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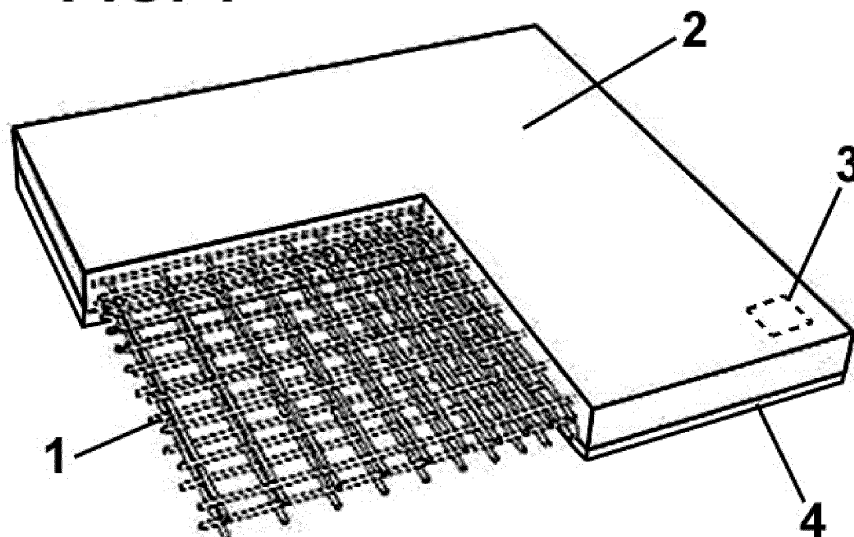
(54) **COVER FOR USE ON PUBLIC ROADS**

(57) The invention relates to a cover for use on public roads, comprising an outer body (2) that houses at least one reinforcement (1). Preferably, said outer body (1) is made of a plastic material, e.g. injected plastic material, and said at least one reinforcement (1) is connected by

means of said outer body (2) to form a single piece.

The cover according to the invention is lighter than that conventional covers, given that it is made with less metal and with lighter materials. Moreover, the cover cannot be easily recycled and hence is not at risk of theft.

FIG. 1



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Description

[0001] The present invention relates to a cover for use on public roads, which must support the weight of people and vehicles that pass over the same.

Background of the invention

[0002] Covers for use on public roads, for example manhole covers, are widely known by the general public, normally located on the ground on streets of any city, and have the function of covering access to the public sewers, as well as access to utility tunnels, etc.

[0003] Said covers are typically made of metal materials, the most common of which are covers made of cast metal (iron with greater than 2% carbon).

[0004] One problem associated with manhole covers is that they are often at risk of theft, given that they are made of cast metal and able to be sold by weight, since they can be recycled as scrap metal.

[0005] Currently there are other types of manhole covers, in addition to ones made by cast metal, the characteristics of which make them so they are not at risk of theft (either due to the low weight thereof, to the fact that they are made of non-recyclable materials, etc.). However, said manhole covers are more expensive than common cast metal manhole covers.

[0006] Another problem associated with manhole covers is that over time they can end up moving into the housing thereof, which causes load noises and bangs, resulting in annoyances to neighbors who live in the area of said cover.

[0007] Therefore, it is clear that there is a need to create a type of manhole cover, or cover for underground utility tunnels, that is not at risk of theft and which furthermore has a more economical manufacturing process than conventional processes, in addition to the possibility of preventing noise.

[0008] Another object of the present invention is to provide the manhole cover with extra features, in addition to that of a simple cover.

Description of the invention

[0009] The cover of the present invention resolves the aforementioned drawbacks and has other advantages which are described below.

[0010] The cover for use on public roads according to the present invention comprises at least an outer body made of a plastic material which houses at least a reinforcement, said reinforcement able to be metal or ceramic.

[0011] Advantageously, said reinforcement can be in the form of bars, wires, threads, grilles, profiles, sheet metal, cables and/or cords, and for example, said reinforcement is made of steel or aluminum, or alumina, silicon carbide, silicon nitrate, zirconia, sialon or fiberglass, carbon fiber or aramid fiber, although it could be any suit-

able material that has a sufficient resistance.

[0012] According to two alternative embodiments, said outer body can define a substantially flat continuous upper and lower surface.

[0013] Advantageously, the cover for use on public roads according to the present invention can comprise a housing, for example to house an electronic identification module and/or electronic sensors, which may be counting sensors or motions sensors.

[0014] If desirable, the density of said at least one reinforcement is greater on the central part of the cover than the rest of the cover.

[0015] Moreover, advantageously the cover according to the present invention can comprise a damping seat placed on the part thereof that is in contact with the surfaces against which it rests.

[0016] The cover according to the present invention has at least the following advantages:

- It is lighter than conventional covers, given that it is made with less metal and with lighter materials.
- It cannot be easily recycled and hence is not at risk of theft.
- It provides the possibility of additional informative features, for example by means of RFID or NFC technology, in order to provide technicians with information regarding the installations below said cover, the history of repairs, etc.
- It offers the possibility of smart features, for example motion sensors and counting sensors.

Brief description of the drawings

[0017] For the purpose of helping to make the foregoing description more readily understandable, it is accompanied by a set of drawings that, schematically and by way of illustration and not limitation, represent several practical embodiments.

Figures 1 to 3 are perspective views of three embodiments of the cover according to the present invention, the outer body being partially removed in order to be able to see the inner reinforcements; Figure 4 is a plan view of an embodiment of the cover according to the present invention wherein the density of the reinforcements can be seen; Figure 5 is a perspective view of an embodiment of the cover according to the present invention, which comprises an interchangeable plate; and Figure 6 is a cross-sectional view of the seat area of the cover according to the present invention in the position of use thereof.

Description of preferred embodiments

[0018] The cover for use on public roads according to the present invention comprises one or several reinforcements 1 connected by means of an outer body 2 made

of a plastic material, for example by means of injection, forming a single, indivisible object.

[0019] According to a preferred embodiment, the covers for use on public roads object of the present invention are made with injected thermoplastics forming an outer body 2 on a metal grille which serves as a reinforcement 1.

[0020] Said covers can be different shapes (round, square, irregular, etc.) according to the shape of the mold, being adapted to different applications.

[0021] Said covers can have one or several reinforcements 1, placed inside the outer body 2 made of plastic material, so as to provide the necessary mechanical resistance for the cover. Said reinforcements can be:

- metal bars, welded or not welded;
- wires
- threads
- metal grilles, welded or not welded;
- sheet metal, cut, embedded, punched, etc.
- connected metal profiles;
- steel cables;
- networks of steel cables;
- cables or cords made of fiberglass, carbon, aramid, etc.
- networks of fiberglass, carbon, aramid, etc.
- ceramic profiles (alumina, silicon carbide, silicon Nitrate, Zicronia, Sialon, etc.);
- ceramic profiles (alumina, silicon carbide, silicon Nitrate, Zicronia, Sialon, etc.); or
- any combination of the same.

[0022] Said reinforcements 1 can also provide a distribution that is either regular or irregular, offering a greater reinforcing density 1 in the center of the cover, given that it is the point of the greatest mechanical stress.

[0023] According to a preferred embodiment, said cover has a housing 3 for an identification element, said identification element being an electronic identification element in which information may be written regarding the cover (for example on the installations below, the maintenance history, etc.) and which is in bidirectional communication with a receiving device (not shown in the figures). Said receiving device, used by the maintenance technician, public works technician, etc., can be a generic device for example a smart phone, or a specific device, specifically designed for this use.

[0024] Preferably, said electronic identification module would be an RFID or NFC tag.

[0025] According to a preferred embodiment, the cover according to the present invention has a housing 3 for electronic motion or counting sensors. This would allow said elements to be utilized for carrying out controls and traffic statistics, for example.

[0026] According to a preferred embodiment, the cover according to the present invention has a seat 4 made of damping material to prevent noise when vehicles drive over the same. Advantageously, the covers according to

the present invention can be manufactured by a highly automated process, being an automatic process of plastic injection, with a prior process of inserting the reinforcement in the mold, which can easily be done using robots.

5 This way, the manufacturing costs of said manhole covers are reduced.

[0027] Advantageously, the covers according to the present invention have a lighter weight than conventional covers, given that they use less quantities of heavy material, using instead lighter materials (plastic instead of steel). This fact facilitates the assembly and maintenance thereof, since fewer workers are needed to manipulate each piece.

[0028] Advantageously, the covers according to the present invention can have another upper housing 5, so as to be able to place interchangeable plates 6 with different personalized logotypes, with the names of the municipalities, companies, pedestrian information, etc. Said interchangeable plates 6 can be different colors.

20 **[0029]** Advantageously, the covers according to the present invention can have lower wedges 7, in combination with the frame of the cover, to dampen the impacts received by said cover. Optionally, a lower joint 8 can be installed to assist in this aim.

25 **[0030]** Despite the fact that reference has been made to a several embodiments of the invention, it is evident for a person skilled in the art that numerous variations and changes may be made to the cover described, and that all the aforementioned details may be substituted by other technically equivalent ones, without detracting from the scope of protection defined by the attached claims.

Claims

- 35 1. A cover for use on public roads, **characterized in that** it comprises an outer body (2) that houses at least one reinforcement (1).
- 40 2. The cover for use on public roads according to claim 1, wherein said outer body (1) is made of a plastic material.
- 45 3. The cover for use on public roads according to claim 2, wherein said outer body (1) is made of injected plastic material.
- 50 4. The cover for use on public roads according to claim 2, wherein said at least one reinforcement (1) is connected by means of said outer body (2), forming a single piece.
- 55 5. The cover for use on public roads according to any of the claims 1 to 4, wherein said outer body (1) is metal or ceramic.
6. The cover for use on public roads according to any of the claims 1 to 4, wherein said reinforcement (1)

is in the form of bars, grilles, profiles, sheet metal, cables and/or cords.

dimension of the elements that make up the reinforcement (1).

7. The cover for use on public roads according to any of the claims 1 to 4, wherein said reinforcement (1) is steel. 5
8. The cover for use on public roads according to any of the claims 1 to 4, wherein said reinforcement (1) is aluminum. 10
9. The cover for use on public roads according to any of the claims 1 to 4, wherein said reinforcement (1) is alumina, silicon carbide, silicon nitrate, zirconia or sialon. 15
10. The cover for use on public roads according to any of the claims 1 to 4, wherein said reinforcement (1) is fiberglass, carbon fiber or aramid fiber. 20
11. The cover for use on public roads according to claim 1, wherein said outer body (2) defines substantially flat continuous upper and lower surfaces.
12. The cover for use on public roads according to claim 1, which comprises a housing (3). 25
13. The cover for use on public roads according to claim 12, wherein said housing (3) houses an electronic identification module. 30
14. The cover for use on public roads according to claim 12, which comprises electronic sensors.
15. The cover for use on public roads according to claim 14, which comprises electronic motion or counting sensors. 35
16. The cover for use on public roads according to claim 1, which comprises an upper housing (5) for housing interchangeable plates (6). 40
17. The cover for use on public roads according to claim 1, wherein the density of said at least one reinforcement (1) is greater in the central part of the cover than in the rest of the cover. 45
18. The cover for use on public roads according to claim 1, which comprises a damping seat (4) placed on the lower part thereof. 50
19. The cover for use on public roads according to claim 17, wherein said greater density is due to a greater concentration of the elements that make up the reinforcement (1). 55
20. The cover for use on public roads according to claim 17, wherein said greater density is due to a greater

21. The cover for use on public roads according to claim 18, wherein said damping seat (4) are wedges (7) in conjunction with the frame of the cover.

FIG. 1

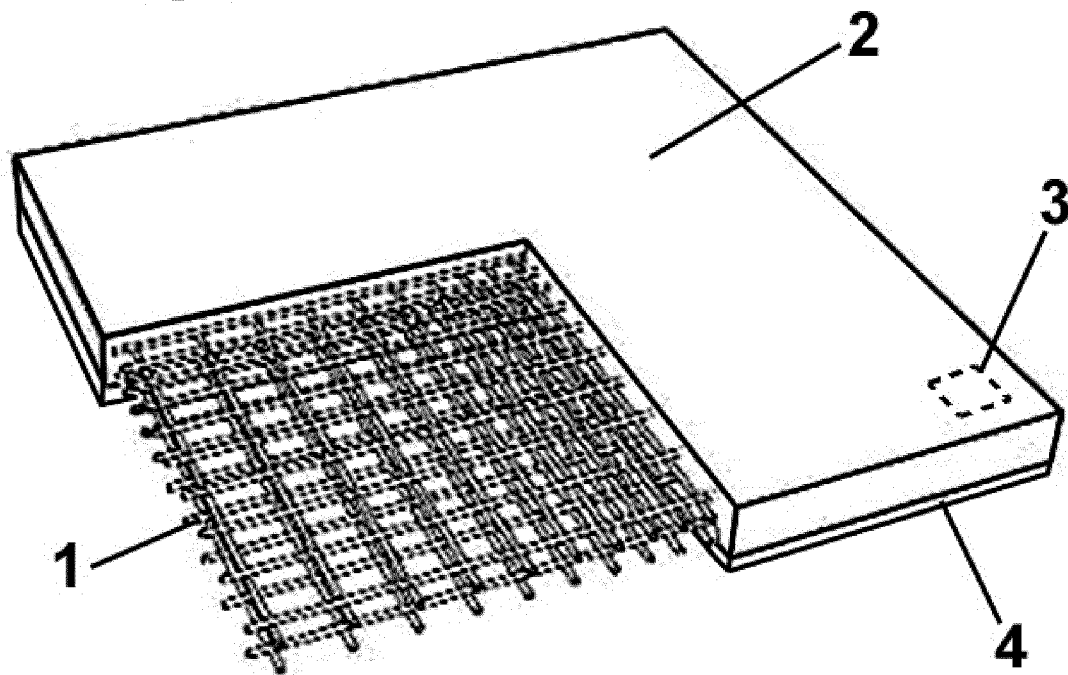


FIG. 2

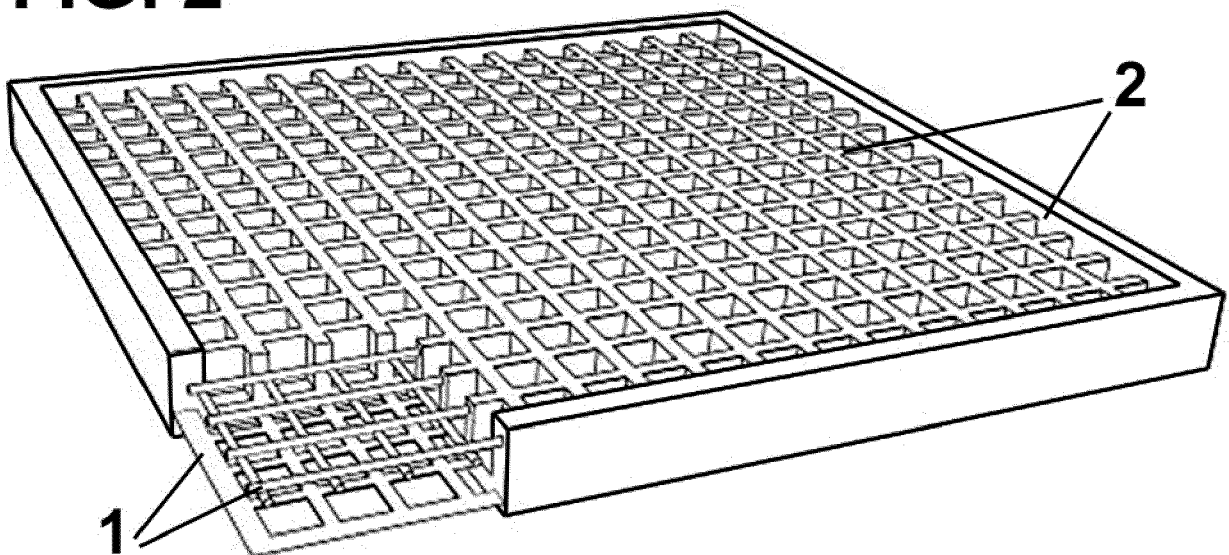


FIG. 3

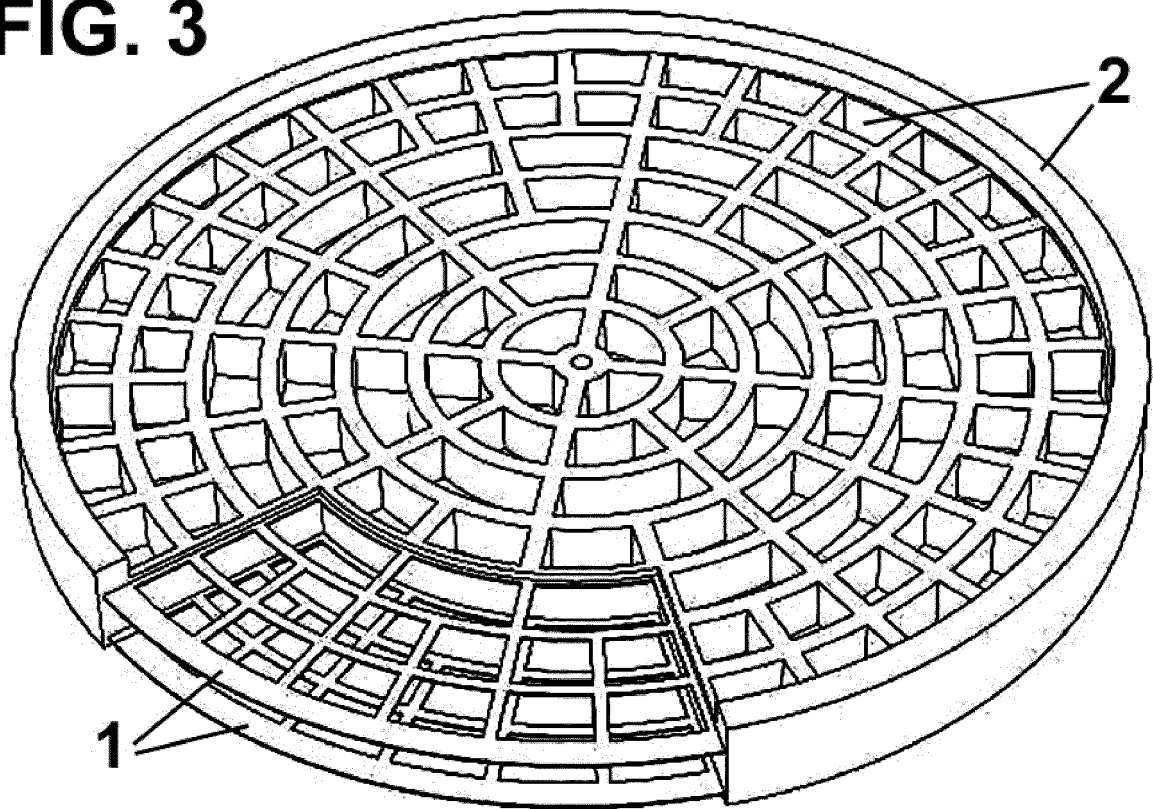


FIG. 4

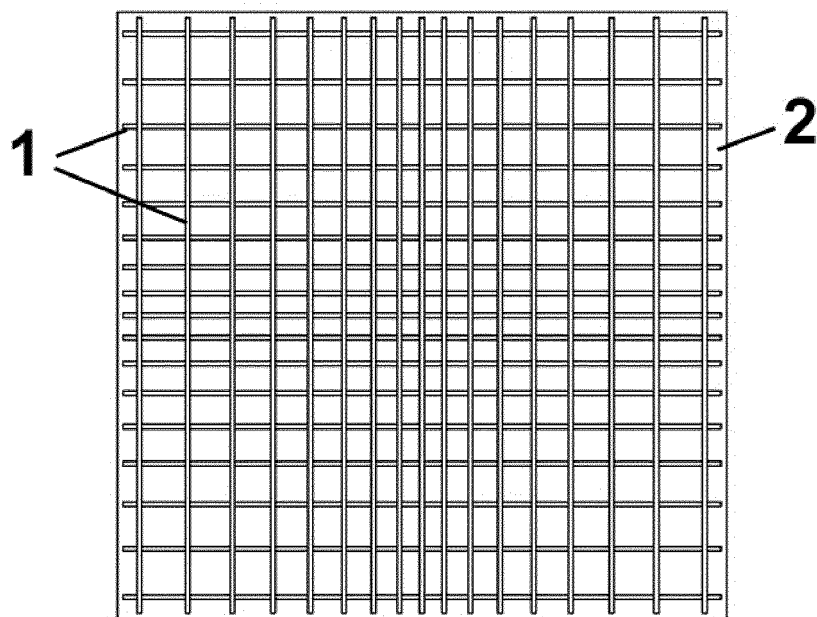


FIG. 5

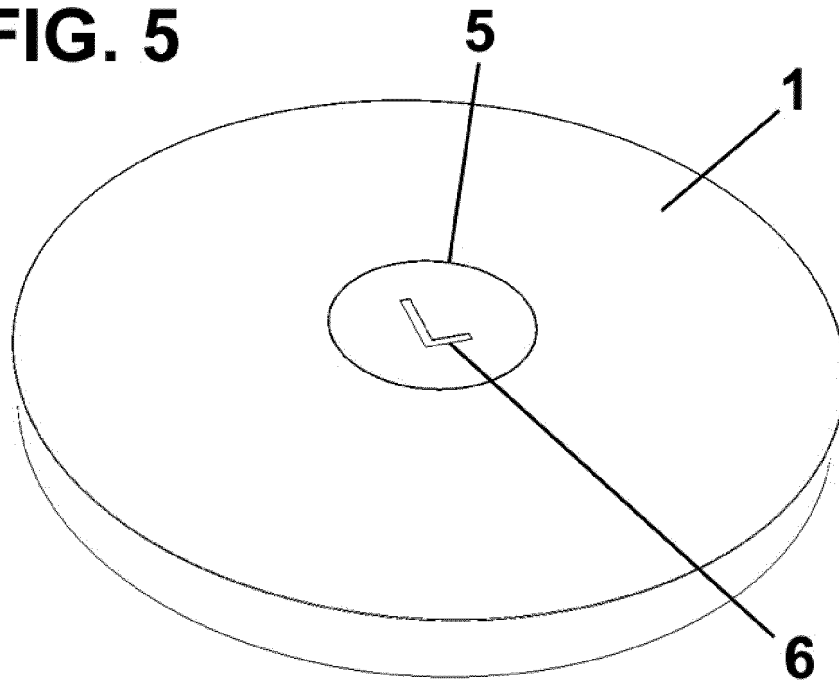
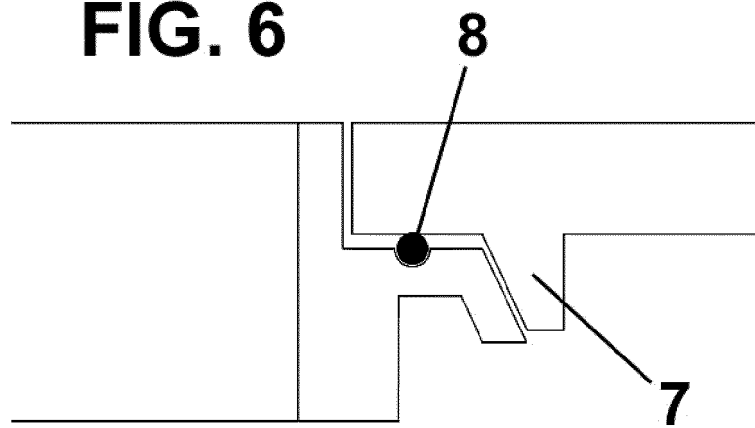


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2017/070325

A. CLASSIFICATION OF SUBJECT MATTER

E02D29/14 (2006.01)

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)
E02D

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)

EPODOC, INVENES

C. 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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X	CN 2670448Y Y (HU JINSHUI) 12/01/2005, figures. & Abstract from DataBase EPODOC. Retrieved of EPOQUE; AN CN-200320127469-U	1-21
A	KR 101331873B B1 (DONGE INDUSTRY DEV ET AL.) 21/11/2013, figures. & Abstract from Database EPODOC. Retrieved from EPOQUE; AN KR-20130081711-A.	1-21
A	US 2012293339 A1 (MILON CHRISTOPHE ET AL.) 22/11/2012, figures. & Abstract from Database WPI. Retrieved from EPOQUE; AN 2011-J38774	1-21
A	US 4187647 A (HALL JOHN R) 12/02/1980, column 1, line 1 - column 4, line 17; figures.	1-21

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance.	
"E" earlier document but published on or after the international filing date	
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"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search
22/06/2017

Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2017/070325

Information on patent family members

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Form PCT/ISA/210 (patent family annex) (January 2015)