



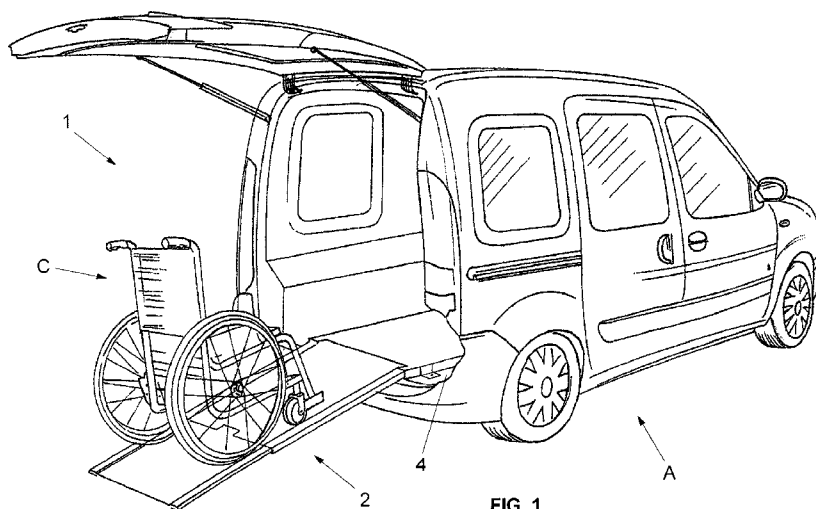
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(54) **Title:** DEVICE FOR LOADING AND UNLOADING GOODS OR WHEELCHAIRS CARRYING DISABLED PERSONS



(57) **Abstract:** The invention is a multifunctional loading and unloading device (1) to be applied to a motor vehicle (A), comprising: a platform (2) consisting of one or more thin rigid portions; a substantially plane box-shaped container (3) of the platform (2), associated with the bed (4) of the motor vehicle (A); telescopic sliding means for inserting and withdrawing one or more thin rigid portions of the platform (2) in and from the container (3). Said sliding means define an operating position in which the platform (2) has its free end (7a) arranged so that it rests on the ground and a rest position in which the platform (2) is completely inserted in the container (3).



DEVICE FOR LOADING AND UNLOADING GOODS OR WHEELCHAIRS
CARRYING DISABLED PERSONS.

DESCRIPTION

The present invention concerns a device to be used in motor vehicles for
5 loading and unloading wheelchairs carrying disabled persons or goods
handled with trucks.

It is known that in order to load/unload goods or wheelchairs carrying disabled
persons on/from motor vehicles plate platforms are used, which are arranged
10 in an inclined position between the ground and the opening of the vehicle's
baggage compartment, or are moved via actuator means from the ground to
vehicle's loading floor and vice versa.

The wheelchairs with the disabled persons or the trucks used to transport
goods are pushed on said platforms. The wheelchair carrying the disabled
15 person and/or the loaded goods are then stored inside the passenger
compartment of the vehicle together with the platforms, thus occupying more
space than that required by the wheelchairs and/or the goods.

Furthermore, as the platforms are generally operated by actuator means, such
as hydraulic or pneumatic pistons, the actuator means generally occupy further
space, thus reducing the space available for the wheelchairs or the goods.

20 The known art also offers platforms for connecting the vehicle's bed and the
ground which, after use, are dismantled into pieces that are arranged one on
top of the other and stored inside a drawer present in the vehicle's passenger
compartment.

The superimposition of the parts that make up the entire platform means that
25 the drawer containing them has a certain height, so that the inside
compartment can be used only for loading goods, while it is actually impossible
to use the platform for transferring wheelchairs carrying disabled persons,
owing to the excessive height of the drawer present in the motor vehicle.

Folding loading platforms that can be extended through actuator means are
30 also known, which are used in trucks and when it is necessary to handle large
and/or bulky loads.

This kind of loading platforms poses the drawback that, being particularly large
and bulky, the platforms are not suitable for the desired double function.

The object of the present invention is to eliminate the above mentioned
35 drawback.

In particular, the main object of the present invention is to provide a multifunctional loading device that can be moved manually and makes it possible to transfer disabled persons on wheelchairs and to load/unload goods, for example goods transported by manual trucks.

5 A further object of the present invention is to provide a multifunctional device for loading/unloading both goods and disabled persons on their wheelchair that, after use, makes it possible to reduce to a minimum the space occupied in the motor vehicle when it is stored therein.

Another, yet not the least object of the invention is to provide a multifunctional
10 loading/unloading device that can be easily handled by the operator, both when it must be prepared for use and when it is stored inside the vehicle after use.

The objects described above are achieved by a multifunctional loading device whose main characteristics are described in the first claim.

15 Hereinafter, the expression "multifunctional loading/unloading device" means that the device can be used for loading/unloading both goods with manual trucks and wheelchairs carrying disabled persons.

Advantageously, the multifunctional loading device constructed according to the present invention allows the operator to move the platform easily with no
20 need for repeated physical efforts.

Still advantageously, the space occupied inside the motor vehicle by the device according to the invention remains unchanged, both when the platform is completely retracted inside the vehicle and when it projects from the vehicle in the loading or unloading position.

25 More specifically, the loading device of the invention consists of a substantially plane box-shaped container containing a platform comprising one or more portions that are substantially plane, too, and move telescopically with respect to said container.

Therefore, the height of the box-shaped container slightly exceeds the height
30 of the highest of the individual sliding elements of the platform that is provided with its own sliding means in order to be able to move telescopically.

This means that any small van, for example a Fiat Doblò, can be used to accommodate the device of the invention in its back compartment and, over it, a disabled wheelchair or one or more trucks for transporting goods, with no
35 need to modify the vehicle.

According to an embodiment of the invention, the maximum height of the device when at rest, that is, with the platform retracted inside the vehicle's passenger compartment, doesn't exceed 80 mm.

This means that a wheelchair carrying a disabled person can be easily
5 arranged inside the vehicle's passenger compartment with no need for the transported person to assume a reclined position.

When the parts making up the platform are completely retracted inside the box-shaped container, the device reaches a height that corresponds to the height of the box-shaped container itself.

10 The objects and advantages described above will be highlighted in greater detail in the description of a preferred embodiment of the invention that is supplied as an indicative, non-limiting example with reference to the enclosed drawings, wherein:

- 15 - Figure 1 shows a perspective view of the multifunctional loading device carried out according to the invention;
- Figure 2 shows an axonometric view of the platform of the device shown in Figure 1;
- Figure 2a shows a detail of Figure 2;
- Figure 3 shows an axonometric view of a detail of the platform of Figure 2;
- 20 - Figure 4 shows a front view of the platform of Figure 2;
- Figure 5 shows an axonometric view from below of a further detail of the platform of Figure 2;
- Figure 6 shows an axonometric view from below of a further detail of the platform of Figure 2;
- 25 - Figure 7 shows a side view of the platform of Figure 2 in operating position;
- Figure 8 shows a side view of the platform of Figure 2 on which a truck for transporting goods is loaded;
- Figure 9 shows a side view of the platform of Figure 2 on which a wheelchair for disabled persons is loaded.

30 As shown in Figure 1, the multifunctional loading device according to the invention, indicated as a whole by **1**, comprises:

- a platform **2** consisting of a thin rigid surface;
- a container **3** suited to contain the platform **2**, associated with the bed **4** of the motor vehicle **A**;
- 35 - sliding means for inserting and withdrawing the platform **2** in/from the

container **3** until it rests on the ground.

When the platform **2** is in rest position, it is completely inserted in the container **3**, as can be seen in Figure 3.

5 According to a preferred embodiment of the invention shown in Figure 2, the platform **2** comprises a first portion **6** having one end **6a** constrained to the container **3**, and a second portion **7** having a free end **7a** intended to be arranged so that it rests on the ground when the platform **2** is in operating position.

10 The first portion **6** and the second portion **7** of the platform **2** are slidingly coupled with each other in a telescopic way, so that they overlap only partially at the level of the ends in mutual contact when the platform **2** is in operating position, as shown in Figure 2.

As can be seen in Figure 2, the second portion **7** of the platform **2** is preferably contained in the first portion **6** and is the first to be withdrawn. The first portion **6** of the platform **2**, on the other hand, remains constrained to the container **3**.

15 According to a construction variant not shown in the figures, it is also possible to withdraw the outermost portion of the platform first.

The plane box-shaped container **3** of the platform **2**, which can be seen more clearly in Figure 3, is delimited at the two sides by a body **8** that has the shape of a symmetrical C whose side edges define two projections **9** converging towards the inside.

The top of the container **3** is provided with a plane sheet **31** fixed to the C-shaped body **8** by welding.

25 In order to allow the container **3** to be secured to the vehicle's bed, each one of the shaped bodies **8** is provided with two squares **81** which are rigidly fixed to the body **8**, too, and each one of which is provided with a through hole **82** whose axis coincides with the axis of a hole already provided in the vehicle's bed.

30 In this way, no adjusting operation is required to fix the device of the invention to the motor vehicle, since to connect the device to the bed it is sufficient to apply a bolt to every hole **82**, the vehicle's bed being already provided with a threaded hole suited to house a fixing bolt as a standard feature.

The shaped body **8** of the container **3** is provided with bearings or rollers **10**, in order to allow the platform **2** to slide inside the container **3**.

35 Other ball bearings (not visible in the figures) are fixed to the second portion **7**

of the platform **2** in order to facilitate the sliding movement of the former with respect to the platform **2**.

According to a construction variant not illustrated in the figures, in order to facilitate the sliding movement of the second portion **7** of the platform **2** with respect to the platform **2** itself, sliding guides (not shown herein) are provided
5 that are made of a self-lubricating plastic material, for example Polizene[®], and consist of flat strips of said plastic material or C-shaped sections in plastic or metal applied using a technique known to the person skilled in the art in order to avoid any direct friction between the metal surfaces as well as vibrations.

10 The use of the plastic material for the guides considerably reduces the friction that would otherwise be originated between the metal surfaces when they mutually slide against each other.

With particular reference to the detail shown in Figure 5, it can be observed that the second portion **7** of the platform, when it is withdrawn from the container **3** by the operator, features a thin projection **11** that after the sliding
15 movement towards the outside, once having reached the end of stroke, counteracts a surface **12** belonging to the first portion **6**.

The counteracting action between the thin projection **11** of the second portion **7** of the platform **2** and the surface **12** of the first portion **6** makes the second
20 portion **7** of the platform **2** slide towards the outside, until it is arranged as shown in Figure 7.

When the first portion **6** of the platform **2** is withdrawn, it remains constrained to the shaped body **8** of the container **3** owing to the presence of pins **13** in each one of the sides of the first portion **6** of the platform **2**, as shown in
25 Figure 6.

In fact, said pins **13** projecting from the sides of the first portion **6** of the platform **2** counteract the internal surface of thin bodies **14** that serve as stop elements.

It is important to notice that the surfaces of both portions **6** and **7** of the platform **2** where the loads are moved, as shown in Figure 2, are strengthened
30 by the presence of holes **5** and annular projections **51** obtained by drawing. Thus the surfaces (visible in Figure 2a) stiffened in this way are more resistant to stress.

Furthermore, the presence of projections obtained by drawing on the walking surface ensures an anti-slip function that is important in order to avoid
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accidents during the loading and unloading operations.

According to a construction variant not illustrated in the figures, the loading device carried out according to the invention can be provided, at the sides of the platform, with position sensors of known type which, once the platform has
5 been arranged in the operating position, come on intermittently in order to make external observers aware of the presence of the platform.

Said position sensors are useful especially during the night.

A thin but highly resistant honeycomb panel **40** of the type used and widely tested for making lift floors is placed and rests on the shaped body **8** of the
10 box-shaped container **3** of the platform of the invention. The seats and the wheelchair are anchored at the height of said honeycomb panel **40**, visible in cross section in Figure 7, using reversible locking means (not shown herein) provided on said panel and known to the operators skilled in the art.

For this reason the platform of the invention is called "infrabed", as it is
15 positioned over the original bed of the vehicle and under the new bed reproduced by said shaped body.

The reversible locking means can be, for example, angular elements provided with through holes and positioned at the sides of the wheelchair or the truck once the latter have been harnessed and constrained to the inner walls of the
20 vehicle.

It should be underlined, as already pointed out, that the platform of the invention is fixed to the vehicle's bed with no need to make any functional modification to the vehicle itself.

The loading device that is the subject of the invention is used both to
25 load/unload goods transported on trucks **B**, as shown in Figure 8, and to transport disabled persons on wheelchairs, as shown in Figure 9.

This double function makes it possible to use the platform to load both goods trucks and disabled wheelchairs and makes the loading device of the invention very versatile to use, which was not possible before, since the devices for
30 transporting disabled persons were too specific to allow a different use.

In practice, once the platform of the invention has been used, the wheelchair of the disabled person or the truck with the goods can be stored on the bed of the vehicle and the platform is repositioned manually inside its container with a single manual movement, reducing its overall dimensions and the physical
35 effort required of the operator.

In the construction phase, the loading device that is the subject of the invention can be provided with stiffening crossbars in order to reinforce the structure of the device itself.

5 The above clearly shows that the loading device constructed according to the invention achieves all the set objects in terms of multifunctionality.

The loading device constructed according to the invention can be subjected to changes and/or modifications that must all be considered protected by the present patent, provided that they fall within the scope of the following claims.

10 In the cases where the technical characteristics illustrated in the claims are followed by references, these have been added only with the aim to facilitate the comprehension of the claims themselves and therefore said references do not have any limiting effect on the degree of protection to be granted to each element they identify only by way of example.

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CLAIMS

1) Multifunctional loading and unloading device (1) to be applied to a motor vehicle (A), **characterized in that** it comprises:

- a platform (2) consisting of one or more thin rigid portions;
- 5 - a substantially plane box-shaped container (3) of said platform (2), associated with the bed (4) of said motor vehicle (A);
- telescopic sliding means for inserting and withdrawing said one or more thin rigid portions of said platform (2) in and from said container (3) in order to define an operating position in which said platform (2) has its free end
10 (7a) resting on the ground and a rest position in which said platform (2) is completely inserted in said container (3).

2) Device (1) according to claim 1), **characterized in that** said platform (2) comprises a first portion (6) having one end (6a) constrained to said container (3) through coupling means and a second portion (7) having its free
15 end suited to be arranged so as to rest on the ground when said platform (2) is in the operating position, said first portion (6) and said second portion (7) being constrained to each other at the level of one common end.

3) Device (1) according to any of the preceding claims, **characterized in that** said constrained coupling of said first portion (6) with said second portion
20 (7) of said platform (2) is obtained by means of a counteracting surface (12) belonging to said first portion of said platform (2).

4) Device (1) according to any of the preceding claims, **characterized in that** said container (3) of said platform (2) lies on the loading bed of said motor vehicle (A) and is fixed to it by means of squares (81) connected to the side
25 body (8) of said container (3).

5) Device (1) according to claim 4), **characterized in that** said shaped body (8) of said container (3) has substantially the shape of a symmetrical C whose side edges define two projections (9) converging towards the inside.

6) Device (1) according to any of the preceding claims, **characterized in that** said shaped body (8) of said container (3) is provided with thin surfaces
30 (11), each one of which is respectively welded to one of said projections (9) converging towards the inside.

7) Device (1) according to any of the preceding claims, **characterized in that** said sliding means of said platform (2) are defined by ball bearings (10)
35 suited to allow said platform (2) to slide in said container (3).

8) Device (1) according to claims from 1) to 6), **characterized in that** said sliding means of said platform (2) are sliding guides made of a self-lubricating plastic material.

9) Device (1) according to any of the preceding claims, **characterized in**
5 **that** the surface of said platform (2) is provided with holes (5) and annular
projections (51) obtained by drawing.

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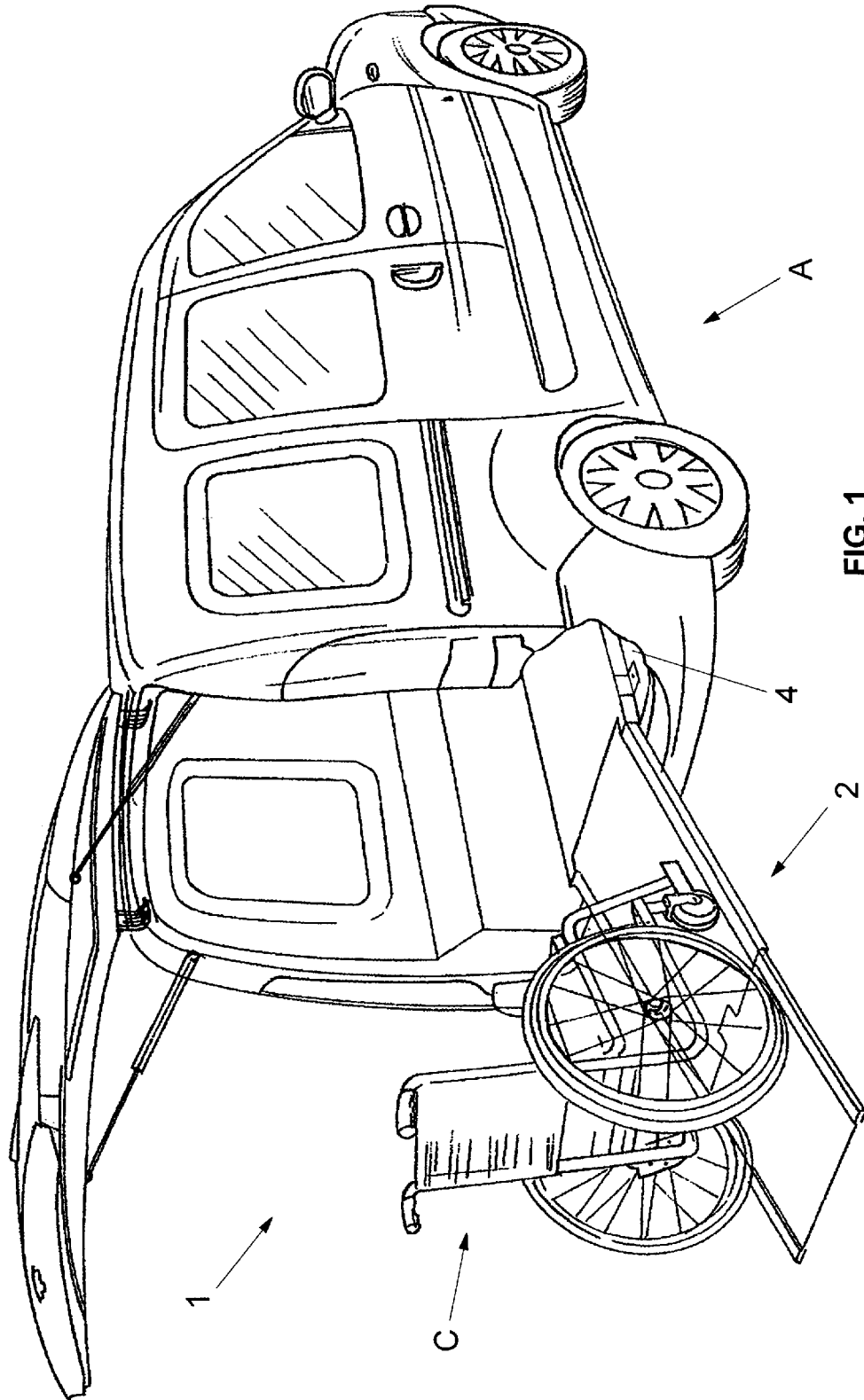
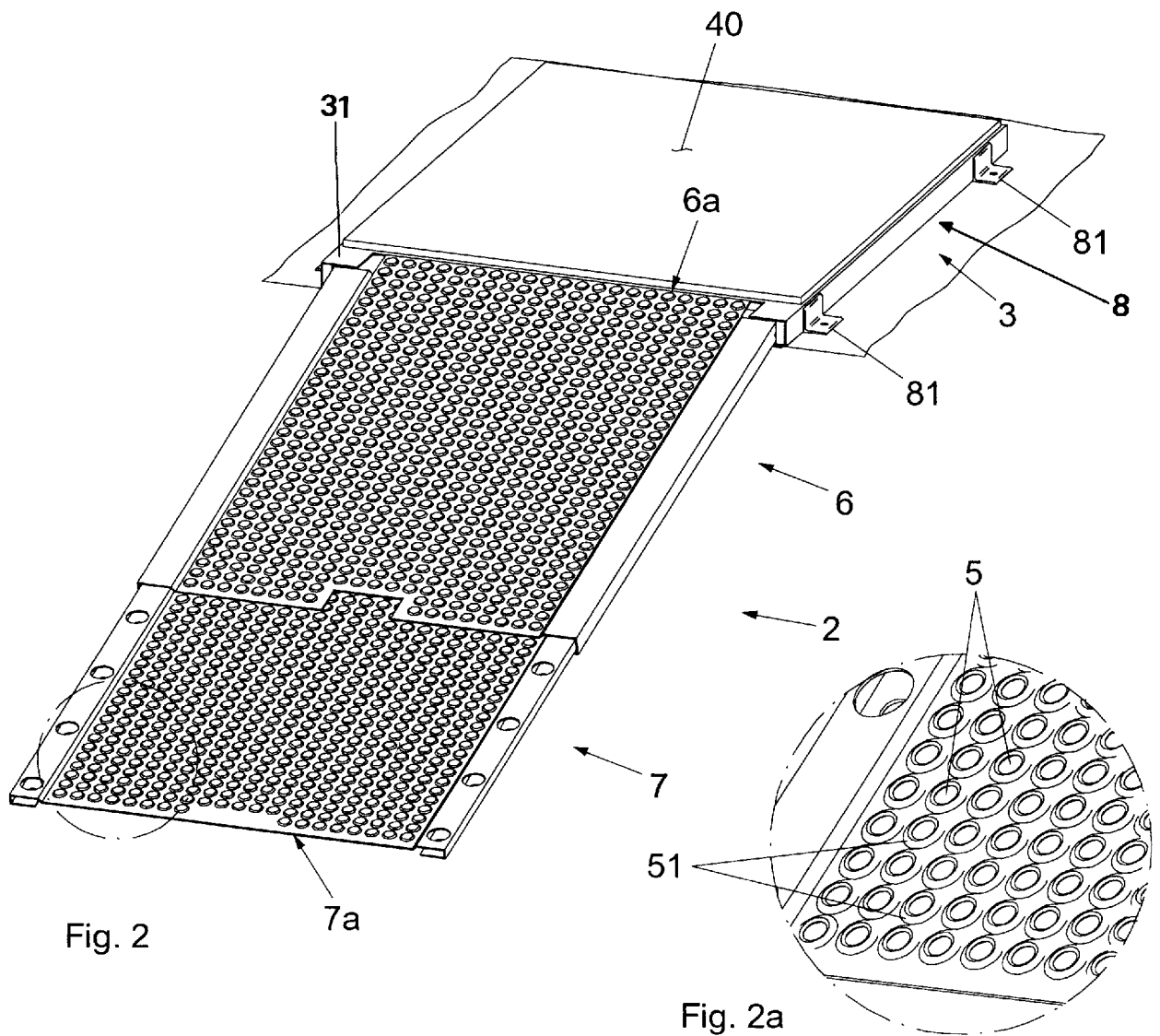
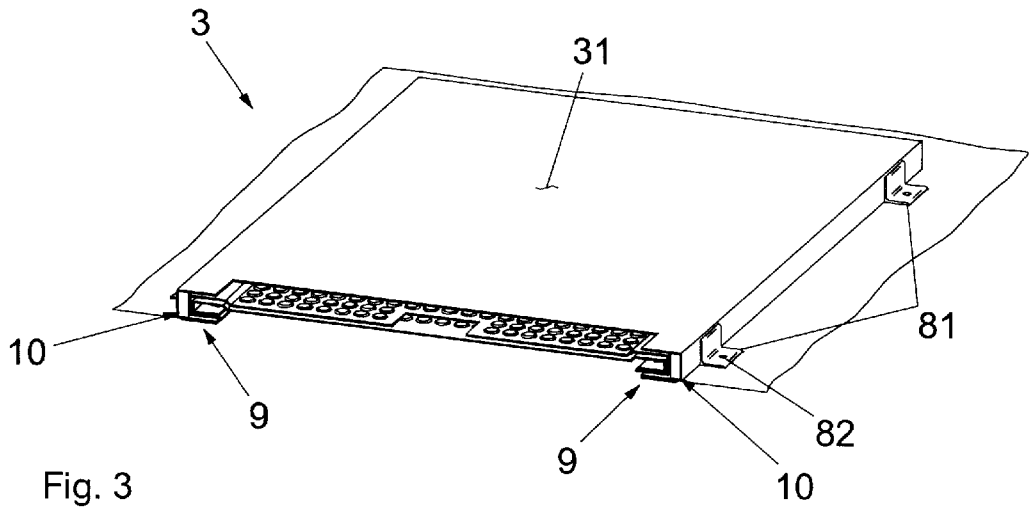


FIG. 1



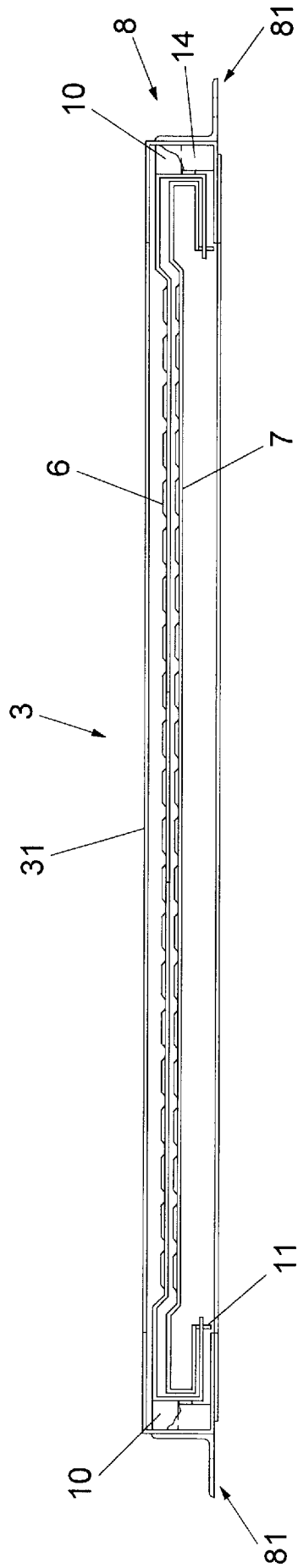


Fig. 4

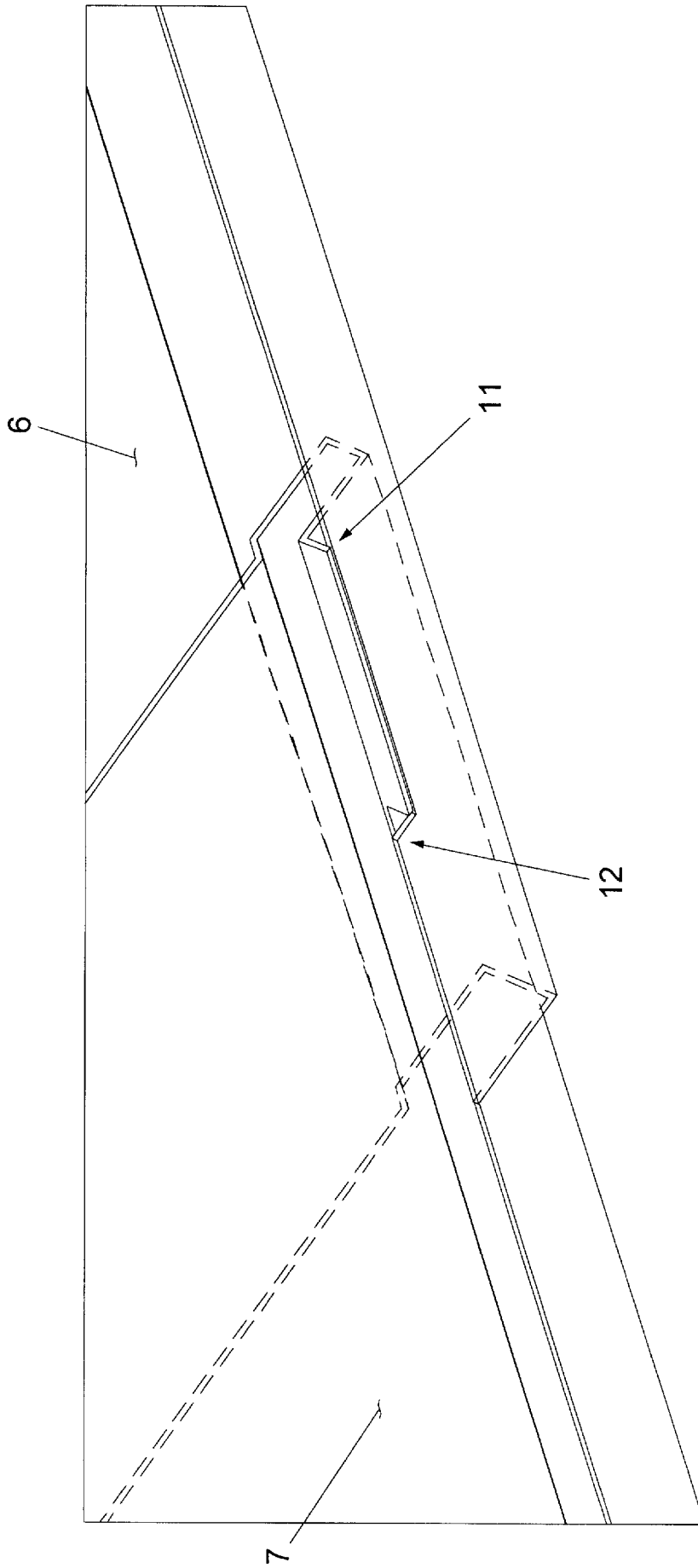


Fig. 5

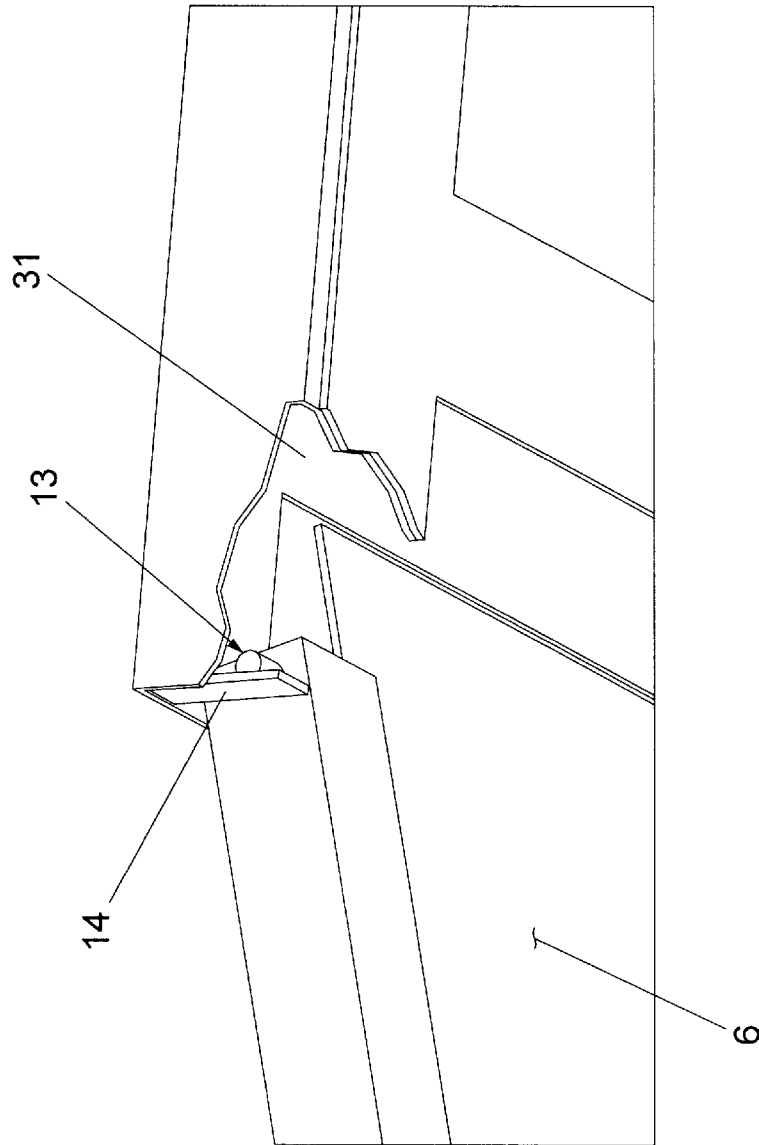


Fig. 6

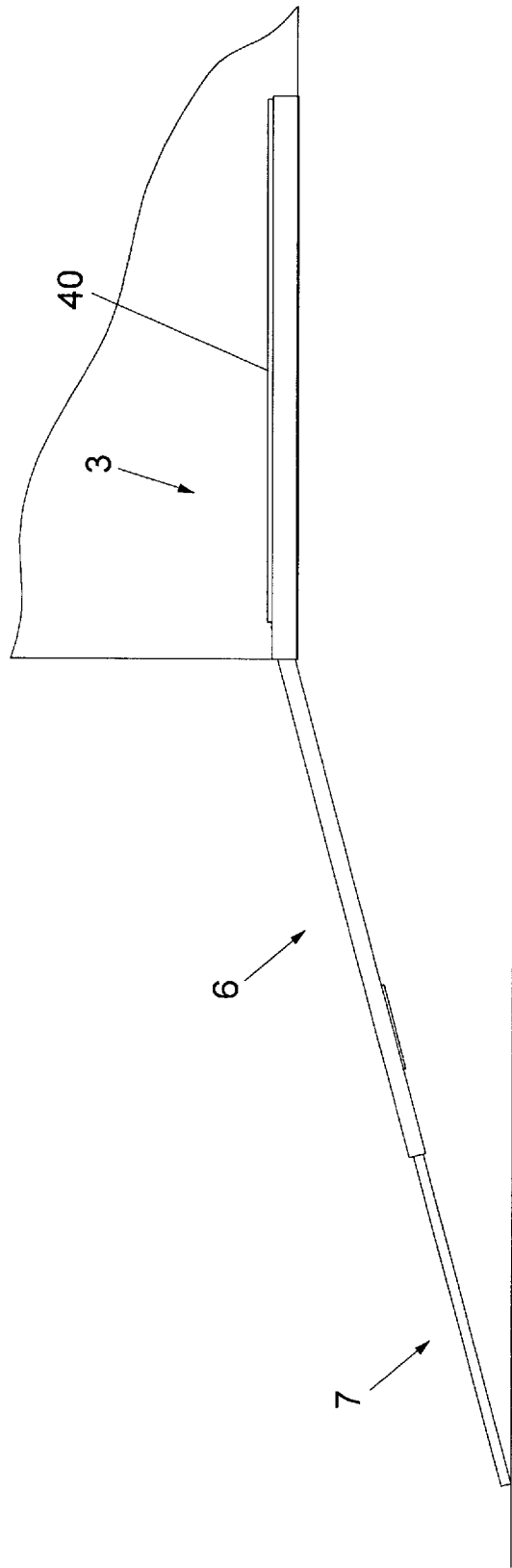


Fig. 7

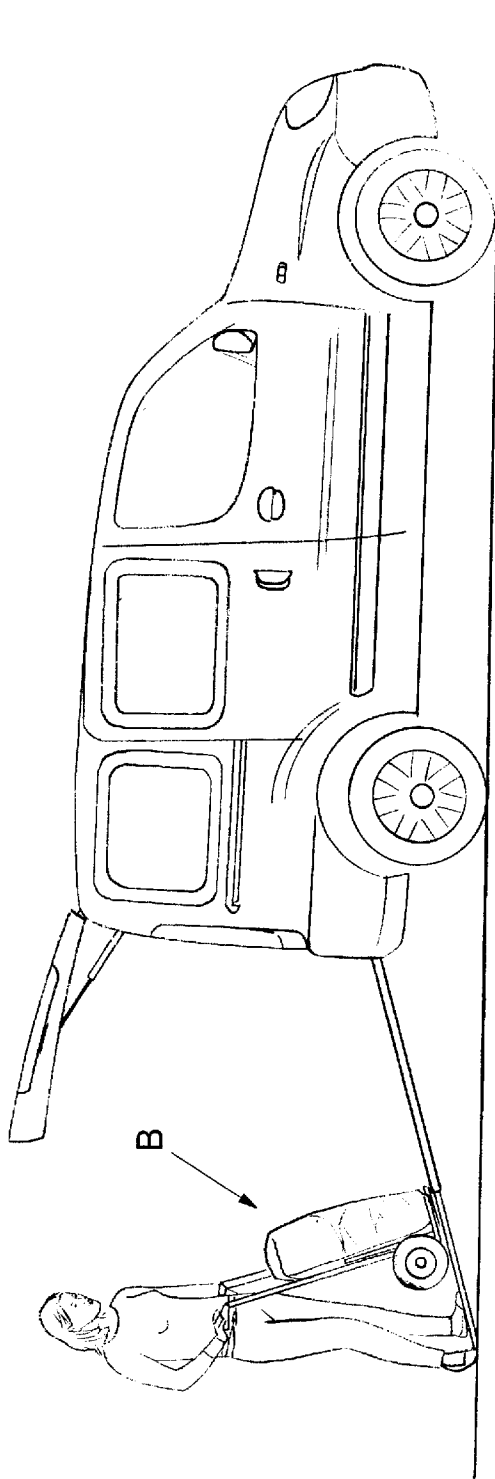


FIG. 8

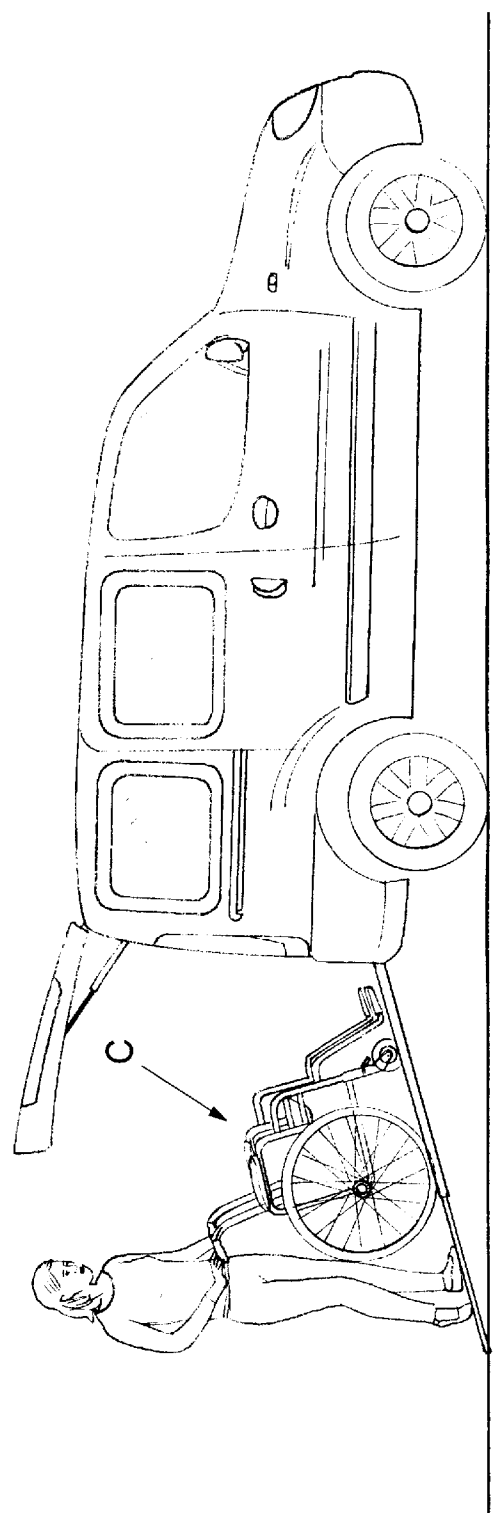


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/054912

A. CLASSIFICATION OF SUBJECT MATTER
 INV. B60P1/43 A61G3/06 B65G69/28
 ADD.

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)
 B60P A61G B65G

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	US 6 484 344 B1 (COOPER SIMON M [GB]) 26 November 2002 (2002-11-26) page 3, line 55 - page 5, line 65; claim 1; figures 1-6 -----	1-9
X	US 6 042 923 A (LEWIS ROBERT P [US]) 28 March 2000 (2000-03-28) page 3, line 50 - page 4, line 50; claim 1; figures 1-4 -----	1-9
X	WO 2007/046793 A1 (BRAUN CORP [US]; MERRICK DAVID D [US]) 26 April 2007 (2007-04-26) paragraphs [0024] - [0030]; figures 1-5 -----	1,4
X	GB 2 447 384 A (STEEDMAN DANIEL [GB]) 10 September 2008 (2008-09-10) the whole document -----	1-3
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Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
E earlier document but published on or after the international filing date	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
O document referring to an oral disclosure, use, exhibition or other means	*&* document member of the same patent family
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 12 July 2010	Date of mailing of the international search report 19/07/2010
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Szaip, András
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/054912

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 20 2007 016304 U1 (HERZBERG REINER [DE]) 20 March 2008 (2008-03-20) paragraphs [0015] - [0024]; claim 1; figures 1-2 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2010/054912

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6484344	B1	26-11-2002	NONE
US 6042923	A	28-03-2000	NONE
WO 2007046793	A1	26-04-2007	NONE
GB 2447384	A	10-09-2008	NONE
DE 202007016304	U1	20-03-2008	NONE