



(51) International Patent Classification:
H01L 31/045 (2006.01)

(21) International Application Number:
PCT/IB2009/006348

(22) International Filing Date:
18 June 2009 (18.06.2009)

(25) Filing Language: English

(26) Publication Language: English

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ,

CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: SOLAR ENERGY RECOVERY DEVICE FOR A TRUCK

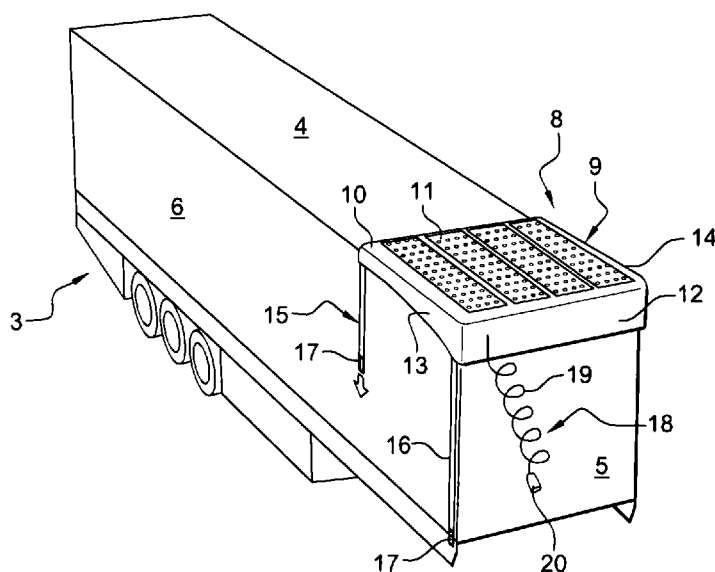


Fig. 1

(57) Abstract: The solar energy recovery device (8) comprises a support (9) having photovoltaic cells (11) thereon, temporary fastening means (15) of said support (9) on the trailer (3) of a truck and electrical connecting means (18) capable of electrically connecting said photovoltaic cells (11) to the tractor of said truck. The support (9) is designed to be in one of a working configuration, in which it is spread onto the trailer roof (4), and a storing configuration, in which it is more compact and can be stored in the cabin of the tractor.

SOLAR ENERGY RECOVERY DEVICE FOR A TRUCK

Field of the invention

5 The present invention relates to a solar energy recovery device for a truck.

Technological background

10 Trucks drivers are generally obliged to have regular breaks when they drive long distances. Moreover, during long journeys, they may be forced to stop travelling for a full day due to traffic restrictions, or to wait for long hours for the cargo to be charged on-board the truck.

 During these non-travelling periods, the driver can have various
15 needs requiring electricity such as heating or cooling the cabin, watching TV, cooking, etc. Most of the time, the needs in terms of electricity exceed the battery capacity. As a consequence, the truck engine has to be started up in order to supply the required energy. This entails additional fuel consumption and generates noise inside the cabin where the driver is having a rest.

20 To solve these problems, it would appear to be a solution to provide solar panels that are installed on the cabin roof and supply electricity to various devices in the cabin, as mentioned above. However, because there is only a small surface area available on the cabin roof, the electricity supplied by means of such solar panels would be far below the needs.

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Summary of the invention

 It is an object of the present invention to provide an improved solar energy recovery device for a truck, which can effectively increase the electricity
30 supplied to the truck.

 According to the invention a solar energy recovery device for a truck including a tractor and a trailer comprises a support having photovoltaic cells thereon, and further comprises temporary fastening means for fastening of said support on the trailer and electrical connecting means for electrically
35 connecting said photovoltaic cells to the tractor, the support being designed to be in one of a working configuration, in which it is spread onto the trailer roof,

and a storing configuration, in which it is more compact and can be stored on the tractor, for example in the cabin of the tractor or in a storage compartment of said tractor which can be located outside the cabin.

Thanks to the invention, as the support is intended to be installed
5 on the trailer roof, it can have a much greater surface area than solar panels which would be dimensioned to fit on the cabin roof, and therefore supply more electricity. As a consequence, the driver's needs can be fulfilled without requiring to start-up the engine so often.

The great surface area of the support does not make said support
10 difficult to handle or to store since it can be put in a storing configuration in which it is less bulky, and forms a more compact item because it takes up less surface area.

The fact that the solar device is only temporarily attached to the trailer allows that this device can be assigned to a tractor and can be switched
15 from one trailer to another trailer when that other trailer is attached to the tractor in place of the previous one. Therefore, the driver using the same tractor to tow different trailers can keep the solar device and install it on those different trailers. Moreover, a driver working for a company having several tractors and to which several of these tractors can be assigned can bring use his solar
20 device whichever tractor he his driving and whichever trailer he is towing.

If necessary, the driver can remove the solar device from the trailer when the trailer is in motion. In such a case, the device can be stored in the cabin when the truck is in motion, for example behind the seats, below the bunk. When the truck is stopped, typically when the driver is having a break,
25 the driver takes the device and installs it on the trailer roof. To this end, the driver can climb a ladder generally provided on the tractor. Then he / she spreads the support on the trailer roof, fastens it temporarily to the trailer, and electrically connects the photovoltaic cells of the device to the tractor electric circuit. Before setting off again, the driver just has to electrically disconnect the
30 device from the tractor electrical network, to unfasten the device from the trailer, and to remove the device, which can then be stored in the cabin.

Of course, provided that the solar device attachment means are effective enough, the driver can choose to keep the solar device on the trailer while the truck is in motion. In such a case, the electricity produced by the solar
35 device can nevertheless be useful inasmuch as the traditional engine driven

generator may be less used than if the solar device were not present, this resulting in a decreased fuel consumption.

Thanks to the electrical connecting means, the device – which is installed on the trailer – can be used to supply electricity to the cabin of the tractor, and more precisely to the tractor electrical network.

According to a first embodiment of the invention, the support is substantially rigid or semi rigid and is foldable. For example, the support can comprise several panels linked by hinging means.

According to a second embodiment of the invention, the support is flexible. For example, the support can be made of a canvas or a tarpaulin. The device may be rolled in its storing configuration.

Advantageously, the support can comprise a main portion designed to cover at least part of the trailer roof, and at least one flap extending from an edge of said main portion and designed to lie substantially vertically close to a vertical surface of the trailer in the working configuration. Such a flap helps positioning and maintaining the support in the proper location.

Preferably, the main portion of the support is substantially rectangular and the support comprises three flaps which extend from distinct edges of said main portion and which, in the working configuration, lie respectively close to a front wall and to one of two side walls of the trailer.

The temporary fastening means of said support on the trailer can comprise at least one strap fixed on said support and equipped with an attachment means designed to be temporarily fixed on the trailer.

These and other advantages will become apparent upon reading the following description in view of the drawings attached hereto representing, as non-limiting examples, embodiments of a vehicle according to the invention.

Brief description of the drawings

The following detailed description of several embodiments of the invention is better understood when read in conjunction with the appended drawings being understood, however, that the invention is not limited to the specific embodiments disclosed. In the drawings,

Figure 1 is a perspective view of a truck trailer equipped with a solar energy recovery device according to the invention, the support of said device being in the working configuration;

Figure 2 is a schematic view of a first embodiment of the device, in the storing configuration;

Figure 3 is a schematic view of a second embodiment of the device, in the storing configuration;

5 Figure 4 is a partial perspective view of a truck showing the device in the storing configuration inside the cabin.

Detailed description of the invention

10 Figure 4 shows a truck 1 which comprises a tractor 2 having a cabin for the driver, and a trailer 3 which can be mechanically coupled with the tractor 2. The trailer 3 alone is illustrated on Figure 1. It has a roof 4, a front wall 5 and two side walls 6, 7.

 A solar energy recovery device 8 according to the invention is
15 shown on Figure 1, in its working configuration, i.e. installed on the trailer 3 in order to supply electricity.

 Said device 8 comprises a support 9 which has a main portion 10 of substantially rectangular shape intended to be spread onto the trailer roof 4 in the working configuration. Preferably, in this working configuration, the main
20 portion 10 extends over the whole width of the trailer 3, from one side wall 6 to the other 7; said main portion 10 (along the longitudinal direction of the trailer) is as long as possible, provided the device 8 remains easy to handle by the driver alone and easy to store.

 On the support main portion 10 are provided photovoltaic cells 11
25 capable of converting solar energy into electricity. For example, these cells 11 can be glued on the support 9. The cells can be rigid or flexible

 The support 9 also comprises three flaps, namely:

- a front flap 12 extending from the front edge of main portion 10, and lying substantially vertically close to the trailer front wall 5;
- 30 - and two side flaps 13, 14 each extending from a side edge of main portion 10, and lying substantially vertically close to one of the trailer side walls 6, 7.

 Preferably, each side flap is joined to the vertical flap along their common vertical edge, so as to form a three-dimensional corner which can
35 engage the corresponding top front corner of the trailer.

As a result, the support 9 can be properly positioned and maintained at the front part of the trailer roof 4 by means of flaps 12, 13, 14.

The vertical flaps are particularly useful in the case where the solar device is kept on the trailer when the truck is in motion because they not only
5 make sure that the device is properly maintained in the right position, but they also limit the entry of airflow beneath the solar device which could tend to strip the device off the trailer.

The device 8 further comprises temporary fastening means 15 of said support 9 on the trailer 3. Said fastening means 15 can comprise, on each
10 side of the support 9, two straps 16 having a first end fixed onto one flap 13, 14 and a second end equipped with a buckle, a hook, or any appropriate attachment means 17 designed to be temporarily fixed on the trailer 3. Said fastening means are deemed temporary inasmuch as they should be easily and repeatedly usable by the driver to attach and remove the solar device on a
15 trailer. Preferably, those fastening means should not require the use of complex tools. Nevertheless, those fastening means may comprise some locking means to ensure that the solar device may not be easily robbed when installed on a trailer.

The device 8 also comprises electrical connecting means 18
20 capable of electrically connecting the photovoltaic cells 11 to the electrical network of the tractor 3. Typically, said electrical connecting means 18 comprise a cable 19 connected to said cells 11 and having a plug 20 at its free end.

An important aspect of the invention lies in the fact that the solar
25 energy recovery device 8 is an accessory which can be:

- either in a working configuration, as shown on Figure 1, in which the support 9 is spread onto the trailer roof 4, temporarily fastened to the trailer 3, and electrically connected to the tractor 2, in order to supply electricity to various elements that can be used by the driver inside the cabin;
- 30 - or in a storing configuration, as shown on Figures 2 to 4, in which the device 8 is made more compact and is stored on the tractor 2. For example, the device 8 can be stored behind the driver seat 21, under the bunk 22 as illustrated on Figure 4.

Therefore, not only can the solar device be removed from one
35 trailer to be installed on another trailer, but it is possible to keep the device within the tractor when the tractor is driven without a trailer from one location to

the other, or when the additional energy provided by the solar device is not necessary, or when it would be inconvenient to install the solar device on a trailer.

According to a first embodiment, illustrated on Figure 2, the support 9 is substantially rigid or semi rigid and is foldable. The main part 10 of the support 9 comprises several panels 23 linked by hinging means 24. Said hinging means are for example made of thinner zones making it possible to fold the support 9. As a result, the support 9 can be folded as the bellows of an accordion. In this storing configuration, the device 8 is more compact, since it takes up less surface area, and can be easily stored in the tractor cabin.

According to a second embodiment, illustrated on Figure 3, the support 9 is flexible. For example, said support 9 can be made of a canvas or a tarpaulin. In such a case, if the photovoltaic cells 11 are also flexible, or if they are rigid but of a sufficiently small unitary size, the solar device may be rolled in its storing configuration.

Thus, the invention provides a solar energy recovery device that can be easily and temporarily installed on a trailer, and that can be easily transferred from one trailer to another. The invention makes it possible to increase the solar panel capacity in order to fulfil the needs of electricity powered elements in the truck, and especially in the cabin. Therefore, there is no need to start the engine up, the overall fuel consumption can be reduced and the driver comfort is improved since there is no engine noise. Another important advantage of the invention is the possibility to put the device in a more compact configuration (by folding it, winding it or the like) in order to store it on the tractor.

Of course, the invention is not restricted to the embodiments described above by way of non-limiting examples, but on the contrary it encompasses all embodiments thereof.

CLAIMS

1. A solar energy recovery device for a truck (1) including a tractor (2) and a trailer (3), said device (8) comprising a support (9) having photovoltaic cells (11) thereon, characterized in that the device (8) further comprises temporary fastening means (15) for fastening of said support (9) on the trailer (3) and electrical connecting means (18) for electrically connecting said photovoltaic cells (11) to the tractor (2), the support (9) being designed to be in one of a working configuration, in which it is spread onto the trailer roof (4), and a storing configuration, in which it is more compact and can be stored on the tractor (2).

2. The device according to claim 1, characterized in that the support (9) is substantially rigid or semi rigid and is foldable.

3. The device according to claim 1 or 2, characterized in that the support (9) comprises several panels (23) linked by hinging means (24).

4. The device according to claim 1, characterized in that the support (9) is flexible.

5. The device according to any one of claims 1 to 4, characterized in that the support (9) is made of a canvas or a tarpaulin.

6. The device according to claim 4 or 5, characterized in that the device can be rolled.

7. The device according to any one of claims 1 to 6, characterized in that the support (9) comprises a main portion (10) designed to cover at least part of the trailer roof (4), and at least one flap (12, 13, 14) extending from an edge of said main portion (10) and designed to lie substantially vertically close to a vertical surface (5, 6, 7) of the trailer (3) in the working configuration.

8. The device according to claim 7, characterized in that the main portion (10) of the support (9) is substantially rectangular and in that the support (9) comprises three flaps (12, 13, 14) which extend from distinct edges

of said main portion (10) and which, in the working configuration, lie respectively close to a front wall (5) and to one of two side walls (6, 7) of the trailer (3).

5 9. The device according to any one of claims 1 to 8, characterized in that the temporary fastening means (15) of said support (9) on the trailer (3) comprise at least one strap (16) fixed on said support (9) and equipped with an attachment means (17) designed to be temporarily fixed on the trailer (3).

10 10. The device according to any one of claims 1 to 9, characterized in that, in the storing configuration, the device can be stored in the cabin of the tractor or in a storage compartment on the tractor.

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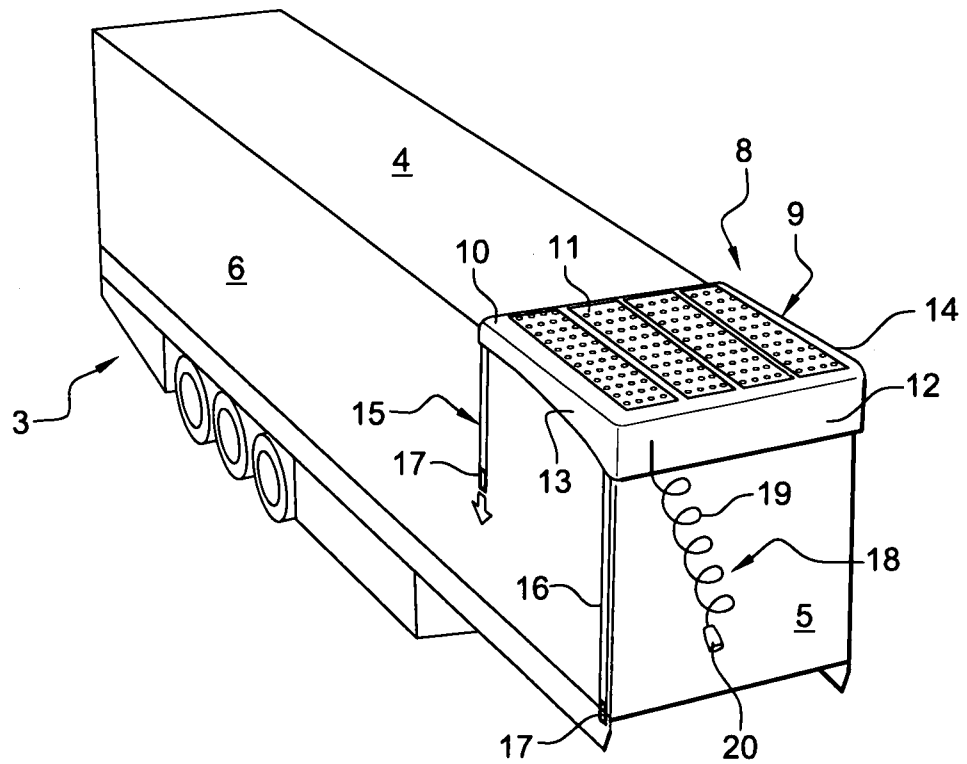


Fig. 1

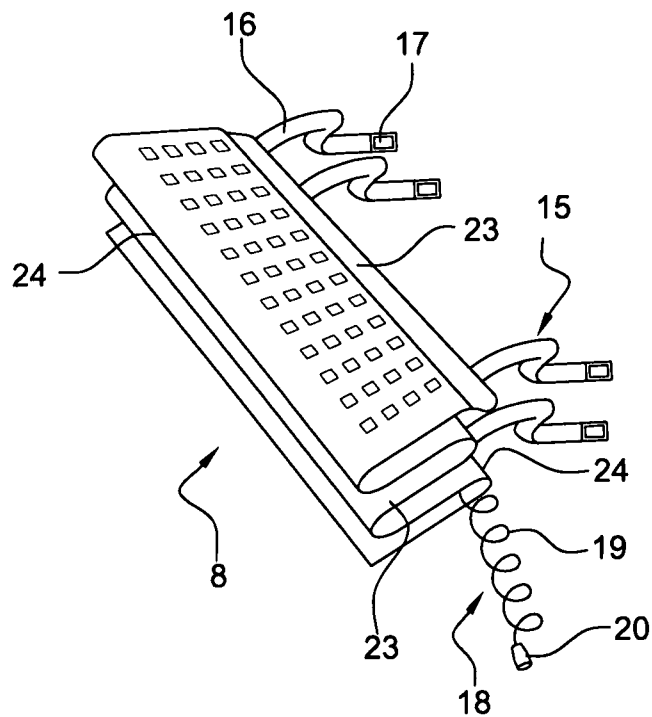


Fig. 2

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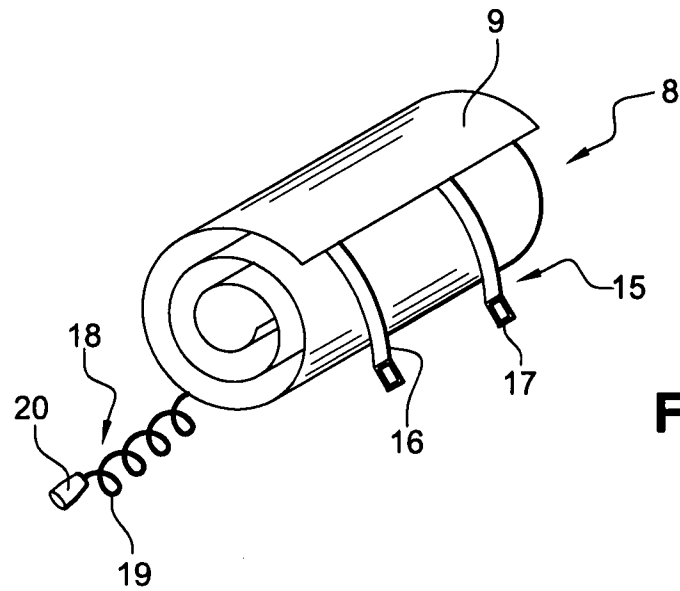


Fig. 3

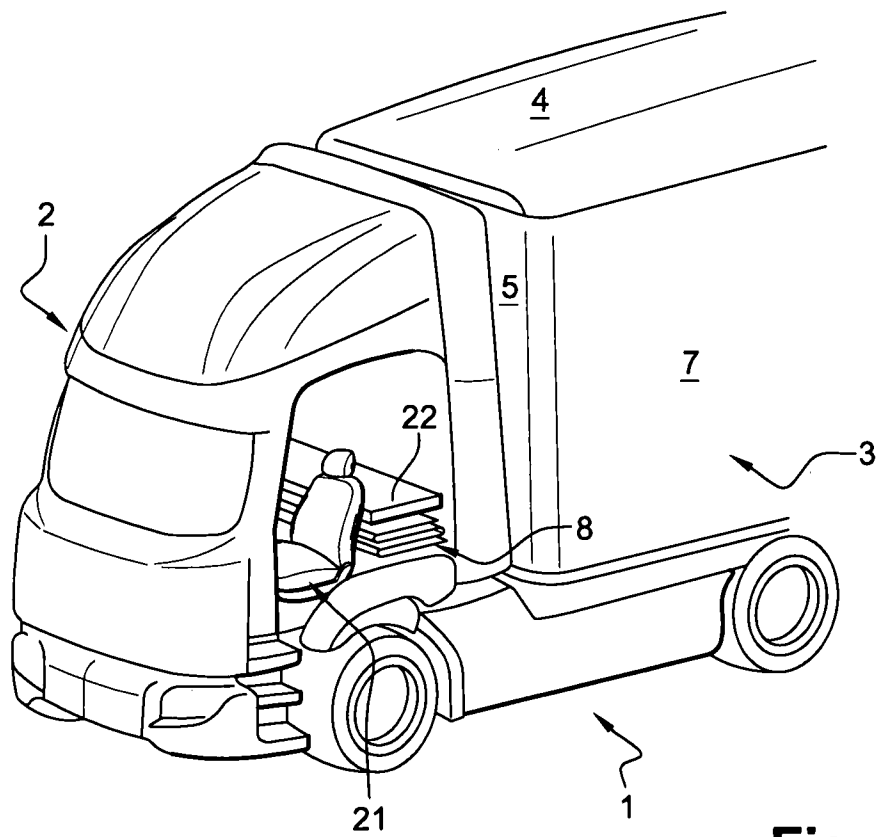


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2009/006348

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01L31/045
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)
H01L

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.
Y	DE 40 28 937 A1 (STRAUCH JUERGEN [DE]) 19 March 1992 (1992-03-19) column 2, line 20 - column 3, line 30; figure 1	1-10
Y	----- US 2006/225781 A1 (LOCHER STEVE [US]) 12 October 2006 (2006-10-12) paragraph [0029] - paragraph [0035] paragraph [0047] paragraph [0062] - paragraph [0064]; figures 1,9,10,16-19	1-10
A	----- US 2007/107768 A1 (ROMANA JAGJIT S [US] ET AL) 17 May 2007 (2007-05-17) paragraph [0030] - paragraph [0041]; figure 1	1-10

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

☒ See patent family annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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.

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Date of the actual completion of the international search

3 May 2010

Date of mailing of the international search report

17/05/2010

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2009/006348

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 4028937	A1	19-03-1992	NONE	
US 2006225781	A1	12-10-2006	NONE	
US 2007107768	A1	17-05-2007	NONE	