(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 219 854 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
20.09.2017 Bulletin 2017/38

(21) Application number: **15858331.0**

(22) Date of filing: **15.06.2015**

(51) Int Cl.:
E01F 9/70 *(2016.01)*

(86) International application number:
PCT/ES2015/070466

(87) International publication number:
WO 2016/075346 (19.05.2016 Gazette 2016/20)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

(30) Priority: **13.11.2014 ES 201431467 U**

(71) Applicant: **Moreno Lopez, Antonio**
19174 Galapagos (Guadalajara) (ES)

(72) Inventor: **Moreno Lopez, Antonio**
19174 Galapagos (Guadalajara) (ES)

(74) Representative: **Monzón de la Flor, Luis Miguel**
C/Velázquez 109, 2ºD
ES-28006 Madrid (ES)

(54) TOOL FOR REMOVING EMBEDDED MARKERS

(57) An object of the present invention is a tool for the extraction of recessed signalling beacons comprising: a support structure to the ground comprising: An upper element, a lower element, disposed facing the upper element, and whereon a central space is defined and means of joining and connection between the upper element and the lower element; it also comprises fixing means on the upper edge of the casing of a beacon, which may be screwed or by means of hooks, and linear displacement means (worm or a hydraulic actuator) joined in its lower end to the fixing means on the upper edge of the beacon and which, in its upper end, have displacement actuation means mounted on the upper element. It allows the extraction of the beacons simply and effectively.

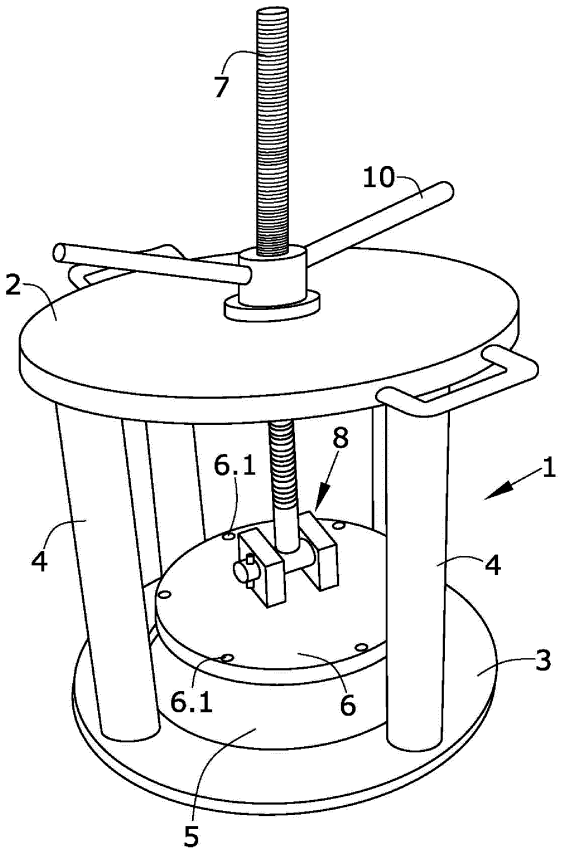

FIG.1

EP 3 219 854 A1

Description

OBJECT OF THE INVENTION

[0001] An object of the present invention, as the title of the invention establishes, is a tool for the extraction of beacons recessed in the ground.

[0002] The present invention is characterized in that the special constructive characteristics of the tool make it an element which allows the extraction of the beacons recessed in the ground in a simple and effective manner, without damages to any previous connections there may be and even to the beacon which can be reused in situ, nor the paving that contains it and in a reduced time.

[0003] Therefore, the present invention is included within the field of utensils or tools for the extraction of elements recessed in the ground.

BACKGROUND OF THE INVENTION

[0004] Signalling beacons are devices intended for the identification of roads, taxiways, runways, platform during the night-time or in conditions of reduced visibility, facilitating the circulation of aircraft and vehicles on them.

[0005] The recessed beacons mounted in the area of movements of an aircraft comprise a casing by way of bushing or base box, of cylindrical form and flush with the paving, whereon the beacon lens is fixed above by means of screwing.

[0006] For the fixing of the beacons in the ground, a perforation is previously made in the paving of a diameter slightly greater than that of the casing or base box, to then house it and fix it by means of resin or mortar applied in the space between the perforation and the outer face of the beacon. In this way, the beacon is firmly fixed to the paving.

[0007] The problem arises when it is necessary to remove the beacon for its repair, maintenance or replacement, and given that the casing or base box has been firmly fixed to the paving, it becomes necessary to use a drill bit or crown wheel of a greater diameter making a concentric perforation around the beacon or demolishing the contour until it allows its extraction, with the consequent drawback of breakage of the connection cables and asphalt replacement and concreting or restoration of the perforation made, so that the area is unusable by traffic during several days, until after the removal of the old beacon the new beacon is replaced.

[0008] Therefore, an object of the present invention is to develop a tool which allows the extraction of the recessed beacons in the paving of roads and airports, in a simple and effective manner, which does not cause additional damages in the ground and, therefore, requires subsequent adjustments, reducing the out-of-service time to traffic in the area, developing a tool such as that described below and essentially included in claim one.

DESCRIPTION OF THE INVENTION

[0009] An object of the present invention is a tool for the extraction of recessed signalling beacons comprising:

- A support structure to the ground comprising:
    - o An upper element,
    - o A lower element, disposed facing the upper element, and whereon a central space is defined
    - o means of joining and connection between the upper element and the lower element
- fixing means on the upper edge of the casing or base box of a beacon,
- linear displacement means joined in its lower end to the fixing means on the upper edge of the beacon and which, in its upper end, have displacement actuation means mounted on the upper element.

[0010] The fixing means on the upper edge of the beacon, in a possible embodiment, may comprise an extraction support, which, furthermore, in a possible embodiment, may be hinged, for its adjustment if the ground had degrees of inclination not in accordance with the ground. Said extraction support would have perforations for its screwing on the perforations of the casing or base box of the beacon used for the fixing of the lens.

[0011] It is convenient that it is hinged with the aim of being able to get around the levelling differences in the assembly of the beacon, and be able to extract it without breaking it.

[0012] Another possible embodiment of the fixing means on the upper edge of the beacon are hooks which, housed under the perimeter protuberance of the upper edge of the beacons, allows the extraction thereof.

[0013] In a possible preferred embodiment, the support structure to the ground adopts a cylindrical form, the lower element a circular crown or ring form, where the extraction support also has a circular form of the dimensions corresponding to the upper edge of the casing or base box of the beacons.

[0014] The linear displacement means may be any of those known, such as a worm, it also being possible that they are hydraulic means.

[0015] The displacement of the worm may be performed by means of a wing nut or multiplier which, disposed above the upper element, on rotating it causes a linear movement of the worm, in the case of using hydraulic means being a vertical thrust.

[0016] The displacement of the hydraulic actuator may be by means of a lever, with the subsequent advantage arising from the multiplication of the force applied.

[0017] The hinged joint between the end of the linear displacement means and the extraction support may be such that it allows the rotation with respect to the shaft or rotation with respect to an articular joint by means of

a sphere, and therefore, in any direction.

[0018] Both the possible fixing means on the upper edge of the beacon and the possible linear displacement means can be used in combined form in all the possible embodiments that may be achieved.

[0019] Throughout the description and the claims the word "comprises" and its variants are not intended to exclude other technical characteristics, additives, components or steps. For persons skilled in the art, other objects, advantages and characteristics of the invention will be inferred in part from the description and in part from the practice of the invention.

EXPLANATION OF THE FIGURES

[0020] To complement the description being made and in order to aid towards a better understanding of the characteristics of the invention, in accordance with a preferred example of practical embodiment thereof, a set of drawings is attached as an integral part of said description wherein, with illustrative and non-limiting character, the following has been represented.

[0021] In figure 1, we can observe a general representation of the extraction tool object of the invention.

[0022] In figure 2, we can observe in detail a possible embodiment of achieving the hinging of extraction support in its join with the linear displacement element.

PREFERRED EMBODIMENT OF THE INVENTION.

[0023] In light of the figures, a preferred embodiment of the invention proposed is described below.

[0024] In figure 1, we can observe a first embodiment of the extraction tool and which, in the embodiment shown, comprises:

- A structure or casing or base box of support on the ground (1), comprising, in turn, an upper element, in the embodiment shown it is a disc (2); a lower element, which is an element in the form of a circular crown or ring (3), the disc (2) and the ring (3) being joined by means of bars or interconnection elements (4).
- A hinged extraction support (6) which, in its periphery, shows a series of perforations (6.1) for its screwing on the perforations of the casing or base box of the beacon used for the fixing of the lens.
- A linear displacement means of the extraction support, which in the embodiment shown is a worm (7), which is joined in its lower end to the extraction support (6) by means of a hinged joint.

[0025] The support structure to the ground (1) defines an inner space (5) wherethrough there runs, in this case, the extraction assembly which is formed by the hinged extraction support (6) and the linear displacement means, which, in the embodiment shown, corresponds to a worm (7).

[0026] The actuation of the worm (7) for its linear displacement is achieved by means of a wing nut (10) disposed above the upper disc (2) so that, when it is rotated, it causes the linear displacement of the worm.

[0027] In figure 2, it shows in detail a possible embodiment of the hinged joint of the end of the linear displacement means, which in the embodiment shown corresponds to a worm, with the hinged support.

[0028] Said hinged joint (8) comprises:

- lugs (8.1) welded on the extraction support and which have facing perforations.
- A shaft (8.2) housed in the perforations of the lugs (8.1) and retained in its linear displacement by means of a stop (8.3), with the end of the linear displacement element being joined to the shaft (8.2) by means of a weld (9).

[0029] In figures 3 and 4, it shows a second embodiment, wherein the fixing means on the upper edge of the beacon consist of hooks (11) the ends whereof remain below the upper perimeter edge of the beacon; whilst the linear displacement means consist of a hydraulic actuator (12), which, by means of a piston rod (13), in the case represented, transmits the force to two cylinders (14) connected in their lower end to the hooks (11), said joint being an articular joint (15).

[0030] Thus, by means of the displacement of the piston rod (13) of the actuator (12) it causes the vertical displacement of the cylinders (14) which, as they are joined in their lower end to the hooks (11) fixed on the upper edge of the beacons, cause the extraction thereof, as can be observed in figures 3 and 4.

[0031] Having sufficiently described the nature of the present invention, as well as the manner of putting it into practice, it is stated that within is essential nature, it can be put into practice in other forms of embodiment that differ in details from those indicated by way of example, and whereto protection claimed will equally cover, provided that its main principle is not altered, changed or modified

Claims

1. Tool for the extraction of recessed signalling beacons **characterized in that** it comprises:

   - A support structure to the ground which, in turn, comprises:

     • An upper element,
     • A lower element, disposed facing the upper element, and whereon a central space is defined
     • Connection means between the upper element and the lower element

- fixing means on the upper edge of the casing or base box of a beacon,
- linear displacement means joined in its lower end to the fixing means on the upper edge of the beacon and which, in its upper end, have displacement actuation means mounted on the upper element.

2. Tool for the extraction of recessed signalling beacons, according to claim 1, wherein the fixing means on the upper edge of the beacon comprise an extraction support (6) which has perforations (6.1) for its screwing on the perforations of the casing or base box of the beacon used for the fixing of the lens.

3. Tool for the extraction of recessed signalling beacons, according to claim 2, wherein the extraction support (6) is a hinged support.

4. Tool for the extraction of recessed signalling beacons, according to claim 1, wherein the fixing means on the upper edge of the beacon comprise hooks (11) the ends whereof remain below the upper perimeter edge of the beacon.

5. Tool for the extraction of recessed signalling beacons, according to any of the preceding claims, wherein the linear displacement means is a worm (7) which traverses the upper element and is joined to the extraction support by means of a hinged joint (8).

6. Tool for the extraction of recessed signalling beacons, according to claim 5, wherein the worm (7) is actuated by means of a wing nut (10) disposed above the upper disc (2) so that, when it is rotated, it causes the linear displacement of the worm.

7. Tool for the extraction of recessed signalling beacons, according to claim 5 or 6, wherein the hinged joint (8) comprises:

- lugs (8.1) welded on the extraction element (6) and which have facing perforations.
- A shaft (8.2) housed in the perforations of the lugs (8.1) and retained in its linear displacement by means of a stop (8.3), with the end of the linear displacement element being joined to the shaft (8.2) by means of a weld (9).

8. Tool for the extraction of recessed signalling beacons, according to any of claims 1 to 4, wherein the linear displacement means comprise a hydraulic actuator (12) comprising a piston rod (13)

9. Tool for the extraction of recessed signalling beacons, according to claim 8, wherein the piston rod (13) of the actuator (12) transmits the force to two cylinders (14) connected in their lower end to fixing means on the upper edge of the beacon.

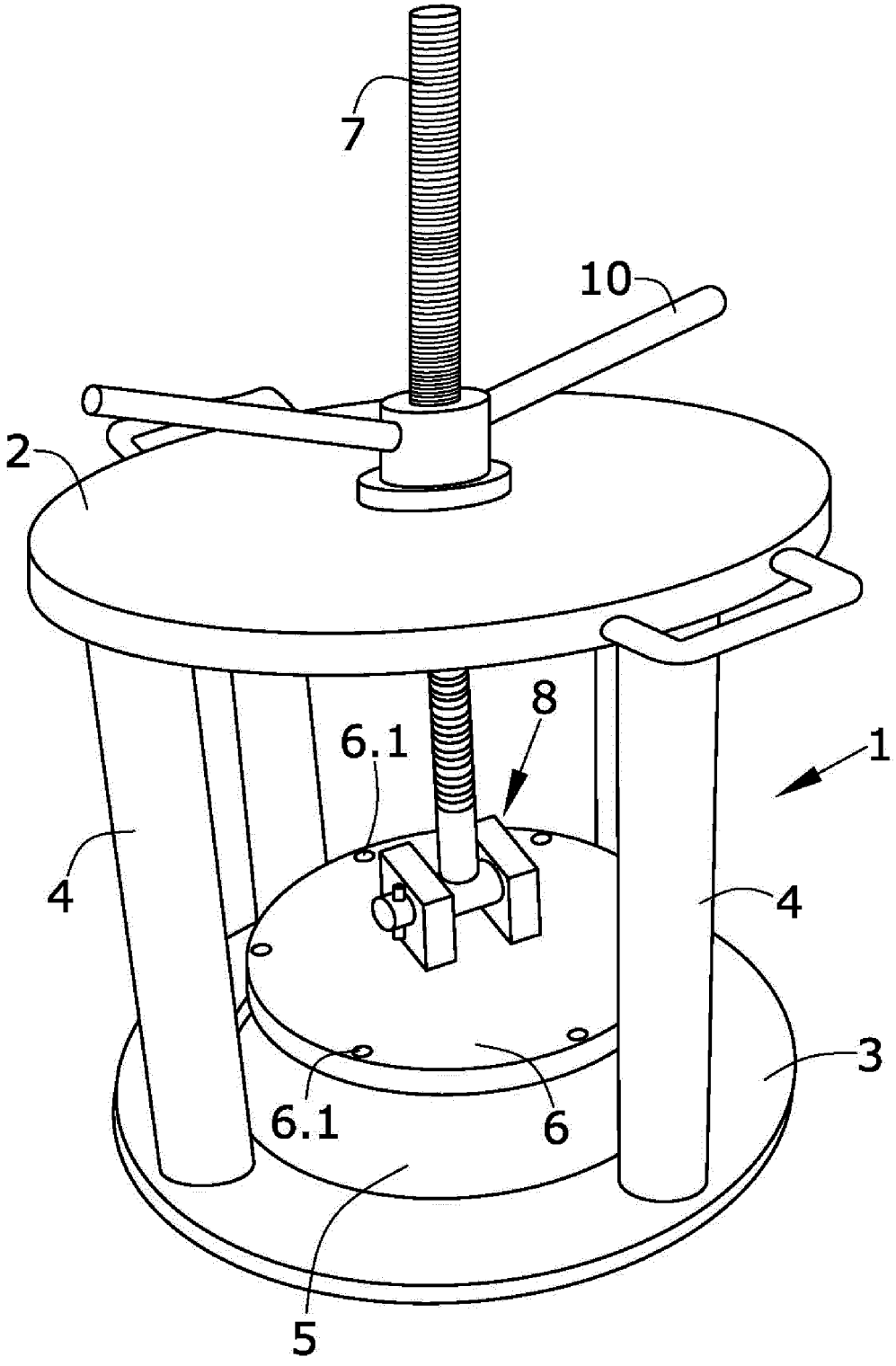

FIG.1

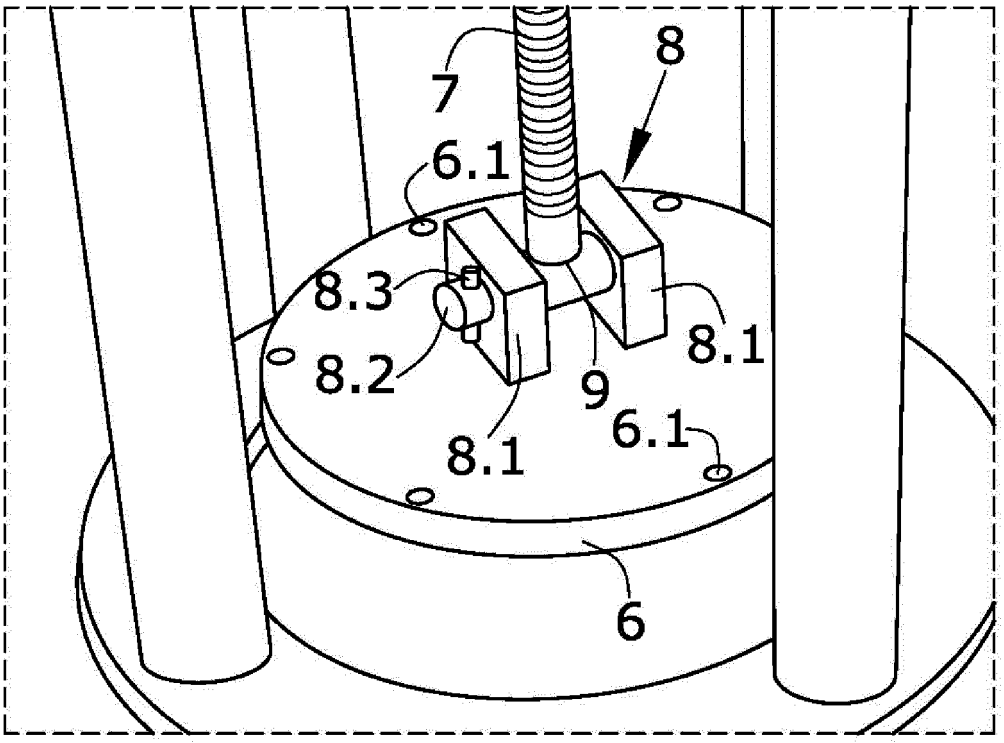

FIG.2

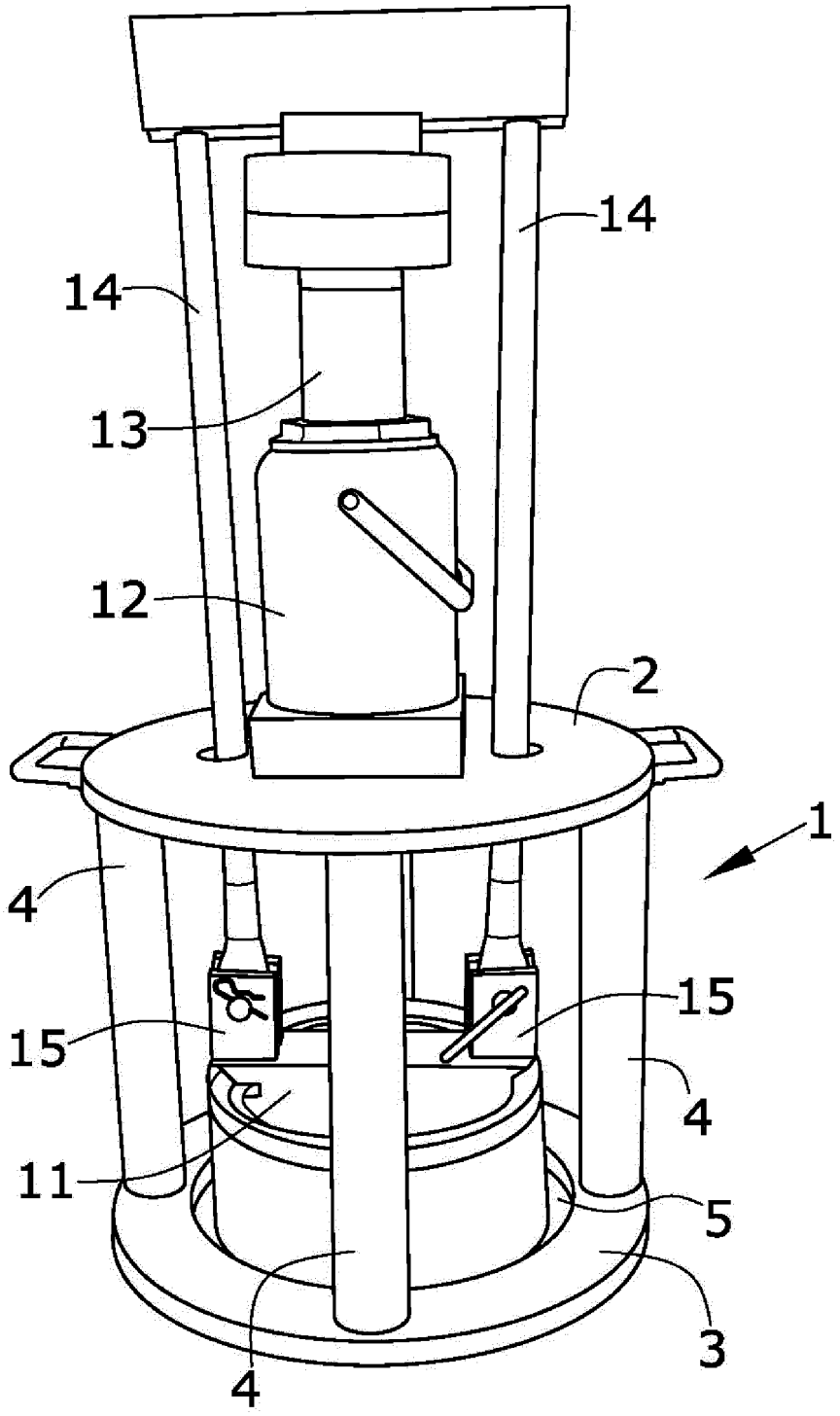

FIG.3

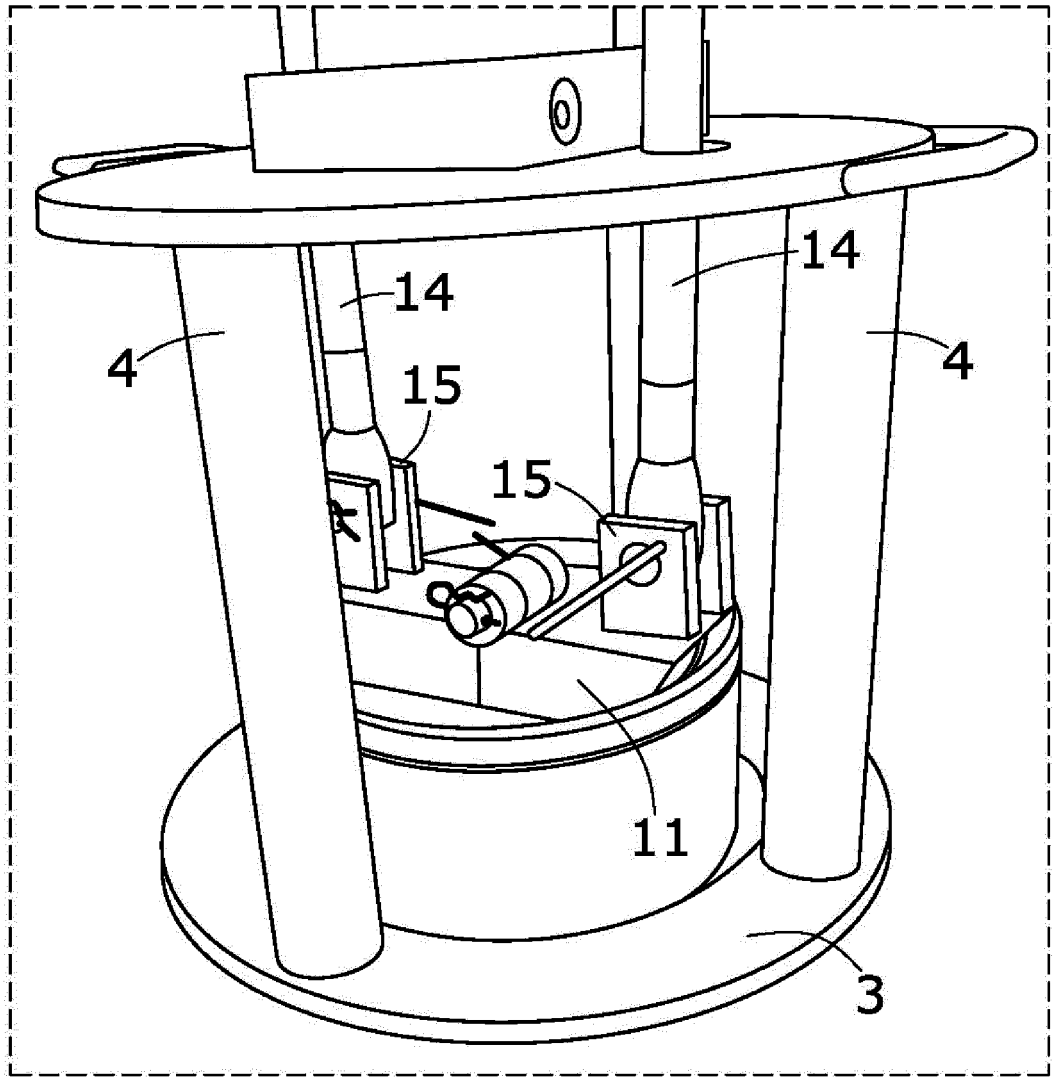

FIG.4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2015/070466

A. CLASSIFICATION OF SUBJECT MATTER

E01F9/014 (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)
E01F

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, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6302377 B1 (PIMENTEL MARTIN) 16/10/2001, description; figures.	1, 5, 6, 8, 9
A	US 1999174 A (HENRY JACKSON CHARLES) 30/04/1935, description; figures.	1-9
A	US 5009394 A (MARSHALL RICK A) 23/04/1991, description; figures.	1-9
A	JP H08170315 A (TOYAMA PREFECTURE) 02/07/1996, Abstract from DataBase WPI. Retrieved of EPOQUE AN-1996-358831. Figures.	1-9
A	US 5192052 A (ABAROTIN EUGENE V) 09/03/1993, description; figures.	1-9

☒ 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.
"E" earlier document but published on or after the international filing date
"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)
"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 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	Date of mailing of the international search report
08/10/2015	**(09.10.2015)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer L. Molina Baena Telephone No. 91 3495554

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2015/070466

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2789745 A1 (SENN KONSTRUKTIONSWERKSTÄTTE AG) 15/10/2014, Abstract from DataBase WPI. Retrieved from EPOQUE AN-2014-T31497. Figures.	1-9

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2015/070466

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
US6302377 B1	16.10.2001	NONE	
US1999174 A	30.04.1935	NONE	
US5009394 A	23.04.1991	NONE	
JPH08170315 A	02.07.1996	NONE	
US5192052 A	09.03.1993	NONE	
EP2789745 A1	15.10.2014	CH707908 A1	15.10.2014

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