



(51) International Patent Classification:
G06Q 10/00 (2012.01)

(21) International Application Number:
PCT/IT2011/000206

(22) International Filing Date:
17 June 2011 (17.06.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
AN2011A000033 8 March 2011 (08.03.2011) IT

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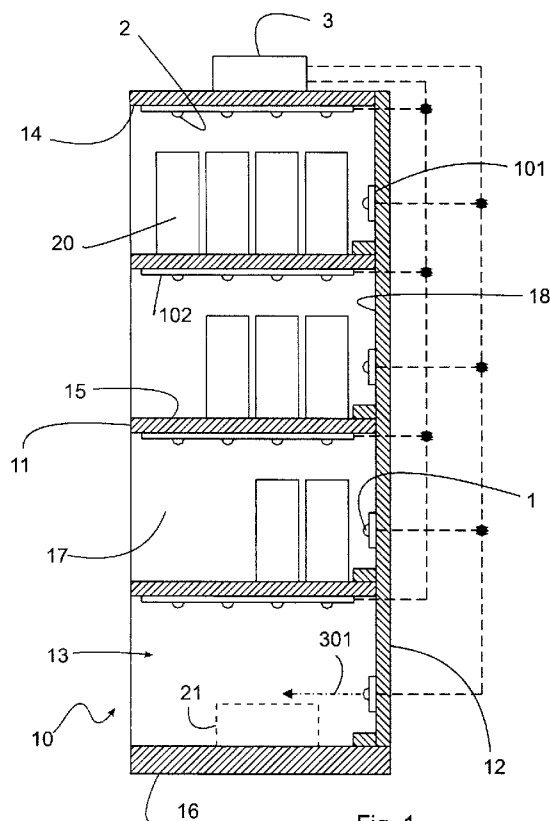
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, 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, TH, 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, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

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(54) Title: SYSTEM FOR REAL-TIME VERIFICATION AND DETECTION OF STOCK SHORTAGES OF GOODS DISPLAYED FOR SALE



(57) Abstract: Real time stock break survey system for products displayed on sale, comprising at least one position sensor means or presence sensor means positioned on the display surface nearby the group of products under stock break survey, at least one transmission means to transmit the data detected by said sensor means and notified to said transmission means, and a data processing and management unit provided with a software program for the management of the detected data, and communicating with said transmission means.



EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, **Published:**

LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,

GW, ML, MR, NE, SN, TD, TG).

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

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

**“SYSTEM FOR REAL-TIME VERIFICATION AND DETECTION OF STOCK
SHORTAGES OF GOODS DISPLAYED FOR SALE”**

DESCRIPTION

5 The present invention relates to a system for real-time verification and detection of availability and location of goods displayed for sale, and in particular stock shortages related to shelving in commercial outlets such as supermarkets, hypermarkets or any other retail area, in order to monitor the display of products on said shelving.

10 Furthermore, the system has a section where a whole series of data is processed and stored in order to carry out and provide statistical analyses relating to the life of the products on the shelves, so as to be able to strategically assess how consumer habits vary over time and geographically, comparing the data gathered over different periods and at different points of
15 sale (belonging to the same chain but in different locations).

 Therefore, the system according to the present invention is a useful and essential tool for the management of goods displayed for sale, enabling the number of products present on a specific shelf and/or display stand to be assessed and warning the point of sale staff when there is a stock shortage.

20 A stock shortage occurs when a certain product runs out on a particular shelf or on a self-service / non-self-service display stand, and the situation remains so until the point of sale staff replenish the stock.

 This represents poor quality of service for the consumer who is deprived of the possibility of purchasing that particular product and must fall

back on a product that is similar but of another brand, or go to another point of sale to remain loyal to the brand and fully satisfy his/her requirements.

The usual widespread practice in the large-scale retail trade is to check the state of the shelves at least once a day, which not only takes a
5 considerable amount of time but also fails to prevent the risk of products being missing from the shelves for a whole day.

Systems for checking and detecting stock shortages also exist, and these include: manually checking the spaces allocated to the display of goods, checking and comparing the POS (Point Of Sale) data, keeping a continuous
10 inventory of said goods, and adopting product- or shelf-weighing systems.

However, none of these systems completely fulfils its function, and none guarantees the objectivity of the data or gives a real-time warning of stock shortages.

Therefore, the primary aim of the present invention is to provide a
15 system for real-time verification and detection of stock shortages of products displayed for sale, in order to monitor the display of the products on said shelves.

A further aim of the present invention is to obtain a statistical analysis of the products in order to strategically assess consumer habits and how they
20 vary depending on the period and point of sale under consideration.

Accordingly, the object of the present invention is a system for real-time detection of stock shortages of goods displayed for sale, including at least one position-detection sensor means located on the display shelf near the group of products for which stock shortage is to be detected, at least one means for
25 transmitting the data detected by said sensor means and sent to said

transmission means, and at least one data processing and management unit equipped with a software program to manage the data collected and communicating with said transmission means.

These and other features of the invention, and the advantages that
5 derive therefrom, will emerge from the following detailed description of a preferred embodiment, shown by way of a non-limiting example, with reference to the accompanying drawings, in which:

Fig. 1 is a sectional view of a shelf unit on which an embodiment of the system according to the present invention is installed;

10 Fig. 2 is a front elevation of the embodiment of the system shown in Fig. 1.

Fig. 1 shows a display shelf unit indicated by reference numeral 10 in the figure.

The shelf unit 10 comprises a series of shelves 11, connected laterally
15 to sides 17 and backwardly to a back panel 12; the back panel 12 and the sides 17 are connected at the bottom to the base 16. In this way, the shelf unit has formed a plurality of chambers 13 in which the products 20 can be accommodated. On the top wall 14 of each chamber 13 there is a supporting means 102 which supports a plurality of sensors 2; a similar supporting
20 means 101 supports the sensors 1 on the wall 18 of the back panel 12. The sensors 1 and 2 of said shelf unit 10 all communicate with a transmission means 3 located on the top wall of the shelf unit 10.

Figure 2 shows two contiguous shelf units equipped with the system according to the present invention; the same parts are denoted by the same

reference numerals. The figure shows the presence of a central control unit 4 connected to the transmission means 3 of the two contiguous shelf units.

The operation of the system according to the present invention will become clear from the following description. The products 20 are positioned in the chambers 13 of the shelf units 10, and the sensors 1 detect their presence; the sensors that can be used for this purpose can generally be position-detection sensors or presence sensors, such as infrared sensors, capacitive sensors, volumetric sensors, optical sensors, video cameras or the like.

The sensors 1 positioned on the back wall 18 simply detect when the row of products 20 arranged in front of them has been used up; advantageously, on the supporting means 101, as many sensors 1 will be positioned as there are rows of products intended to occupy the chamber 13 in which said sensors 1 are positioned. The supporting means can be connected to the back panel 12 of the shelf unit 10 by the appropriate fixing means; in particular, if the frame of the shelf unit 10 is mainly made of metal, the supporting means 101, and similarly also supporting means 102, will be fitted with magnetic means, preferably of the permanent magnet type, for the connection to said shelf unit. The sensors 1 detect when, as in the lowest chamber of the shelf unit 10, the product is no longer in front of them. The information thus detected is sent to the transmitting means 3 where it is processed, being characterised by the appropriate identification data indicating the position of the shelf on which the product has run out, i.e. the stock shortage, and then transmitted via GPRS, zigbee, RF reception/

transmission or similar systems, to a central processing unit 4 which signals the product's stock shortage status to the product stock management system.

At this point, the system signals to the point of sale staff or those appointed to receive the information about stock shortage, who will arrange
5 for the product on the shelf to be replenished and, simultaneously, the system will process and store the information relating to the stock shortage, i.e. the permanence and absence time of the product from the display shelf unit; these data represent an important parameter for product sales statistics.

The data management and processing software receives, through a
10 GPRS or ethernet or similar connection, a string of data whereby it is possible to identify the central processing unit 4 which transmitted said string of data.

Furthermore, said string of data includes an identification code of the supporting means detected by the central processing unit 4, and describes the operation status of each supporting means (OK, Error, Battery Low) as well as
15 the status of each sensor associated therewith.

The software is capable of recognising the information contained in this string and filtering any incorrect communications (e.g. wrong number of sensors per supporting means, very high number of status changes) that may occur as a result of hardware malfunctions.

20 The data thus obtained are analysed and compared with the data in the database and, if a sensor detects a change in status compared with the previous reading, two situations can have arisen: if the product was previously present and is now no longer so, the software associates a product shortage to the position of that specific sensor; by contrast, if previously the product

was not present and now it is, the software cancels the stock shortage previously detected.

If said software finds no variations between two subsequent readings, it ignores the data pertaining thereto.

5 After updating the status of each sensor, the software checks whether the position shortages detected by said sensors also involve a stock shortage, i.e. whether any sensors targeted to products of the same type detect the presence of the product.

10 In fact, the sensors 2 are capable of detecting more thoroughly the amount of products existing on the shelf unit in a given row; this detection system allows the sales data detected at the tills to be cross-referenced with those of the display unit, thereby providing another important statistical database.

15 Moreover, as shown in the lowest chamber 13 of the shelf unit 10 in Figure 1, if a product is running low or has run out, as indicated by the dotted lines 21, the system equipped only with sensor 1 would detect the absence of product on that shelf, given that the product would not interfere with the beam 301 of the sensor; in this way, however, the detection cross-reference inside the chamber 13 using the data detected by the sensors 2 and that detected by
20 the sensors 1 provides a true picture of the shelf's supply status.

 The software signals the stock shortage by sending an email and/or SMS text to the appointed recipients in a configuration page containing the information relating to the product in question, its location within the point of sale, and the time at which the shortage occurred. At the same time, a special
25 table in the database is updated.

This last stage also occurs if a shortage is replenished.

In parallel to this, the software is capable of enabling an authorised user to configure the number of bars and sensors used, and the respective associations with the products in the planogram, i.e. the diagram showing the
5 arrangement of the products on the shelves of the shelf units and on the display stands.

Advantageously, said sensor means and said transmission means can also be powered by batteries, so as to avoid wiring up the shelf units, which usually may be frequently moved.

10 The information gathered by the sensors is sent to a data management and processing board, via a modem or similar devices for the wireless transmission of data, installed on said metal bars where the sensors are also installed.

The system also ensures that the information gathered by sensors 2
15 and 1 is sent to the transmission means 3 either through a physical connection formed by internal wiring between the bars and transmission means 3 or in a wireless mode, by means of a modem with a wireless data transmission technology (zigbee, RF, etc.).

The data management and processing card, i.e. the transmission
20 means 3, after having received the information from the sensors, will transmit it to the processing unit 4 which, via the data processing and management software, will send the information to a cellular telephone by a text message or to an email address via an email, or by using another method of sending data (fax, notification messages via LANs, etc.), thus informing the appointed
25 individuals of the stock shortage.

All of the information processed and sent by the data processing unit 4 will be stored and, on request, can be processed and used as a report which will provide a summary thereof divided according to product code or category, for each point of sale or groups of points of sale, for each day of the week or
5 for several weeks, with the possibility of customizing the report according to product/location/time.

Moreover, the data processing and management software offers the possibility of obtaining, in real time, a series of data about the current situation of each point of sale, listing the stock shortages not yet replenished or those
10 that have been replenished by ordering them as a matter of urgency, or showing these data as graphs, always updated in real time, for the weekly trend of each product, so as to detect obvious critical situations, the distribution of stock shortages among the various products, the OOS (Out of Stock) percentages of each product compared to the shop's total, even
15 weighting the facing number of each one, and so on.

CLAIMS

1. System for real-time detection of stock shortages of products displayed for sale, including at least one position detection means or presence sensor
5 means located on the display surface near the group of products for which stock shortage is to be detected, at least one means for transmitting the data detected by said sensor means and sent to said transmission means, and at least one data processing and management unit equipped with a software program to manage the data collected and communicating with said
10 transmission means.
2. System for real-time detection of stock shortages of products displayed for sale according to claim 1, wherein said sensor means are arranged on said supporting means positioned on the back part of the display surface by means of suitable fixing means such as hooks or magnets, for example.
- 15 3. System for real-time detection of stock shortages of products displayed for sale according to claim 2, wherein said supporting means comprise bars or the like.
4. System for real-time detection of stock shortages of products displayed for sale according to any one of the preceding claims 1 to 3, wherein said display
20 surface comprises shelves or the like.
5. System for real-time detection of stock shortages of products displayed for sale according to any one of the preceding claims 1 to 4, wherein said position-detection sensors or presence sensors comprise infrared sensors, capacitive sensors, volumetric sensors, optical sensors, video cameras or the
25 like.

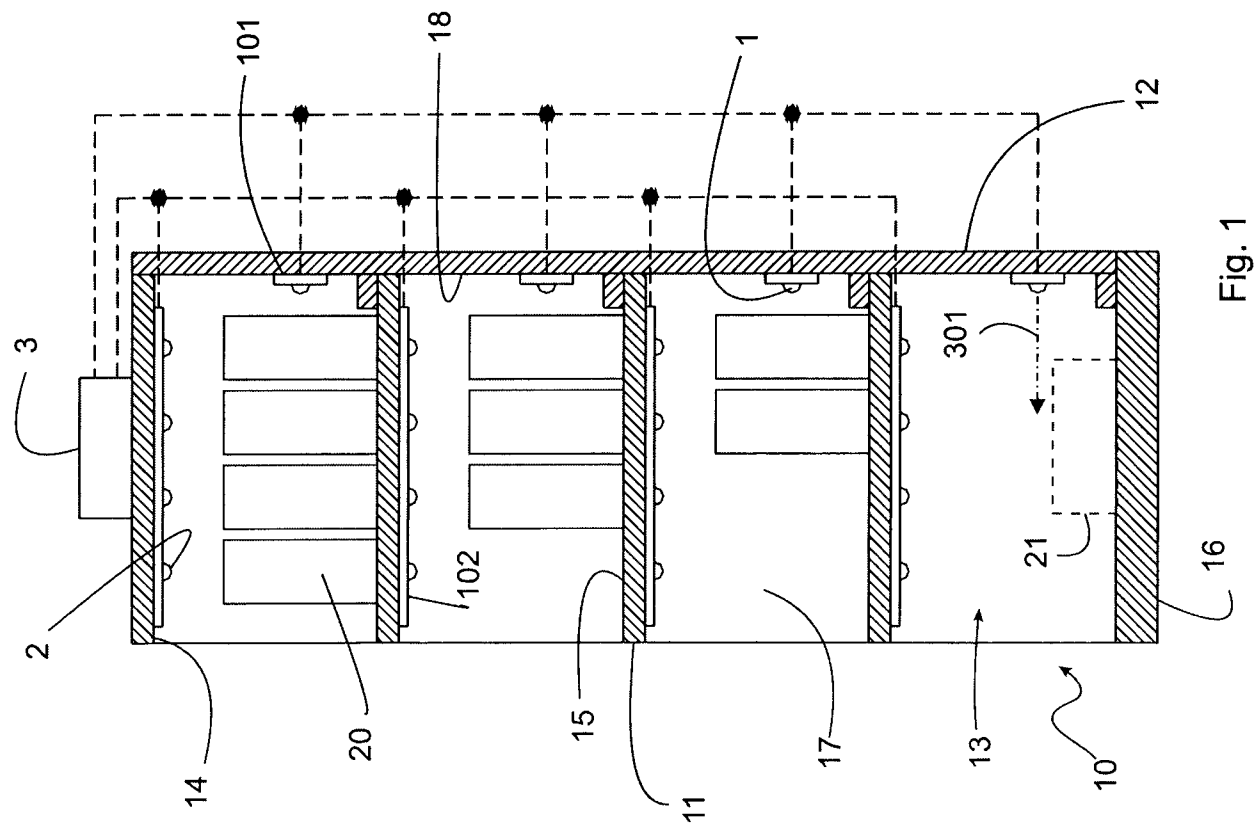
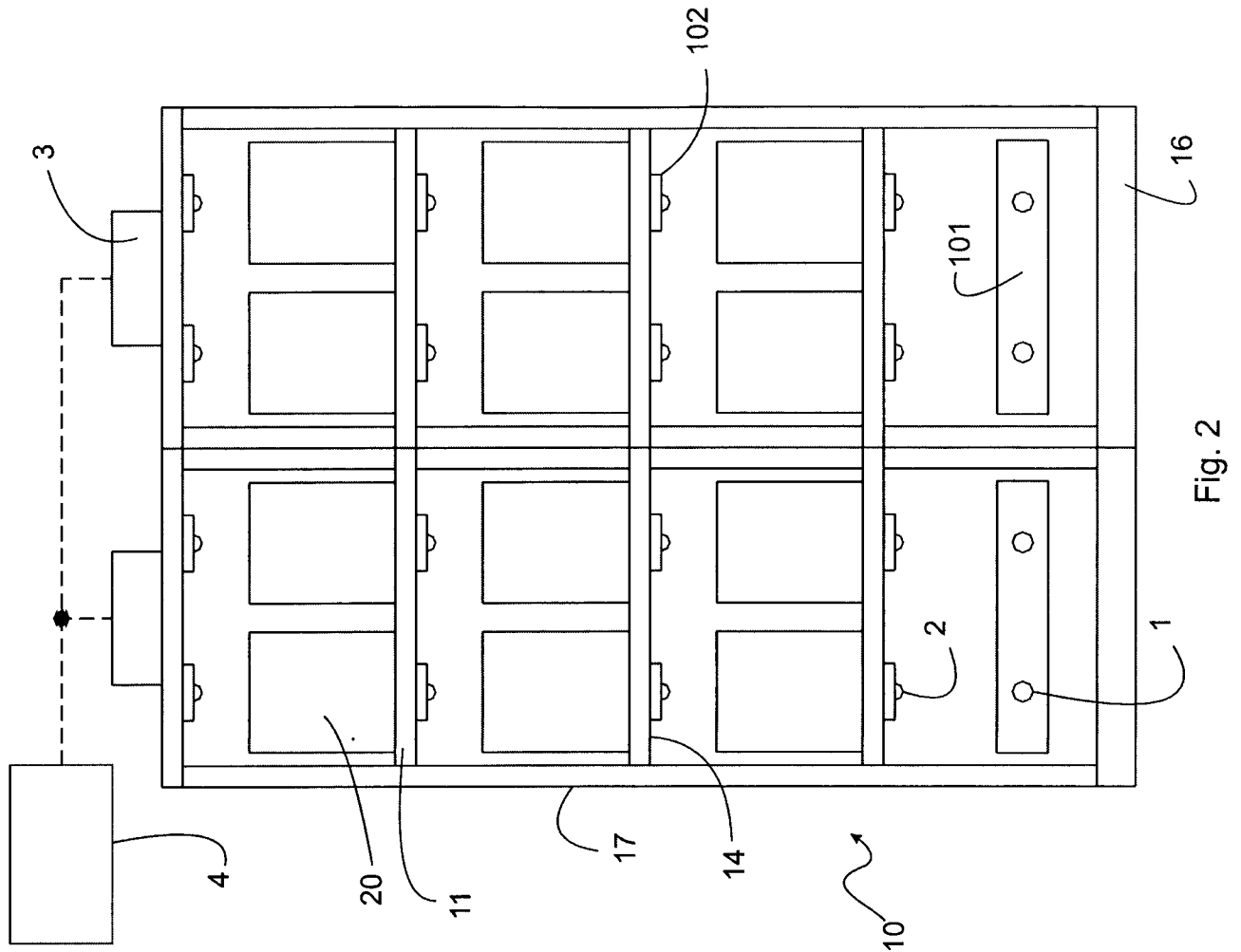
6. System for real-time detection of stock shortages of products displayed for sale according to any one of the preceding claims 1 to 5, wherein said data transmission means receives data from the sensor means and transmits them to the data processing and management unit.

5 **7.** System for real-time detection of stock shortages of products displayed for sale according to claim 6, wherein said data processing and management unit communicates the processed data, and possibly warns of a stock shortage, by sending an SMS text to a cellular telephone, by sending an email to a specific email address, or by using another method of sending data including faxes or
10 similar devices.

8. System for real-time detection of stock shortages of products displayed for sale according to any one of the preceding claims from 1 to 7, wherein the data sent to the data processing and management unit are stored so as to obtain a statistical analysis of the products in order to strategically assess
15 consumer habits and the average lifetime of the products on said display surfaces.

9. System for real-time detection of stock shortages of products displayed for sale according to any one of the preceding claims 1 to 8, wherein said system can also be powered by batteries.

20 **10.** System for real-time detection of stock shortages of products displayed for sale according to any one of the preceding claims 1 to 9, wherein, at each row of products, there are rows of sensors positioned above said products and arranged on supporting means appropriately connected to the frame of the display surface.



INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2011/000206

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q10/00
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)
G06Q

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 2010/036754 A1 (KHAN FARRUKH [US] ET AL) 11 February 2010 (2010-02-11) abstract paragraphs [0001] - [0022] paragraphs [0047] - [0049], [0055] paragraphs [0065] - [0073] paragraphs [0091], [0095] - [0107] -----	1-10
X	WO 2006/055667 A2 (GOLIATH SOLUTIONS L L C [US]) 26 May 2006 (2006-05-26) abstract paragraphs [0002] - [0004] paragraphs [0009] - [0020] paragraphs [0031] - [0036] paragraphs [0039] - [0041] ----- -/-	1-10



Further documents are listed in the continuation of Box C.



See patent family annex.

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"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.

"&" document member of the same patent family

Date of the actual completion of the international search

3 October 2011

Date of mailing of the international search report

12/10/2011

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/IT2011/000206

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008/077510 A1 (DIELEMANS CORNE [BE]) 27 March 2008 (2008-03-27) abstract paragraphs [0001], [0008] - [0030] paragraphs [0037] - [0041] paragraphs [0046] - [0049] -----	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IT2011/000206

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010036754	A1	11-02-2010	NONE

WO 2006055667	A2	26-05-2006	AU 2005307767 A1 26-05-2006
			CA 2587925 A1 26-05-2006
			EP 1825445 A2 29-08-2007

US 2008077510	A1	27-03-2008	NONE
