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(54) **METHOD FOR INDICATING EMPTY PARKING SPACES FOR VEHICLES AND PAYMENT FOR THE USE OF SAID SPACES**

(57) Process for informing of free parking spaces for vehicles and payment for occupying said spaces by means of a wireless device that solves the problem of knowing which spaces are available using a simple application, in a quick and accurate manner regarding the

actual time at which a space becomes available, and allowing payment for parking. For this purpose the users and monitoring means upload the data to a server, so that the server obtains the actual time at which the parking ends.

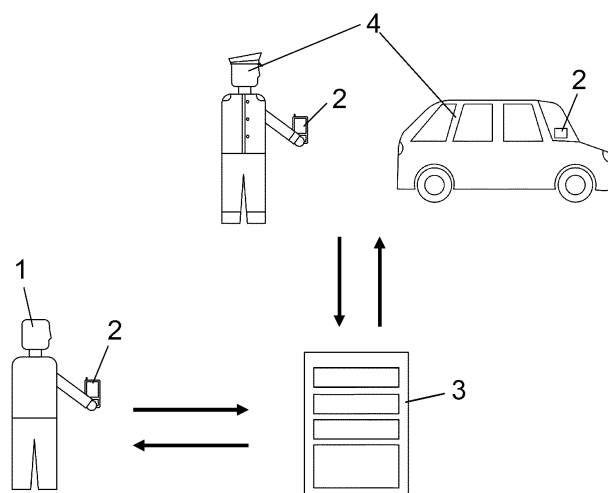


Fig. 1

Description

OBJECT OF THE INVENTION

[0001] The present invention belongs to the field of vehicle traffic control systems that indicate available parking spaces.

[0002] The invention relates to a process for informing of free parking spaces for vehicles and for payment for occupying said spaces using a wireless device. In this process the users and monitoring means upload the parking garage data to a server, so that the server obtains the actual moment on which the parking ends.

BACKGROUND OF THE INVENTION

[0003] Patent with publication number FR2976702 describes a system for managing parking spaces that does not intend to manage the space itself but instead its use, for which it employs a mobile telephone that sends a message to a network identifying the user, and subsequently an end of parking message to the network, the data centre of which stores the data received and calculates a correction to bill the payment or issue an invoice depending on the time elapsed between the start and end messages.

[0004] According to this patent, the user sends a start of parking message with the date, time of parking and location of parking space, so that the user is responsible for uploading the data to the network. The parking data of a few vehicles are controlled randomly and occasionally by a guard.

[0005] Also known is patent with publication number WO2012/142603, wherein a smartphone is used to find out which parking spaces are available by representing them on a map in the telephone screen. A server stores the data on the free parking spaces, sending them to the user when requested. In this patent the free spaces are managed according to their location, not their occupation state, and there is no monitoring system that checks or loads data.

[0006] To overcome the drawbacks of the prior art, a process is disclosed for informing of free parking spaces for vehicles and for payment for occupying said spaces.

DESCRIPTION OF THE INVENTION

[0007] The present invention is established and characterised in the independent claims, while the dependent claims describe additional characteristics thereof.

[0008] The object of the invention is a process for informing of free parking spaces for vehicles and for paying for occupying said spaces using a commonly-used device, such as a wireless device. The technical problem addressed is the definition of consecutive stages that allow knowing which parking spaces are free by means of a simple application, quickly and accurately regarding the actual time at which a free space becomes available,

and allowing payment for the parking.

[0009] In view of the above, the invention relates to a process for informing on free parking spaces for vehicles and for paying for occupying said spaces, characterised in that it comprises the following stages:

a) at least one user employs a wireless device and a data collection application to send to a server the parking data on his or her vehicle, its position and time of occupation;

b) some monitoring means employ a wireless device and the data collection application to send to the server the parking data required to identify each vehicle parked, its position, and its period of occupation;

c) the server gathers the data on all the parking spaces, calculates the expected end of parking time, and sends the gathered and calculated data to the users and the monitoring means;

d) the user employs the data collection application to check in the wireless device the data on the parking spaces sent by the server;

e) the user occupies a parking space following the steps of stage a);

f) the user leaves a parking space and proceeds to payment;

g) the server obtains the actual end of parking time;

h) the server obtains and sends the data as in stage c), so that the users and monitoring means have updated data on the parking spaces.

[0010] An advantage of this invention is the reliability of the information, as the actual end of parking time is known.

[0011] Another advantage is the convenience for the user who, using a wireless device, can obtain information on the parking and proceed to payment at its conclusion.

DESCRIPTION OF THE DRAWINGS

[0012] This specification is supplemented with a set of drawings illustrating the preferred embodiment, which are never intended to limit the invention.

Figure 1 represents a chart of the data flow between the monitoring means and the server and vice versa, and between the user and the server and vice versa.

Figure 2 represents a wireless device that includes a grid with the streets and occupation signs of the parking spaces, and indicates the number of free parking spaces.

Figure 3 represents a wireless device that includes a grid with the streets and the indicator of the space occupied by the user, as well as the button pressed at the end of the parking.

PREFERRED EMBODIMENT OF THE INVENTION

[0013] The invention relates to a process for informing of free parking spaces for vehicles and payment for occupying said spaces that comprises the stages described below.

[0014] Stage a) : at least one user (1) employs a wireless device (2), which is preferably a mobile telephone but could be any other device such as a tablet or laptop computer, in which a data collection application is installed, and sends to a server (3) the parking data allowing to identify the vehicle, its position (9) and the time of occupation.

[0015] If a mobile telephone is used, as shown in figures 2 and 3, the data collection application is a mobile application installed in it.

[0016] The wireless device (2) includes the physical and programming elements enabling it to carry out the functions of the process, and therefore can connect to a server (3), has a camera or the like, wireless connection and geolocation, such as GPS, which is currently accessible to most mobile telephones, such as smartphones, as well as an Internet connection.

[0017] The server (3) is of a known type and can be a computer with the common components, such as a CPU, a data storage disc and a card for wireless data transmission and reception. It can also be a shared server, currently known as the 'cloud'.

[0018] The vehicle identification data commonly consist of its license plate number, but could also be the vehicle make and model and the name of its owner, for example.

[0019] The time of occupation of the parking space referred to in this stage is the time at which the user (1) confirms the occupation in the data collection application.

[0020] Stage b): some monitoring means (4) employ a wireless device (2) and the data collection application to send to the server (3) the parking data required to identify each vehicle parked, its position (9) and the time of occupation.

[0021] The monitoring means (4) can consist of a vehicle, allowing convenient and to a certain extent automated monitoring, as the wireless device (2) and the data collection application are configured to operate as the vehicle moves, for example capturing the license plates of the parked vehicles. The monitoring means (4) can also consist of a guard who enters the data manually in the wireless device (2).

[0022] The wireless device (2) of the monitoring means (4) can be a mobile telephone, although it is equally common to use a mobile telephone with an external GPS type geolocator, which increases its accuracy and extends battery life. In the simplest case they can be a camera with means for sending information to the server.

[0023] Stage c): the server (3) gathers the data on all the parking spaces (5, 6, 7), calculates the expected end of parking time, and sends the gathered and calculated data to the users (1) and the monitoring means (4).

[0024] This method of operation is different from those previously known, as normally the user (1) will request the data from the server (3), requiring loading them in the application of the wireless device (2), leading to slow responses. This operation in which the server (3) is the active element makes the entire system quicker and more efficient, as the wireless device (2) only receives information passively in this stage.

[0025] The expected end of parking time uses as input data the time entered by the user (1) in the application, but will depend on the balance available and the maximum time allowed legally. That is, the user has a money balance for covering the parking cost, and the end of parking is calculated according to the maximum parking time allowed, or by the available balance of the user (1). For example, if the user (1) has a balance of thirty minutes then this will be the expected time for the end of parking; however, if the balance allows three hours but the legislation in force provides for a maximum of two hours of parking, then the expected time of end of parking will be two hours. In short, the expected end of parking time is an estimated data item that allows foreseeing the parking spaces that will become available.

[0026] Stage d) : the user (1) employs the data collection application to check in his or her wireless device (2) the data on parking spaces (5,6,7) sent by the server (3), thereby finding out which spaces are free and which are taken.

[0027] The user (1) checks in the wireless device (2), usually in its screen, the data on the parking spaces (5,6,7), thereby finding out where to go to park in a convenient location.

[0028] Preferably, data on the parking spaces (5,6,7) consist of an indication of high parking space occupation (5), an indication of low parking space occupation (6) and the number of free parking spaces (7). In this way the user (1) can quickly see in the wireless device (2), as shown in figures 2 and 3, where to go to be more likely to find a free parking space.

[0029] Stage e): the user (1) occupies a parking space following the steps of stage a).

[0030] When the user (1) occupies a space, he or she must upload the data to the server (3). In this way the user (1) maintains the server data.

[0031] Preferably, as shown in figure 3, the parking space occupation is highlighted in the wireless device (2) by an occupied parking stage indicator (8).

[0032] Stage f): the user (1) leaves an occupied parking space and proceeds to pay.

[0033] Specifically, payment can be performed in two ways: with the wireless device (2), or conventionally at the payment machines provided.

[0034] When paying with the wireless device (2) and a payment application, at the time of payment, when pressing a button (11) or the like, the application will send the actual time of end of parking to the server (3) for collection, thereby obtaining the exact time at which a space becomes available.

[0035] When payment is made at a payment machine, the monitoring means (4) will enter the end of parking information during their period monitoring, as explained further below.

[0036] Stage g): the server (3) obtains the actual end of parking time.

[0037] Stage h): the server (3) obtains and sends the data as in stage c), so that the users (1) and monitoring means (4) have updated data on the parking spaces (5, 6, 7).

[0038] The monitoring means (4) periodically check the parking data with their wireless device (2) and a verification application, using an identifier placed in the vehicle. IN this way the data in the server (3) are periodically updated. The frequency will depend on the route to be travelled, with a typical value of half an hour.

[0039] The identifier placed in the vehicle can be a QR code, preferably placed inside the windshield, which is read by the wireless device (2).

[0040] If the vehicle does not include an identifier, the monitoring means (4) use the wireless device (2) to verify the parking data (5, 6, 7) entering in the data verification application the identification data of a vehicle and its position.

[0041] Preferably, the data verification application includes a grid (10) with the streets and sidewalks of a location, thereby allowing the location of the vehicle and the spaces (5,6,7) to be displayed on said grid (10).

[0042] The grid (10) is created from a surveying measurement of the streets and sidewalks. To simplify its interpretation, it is normally superimposed on a previously available map.

[0043] Advantageously, the data verification application projects the position of the vehicle (9) onto the grid (10), thereby improving the accuracy in the positioning of the vehicle (9). When the monitoring means (4) have loaded the position data, this data will be projected to the nearest sidewalk section, so that the application receives assistance in areas with poor section discrimination. When the user (1) has loaded this data, the application projects each measurement point onto the street grid (10) to allow discriminating unwanted turns and locations; the application also allows the user (1) to change from one segment to another in the grid (10), and when the vehicle stops it projects its position to the nearest sidewalk section.

[0044] The change from one section of the grid (10) to another, which the user can perform with the application, is useful when there are nearby areas with different parking prices, so that the user (1) can select the most convenient one.

[0045] The projection is performed whenever the user (1) or the monitoring means (4) ask its wireless device (2) to locate them, to enter positions or verify them.

[0046] This operation results in an increased accuracy provided by the GPS, which advantageously is an Assisted GPS or AGPS. For this purpose, it is convenient to have a topographical map of the location loaded in the

server (3) and/or the wireless device (2).

[0047] If the user (1) is a resident, the monitoring means (4) will enter as the expected end of parking time the last time of the day, which is that allowed by the resident agreement.

[0048] As an advantageous option, the data verification application periodically notifies the monitoring means (4) of the upcoming expected end of parking times.

[0049] In addition, the data verification application calculates the route for reaching the vehicles of the users (1) with upcoming expected end of parking times.

15 Claims

1. Process for informing of free parking spaces for vehicles and payment for occupying said spaces **characterised in that** it comprises the following stages:

- a) at least one user (1) employs a wireless device (2) and a data collection application to send to a server (3) the parking data on his or her vehicle, its position (9) and time of occupation;
- b) some monitoring means (4) employ a wireless device (2) and the data collection application to send to the server (3) the parking data required to identify each vehicle parked, its position (9) and the time of occupation;
- c) the server (3) gathers the data on all the parking spaces (5, 6, 7), calculates the expected end of parking time, and sends the gathered and calculated data to the users (1) and to the monitoring means (4) ;
- d) the user (1) employs the data collection application to check in the wireless device (2) the data on the parking spaces (5, 6, 7) sent by the server (3);
- e) the user (1) occupies a parking space following the steps of stage a);
- f) the user (1) leaves an occupied parking space (8) and proceeds to pay;
- g) the server (3) obtains the actual end of parking time;
- h) the server (3) obtains and sends the data as in stage c), so that the users (1) and monitoring means (3) have updated data on the parking spaces (5, 6, 7).

2. Process according to claim 1, wherein the monitoring means (4) periodically check the parking data with their wireless device (2) and a verification application, using an identifier placed in the vehicle.

3. Process according to claim 2 wherein the identifier placed in the vehicle is a QR code.

4. Process according to claim 1 wherein the monitoring

means (4) periodically check the parking data with their wireless device (2), entering in the data verification application the identification data for a vehicle and its position.

5. Process according to claim 1, wherein the calculation of stage c) is carried out according to the maximum parking time determined by the regulations in force or by the available balance of the user (1). 5
6. Process according to any of the above claims, wherein the payment of stage f) is performed using the wireless device (2) and a payment application, which sends the actual time of end of parking to the server (3) so that it is collected in stage g). 10
7. Process according to any of claims 2 or 4, wherein the payment of stage f) is performed at a payment machine and the monitoring means (4) enter the end of parking data in their periodic checks. 15
8. Process according to any of the above claims, wherein the data verification application includes a grid (10) with the streets and sidewalks of a location. 20
9. Process according to claim 8, wherein the data verification application projects the position of the vehicle (9) onto the grid (10). 25
10. Process according to any of claims 2 or 4, wherein if the user (1) is a resident, the monitoring means (4) will enter as the expected end of parking time the last possible time of the day. 30
11. Process according to claim 1, wherein the data verification application periodically notifies the monitoring means (4) of the upcoming expected end of parking times. 35
12. Process according to claim 11, wherein the data verification application calculates the route for reaching the vehicles of the users with upcoming expected end of parking times. 40
13. Process according to any of the previous claims, wherein the monitoring means (4) are a vehicle. 45
14. Process according to any of claims 1 to 12, wherein the monitoring means (4) are a guard. 50

Amended claims under Art. 19.1 PCT

1. Process for informing of free parking spaces for vehicles and payment for occupying said spaces **characterised in that** it comprises the following stages: 55

a) at least one user (1) employs a wireless device (2) and a data collection application to send to a server (3) the parking data on his or her vehicle, its position (9) and time of occupation;
 b) some monitoring means (4) employ a wireless device (2) and the data collection application to send to the server (3) the parking data required to identify each vehicle parked, its position (9) and the time of occupation;
 c) the server (3) gathers the data on all the parking spaces (5, 6, 7), calculates the expected end of parking time, and sends the gathered and calculated data to the users (1) and to the monitoring means (4) ;
 d) the user (1) employs the data collection application to check in the wireless device (2) the data on the parking spaces (5, 6, 7) sent by the server (3);
 e) the user (1) occupies a parking space following the steps of stage a);
 f) the user (1) leaves an occupied parking space (8) and proceeds to pay;
 g) the server (3) obtains the actual end of parking time;
 h) the server (3) obtains and sends the data as in stage c), so that the users (1) and monitoring means (3) have updated data on the parking spaces (5, 6, 7).

2. Process according to claim 1, wherein the monitoring means (4) periodically check the parking data with their wireless device (2) and a verification application, using an identifier placed in the vehicle.

3. Process according to claim 2 wherein the identifier placed in the vehicle is a QR code.

4. Process according to claim 2 wherein the monitoring means (4) periodically check the parking data with their wireless device (2), entering in the data verification application the identification data for a vehicle and its position.

5. Process according to claim 1, wherein the calculation of stage c) is carried out according to the maximum parking time determined by the regulations in force or by the available balance of the user (1).

6. Process according to any of the above claims, wherein the payment of stage f) is performed using the wireless device (2) and a payment application, which sends the actual time of end of parking to the server (3) so that it is collected in stage g).

7. Process according to any of claims 2 or 4, wherein the payment of stage f) is performed at a payment machine and the monitoring means (4) enter the end of parking data in their periodic checks.

8. Process according to claim 2, wherein the data verification application includes a grid (10) with the streets and sidewalks of a location.

9. Process according to claim 8, wherein the data verification application projects the position of the vehicle (9) onto the grid (10). 5

10. Process according to any of claims 2 or 4, wherein if the user (1) is a resident, the monitoring means (4) will enter as the expected end of parking time the last possible time of the day. 10

11. Process according to claim 2, wherein the data verification application periodically notifies the monitoring means (4) of the upcoming expected end of parking times. 15

12. Process according to claim 11, wherein the data verification application calculates the route for reaching the vehicles of the users with upcoming expected end of parking times. 20

13. Process according to any of the previous claims, wherein the monitoring means (4) are a vehicle. 25

14. Process according to any of claims 1 to 12, wherein the monitoring means (4) are a guard. 30

Statement under Art. 19.1 PCT

Differences between the claims as filed and the claims as amended:

Claims 4, 8 and 11 as filed are replaced by amended claims with the same numbering; the rest of claims unchanged. 35

Basis for the amendments of the claims are: 40

- claims 4, 8 and 11: these claims include "verification application" which is mentioned for the first time in claim 2, thus the dependency of claims 4, 8 and 11 is changed to the claim 2. 45

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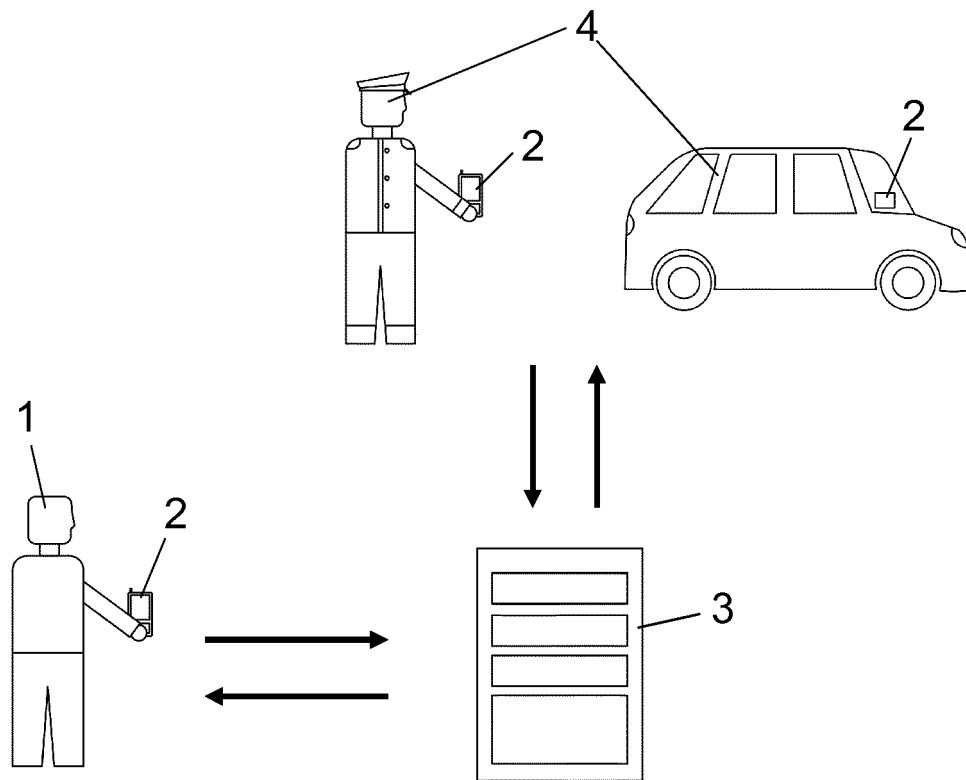


Fig. 1

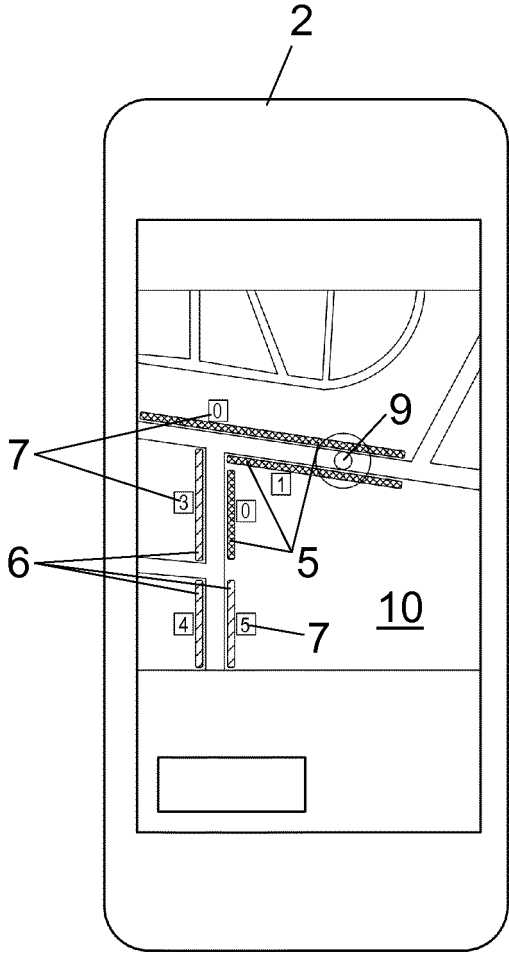


Fig.2

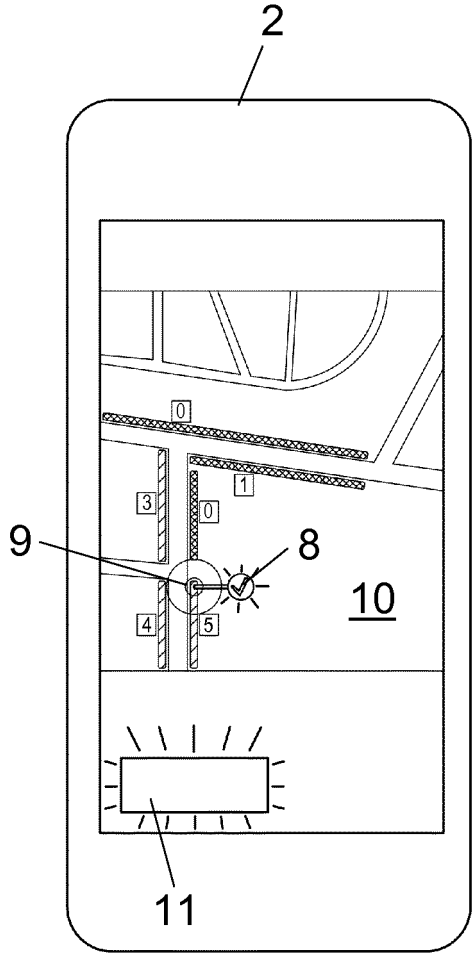


Fig.3

INTERNATIONAL SEARCH REPORT

International application No
PCT/ES2013/070235

A. CLASSIFICATION OF SUBJECT MATTER

INV. G08G1/14
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)
G08G

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 practicable, 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.
E	WO 2013/086140 A1 (MASSACHUSETTS INST TECHNOLOGY [US]) 13 June 2013 (2013-06-13) abstract; figures 1b, 1d paragraph [0012] - paragraph [0013] paragraph [0025] - paragraph [0036] -----	1
X	US 2004/068433 A1 (CHATTERJEE AMALENDU [US] ET AL) 8 April 2004 (2004-04-08)	1-6, 14
Y	paragraph [0020] - paragraph [0021] paragraph [0026] paragraph [0045] - paragraph [0052] paragraph [0055] - paragraph [0061] paragraph [0075] - paragraph [0079] paragraph [0099] - paragraph [0102] ----- -/-	10-13

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

☒ See patent family annex.

* Special categories of cited documents :

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"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

5 December 2013

Date of mailing of the international search report

13/12/2013

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INTERNATIONAL SEARCH REPORT

International application No

PCT/ES2013/070235

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	abstract; figure 2 paragraph [0007] paragraph [0030] - paragraph [0033] paragraph [0090] - paragraph [0095] -----	10-13
A	US 2004/236615 A1 (MSNDY DAMIEN [FR]) 25 November 2004 (2004-11-25) abstract; figure 1 paragraph [0020] - paragraph [0024] paragraph [0040] - paragraph [0041] paragraph [0072] -----	1-14

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/ES2013/070235

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REFERENCES CITED IN THE DESCRIPTION

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- WO 2012142603 A [0005]