fig. 3 the backrest and the main panel of the pocket, wherein the main panel is detached from a support structure within the backrest;
- Fig. 4 the backrest in a side view, wherein the pocket is in its unexpanded state;
- Fig. 5 the backrest in a side view, wherein the pocket is in its expanded state with increased volume;
- Fig. 6 the backrest with the pocket, wherein a folding table arrangement is assembled to a main body of the backrest and a tray of the folding table arrangement is shown in its stowage position;

- Fig. 7 an exploded view of components of the folding table arrangement;
- Fig. 8 a perspective view of the folding table arrangement to be mounted to the seat back structure;
- Fig. 9 a side view of the backrest, wherein the pocket is shown in its unexpanded state and the tray is hidden in the pocket;
- Fig. 10 a side view of the backrest, wherein the pocket is shown in its expanded state with increased volume;
- Fig. 11 a sliding movement of the tray which is pulled upwards from the stowage position within the pocket in order to bring the tray into its working position;
- Fig. 12 the backrest with the tray which is folded or pivoted into its working position;
- Fig. 13 another view of the backrest showing the support structure and the tray in its stowage position;
- Fig. 14 the sliding movement of the tray along the guide rails mounted to the support structure;
- Fig. 15 a pivoting movement of the tray into its working position and the locking of the tray;
- Fig. 16 a view towards the rear side of the backrest with the tray in its stowage position within the pocket;
- Fig. 17 a section view along a line XVII-XVII in Fig. 16; and
- Fig. 18 the backrest with the folding table arrangement in a perspective view, wherein the tray is moved into its working position.

Fig. 1 shows a backrest 10 of a vehicle seat, wherein at a rear side of a main body 12 of the backrest 10 a pocket 14 is arranged which provides a storage volume for the storage of maps or the like. A main panel 16 of the pocket 14 can rotate about a pivot axis A in order to increase the volume of the pocket 14.

As can be seen from the exploded view in Fig. 2, the pocket 14 comprises expansion devices in the form of two link mechanisms 18 which link the main panel 16 of the pocket 14 to a support structure 20 within the main body 12 of the backrest 10 (see Fig. 5).

Each link mechanism 18 comprises a first member 22 or first support link which is fixed to an upper support bracket 24. The upper support brackets 24 are fixedly connected to the support structure 20 of the backrest 10 (see Fig. 3). A second member 26 or second support link of each link mechanism 18 is connected to an upper edge of the main panel 16 of the pocket 14.

For a hinged movement of the first member 22 and the second member 26 with respect to each other and with respect to the support brackets 24 as well as to the main panel 16, six rivets 28 are utilized. However, only one of the rivets 28 is shown in the exploded view in Fig. 2. Also, each link mechanism 18 comprises a spring 30, which is configured to spread the first member 22 and the second member 26 apart from each other and thus to expand the volume of the pocket 14. However, in the exploded view in Fig. 2 only one of the springs 30 is shown.

As can be seen from Fig. 3, the pivot axis A of the main panel 16 is provided by a pair of lower support brackets 32 which are fixedly connected to the support structure 20.

Fig. 4 shows the backrest 10 with the pocket 14 in its unexpanded state. In order to increase the volume of the pocket 14, the main panel 16 is pushed towards the support structure 20 of the backrest 10, i.e. in a direction being indicated by an arrow 34 in Fig. 4. This push mechanism releases the springs 30 of the two link mechanisms 18 and leads to a pivoting movement of the main panel 16 about the pivot axis A and thus to an increase of the volume of the pocket 14. Thus, more volume can be utilized by an occupant of the vehicle which is equipped with a vehicle seat having the backrest 10.

As the main panel 16 or map pocket cover is spring loaded in its unexpanded position or unexpanded state (see Fig. 4) increasing the volume of the pocket 14 is achieved by a very simple operation.

As can be seen from Fig. 5, in the expanded state of the pocket 14 the first member 22 and the second member 26 form an angle of less than 180°. Thus, these links act as a stopper at a particular angle as soon as by increasing the volume of the pocket 14 more space for the storage of items is provided. The spring loaded link mechanism 18 applies a push-push concept, in which reconvertng the pocket 14 into its unexpanded state (see Fig. 4) is also realized by pushing the main panel 16 of the pocket 14 towards the support structure 20. Thus, pushing the main panel 16 of the pocket 14 in its expanded state with increased volume in the direction indicated by the arrow 34 in Fig. 4 leads to decreasing the volume of the pocket 14.

Therefore starting from the unexpanded state of the pocket 14 (see Fig. 4) pushing the main panel 16 of the pocket in the direction indicated by the arrow 34 first leads to increasing the volume of the pocket 14. When the increased storage space is no longer needed by the occupant of the vehicle, pushing the main panel 16 of the pocket in the direction indicated by the arrow 34 a second time decreases the volume of the pocket 14. Thus by this push-push concept more volume of the pocket 14 can be achieved by the occupant of the vehicle and also the pocket 14 can be brought into its storage position (see Fig. 4), in which the pocket 14 occupies particularly little space within the vehicle.

The main panel 16 as well as side walls 36 extending from the main panel 16 towards the support structure 20 can in particular be made of a rigid plastic material. If the pocket 14 is in its unexpanded state (see Fig. 4), at least a part of the side walls 36 is immersed in the main body 12 of the backrest 10 (see Fig.4).

As can be seen from Fig. 6, the backrest 10 can comprise a folding table arrangement 38 (see Fig. 8) comprising a tray 40 with a latch 42. When the tray 40 is in its non-use position or stowage position, the tray 40 is for the most part hidden in the pocket 14. However, the tray 40 can be pulled out of the pocket 14 and then pivoted into its working position, in which the tray 40 provides a flat working surface (see Fig. 18). In the stowage position or design position, the main panel 16 of the pocket 14 covers the part of the tray 40 which is below the latch 42.

As can be seen from Fig. 7, the folding table arrangement 38 comprises a first guide rail 44 and a second guide rail 46. The lower end of each one of the guide rails 44, 46 is fixed to the lower support bracket 32 which is fixedly connected to the support structure 20 of the backrest 10. An upper end of each guide rail 44, 46 is fixed to the second member 26. Thus, when the pocket 14 is converted into its expanded state, the guide rails 44, 46 also pivot about the pivot axis A.

On a first side of the tray 40, which faces the first guide rail 44 a first sliding device 48 is arranged, which may move along the first guide rail 44 when the tray 40 is pulled out of the pocket 14. On the opposite side of the tray 40 a second sliding device 50 is arranged which can move along the second guide rail 46. Further, support links 52 are provided on each side of the tray 40, which faces the respective guide rail 44, 46. The support links 52 are close to the lower end of the guide rails 44, 46, as long as the tray 40 is in its stowage position (see Fig. 8).

Further, locking elements in the form of spring loaded pins 54 extend from the tray 40 into a direction coinciding with the pivot axis A. These spring loaded pins 54 are engaged in corresponding lower openings 56 in the guide rails 44, 46, when the tray 40 is in its stowage position (see Fig. 8).

Fig. 9 shows the backrest 10 with the pocket 14 in its unexpanded state and the tray 40 hidden within the pocket 14. Upon pushing the main panel 16 towards the main body 12 of the backrest 10 the pocket 14 is converted into its expanded state with increased volume. During this increase of volume the tray 40 can rotate about the pivot axis A by about 9°. Then the tray 40 can be slid upwards or pulled towards the top of the backrest 10, i.e. in a direction indicated by an arrow 58 in Fig. 10. In the non-use condition of the tray 40, which is shown in Fig. 10, pocket 14 provides an increased storage space for maps, magazines and the like.

To allow the sliding movement of the sliding devices 48, 50 along the guide rails 44, 46 which is indicated by the arrow 58 in Fig. 10, the spring loaded pins 54 need to be unlocked or released. This can be accomplished by pulling the latch 42. Consequently the pins 54 disengage from the lower openings 56 and the tray 40 can be pulled out of the pocket 14.

Fig. 11 shows the tray 40 in its lifted or pulled out position. In this intermediate position the spring loaded pins 54 engage in second openings 60 provided near the upper end of

the guide rails 44, 46 (see Fig. 7). The two pins 54 on the opposite sides of the tray 40 provide a second pivot axis about which the tray 40 can be folded into the working position shown in Fig. 12 and in Fig. 15. Thus after lifting the tray 40 as shown in Fig. 11, the tray 40 is folded or pivoted about the second pivot axis provided by the pins 54 towards the occupant of the vehicle as shown in Fig. 12.

As can be further seen from Fig. 12, when the tray 40 has reached its working position, in which it provides a substantially flat working surface to the occupant of the vehicle, the support links 52 stabilize the tray 40. If the backrest 10 of the vehicle is reclined at different angles, the orientation of the tray 40 can be adjusted accordingly in order to provide the flat working surface to the occupant of the vehicle.

Fig. 13 visualizes the movement of the guide rails 44, 46 with respect to the support structure 20, when the main panel 16 of the pocket 14 is pushed towards the support structure 20 in the direction indicated by the arrow 34 in Fig. 13. Due to the spring loaded link mechanism 18, the pocket 14 is opened and the guide rails 44, 46 pivot about the pivot axis A.

When subsequently the spring loaded pins 54 are released by manipulating the handle or latch 42, the two pins 54 will be unlocked from the guide rails 44, 46. Consequently the tray 40 can slide upwards until the pins 54 are locked again in the openings 60 at a higher position in the guide rails 44, 46 (see Fig. 14). The sliding movement of the tray 40 is indicated in Fig. 14 by another arrow 62.

As can be seen from Fig. 15, the tray 40 is rotated into its working position. At the same time a lower end of each one of the support links 52 also rotates about a pivot axis. This rotating movement is indicated in Fig. 15 by a further arrow 64. The opposite end of the support link 52 slides along a guideway 66 provided on each side of the tray 40 until it reaches a locking position within the guideway 66. The corresponding sliding movement of a protrusion extending from the support link 52 into the guideway 66 is indicated in Fig. 15 by another arrow 68. Thus, the support link 52 gets locked in the tray 40.

By utilizing the opening mechanism of the folding table arrangement 38 visualized in Fig. 13 to Fig. 15, good knee clearance for the occupant of the vehicle during the opening of the folding table arrangement 38 is achieved. This reduces the risk of injury during a crash of the vehicle. The opening mechanism of the folding table arrangement 38

comprises a push-push concept, a sliding movement of the tray 40 and then a pivoting or folding movement of the tray 40 towards the occupant.

The view towards the rear side of backrest 10 in Fig. 16 shows particularly well how the tray 40 is for the most part hidden by the main panel 16 of the pocket 14 when the tray 40 is in its non-use condition.

As can be seen from Fig. 17, the pocket 14 in its expanded state provides an increased volume for the storage of maps, documents, magazines and the like even if the tray 40 is in its non-use position within the pocket 14. An arrow 70 in Fig. 17 illustrates the taking out of objects from the pocket 14 in its expanded state.

Fig. 18 shows the backrest 10 with the pocket 14 in its expanded state, wherein the tray 40 of the folding table arrangement 38 is moved into its working position. In this working position or use position the tray 40 or table can be fully used.

List of reference signs

10	backrest
12	main body
14	pocket
16	main panel
18	link mechanism
20	support structure
22	first member
24	support bracket
26	second member
28	rivet
30	spring
32	support bracket
34	arrow
36	side wall
38	folding table arrangement
40	tray
42	latch
44	first guide rail
46	second guide rail
48	first sliding device
50	second sliding device
52	support link
54	pin
56	opening
58	arrow
60	opening
62	arrow
64	arrow
66	guideway
68	arrow
70	arrow
A	pivot axis

Claims

1. Backrest for a vehicle seat comprising a support structure (20) and a pocket (14) with an expansion device (18), the pocket (14) being arranged at a rear side of the backrest (10), wherein a first member (22) of the expansion device (18) is fixed to the support structure (20) and a second member (26) of the expansion device (18) is fixed to a main panel (16) of the pocket (14), characterized in that a spring element (30) of the expansion device (18) is configured to spread the first member (22) and the second member (26) apart from each other to increase the volume of the pocket (14).
2. Backrest according to claim 1, characterized in that by pushing the main panel (16) of the pocket (14) towards the support structure (20) of the backrest (10) the pocket (14) is convertible in an expanded state with increased volume.
3. Backrest according to claim 2, characterized in that by pushing the main panel (16) of the pocket (14) in its expanded state towards the support structure (20) of the backrest (10) the pocket (14) is reconvertible in an unexpanded state.
4. Backrest according to claim 2 or 3, characterized in that in the expanded state of the pocket (14) the first member (22) and the second

member (26) form an angle of less than 180°.

5. Backrest according to any one of claims 1 to 4, characterized in that a pivot axis (A) for the main panel (16) of the pocket (14) is provided by a pair of brackets (32) being fixed to lower part of the support structure (20).
6. Backrest according to any one of claims 1 to 5, characterized by a folding table arrangement (38) comprising a tray (40) which is movable from a stowage position, in which the tray (40) is at least partially hidden in the pocket (14), into a working position, in which the tray (40) provides a substantially flat working surface.
7. Backrest according to claim 6, characterized in that the pocket (14) is provided with a first guide rail (44) and a second guide rail (46), wherein the tray (40) is movable from the stowage position into the working position by sliding a first sliding device (48) and a second sliding device (50) arranged on the tray (40) along the first guide rail (44) and the second guide rail (46) respectively, and by pivoting the tray (40) into the working position.
8. Backrest according to claim 7, characterized in that the tray (40) is provided with locking elements, in particular in the form of spring loaded pins (54), configured to arrest the tray (40) with respect to the guide rails (44, 46), wherein two locking elements provide a pivot axis about which the tray (40) is pivotable into the working position.
9. Backrest according to any one of claims 1 to 8, characterized in that the main panel (16) of the pocket (14) is made from a rigid plastic material.
10. Vehicle seat with a backrest (10) according to any one of claims 1 to 9.



Application No: GB1401696.8

Examiner: Vaughan Phillips

Claims searched: 1-10

Date of search: 8 July 2014

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	-	GB 2430420 A (NISSAN) see abstract
A	-	DE 102005041935 A1 (DAIMLERCHRYSLER) see Fig. 1 & WPI abstract accession no. 2007-312005
A	-	JP 2008056017 A (TOYOTA) see the Figures & WPI abstract accession no. 2008-E13963

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

--

Worldwide search of patent documents classified in the following areas of the IPC

B60R

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
B60R	0007/04	01/01/2006
B60N	0003/00	01/01/2006