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(71) Applicant(s):
Ford Global Technologies, LLC
(Incorporated in USA - Delaware)
600 Parklane Towers East,
One Parklane Boulevard, Dearborn,
Michigan 48126, United States of America

(72) Inventor(s):
Gary Brown
Dean Biles
Lee David Sutton
Kay L Wright
Iain Stuart Stanfield
Torsten Gerhardt
Jonathan Young
Alan Richard Condon
William Farrelly
Peter M Hanrahan
Stephen David Fleming

(continued on next page)

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(56) Documents Cited:
EP 1106427 A1 **EP 1044845 A3**
WO 1998/041420 A1 **US 6616235 B1**
US 5370446 A **US 20030234567 A1**
US 20030155797 A1 **US 20020089220 A1**

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INT CL⁷ **B60N**
Other: **Online:EPODOC,PAJ,WPI**

(54) Abstract Title: **Vehicle seat assembly including a backrest mounted pivotal headrest for support of the side of a head of an occupant of the assembly**

(57) A seat assembly 5 includes at least one headrest 12 pivotally connected 13 to a backrest 11 of the assembly to support the side of a head of an occupant of the assembly. The headrest is movable from a stored position to one or more deployed positions, for example an adult deployed position (Fig. 1) or a child deployed position (Fig.5). The headrest provides a convenient place for the occupant to rest their head if they wish to rest or sleep. The headrest may also reduce the risk of neck injuries during a vehicle side impact in that the headrest restricts or limits side to side or lateral motion of the head during the impact.

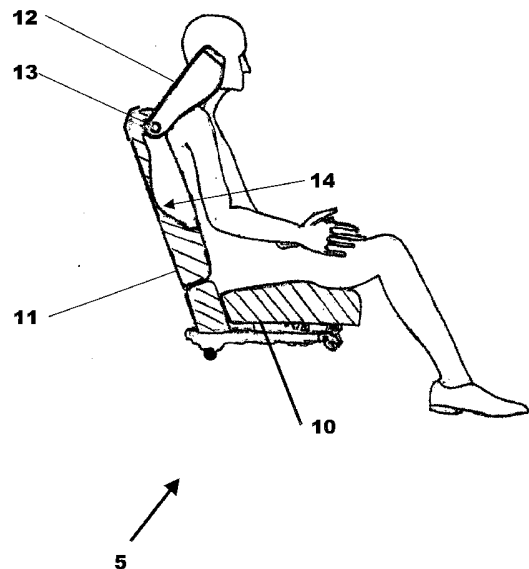


Fig.1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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GB 2415616 A continuation

(74) Agent and/or Address for Service:
Ford Motor Company Limited
Room 1/445, Eagle Way, BRENTWOOD,
Essex, CM13 3BW, United Kingdom

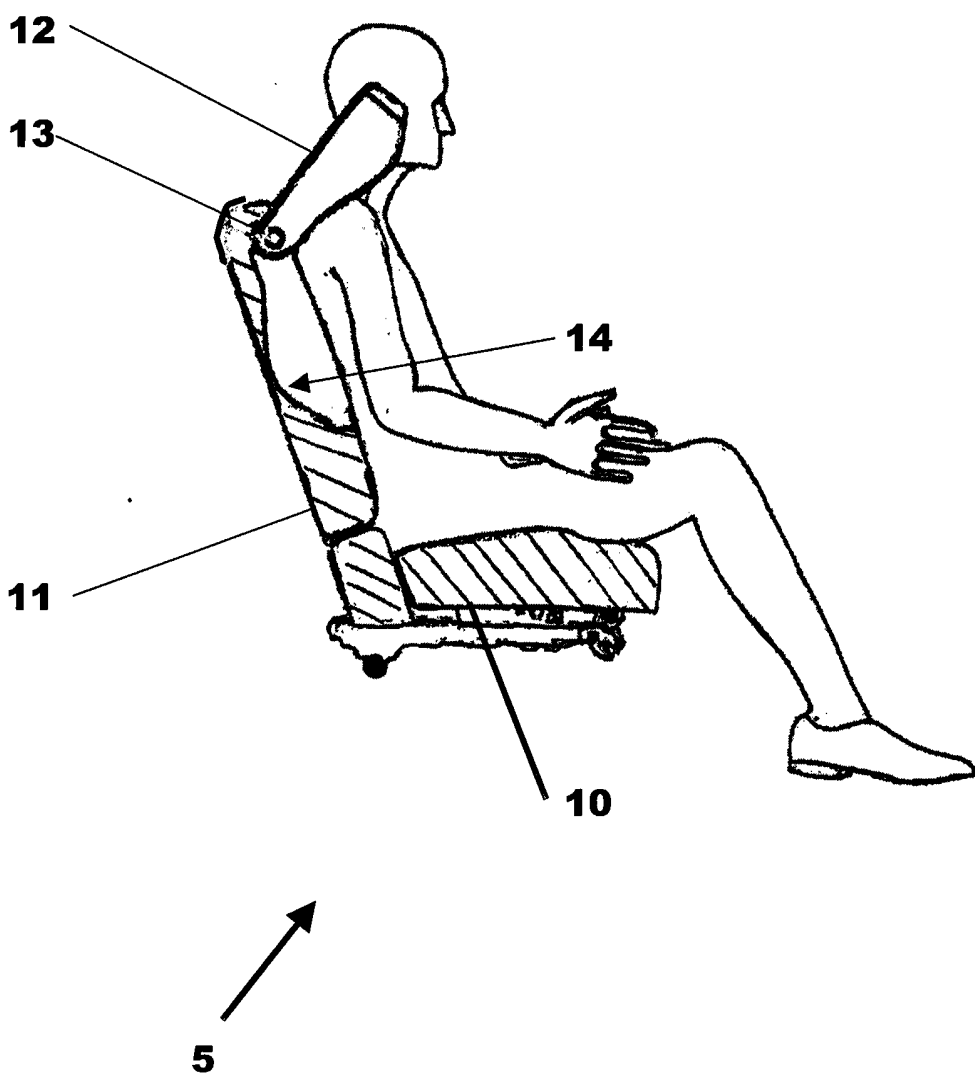


Fig.1

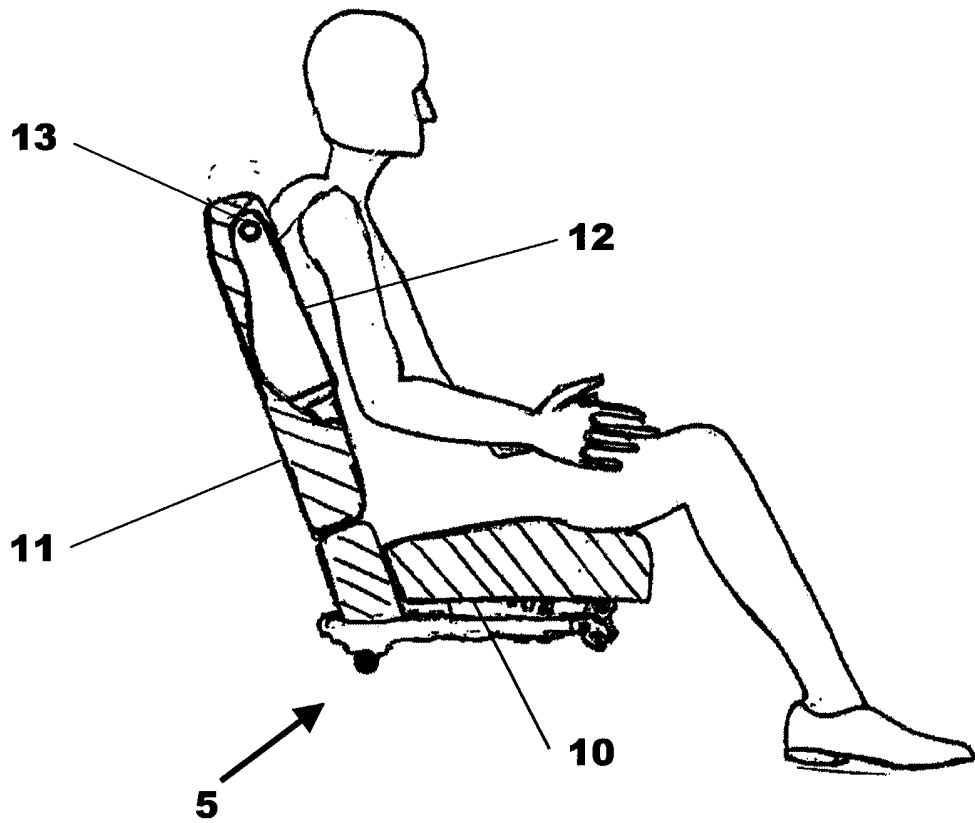


Fig.2

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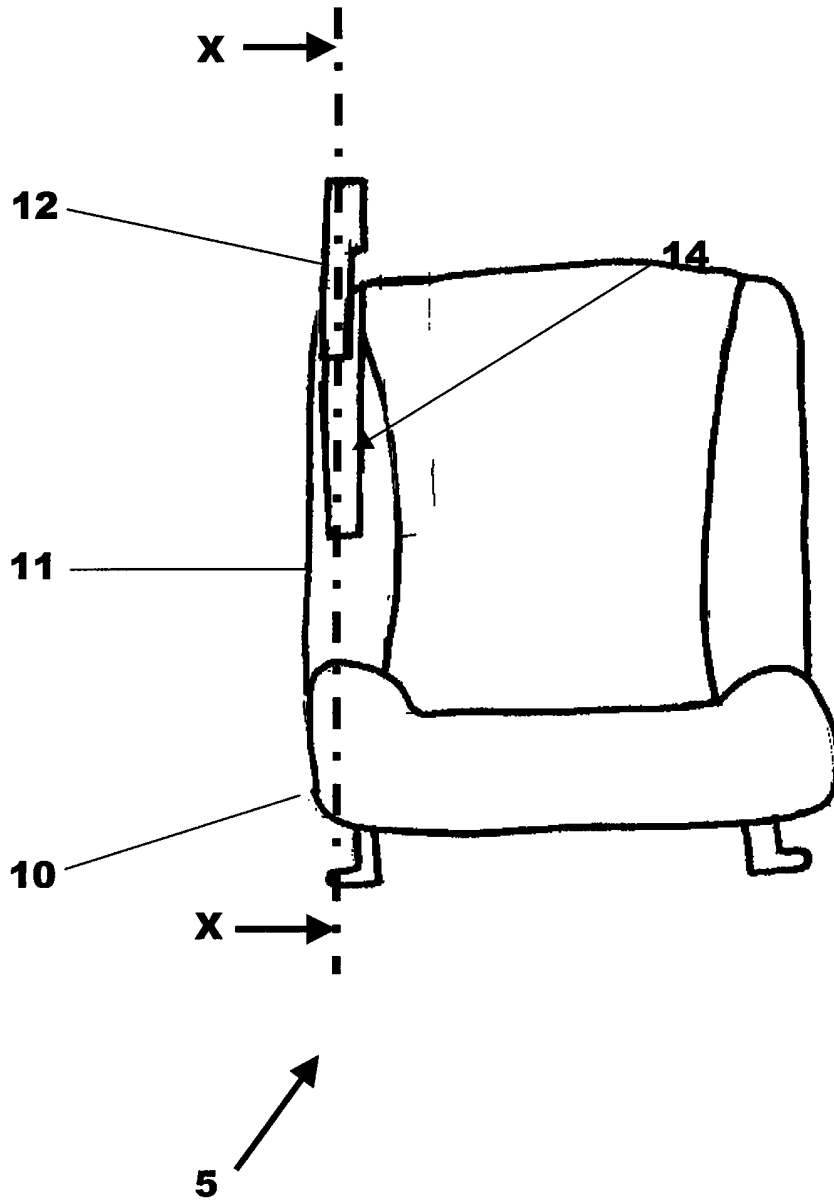


Fig.3

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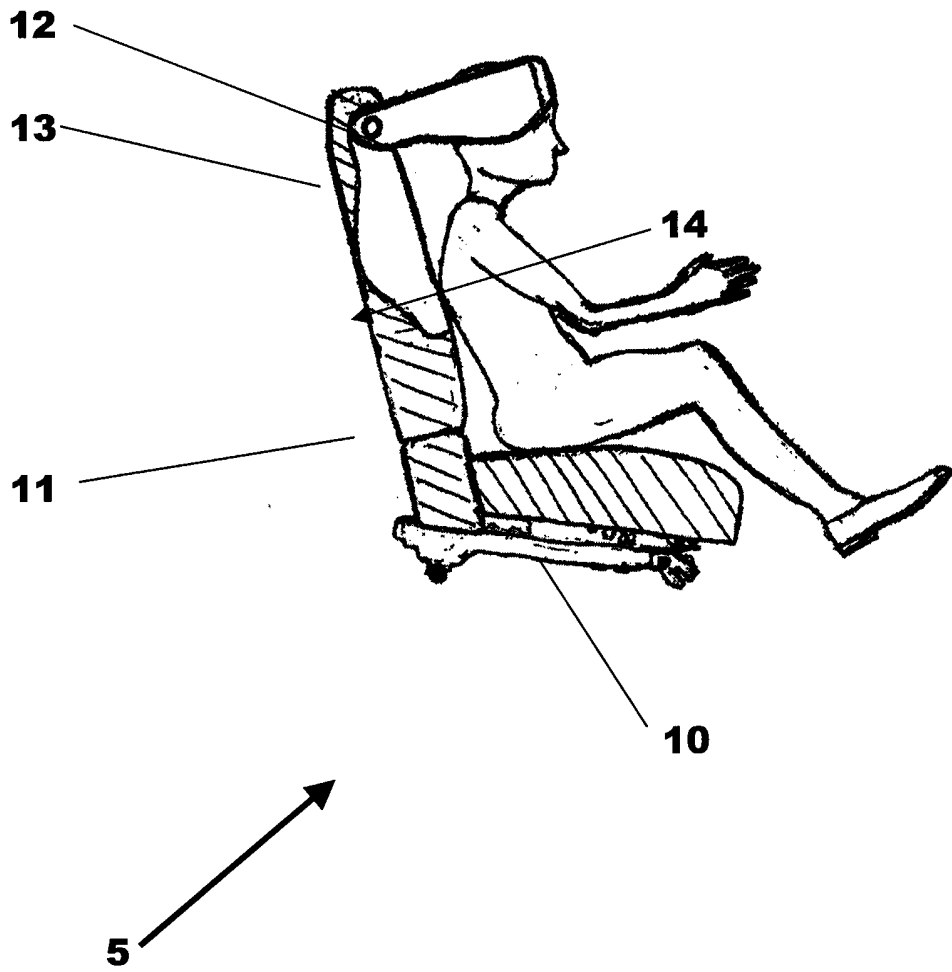


Fig.4

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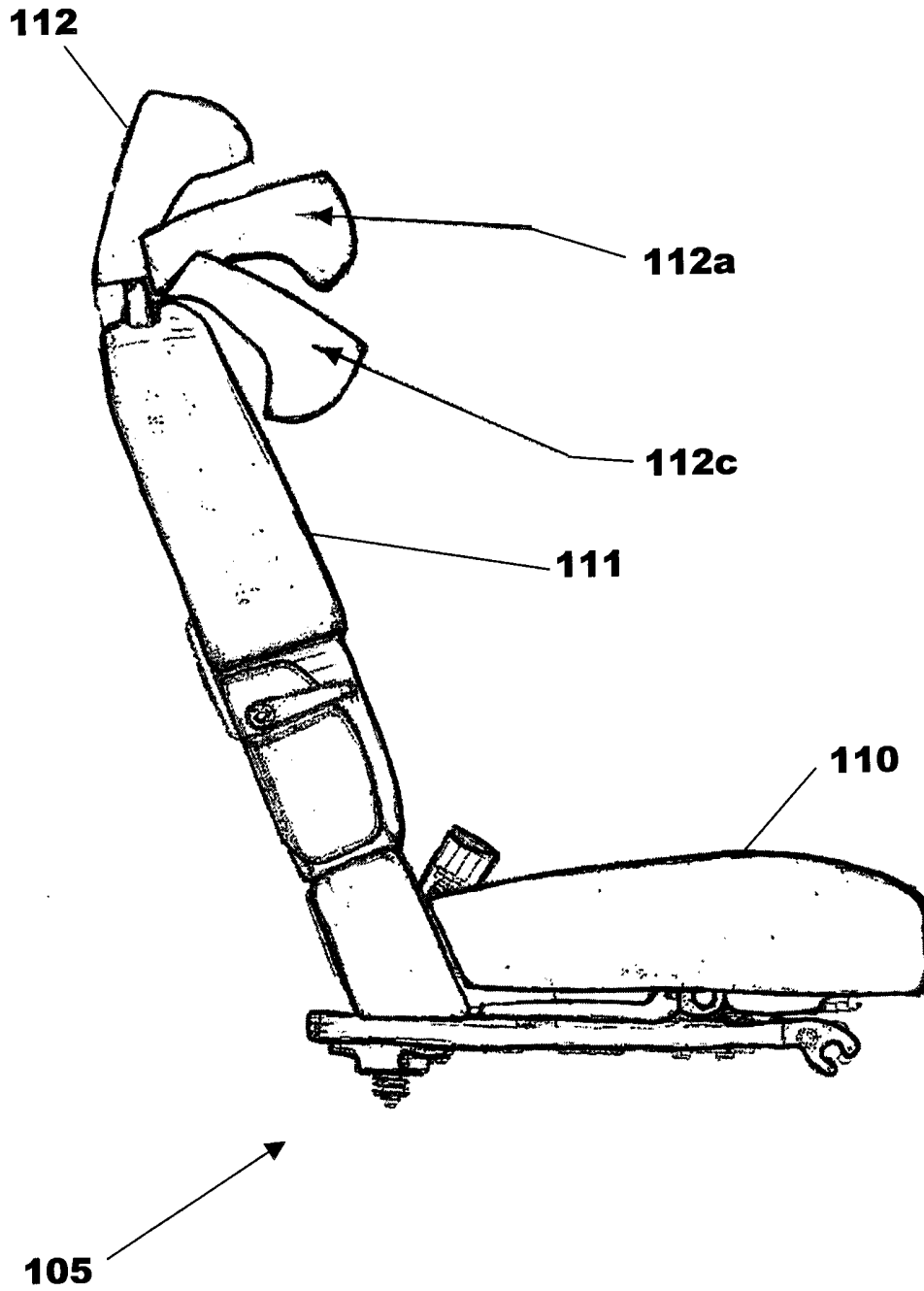


Fig.5

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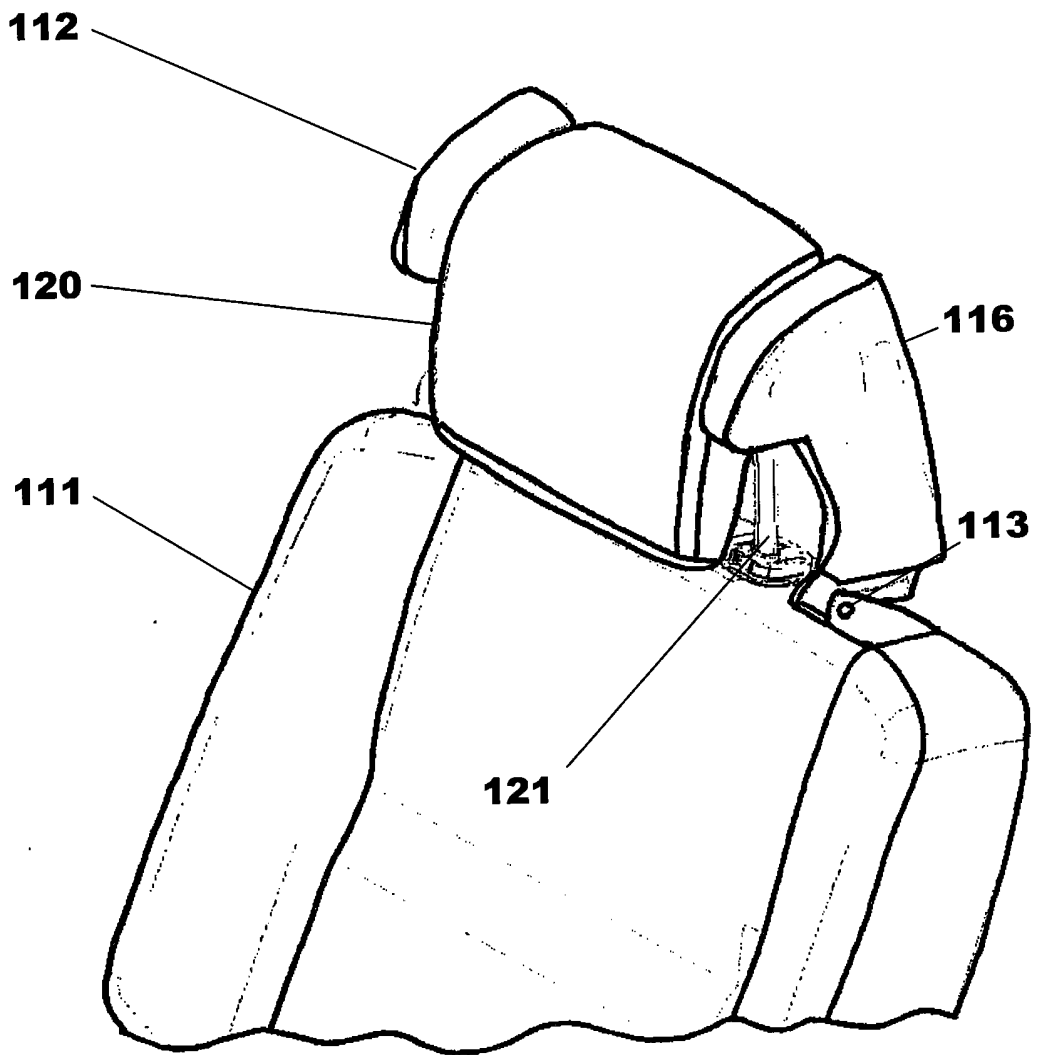


Fig.6

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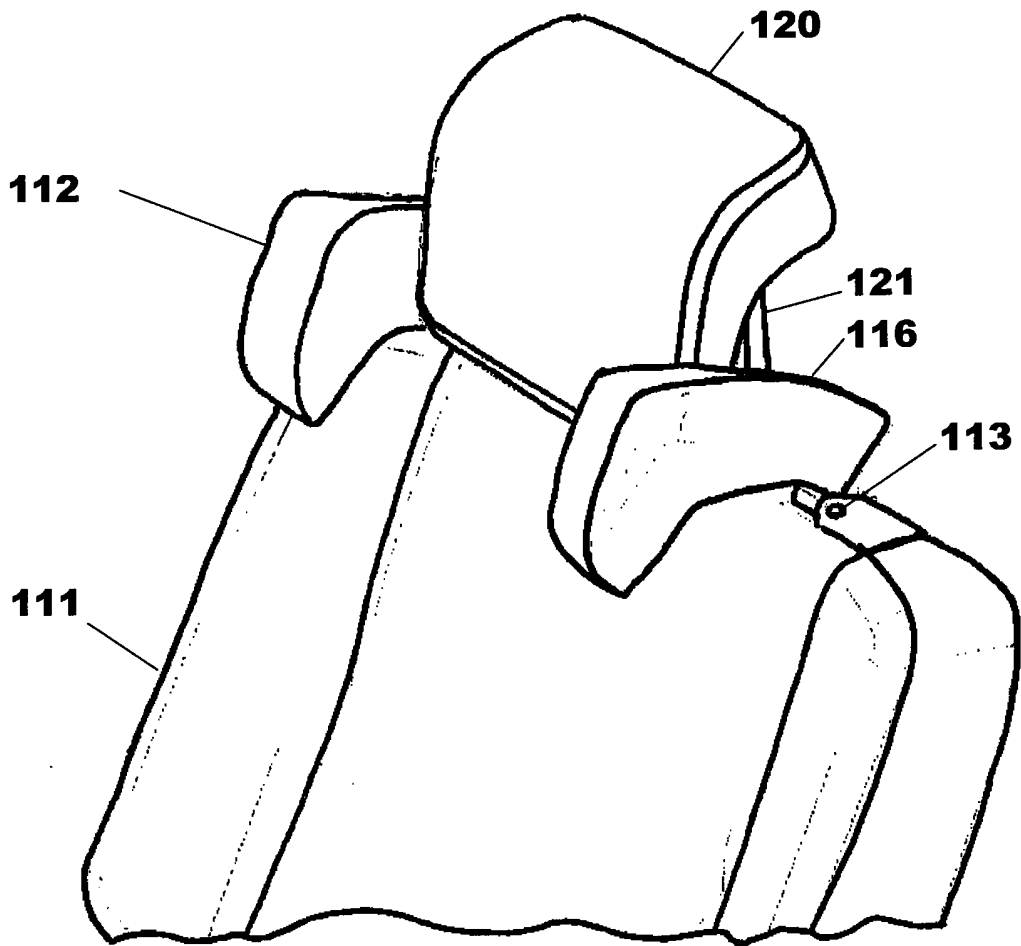


Fig.7

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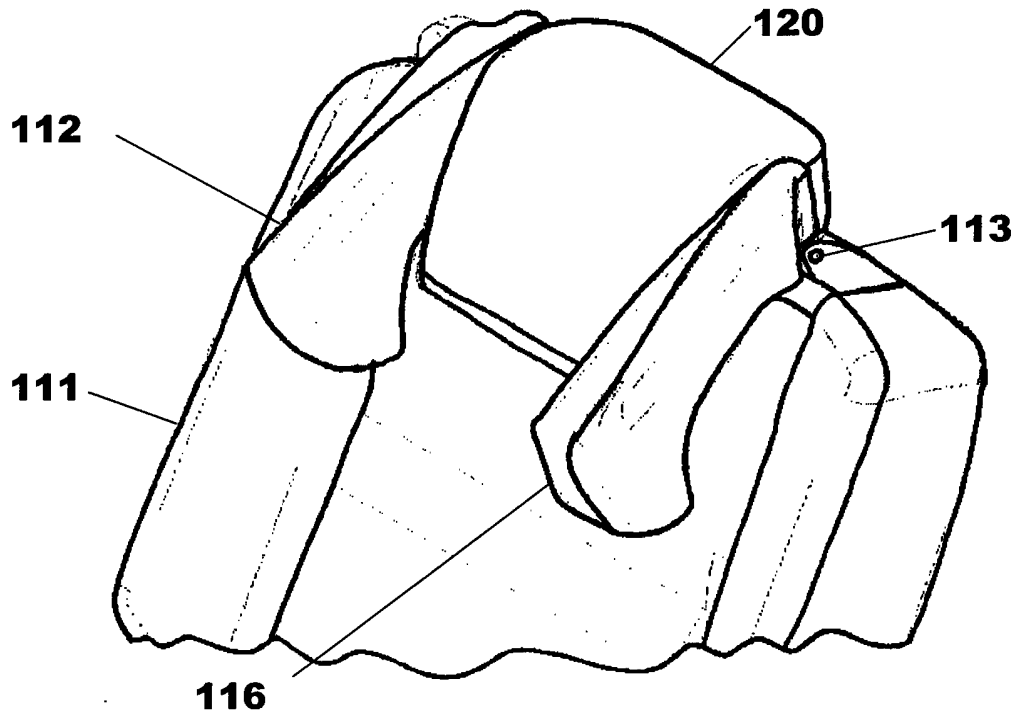


Fig.8

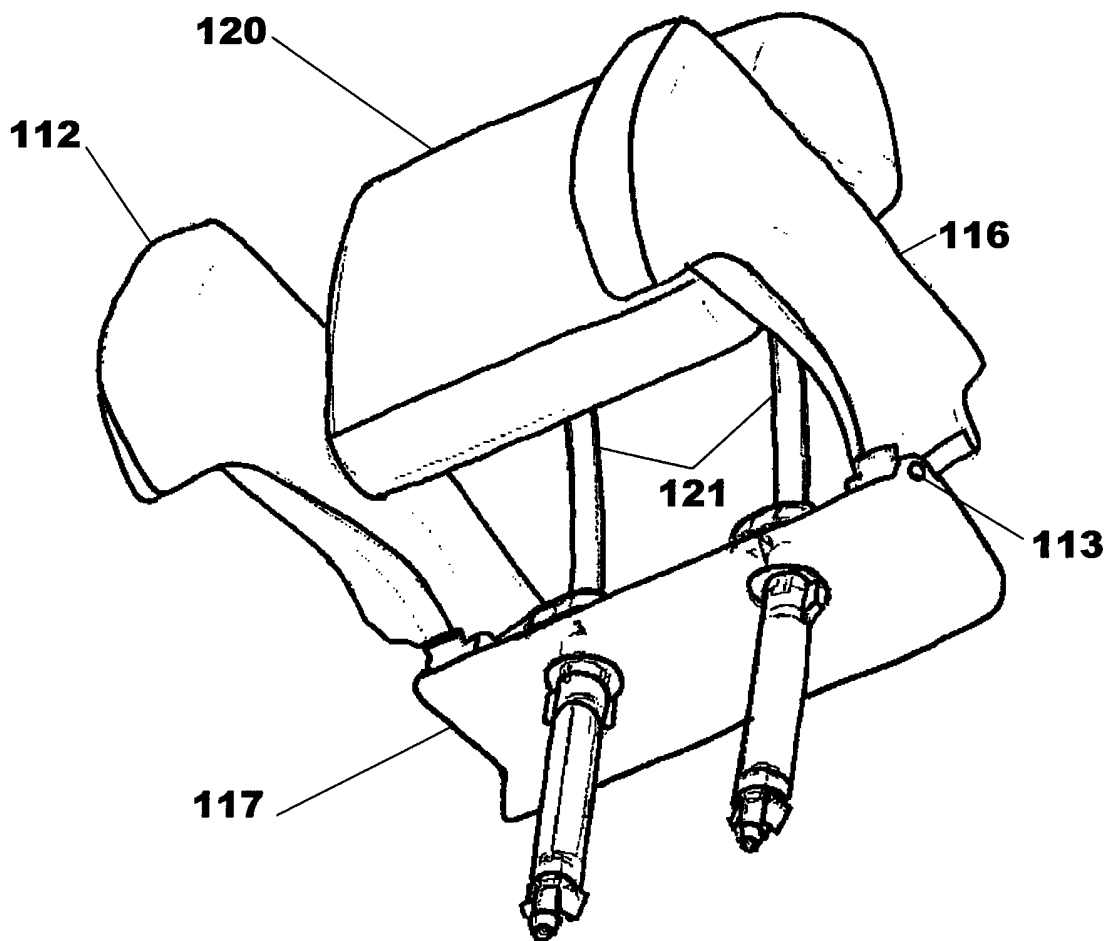


Fig.9

A SEAT ASSEMBLY FOR A MOTOR VEHICLE

This invention relates to seat assemblies for motor vehicles and in particular to a headrest for a motor vehicle
5 seat.

It is well known to provide a seat assembly for a motor vehicle with a head restraint located on the top of a backrest to provide rear support for the head of an occupant
10 of the seat assembly. Such head restraints are intended to reduce injury in the event of a collision or accident by preventing excessive rearward motion of the head of the occupant.

Such head restraints are not intended to provide a support for a passenger who is tired or requires a rest and when used for such a purpose provide no side support for the head. This is a problem because there is a tendency for the head of a resting passenger to move from side to side
15 particularly during cornering of the motor vehicle. In some cases this can result in the head of the resting passenger coming into contact with part of a body structure of the motor vehicle, another occupant or with a side window all of which are undesirable.

25 It is an object of this invention to provide a headrest for use by an occupant of a motor vehicle.

According to a first aspect of the invention there is provided a seat assembly for a motor vehicle comprising a seat cushion, a backrest attached to the seat cushion and at least one headrest pivotally connected to the backrest to selectively provide side support for a head of an occupant of the seat assembly.
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35 Each headrest may be pivotally connected for rotation about an axis extending across the width of the backrest.

Each headrest may comprise an elongate arm pivotally connected at one end to the backrest.

In accordance with a first embodiment of the first aspect of the invention each headrest is pivotally connected to the backrest near to but offset from a top edge of the backrest.

Each headrest may be pivotally connected to the backrest so as to be inset from a side edge of the backrest.

Each headrest may be moveable from a stored position to one or more deployed positions in which the headrest extends forwardly from its position of connection to the backrest.

When in the stored position, each headrest may be located in a respective recess in the backrest.

Each headrest, when positioned for use by an adult occupant of the seat assembly, may extend forwardly and upwardly from its position of connection to the backrest.

In accordance with a second embodiment of the first aspect of the invention each headrest is pivotally connected to a top edge of the backrest.

Each headrest may be moveable from a stored position to one or more deployed positions in which it is located so as to provide support for the side of the head of the occupant of the seat assembly.

When in the stored position, each headrest may extend upwardly from its position of connection to the top edge of the backrest.

When in an adult deployed position, each headrest may extend forwardly from its position of connection to the top edge of the backrest.

5 When in a child deployed position, each headrest may extend forwardly and downwardly from its position of connection to the top edge of the backrest.

10 The top edge of the backrest may include a support plate to which each headrest is pivotally connected.

 Preferably, there may be two headrests pivotally connected to the top edge of the backrest.

15 The seat assembly may further comprise a head restraint to provide rear support for the head of the occupant.

20 In which case, the two headrests may be positioned such that, when in a stored position, one of the headrests is located adjacent one end of the head restraint and the other of the headrests may be located adjacent an opposite end of the head restraint.

25 For either embodiment, at least part of each headrest may be padded to provide a soft surface against which an occupant of the seat assembly can rest their head.

30 The padding may be provided by a layer of foam positioned between a structural support of the headrest and a surface covering.

 According to a second aspect of the invention there is provided a motor vehicle having at least one seat assembly in accordance with said first aspect of the invention.

35

 The invention will now be described by way of example with reference to the accompanying drawing of which:-

Fig.1 is a cross-sectional side view along the line X-X on Fig.3 of a first embodiment of a seat assembly according to the invention showing a headrest in an adult deployed position;

Fig.2 is a cross-section similar to Fig.1 but showing the headrest in a stored position;

Fig.3 is a front view of the seat assembly shown in Fig.1;

Fig.4 is a cross-section similar to Fig.1 but showing the headrest in a child deployed position;

Fig.5 is a right hand side view of second embodiment of a seat assembly according to the invention showing a headrest in stored, adult deployed and child deployed positions;

Fig.6 is a left hand pictorial view on an enlarged scale of part of a backrest of the seat assembly shown in Fig.5 showing the headrest in a stored position;

Fig.7 is a view similar to Fig.6 but showing the headrest in an adult deployed position;

Fig.8 is a view similar to Fig.6 but showing the headrest in a child deployed position; and

Fig.9 is an underside pictorial view of a support plate for attachment to a top edge of the backrest shown in Figs 5 to 8 which is used to pivotally connect the headrest to the backrest.

With particular reference to Figs. 1 to 4 there is shown a first embodiment of a seat assembly according to

the invention. The seat assembly 5 comprises a seat cushion 10 to which is connected a backrest 11. The backrest 11 extends upwardly from the seat cushion 10 and has a left hand side (not shown in Figs 1, 2 and 4) and a right hand side. The distance between the left and right hand sides of the backrest 11 defining the width of the backrest 11. The backrest 11 has a top edge extending substantially horizontally across the width of the backrest 11 so as to join the two side edges together.

10

The seat assembly, when in use, is fitted within the passenger compartment of a motor vehicle such that an axis extending across the width of the backrest 11 is arranged parallel to a transverse axis of the motor vehicle and approximately normal to a longitudinal axis of the motor vehicle.

15

A headrest 12 is pivotally connected at one end by means of a pivot pin 13 to the backrest 11 at a position near to but offset from the top edge of the backrest 11. The pivot pin 13 is attached to part of a support structure (not shown) and defines a pivot axis for the headrest 12 which extends across the width of the backrest 11. That is to say, the headrest 12 is moveable substantially parallel to a plane aligned with a vertical plane extending along the longitudinal axis of the motor vehicle.

20

25

The headrest 12 is in the form of an elongate arm which is pivotally attached at one end by means of the pivot pin 13 to the backrest 11 and has an internal support structure (not shown) covered in padding in the form of foam (not shown) over which is applied a surface covering such as leather or fabric. The thickness of the foam is greater at a free end of the elongate arm to form a support pad for a head of an occupant of the seat assembly 5.

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The headrest 12 is moveable from a stored position, as shown in Fig.2, to several deployed positions of which the position for a 95 percentile adult is shown in Fig.1 and the position for a 5 percentile child is shown in Fig.4.

5

In each of the deployed positions the headrest 12 extends forwardly from its position of connection to the backrest 11 so that it can support the side of a head of an occupant of the seat assembly 5. When positioned for use by an adult occupant of the seat assembly, the headrest 12 extends forwardly and upwardly from its position of connection to the backrest 11.

The headrest 12 is held in these positions by any convenient holding means such as for example a ratchet mechanism or friction device and may include an operator operable release lever or button to allow the headrest 12 to be easily moved between the various positions.

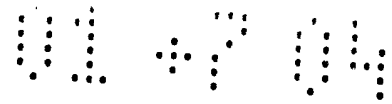
The headrest 12 is pivotally mounted such that it is offset from the right hand side of the backrest 11 and a recess or storage cavity 14 is formed in the backrest 11 in which the headrest 12 can be accommodated when in the stored position.

25

In use the headrest 12 is positioned depending upon the needs of the seat assembly occupant, if the occupant does not require to use the headrest then it is stowed away in the storage cavity 14 but if required for use it is moved to a suitable position so that it is located adjacent to a side of the head of an occupant of the seat assembly. In the deployed position the occupant can rest the side of their head against the headrest 12. This provides support for the head and will assist the occupant to rest or sleep.

35

It will be appreciated that although the invention has been described above with respect to use on the right hand



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side of a seat it could equally be used on the left hand side of a seat, on both sides of the seat or in the case of a bench seat there could be headrests at each end of the seat and near the centre of the seat.

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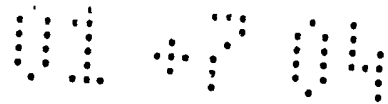
With reference to Figs. 5 to 9 there is shown a second embodiment of a seat assembly 105 according to the invention.

10 The seat assembly 105 comprises of a seat cushion 110 to which is connected a backrest 111. The backrest 111 extends upwardly from the seat cushion 110 and has a left hand side (not shown in Figs.5 and 9) and a right hand side.

15 The distance between the left and right hand sides of the backrest 111 defines the width of the backrest 111. The backrest 111 has a top edge extending substantially horizontally across the width of the backrest 111 so as to join the two side edges together.

20 The seat assembly 105, when in use, is fitted within the passenger compartment of a motor vehicle such that an axis extending across the width of the backrest 111 is arranged parallel to a transverse axis of the motor vehicle and approximately normal to a longitudinal axis of the motor
25 vehicle.

30 Two headrests 112, 116 are pivotally connected at one end by means of respective pivot pins 113 to a support plate 117 fastened to the top edge of the backrest 111. Each of the pivot pins 113 defines a pivot axis for the respective headrest 112, 116 which extends across the width of the backrest 111. That is to say, the headrests 112, 116 are moveable substantially parallel to a plane aligned with a vertical plane extending along the longitudinal axis of the
35 motor vehicle.



The headrests 112, 116 are both in the form of a respective elongate arm which is pivotally attached at one end by means of the respective pivot pin 113 to the support plate 117.

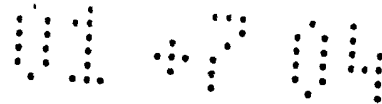
5

Each of the elongate arms has an internal support structure (not shown) covered in padding in the form of foam (not shown) over which is applied a surface covering such as leather or fabric. The thickness of the foam is greater at a free end of the elongate arm to form a support pad for a head of an occupant of the seat assembly 105.

The headrest 12 is moveable from a stored position as indicated by the reference numeral 112 on Fig.5 to several deployed positions in which it is located so as to provide support for the side of the head of the occupant of the seat assembly. The deployed position for a 95 percentile adult is indicated by the reference numeral 112a on Fig.5 and the deployed position for a 5 percentile child is indicated by the reference numeral 112c on Fig.5. It will be appreciated that the headrest 116 is likewise moveable from a stored position to numerous deployed positions as can be seen with reference to Figs. 6 to 8.

In the stored position, each headrest 112, 116 extends upwardly from its position of connection to the top edge of the backrest 111, when in an adult deployed position, each headrest 112, 116 extends forwardly from its position of connection to the top edge of the backrest 111 and, when in a child deployed position, each headrest extends forwardly and downwardly from its position of connection to the top edge of the backrest.

It will be noted that, when the headrests 112, 116 are in a 5 percentile child position, the free ends of the headrests 112, 116 rest against a front face of the backrest 111.



The headrests 112, 116 are held in the deployed positions by any convenient holding means (not shown) such as for example a ratchet mechanism or friction device.

5

A head restraint 120 is also attached to the top edge of the backrest 111 by means of two support rods 121 which are engaged with locking means fastened to the support plate 117. The two headrests 112, 116 are pivotally attached to
10 the top edge of the backrest 111 such that, when they are in the stored position, the left hand headrest 116 is located adjacent a left hand end of the head restraint 120 and the right hand headrest 112 is located adjacent a right hand end of the head restraint 120.

15

In use the headrests 112, 116 are positioned depending upon the needs of the seat assembly occupant, if the occupant does not require to use the headrests 112, 116 then they are is stowed away next to the head restraint 120 but
20 if required for use the required headrest 112, 116 is moved to a suitable position so that it is located adjacent to a side of the head of an occupant of the seat assembly 105.

In the deployed position the occupant can rest the side
25 of their head against the headrest 112, 116. This provides support for the head and will assist the occupant to rest or sleep.

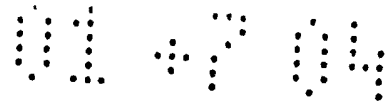
It will be appreciated that only one headrest could be
30 connected to the top edge of the backrest and that although the invention has been described with respect to its use on an individual seat assembly it could equally be used for a bench seat.

35 It will be further appreciated that a headrest according to this invention, although intended primarily for improving the comfort of a resting passenger, also may have

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safety advantages in the event of a vehicle side impact. That is to say, because a headrest according to this invention restricts or limits side to side or lateral motion of the head this may reduce the risk of neck injuries if the motor vehicle is hit in the side by another vehicle in what is often termed a side impact. In addition, because the head is laterally restrained it should not come into contact with any fixed objects on the side of the passenger compartment such as, for example, a seat belt fixing. These safety advantages are maximised if two headrests are positioned one on each side of the head of an occupant.

It will be appreciated by those skilled in the art that although the invention has been described by way of example with reference to a number of specific embodiments it is not limited to these embodiments and that various alternative embodiments or modifications to the disclosed embodiments could be made without departing from the scope of the invention.



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CLAIMS

1. A seat assembly for a motor vehicle comprising a seat cushion, a backrest attached to the seat cushion and at least one headrest pivotally connected to the backrest to selectively provide side support for a head of an occupant of the seat assembly.

2. A seat assembly as claimed in claim 1 wherein each headrest is pivotally connected for rotation about an axis extending across the width of the backrest.

3. A seat assembly as claimed in claim 1 or in claim 2 wherein each headrest comprises an elongate arm pivotally connected at one end to the backrest.

4. A seat assembly as claimed in any of claims 1 to 3 wherein each headrest is pivotally connected to the backrest near to but offset from a top edge of the backrest.

5. A seat assembly as claimed in any of claims 1 to 4 wherein each headrest is pivotally connected to the backrest so as to be inset from a side edge of the backrest.

6. A seat assembly as claimed in any of claims 1 to 5 wherein each headrest is moveable from a stored position to one or more deployed positions in which the headrest extends forwardly from its position of connection to the backrest.

7. A seat assembly as claimed in claim 6 wherein, when in the stored position, each headrest is located in a respective recess in the backrest.

8. A seat assembly as claimed in claim 6 or in claim 7 wherein each headrest, when positioned for use by an adult occupant of the seat assembly, extends forwardly and upwardly from its position of connection to the backrest.



9. A seat assembly as claimed in and of claims 1 to 3 wherein each headrest is pivotally connected to a top edge of the backrest.

5

10. A seat assembly as claimed in claim 9 wherein each headrest is moveable from a stored position to one or more deployed positions in which it is located so as to provide support for the side of the head of the occupant of the seat assembly.

10

11. A seat assembly as claimed in claim 10 wherein, when in the stored position, each headrest extends upwardly from its position of connection to the top edge of the backrest.

15

12. A seat assembly as claimed in claim 10 or in claim 11 wherein, when in an adult deployed position, each headrest extends forwardly from its position of connection to the top edge of the backrest.

20

13. A seat assembly as claimed in any of claims 10 to 12 wherein, when in a child deployed position, each headrest extends forwardly and downwardly from its position of connection to the top edge of the backrest.

25

14. A seat assembly as claimed in any of claims 9 to 13 wherein the top edge of the backrest includes a support plate to which each headrest is pivotally connected.

30

15. A seat assembly as claimed in any of claims 9 to 14 wherein there are two headrests pivotally connected to the top edge of the backrest.

35

16. A seat assembly as claimed in any of claims 9 to 15 wherein the seat assembly further comprises a head

restraint to provide rear support for the head of the occupant.

5 17. A seat assembly as claimed in claim 16 when dependent upon claim 15 wherein the two headrests are positioned such that, when in a stored position, one of the headrests is located adjacent one end of the head restraint and the other of the headrests is located adjacent an opposite end of the head restraint.

10

18. A seat assembly as claimed in any of claims 1 to 17 wherein at least part of each headrest is padded to provide a soft surface against which an occupant of the seat assembly can rest their head.

15

19. A seat assembly as claimed in Claim 18 wherein the padding is provided by a layer of foam positioned between a structural support of the headrest and a surface covering.

20

20. A motor vehicle having at least one seat assembly as claimed in any of claims 1 to 19.

21. A seat assembly substantially as described herein with reference to the accompanying drawing.

25

22. A motor vehicle substantially as described herein with reference to the accompanying drawing.



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Application No: GB0414515.7

Examiner: Mr Gary Williams

Claims searched: 1-22

Date of search: 10 September 2004

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
X	1,20 at least	EP1106427 A1 (MORIN) (13.06.01) (See Figs. 1a&b, and also WPI Abstract Accession No.)
X	1,20 at least	EP1044845 A3 (FAST) (07.11.01) (See Figs. 1&2, and also WPI Abstract Accession No.)
X	1,20 at least	WO98/41420 A1 (CASALS) (24.09.98) (See Figs. 1-3, and also WPI Abstract Accession No.)
X	1,20 at least	US5370446 A (BANCOD) See Figs. 1&2, col.4 lines 3-36
X	1,20 at least	US2003/0234567 A1 (O'CONNOR) See Fig. 31, col. 14 paras [0119]-[0121]
X	1,20 at least	US6616235 B1 (WORLD MARKET) See Figs. 1&2, col.2 lines 35-44
X	1,20 at least	US2003/0155797 A1 (AMIRAULT) See Fig. 1, abstract, page 3 paras [0038]-[0040]
X	1,20 at least	US2002/0089220 A1 (ACHLEITNER) See Fig. 1, page 1 para [0012]

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



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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^W :

A4L

Worldwide search of patent documents classified in the following areas of the IPC⁰⁷

B60N

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

Online: EPODOC, PAJ, WPI