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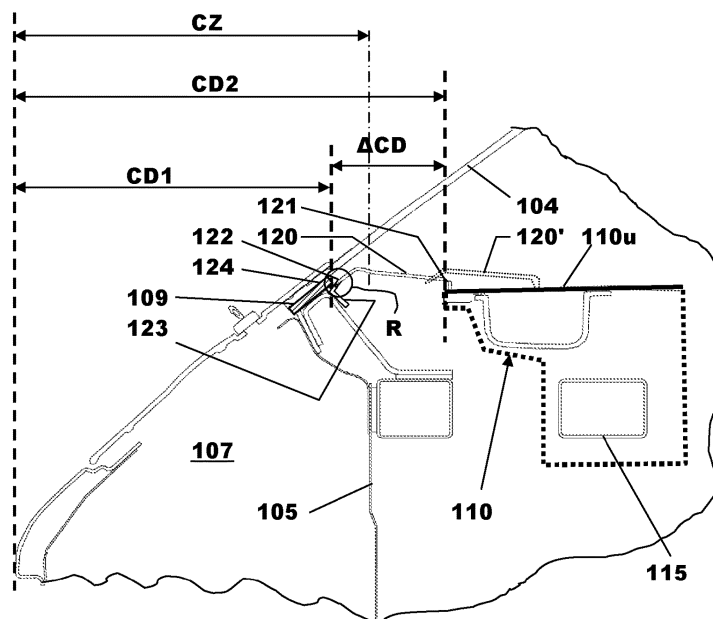
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(56) Documents Cited:  
**DE 102010023483 A1** **US 4146263 A**  
**US 2818933 A** **US 2497261 A**  
**US 20110187144 A1** **US 20080203754 A1**  
**US 20050121890 A1**  
**JP H08132921**

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 INT CL **B60J, B60K, B62D**  
 Other: **EPODOC, WPI**

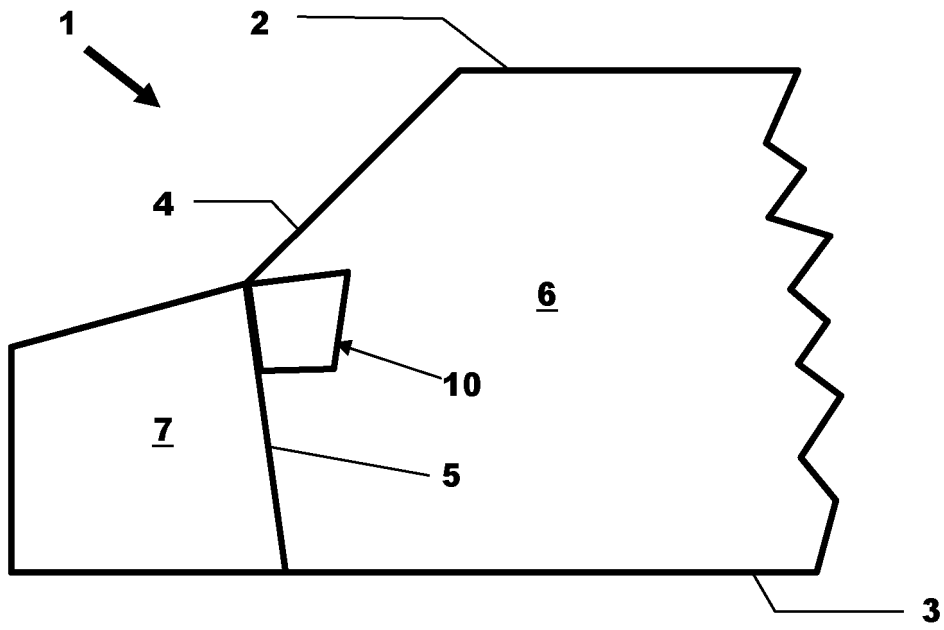
(54) Title of the Invention: **A Motor vehicle having an instrument panel**  
 Abstract Title: **Motor vehicle with cover between instrument panel and windscreen**

(57) A motor vehicle (101, Figure 2), preferably having a rear engine, has an instrument panel 110 that is spaced away from a bottom end of a windscreen 109 so that it is less likely to be damaged in the event of a frontal impact. A cover member 120 is provided to cover a gap (G, Figure 2) produced by spacing the instrument panel 110 from the bottom of the windscreen 104. Instrument panel 110 may be spaced from a bulkhead 105 separating a passenger compartment (106, Figure 2) from a front compartment 107. Instrument panel 110 may comprise a mounting beam 115 connecting panel 110 to the vehicle body structure. In an embodiment, cover member 120 can be made of a resilient flexible material and can slide over an upper surface 110u of instrument panel 110 if the crush distance  $\Delta CD$  of gap G reduces; alternatively cover member may be attached to upper surface 110u and may comprise a living hinge.



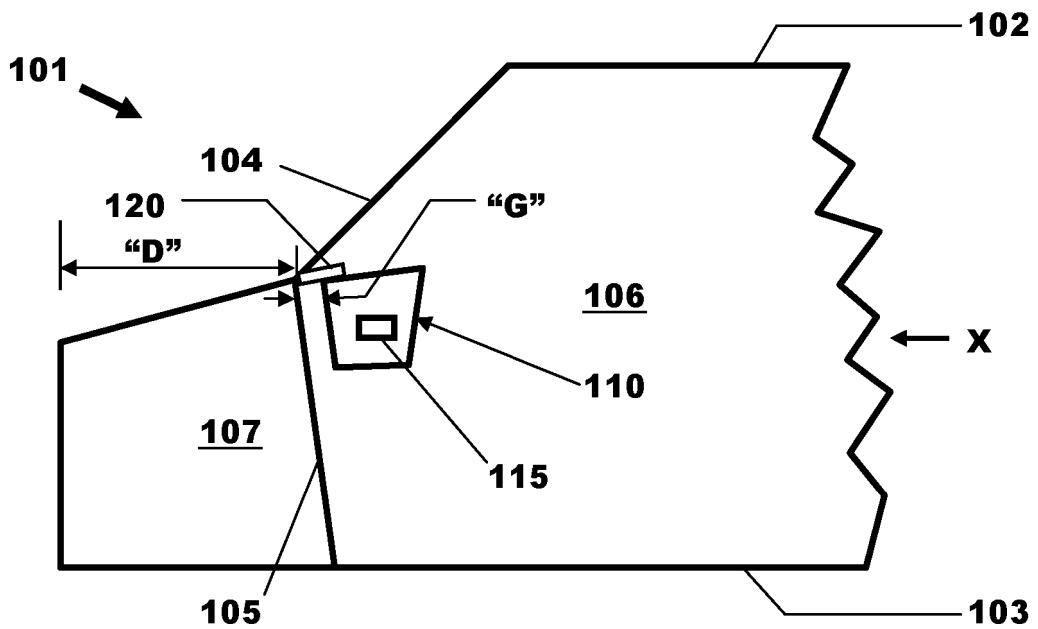
**Fig.4**

1 / 3



Prior Art

**Fig.1**



**Fig.2**

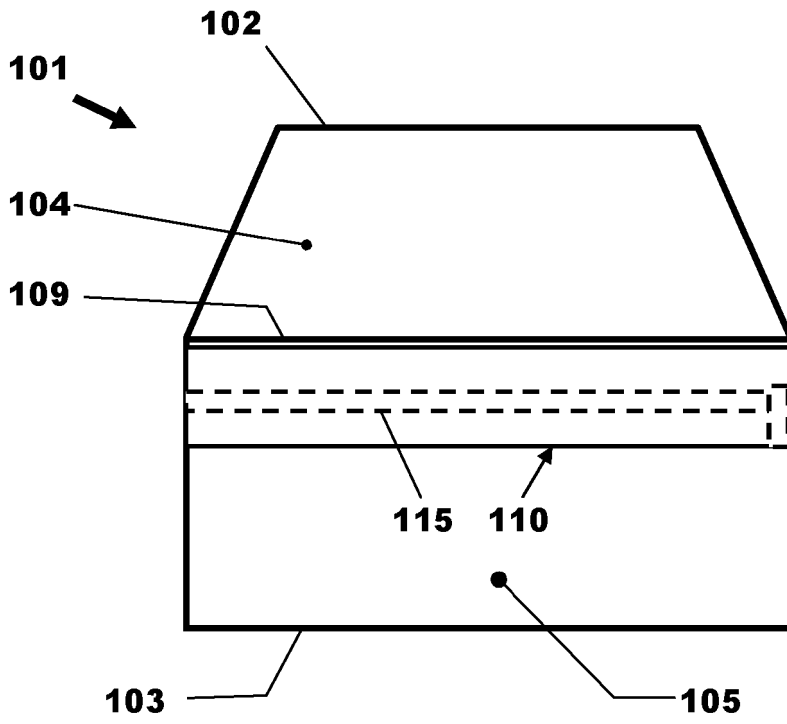


Fig.3

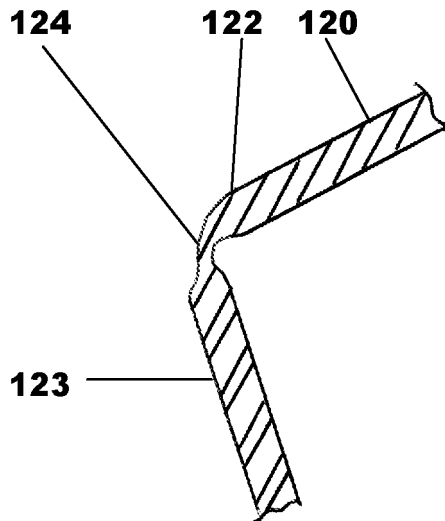


Fig.5

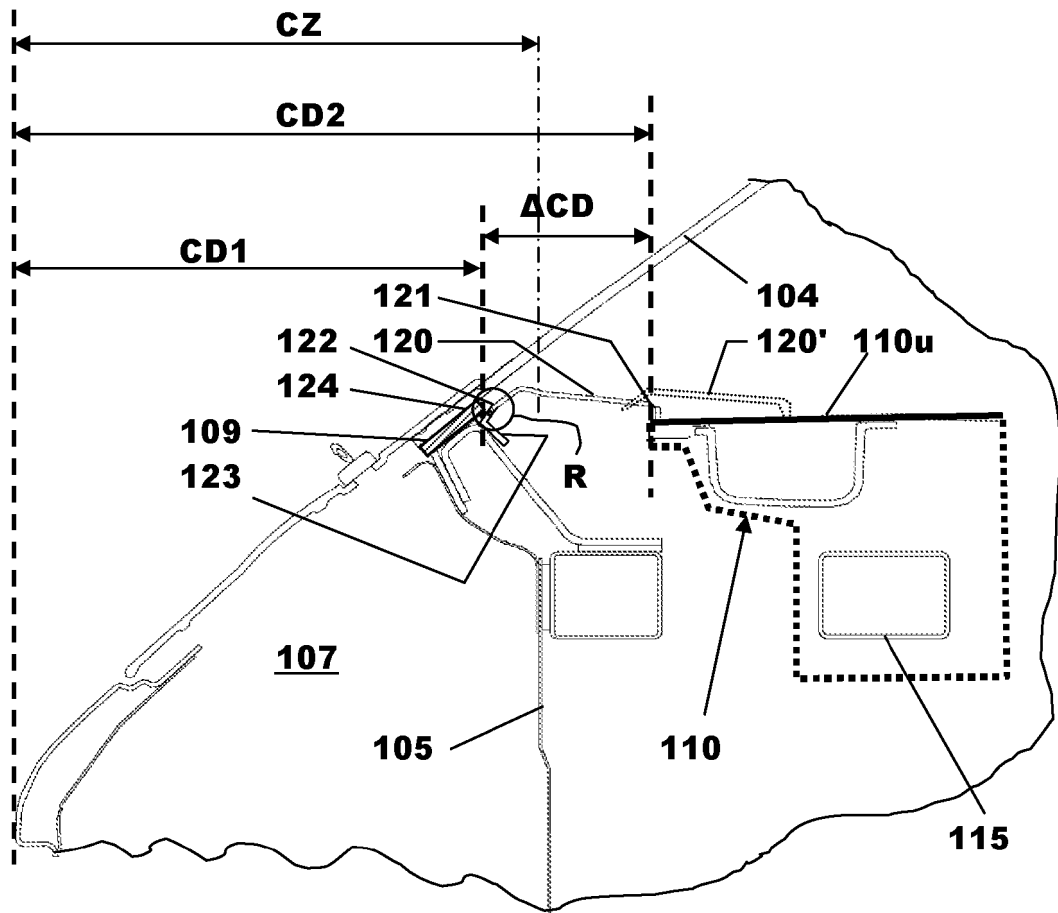


Fig.4

## A Motor Vehicle having an Instrument Panel

This invention relates to motor vehicles and in particular to a motor vehicle having an instrument panel.

5

It is well know to provide a motor vehicle with an instrument panel or dashboard mounted in a passenger compartment of the motor vehicle that extends across the width of the passenger compartment of the motor vehicle.

10

Various instruments are mounted in the instrument panel and it also often houses ducting for part of a ventilation system of the motor vehicle and in some cases one or more airbags.

15

Fig.1 is a schematic side view of a prior art motor vehicle 1 showing a conventionally mounted instrument panel 10 in a passenger compartment 6 of the motor vehicle 1. The motor vehicle 1 comprises a roof 2, a floor 3, a windscreen 4 and a firewall or bulkhead 5 separating the passenger compartment 6 from a front compartment 7. In a motor vehicle having a front mounted engine the engine is mounted in the front compartment 7 and in a motor vehicle having a rear mounted engine the front compartment 7 forms a luggage storage area.

20

A windscreen frame (not shown) for housing the windscreen 4 is joined at a bottom end to other structural components of the motor vehicle 1 including the bulkhead 5.

30

The instrument panel 10 is mounted on the bulkhead 5 or is mounted on a cross vehicle beam (not shown), in either case, the instrument panel 10 abuts against a bottom end of the windscreen 4.

35

In the event of a severe frontal collision a front end of the motor vehicle 1 is designed to crush so as to absorb energy as is well known in the art.

5 For small vehicles and, particularly, small rear engine vehicles, maximum utilisation of the available crush space is critical in order to deliver good crash performance. Where the available crush length is small such as A-class and City vehicles there will be some level of intrusion to  
10 the structure supporting the bottom of the windscreen if the frontal impact is severe. That is to say, a bottom end of the windscreen is located within a front crush zone of the motor vehicle. Such intrusion can result in parts of the instrument panel becoming detached or breaking and thereby  
15 constituting a risk to an occupant of the motor vehicle.

It is an object of the invention to reduce the risk of instrument panel damage in the event of a frontal collision.

20 According to the invention there is provided a motor vehicle having a body structure defining a passenger compartment, an elongate instrument panel mounted in the passenger compartment, a windscreen having a bottom end attached to the body structure of the motor vehicle wherein  
25 the instrument panel is spaced away from the bottom end of the windscreen so as to define a gap therebetween and a cover member is provided to cover the gap between the bottom end of the windscreen and an upper surface of the instrument  
30 panel.

The body structure may include a bulkhead separating the passenger compartment from a front compartment of the motor vehicle and the instrument panel may be spaced away from the bulkhead.

35

The instrument panel may only be connected at each end to the body structure of the vehicle.

The instrument panel may include a mounting beam that is used to support the instrument panel and connect the instrument panel at each end to the body structure of the vehicle.  
5

The cover member may have a first end connected to the body structure of the motor vehicle adjacent to the bottom end of the windscreen and a second end that is positioned during normal use upon the upper surface of the instrument panel.  
10

If the width of the gap between the bottom end of the windscreen and the instrument panel reduces, the second end of the cover member may be arranged to slide over the upper surface of the instrument panel.  
15

The bottom end of the windscreen may be located in a front crush zone of the motor vehicle and the gap may position the instrument panel away from the bottom end of the windscreen out of the front crush zone of the motor vehicle.  
20

The motor vehicle may be a rear engined motor vehicle.  
25

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

Fig.2 is a schematic side view similar to Fig.1 but showing how an instrument panel is mounted in a passenger compartment of a motor vehicle constructed in accordance with the invention;  
30

Fig.3 is a schematic view in the direction of arrow X on Fig. 2;  
35

Fig.4 is side view similar to Fig.2 but showing in more detail the positioning of the instrument panel and a cover member used to bridge a gap between the instrument panel and a bottom end of a windscreen of the motor vehicle;  
5 and

Fig.5 is an enlarged cross section in the region "R" on Fig.4 showing a living hinge forming part of the cover member.  
10

With reference to Figs.2 to 5 there is shown a small rear engined motor vehicle 101 having a roof 102, a floor 103, a windscreen 104 and a firewall or bulkhead 105 separating a passenger compartment 106 from a front  
15 compartment 107. In this case, because the motor vehicle 101 has a rear mounted engine (not shown), the front compartment 107 forms a luggage storage area for the motor vehicle 101.

20 A distance "D" from a front end of the motor vehicle 101 to a bottom end of the windscreen 104 is small so that a corresponding crush distance (CD1 on Fig.4) is small.

A windscreen frame for housing the windscreen 104 is  
25 structurally joined at a bottom end to other structural components of the motor vehicle 101 forming part of a body structure of the motor vehicle 101 such as the bulkhead 105.

An instrument panel 110 is mounted on a cross vehicle  
30 beam 115 that is connected at opposite ends to part of the body structure of the motor vehicle 101.

The instrument panel 110 is connected at each end to the body structure of the vehicle via the mounting beam 115  
35 which both supports the instrument panel 110 and connects it at each end to the body structure of the vehicle 101. The instrument panel 110 extends across the entire width of the



passenger compartment 106. The instrument panel 110 is spaced away from the bulkhead 105 and there are no structural connections between the bulkhead 105 and the instrument panel 110.

5

The windscreen 104 of the motor vehicle 101 has a bottom end attached via a bonding strip 109 to the body structure of the motor vehicle 101. The instrument panel 110 is spaced away from the bottom end of the windscreen 104 so as to define a gap "G" therebetween and a cover member 120 made from a plastic material is provided to cover the gap "G" between the bottom end of the windscreen 104 and an upper surface 110u of the instrument panel 110.

15 As best seen in Figs.4 and 5 the cover member 120 has a first end 121 that rests upon the upper surface 110u of the instrument panel 110 or, to be more precise, upon trim forming the upper surface of the instrument panel 110 and has a second end 122 connected to a fastening member which in this case is in the form of an elongate fastening strip 123 used to connect the cover member 120 to part of the body structure of the motor vehicle 101. It will be appreciated that prior to impact the cover member 120 may be attached to the instrument panel 110 in a frangible manner to prevent rattling. The attachment of the cover member 110 to the instrument panel 110 is easily broken when a load is applied to it so as not to prevent sliding of the cover member 120.

30 A living hinge 124 provides a rotatable connection between the second end 122 of the cover member and the fastening strip 123.

35 It will be appreciated that the cover member 120, the fastening strip 123 and the living hinge 124 are all formed as integral parts of a single component made from a plastic material.

In Fig.4 when the cover member is in a pre-impact position it is indicated by the reference number 120 when the cover member is in a post impact position it is shown in dotted outline referenced 120'. Note that only the cover member 120' is shown in the post impact position and not the support structure for the cover member 120'.

The post impact position corresponds to a situation where the bottom end of the windscreen 104 has moved back and the gap "G" between the bottom end of the windscreen 104 and the instrument panel 110 has been absorbed by the impact. It will be appreciated that the instrument panel 110 has not moved it is the relative movement between the bottom end of windscreen 104 and the instrument panel 110 that results in a diminishing in the width of the gap "G".

Because the cover member 120 rides up onto and slides across the upper surface 110u of the instrument panel 110 no significant force is transferred to the instrument panel 110 until all the gap "G" is absorbed. The width of the gap "G" is therefore set to be as large as possible taking into account packaging constraints for the instrument panel 110 such as the distance required between the instrument panel 110 and any occupants of the motor vehicle 101. The width of the gap "G" is set so as to move the instrument panel 110 out of a front crush zone CZ of the motor vehicle 101.

The width of the gap "G" is typically, by way of example and without limitation, in the range of 0.020 to 0.120m as such a gap provides a good compromise between packaging and improved crash properties.

In Fig.4 the difference in available crush distance between a motor vehicle having an instrument panel mounted adjacent to a bottom edge of a windscreen and a motor vehicle constructed in accordance with this invention having

the instrument panel mounted so that a gap is present is shown.

In the case of a prior art motor vehicle the available  
5 crush distance is shown as CD1. When the crush distance CD1  
is used up due to collapse of the front of the vehicle  
resulting from a frontal impact, a considerable force will  
be transferred from the body structure of the motor vehicle  
into the instrument panel because it abuts the lower edge of  
10 the windscreen 104.

In the case of a motor vehicle constructed in  
accordance with this invention, an available crush distance  
CD2 is provided. Therefore, it is not until the increased  
15 crush distance CD2 is used up will any force be transferred  
from the body structure of the motor vehicle 101 into the  
instrument panel 110. The difference in crush distance  $\Delta CD$   
between CD2 and CD1 corresponds to the width of the gap "G"  
between the bottom end of the windscreen 104 and the  
20 instrument panel 110 as shown in Fig.2. The corresponding  
crush zone CZ for the motor vehicle 101 for a predefined  
serious crash condition will be greater than CD1 but less  
than CD2 as indicated by the double headed arrow CZ on  
Fig.4.

25

The function of the cover member 120 is to cover the  
gap "G" between the bottom end of the windscreen 104 and the  
instrument panel 110 so as to provide an aesthetically  
pleasing appearance and to prevent objects placed upon the  
30 upper surface 110u from falling down behind the instrument  
panel 110.

Although the invention has been described with  
reference to an instrument panel that is supported by a  
35 structural beam it will be appreciated that other types of  
construction could be used for the instrument panel so as to  
provide it with sufficient rigidity and strength to be

supported only at each end. For example and without limitation, the instrument panel can include a skeletal body that is used to support the instrument panel and connect the instrument panel at each end to the body structure of the vehicle. For example, the instrument panel could have a die cast core and an overlying fascia member. See for example the instrument panel construction disclosed in Patent Publication WO2005/021362.

10 Furthermore the invention is not limited to the use of a living hinge other types of connection allowing the cover member to rotate relative to the body structure so as to allow it to ride up onto and slide across the upper surface of the instrument panel could be used such as, for example, 15 one or more conventional mechanical hinges. Alternatively, the cover member could have a first end attached to the body structure near the bottom end of the windscreen and a second end resting upon the upper surface of the dashboard during normal use and be made from a resilient flexible material enabling it to flex or bend sufficiently near its first 20 longitudinal edge to permit the second edge to slide over the upper surface of the instrument panel when the gap is reduced due to a frontal impact.

25 As yet another alternative the cover member could have a first end attached to the body structure near the bottom end of the windscreen, a second end attached to the instrument panel and have a number of corrugations running substantially parallel to the lower end of the windscreen. 30 The corrugations facilitate the easy collapse of the cover member between the first and second ends when the width of the gap between the bottom end of the windscreen and the instrument panel reduces.

35 The connection means used to attach the cover member to the body structure in all cases is such that it tethers the cover member to the body structure during a frontal impact.

It will be appreciated by those skilled in the art that although the invention has been described by way of example with reference to one or more embodiments it is not limited  
5 to the disclosed embodiments and that alternative  
embodiments could be constructed without departing from the scope of the invention as defined by the appended claims.

**Claims**

1. A motor vehicle having a body structure defining a passenger compartment, an elongate instrument panel mounted  
5 in the passenger compartment, a windscreen having a bottom end attached to the body structure of the motor vehicle wherein the instrument panel is spaced away from the bottom end of the windscreen so as to define a gap therebetween and a cover member is provided to cover the gap between the  
10 bottom end of the windscreen and an upper surface of the instrument panel.

2. A motor vehicle as claimed in claim 1 wherein the body structure includes a bulkhead separating the passenger  
15 compartment from a front compartment of the motor vehicle and the instrument panel is spaced away from the bulkhead.

3. A motor vehicle as claimed in claim 1 or in claim 2 wherein the instrument panel is only connected at each end  
20 to the body structure of the vehicle.

4. A motor vehicle as claimed claim 3 wherein the instrument panel includes a mounting beam that is used to support the instrument panel and connect the instrument  
25 panel at each end to the body structure of the vehicle.

5. A motor vehicle as claimed in any of claims 1 to 4 wherein the cover member has a first end connected to the body structure of the motor vehicle adjacent to the bottom  
30 end of the windscreen and a second end that is positioned during normal use upon the upper surface of the instrument panel.

6. A motor vehicle as claimed in claim 5 wherein, if  
35 the width of the gap between the bottom end of the windscreen and the instrument panel reduces, the second end

of the cover member is arranged to slide over the upper surface of the instrument panel.

5           7.    A motor vehicle as claimed in any of claims 1 to 6 wherein the bottom end of the windscreen is located in a front crush zone of the motor vehicle and the gap positions the instrument panel away from the bottom end of the windscreen out of the front crush zone of the motor vehicle.

10           8.    A motor vehicle as claimed in any of claims 1 to 7 wherein the motor vehicle is a rear engined motor vehicle.

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

15

Amendments to the Claims have been filed as follows:-

### Claims

1. A motor vehicle having a body structure defining a passenger compartment, an elongate instrument panel mounted  
5 in the passenger compartment, a windscreen having a bottom end attached to the body structure of the motor vehicle, the instrument panel being spaced away from the bottom end of the windscreen so as to define a gap therebetween and a cover member is provided to cover the gap between the bottom  
10 end of the windscreen and an upper surface of the instrument panel, the cover member having a first end connected to the body structure of the motor vehicle adjacent to the bottom end of the windscreen and a second end that is positioned during normal use upon the upper surface of the instrument  
15 panel wherein, if the width of the gap between the bottom end of the windscreen and the instrument panel reduces, the second end of the cover member is arranged to slide over the upper surface of the instrument panel.

20 2. A motor vehicle as claimed in claim 1 wherein the body structure includes a bulkhead separating the passenger compartment from a front compartment of the motor vehicle and the instrument panel is spaced away from the bulkhead.

25 3. A motor vehicle as claimed in claim 1 or in claim 2 wherein the instrument panel is mounted on a cross vehicle mounting beam connected at opposite ends to the body structure of the vehicle.

30 4. A motor vehicle as claimed claim 3 when dependent upon claim 2 wherein the instrument panel is spaced away from the bulkhead and there are no structural connections between the bulkhead and the instrument panel.

35 5. A motor vehicle as claimed in claim 1 or in claim 2 wherein the instrument panel includes a skeletal body that is used to support the instrument panel and connect the



instrument panel at each end to the body structure of the vehicle.

5           6.    A motor vehicle as claimed in any of claims 1 to 5 wherein the bottom end of the windscreen is located in a front crush zone of the motor vehicle and the gap positions the instrument panel away from the bottom end of the windscreen out of the front crush zone of the motor vehicle.

10           7.    A motor vehicle as claimed in any of claims 1 to 6 wherein the motor vehicle is a rear engined motor vehicle.

            8.    A motor vehicle substantially as described herein with reference to Figs.2 to 5 of the accompanying drawings.  
15



**Application No:** GB1512666.7

**Examiner:** Simon Rose

**Claims searched:** 1-9

**Date of search:** 22 January 2016

**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,Y	X: 1-2, 5, 7-8 Y:3-4	US 2005/0121890 A1 (KONG) See particularly Figure 1, upper panel 213, windscreen 227, instrument panel 235, and abstract
X,Y	X: 1-2, 7-8 Y: 3-4	JP H08132921 A (DAIHATSU) See particularly Figures 1-2, instrument panel 2, upper garnish 4, windscreen 13, and WPI abstract accession number 1996-305488
X,Y	X: 1-2, 7-8 Y:3-4	US 4146263 A (WATARI) See particularly Figures 4-6 and abstract
X,Y	X:1-2, 7-8 Y:3-4	DE 102010023483 A1 (DAIMLER) See particularly Figure 1, windscreen 14, instrument panel 12, protection element 30, gap b, and WPI abstract accession number 2011-B16951
X,Y	X:1-2, 7-8 Y:3-4	US 2008/0203754 A1 (TOWNE et al) See particularly Figures 1A, 1B, 2A, 2B, windscreen 14, instrument panel 16, closeout structure 10, 12, and paragraphs 5-8
X,Y	X:1-2, 7-8 Y:3-4	US 2818933 A (TELL) See particularly Figures 1-3, cowl 10, moulding 66, windscreen 12, instrument panel 16, 26
X,Y	X:1-2, 7-8 Y:3-4	US 2497261 A (HICKS) See particularly Figure 3, windscreen 13, 19, garnish 41, dashboard 42
Y	3-4	US 2011/0187144 A1 (KWOLEK) See particularly Figures 1-4 and 7, instrument panel 16, structural assembly 50, and paragraph 29 and abstract

**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<sup>X</sup> :

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

B60J; B60K; B62D
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The following online and other databases have been used in the preparation of this search report

EPODOC, WPI
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**International Classification:**

Subclass	Subgroup	Valid From
B62D	0025/08	01/01/2006
B62D	0025/14	01/01/2006