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(71) Applicant *(for all designated States except US)*: **RENAULT TRUCKS** [FR/FR]; 99 Route de Lyon, F-69800 St Priest (FR).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **LAGRUT, Jerome** [FR/FR]; 161 rue Chanal - Le Palatin, FR-01700 Miribel (FR).

(74) Agent: **PUTET, Gilles**; Renault Trucks, VTEC France, Corporate Patents TER E80 1 10, 99, route de Lyon, F-69802 Saint Priest Cedex (FR).

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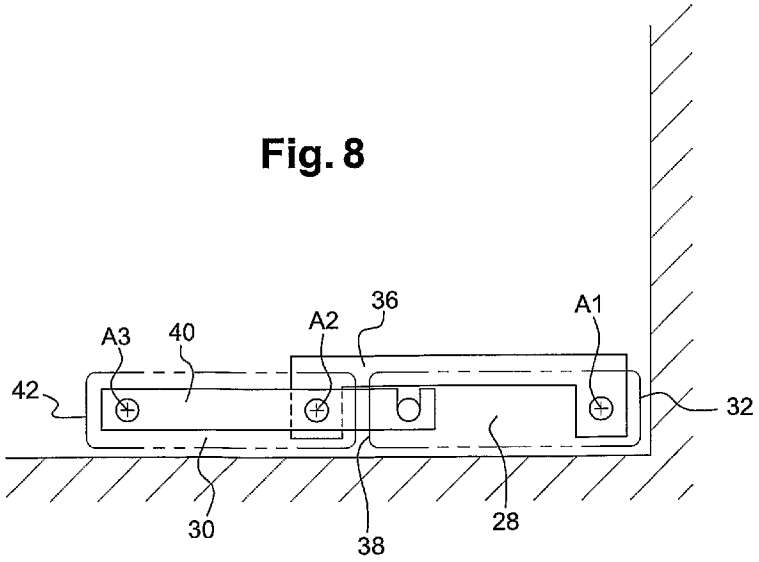
(54) **Title:** MULTI-POSITION BED SYSTEM FOR A VEHICLE

Fig. 8



(57) **Abstract:** The invention relates to a bed system for the cabin of a vehicle, wherein the system comprises a first bed (28) and a second bed (30) which can each be displaced independently between a storage position and a substantially horizontal use position, and wherein in a first use configuration of the system, the second bed (30) is located substantially over the first bed (28), characterized in that the bed system comprises a second use configuration wherein the first and second beds (28, 30) are positioned substantially side by side and horizontally at the same height.

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Multi-position Bed system for a vehicle

Technical field

The invention relates to a bed system for the cabin of a vehicle, especially for the cabin of a road truck.

Background art

It is common for vehicles such as trucks to have a cabin equipped with a bed system, especially for on-highway tractors. According to the most traditional design, the bed system comprises a single bed having its length extending in the transverse direction of the truck and arranged along the rear wall of the cabin. In some arrangements, this single bed can be foldable against the rear wall cabin so as to occupy less space in the interior of the cabin when not used. It is also know to have a second bed, for a second passenger, arranged above the first bed. That second bed may also be foldable against the rear wall of the cabin. In American style trucks, it is know to have convertible-couch-style beds where the bed can be folded into a couch position where a part of the bed forms the seating part of the couch and another part of the bed forms the backrest part of the couch.

Especially in European style trucks of the cab-over engine type, the cabin length is limited, for regulatory reasons. This pushes towards the adoption of beds which have a limited width. Nevertheless, it would be of course beneficial to the comfort of the vehicle to have larger size beds, with the possibility to accommodate either one or two persons. Of course, this would need to be compatible with standard sized cabins and should not interfere with the cabin functionality when the truck is in its driving configuration.

Therefore, one aim of the invention is to offer a bed system which provides superior versatility in the arrangement of two beds in the cabin of the vehicle, while still making sure the bed system can be set into a non-use configuration where it occupies a minimum amount of space within the cabin of the vehicle.

Summary of the invention

The invention provides for a bed system for the cabin of a vehicle, wherein the system comprises a first bed and a second bed which can each be displaced independently between a storage position and a substantially horizontal use position, and wherein in a

first use configuration of the system, the second bed is located substantially over the first bed, characterized in that the bed system comprises a second use configuration wherein the first and second bed are positioned substantially side by side and horizontally at the same height.

Description of figures

Figures 1 to 5 are schematic representations in cross section of a truck cabin having a bed system according to the invention, the bed system being represented in various use and non-use positions.
Figures 6 to 10 are schematic representations representing more in detail the bed system in the various corresponding positions.

Description of the invention

The figures 1 to 5 represent very schematically the interior of a cabin 10 of a truck, for example of the cabin of the tractor for a tractor/semi-trailer truck, as viewed in cross section trough a longitudinal and vertical plane. The cabin, especially in the case of a European-style cab-over-engine design has a substantially box shape having a front side 14, a ceiling 16, a floor 18 and a rear wall 20. On the front side 14 is of course provided a windscreen, and, underneath that windscreen, a dashboard assembly 22. Just rearwards of the dashboard assembly is arranged at least one seat 24 for the driver and in most cases at least another seat for a passenger. The driver and the passenger seats can be individual seats each having a seating part and a backrest part.

The vehicle cabin shown on the figures is equipped with a bed system 26 according to the invention. The bed system is arranged in a rear part of the cabin and comprises two beds 28, 30 which have their length extending in the transversal direction of the truck.

In a fully stored configuration of the system as represented in Figure 1, the two beds 28, 30 are each arranged in a vertical and transversal plane against the rear wall 20 of the cabin, one above the other. In such configuration with the two beds in a storage position, the system occupies a minimum amount of space within the cabin 10 of the vehicle.

On Figure 2 is shown a first use configuration of the bed system where the two beds 28, 30 are each in a first use position, extending each substantially horizontally but

substantially one above the other, each with a first lengthwise edge 32, 34 arranged in close proximity to the rear wall 20 of the cabin. In such configuration, each bed can accommodate one person. Of course the available free space above each of the beds is limited, either by the ceiling 16 of the cabin for the second uppermost bed 30, or by the second bed 30 when considering the first lowermost bed 28. In this use configuration, the bed system 26 can accommodate two persons without needing any specific arrangement in the front part of the cabin which is then totally devoted to the driving environment.

On Figure 3 is shown a second use configuration of the bed system 26, where, according to the invention, the first 28 and second 30 beds are positioned substantially side by side and horizontally at the same height. In the case shown on the Figures, the two beds 28, 30 extend each in the same transverse direction of the truck. Preferably, the two beds are closely arranged one against the other so as to form a double bed or an extra wide single bed, with the corresponding advantages in terms of use either by two persons or by a single person. As can be seen by comparison with Figure 2, the first bed 28 is in the same position for both of the first and second use configurations.

On figure 4, it is represented another use configuration of the system where only the first bed 28 is brought to its use position, the second bed 30 being kept in its storage position. In such a use configuration of the system, the first bed 28 can be used as a sofa or as a bed with a substantial amount of free room immediately above the bed. As another possible configuration of the system, shown on figure 5, it is also desirable that the system offers the possibility to have only the second bed 30 set in its use position with the first bed 28 being kept in its storage position. Such a configuration of the system provides accommodation for one person, while still keeping some available floor space.

Figures 6 to 10 are somewhat more detailed views of a first embodiment of a bed system 26 according to the invention, each figure corresponding to the use configurations of Figures 1 to 5 respectively.

In those figures, it can be seen that the first lowermost bed 28 can be directly articulated around a transversal axis A1 on the rear wall 20, or on the floor 18 near said rear wall 20, by an articulation mechanism not shown on the figures. Axis A1 may be substantially coincident with the first lengthwise edge 32 of the first bed. To the contrary, the second bed 30 of bed system is not articulated directly on the wall 20. Instead, the bed system comprises a mounting structure 36 which is moveable with respect to the cabin 10

between a first and a second position and onto which the second bed 30 is mounted. In the example shown, the mounting structure comprises two main mounting pillars 36 which are located on each lateral side of the cabin. The mounting pillars are articulated with respect to the cabin by their bottom end, either on the rear wall, on the floor, or on the lateral walls of the cabin. Each mounting pillar can therefore pivot with respect to the cabin around a transversal axis from a first position where it stands vertically against the rear wall, as represented on Figures 6, 7, 9 and 10, to a second position where it extends longitudinally towards the front of the cabin as shown on Figure 8. In the shown embodiment, the mounting structure 36 is articulated with respect to the cabin around the same axis A1 as the first bed 28, possibly through a common articulation mechanism. The second bed 30 is attached to the upper end of each mounting pillar 36 at, or proximate, the extremities of its first lengthwise edge 34, with a possibility to pivot around a transversal axis A2 with respect to the mounting structure 36. As can be seen from the figures, for the storage and a first use position of the second bed 30, the mounting structure 36 is in its first position, whereas the mounting structure 36 is brought to its second position when the second bed 30 is in its second use position.

Of course, the mounting structure 36 could be constructed differently. In certain cases, for example to increase its rigidity, it may be necessary to provide a transversal linking bar joining the two mounting pillars. Also, the structure depicted on the drawings is articulated on the cabin 10 near the floor 18 and near the rear wall 20 of the cabin; but other geometries are possible. In any case, the geometry of the mounting structure 36, and its possibility of movement must be such that, when the structure is in its second position, the first lengthwise edge 34 of the second bed 30 must be brought adjacent the second lengthwise edge 38 of the first bed, i.e. the edge opposite the first edge 32 by which it is attached to the cabin.

In the first embodiment shown in Figures 6 to 10, the mounting structure 36 pivots by 90 degrees around the articulation axis A1, from a vertical to a horizontal orientation. The effective length of the mounting pillars 36, between their articulations A1, A2 to the cabin 10 and to the second bed 30, are adjusted so that, in the second configuration of the system, the two beds are side by side. As a consequence, the available free space above the first bed 28, when the system is in its first use configuration, is substantially equal to the width of the first bed 28.

Preferably, the bed system 26 also comprises a supporting structure 40 to support at least the second bed 30, at least in its first use position. In the first embodiment shown on Figures 6 to 10, the supporting structure comprises a pair of supporting pillars 40. Each supporting pillar 40 is articulated to the second bed 30 around a transversal axis A3 at or proximate of the second lengthwise edge 42 of the second bed 30. In the fully stored configuration of the system, or when the second bed 30 is in its storage position, the supporting pillars 40 are arranged vertically against the rear wall 20 of the vehicle. In the first use configuration of the system, shown on Figure 7, the pillars 40 extend substantially vertically downwards from the second bed 30. In the first embodiment shown on figures 6 to 10, the bottom end of each supporting pillar is engaged through a disconnectable pivot connection 44 with the first bed 28, near the second lengthwise edge 38 of the first bed 28. It is to be noted that in such a configuration, the two beds 28, 30, the mounting structure 36 and the supporting structure 40 form a variable geometry parallelogram, and it is therefore possible to move the bed system 26 from its first use position to its second use position without disconnecting the supporting pillars 40 from the first bed 28. Nevertheless, many other possibilities exist for designing a supporting structure. For example, the supporting pillars could rest directly on the floor of the cabin, rather than being connected to the first bed 28. Instead of pillars, the supporting structure could comprise flexible but non-extensible links connecting the second lengthwise edge 42 of the second bed 30 to the ceiling 16 of the cab. In a further alternate design, especially in the cases where the beds extend lengthwise across substantially all the transversal width of the cabin, the supporting structure could comprise supporting brackets fixed on the lateral walls of the cabin.

In the described embodiment of the invention, the supporting pillars are effective only for the first use position of the second bed as shown on Figures 7 and 10. The supporting structure may comprise others means to support the second bed in its second use position. As will be seen hereunder in relation to the second embodiment of the invention, the supporting structure may comprise additional supporting means, the function of which is provided by other elements of the cabin, for example a piece of cabin furniture, such as a seat or a storage box. For example, the supporting structure may comprise a swiveling driver or passenger seat, said seat being brought to a backward facing position so that the seat's seating part acts as the supporting structure for the second bed when it is in its second use position.

On Figures 11 to 15 is represented a second embodiment of a bed system according to the invention, represented in respectively the same positions/configurations as those of Figure 6 to 10.

The main difference between the two embodiments is that the first bed 28 is not articulated around a fixed point on to the cabin 10, but it is articulated onto a bracket or an axle 48 which may slide vertically on rails 46 between a low and a high position. In this particular embodiment, the mounting structure 36 is also mounted to the rear cabin wall 20 through the same sliding bracket or axle 48.

As shown on figure 13, this sliding axle 48 allows raising the height of both beds in the second use configuration of the system. With such a system, it is possible to have the second bed 30 protruding into the driving space of the cabin, over a driver and/or a passenger seat 24. In the embodiment shown, it is provided a seat 24 having a folding-down backrest 50, said folding down backrest being brought to its folded-down position to act as a supporting structure for the second bed 30 in its second use position. It is to be noted that the first bed 28 is supported in its use position by a dedicated supporting structure 52, as shown on Figure 13. This structure 52 can for example be a retractable bracket on the sidewalls of the cabin, as represented, or a storage box extending along the full transverse direction of the cabin next to the rear wall of the cabin. In the latter case, the first bed may be at least partially hidden behind said storage box when it is in its storage position.

Preferably, the bed system 26 also comprises a system for locking at least the two beds in their respective storage position. Preferably, the beds are also locked in their use positions.

CLAIMS

1. A bed system (26) for the cabin (10) of a vehicle, wherein the system (26) comprises a first bed (28) and a second bed (30) which can each be displaced independently between a storage position and a substantially horizontal use position, and wherein in a first use configuration of the system, the second bed (30) is located substantially over the first bed (28), characterized in that the bed system (26) comprises a second use configuration wherein the first and second beds (28, 30) are positioned substantially side by side and horizontally at the same height.

2. A bed system according to claim 1, characterized in that the bed system (26) comprises a mounting structure (36) which is moveable with respect to the cabin between a first and a second position and onto which the second bed (30) is mounted, and in that, for the storage and a first use position of the second bed (30), the mounting structure (36) is in its first position, whereas the mounting structure (36) is brought to its second position when the second bed (30) is in its second use position.

3. A bed system according to claim 2, characterized in that the second bed (30) is mounted on the mounting structure (36) so as to be able to pivot with respect to the structure around a lengthwise axis (A2).

4. A bed system according to claim 3, characterized in that the second bed's articulation axis (A2) with respect to the mounting structure (36) is proximate to a first (34) of the second bed's lengthwise edges.

5. A bed system according to any of claims 2 to 4, characterized in that the mounting structure comprises two parallel pillars (36) which are articulated at one end on the cabin (10) at the other end on the second bed (30), near a first lengthwise edge (34) of the second bed (30).

6. A bed system according to any of claims 4 or 5, characterized in that said first lengthwise edge (34) of the second bed (30) is the lengthwise edge closest to a rear wall (20) of the cabin (10).

7. A bed system according to any of claims 4 to 6, characterized in that the system (26) comprises a supporting structure (40) for supporting the second bed (30) along a second

lengthwise edge (38) opposite said first lengthwise edge (34), at least when it is its first use position.

8. A bed system according to claim 7, characterized in that the supporting structure comprises at least one dedicated pillar (40).

9. A bed system according to claims 7 or 8, characterized in that the supporting structure comprises a piece of cabin furniture, such as a seat or a storage box.

10. A bed system according to claim 9, characterized in that the supporting structure comprises a swiveling driver and/or passenger seat, said seat(s) being brought to a backward facing position so that the seat's seating part acts as the supporting structure.

11. A bed system according to claim 9, characterized in that the supporting structure comprises a seat having a folding down backrest, said folding down backrest being brought to its folded down position to act as the supporting structure.

12. A bed system according to any preceding claim, characterized in that, in the second use configuration of the system (26), the first bed (28) is in the same first position as in the first use configuration of the system.

13. A bed system according to any of claims 1 to 11, characterized in that, in the second use position of the system, the first bed is in a second position at a higher level than the level of its first position.

14. A bed system according to any preceding claim, characterized in that the first bed (28) is independent from the second bed (30).

15. A bed system according to any preceding claim, characterized in that, when it is in its storage position, each bed (28, 30) is substantially folded vertically around one of its lengthwise edges against a rear wall (20) of the cabin (10).

16. A bed system according to any preceding claim, characterized in that the first bed (28) is articulated on a rear wall (20) of the cabin (10).

17. A bed system according to any preceding claim, wherein the second bed's mounting structure (40) is articulated on a wall of the cabin (12).

18. A bed system according to any preceding claim, characterized in that the height between the two beds (28, 30) in their first use position is substantially equal to the width of the first bed (28).

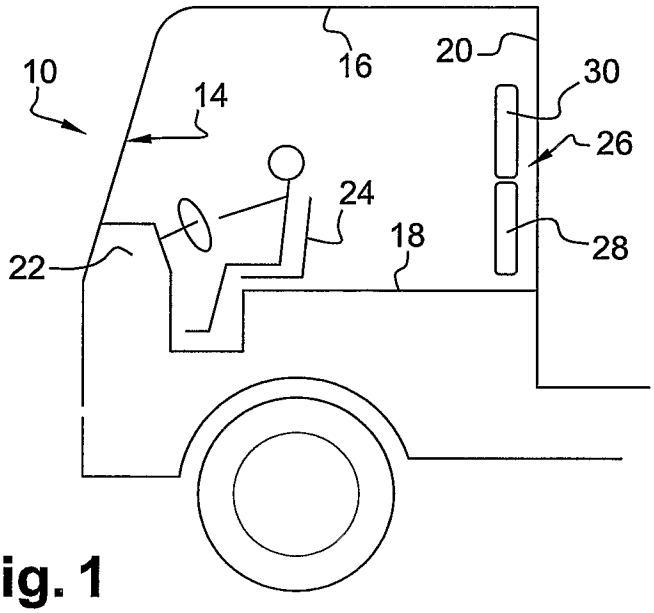


Fig. 1

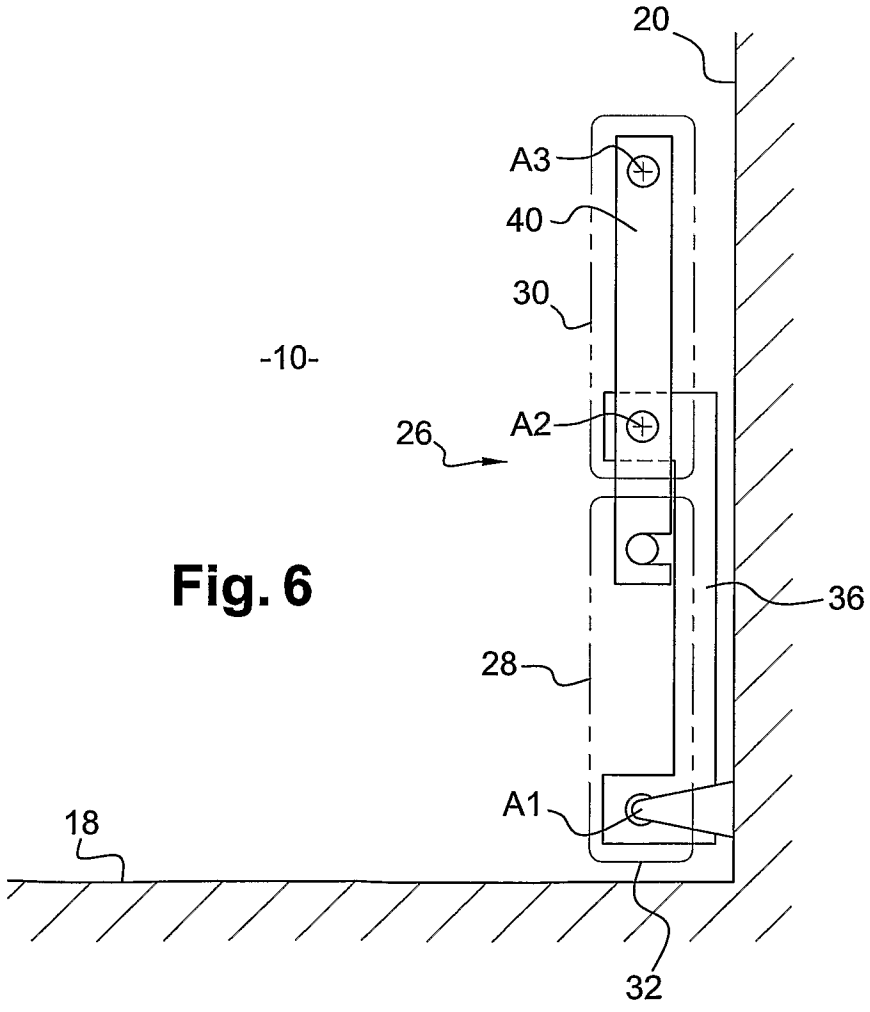


Fig. 6

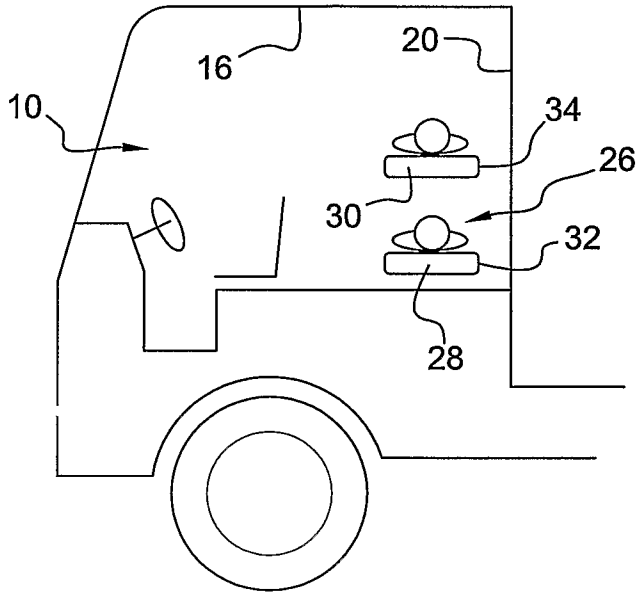


Fig. 2

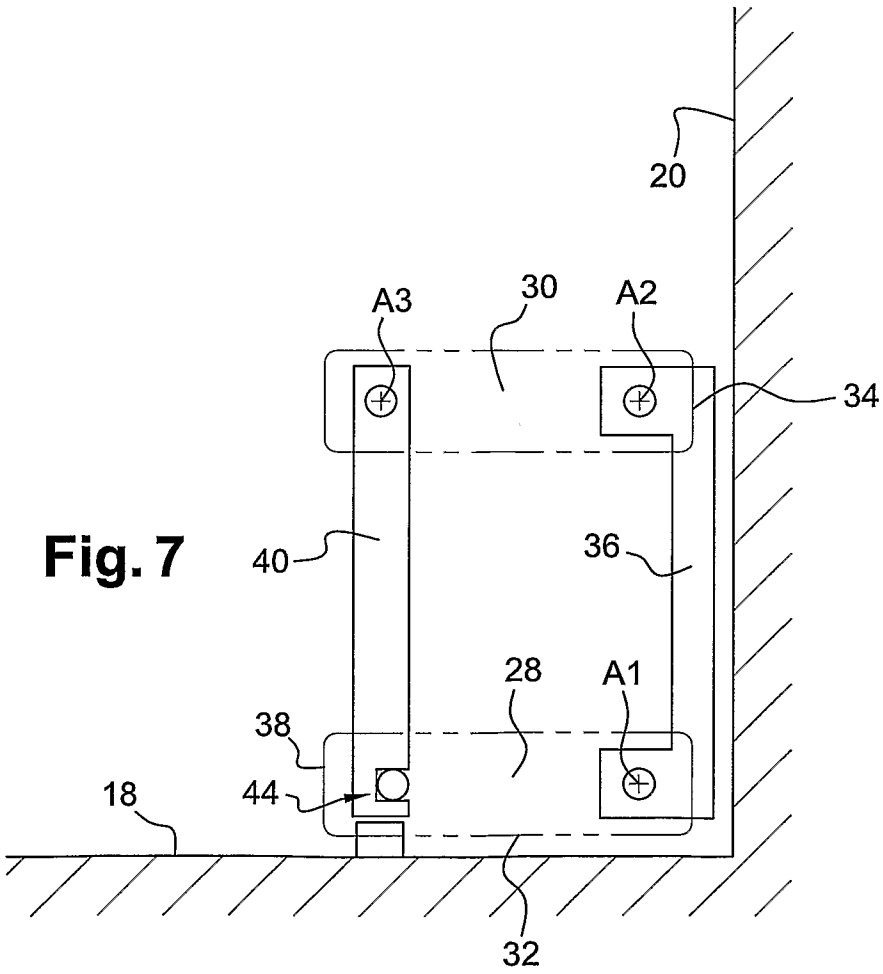


Fig. 7

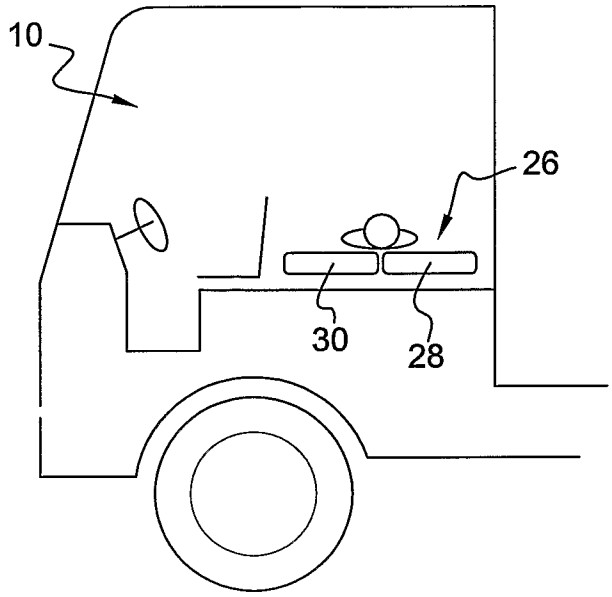
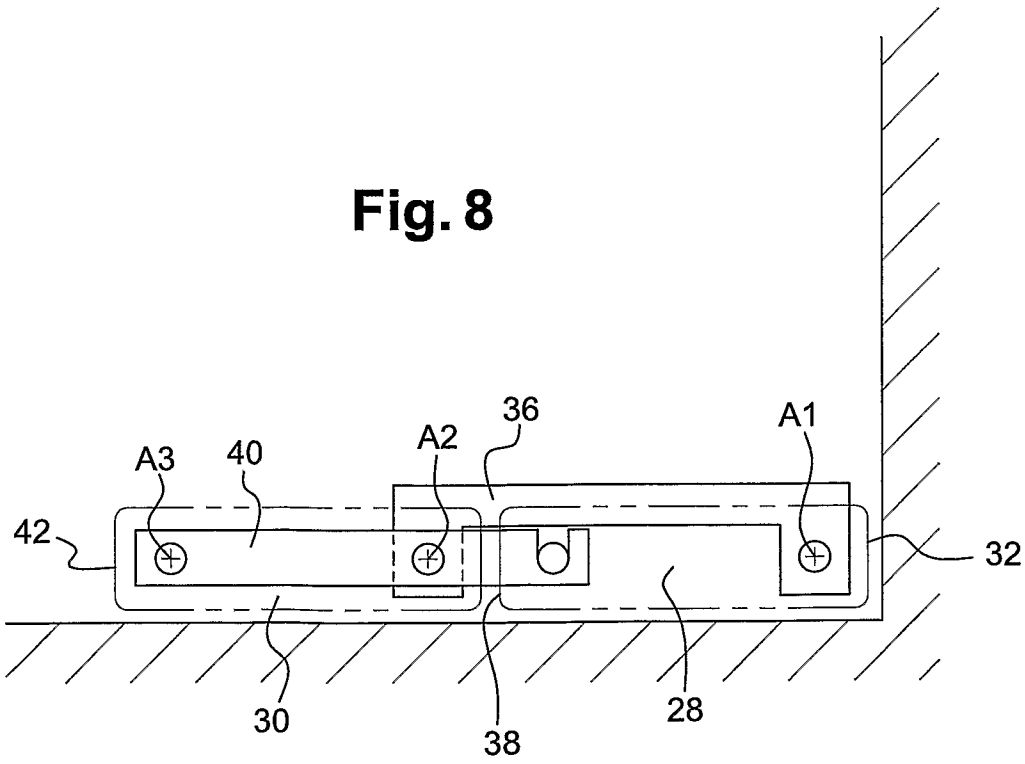


Fig. 3

Fig. 8



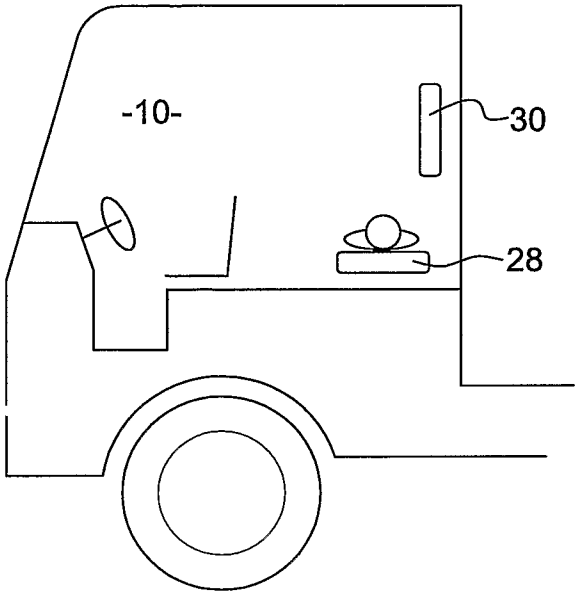


Fig. 4

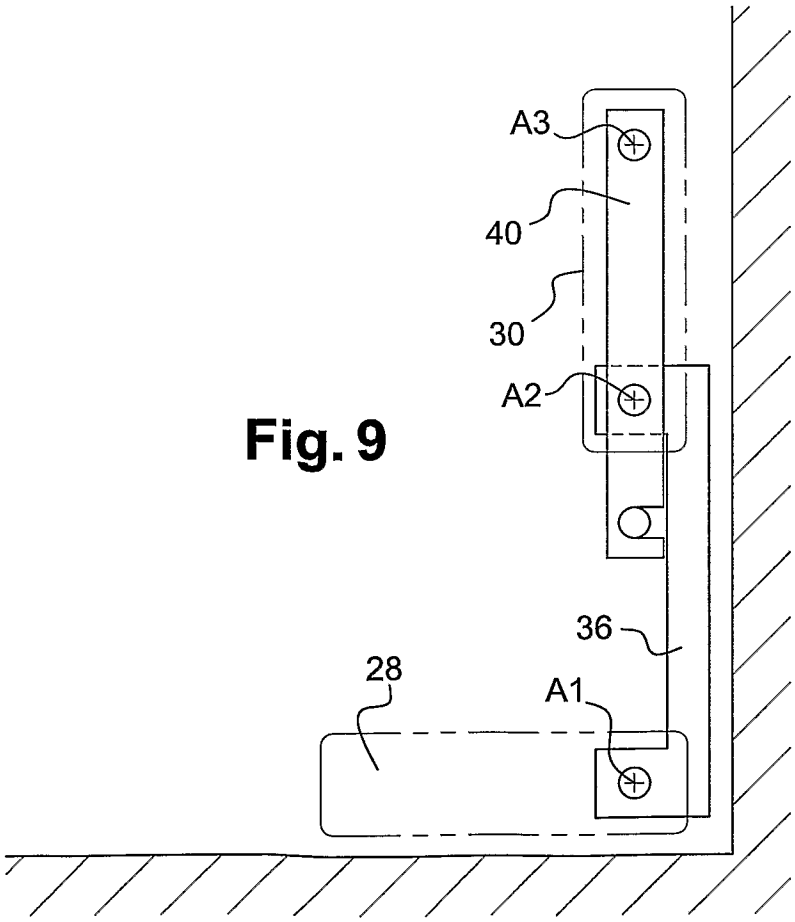


Fig. 9

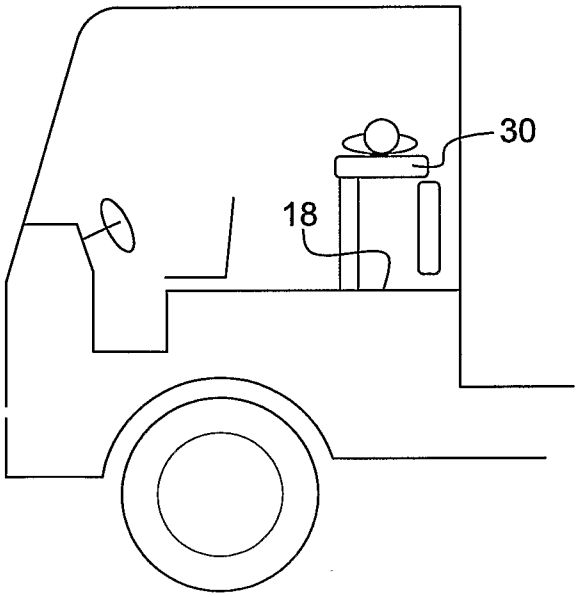


Fig. 5

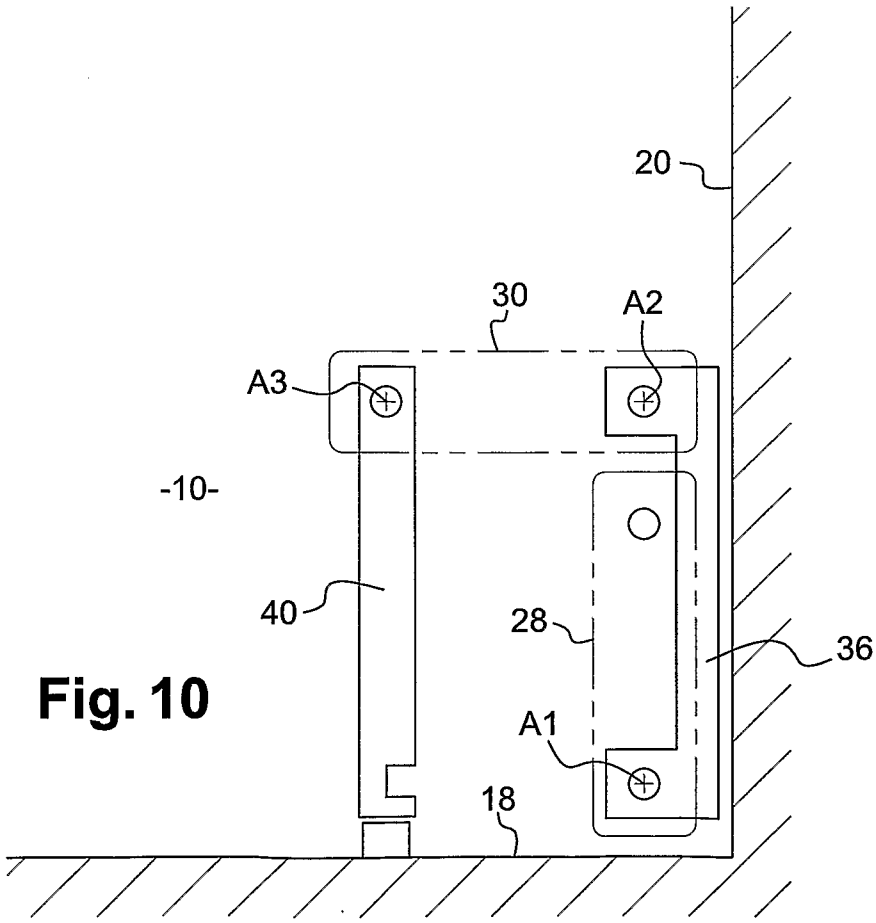


Fig. 10

-10-

Fig. 11

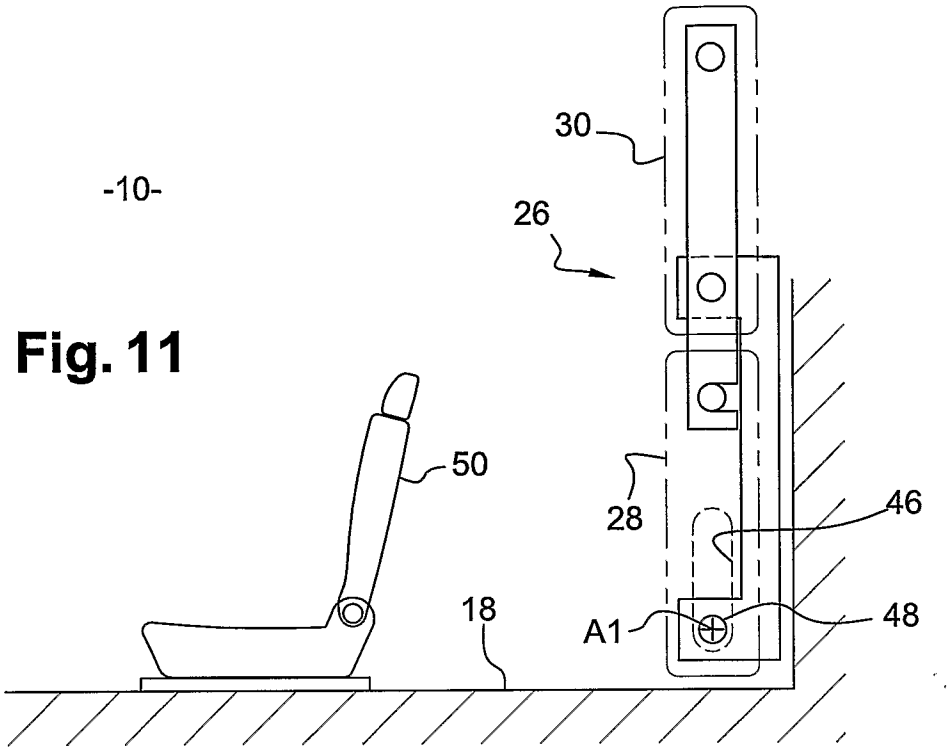
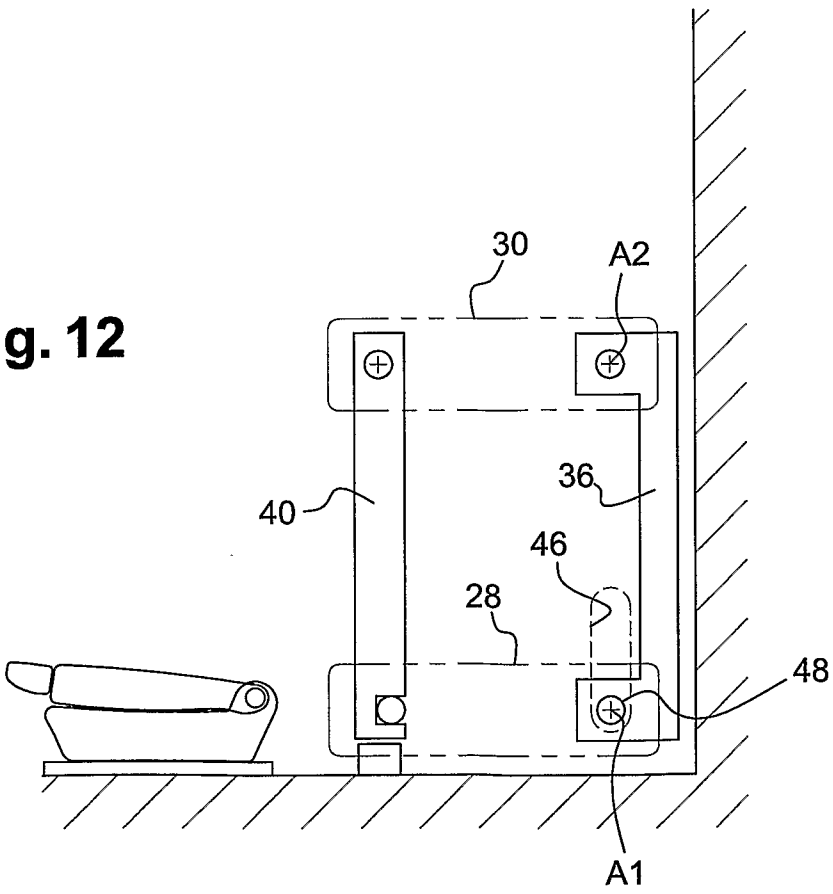


Fig. 12



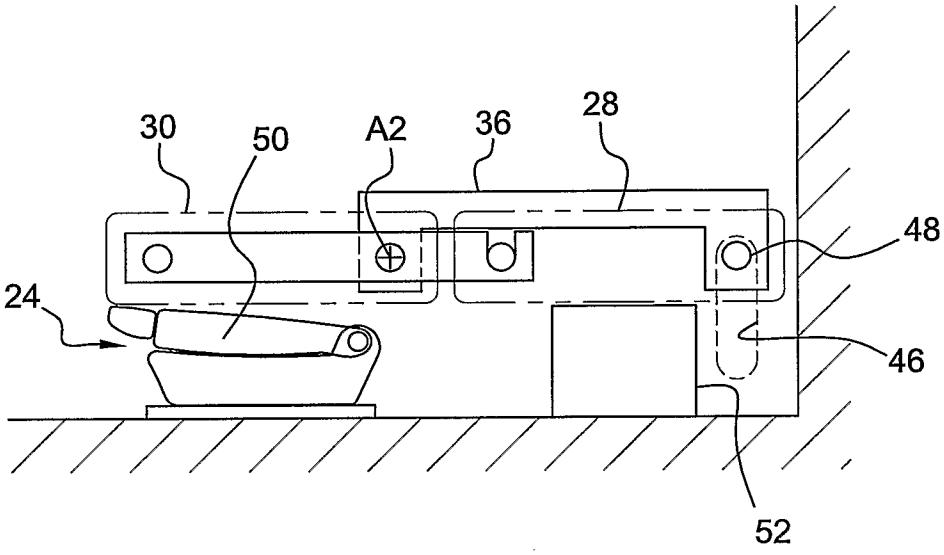


Fig. 13

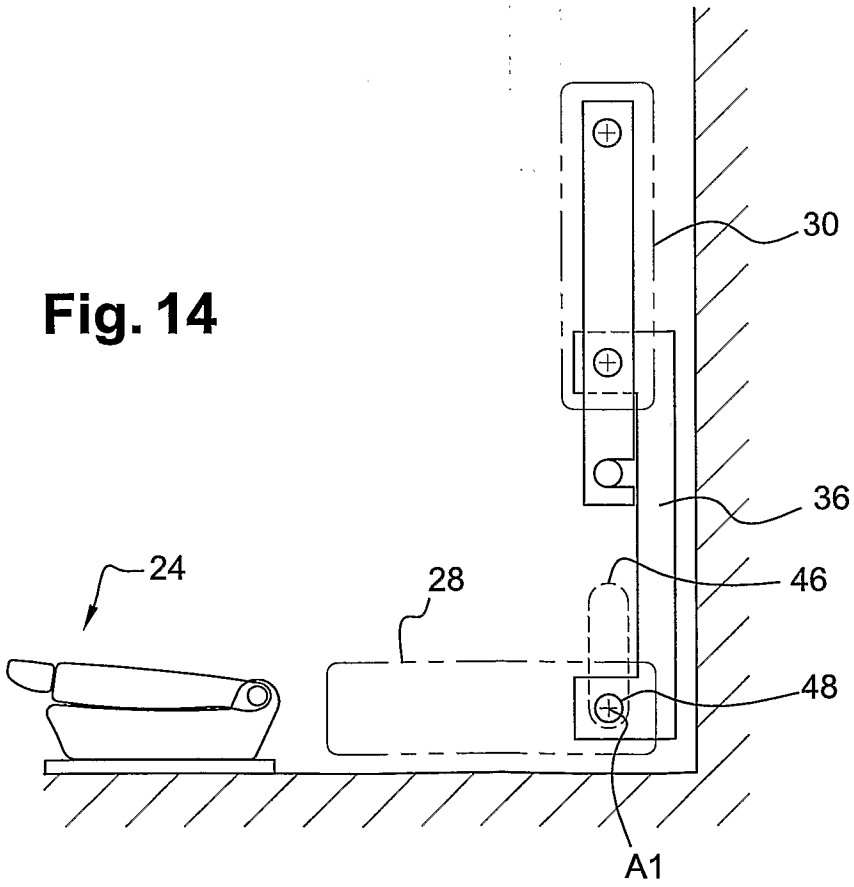


Fig. 14

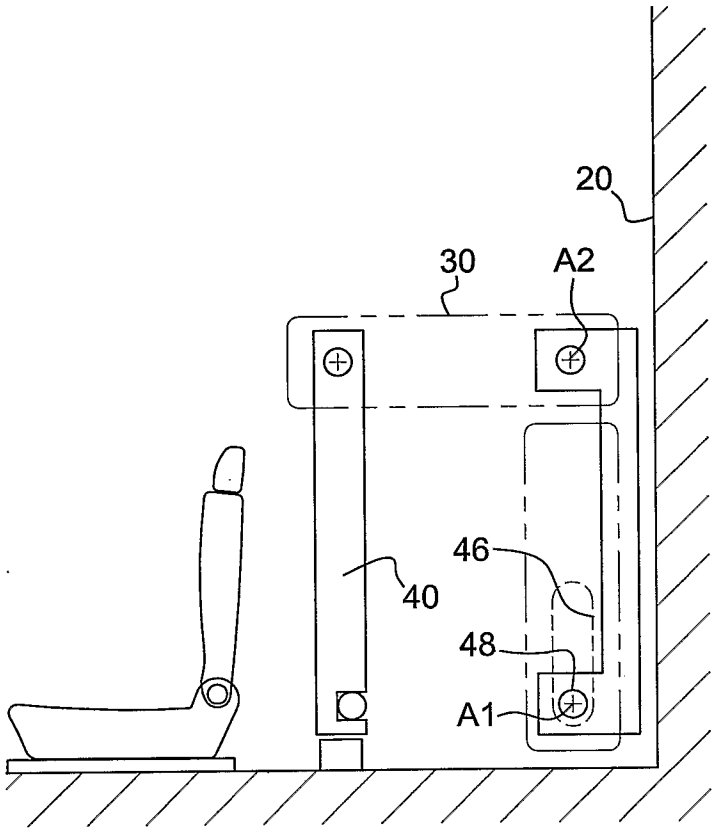


Fig. 15

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2007/004419

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60P3/32 B62D33/06

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)
B62D B60P

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 410 440 A (CI TOURING CARAVANS LTD) 15 October 1975 (1975-10-15) page 2, line 20 - page 3, line 4; figures 1-3	1-4,9, 14,18
X	FR 2 820 295 A (DUFOUR YACHTS [FR]) 9 August 2002 (2002-08-09) page 3, line 5 - page 8, line 13; figures 1-6	1-4,9, 14,18
A	EP 1 749 965 A (IVECO SPA [IT]) 7 February 2007 (2007-02-07) the whole document	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
9 June 2008	23/06/2008

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2007/004419

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 1410440	A	15-10-1975	NONE	
FR 2820295	A	09-08-2002	NONE	
EP 1749965	A	07-02-2007	NONE	