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(72) Inventor: **Punter Gil, Jesús**
12400 Segorbe (ES)

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(74) Representative: **Maldonado Jordan, Julia**
Linares, 7 - 3
46018 Valencia (ES)

(71) Applicant: **Punter Gil, Jesús**
12400 Segorbe (ES)

(54) **HANDRAIL CONSISTING OF PREFABRICATED TUBES AND PARTS MADE OF STAINLESS STEEL**

(57) The present invention relates to a handrail consisting of prefabricated tubes and parts made of stainless steel of the type using longitudinal bars (1) and a plurality of vertical rails (2); and wherein in order to attach the handrail to the floor a series of pillars (6) are provided to which the bars (1) are attached by means of brackets (10), said pillars (6) being attached to the floor by means of an anchor plate (11); characterized in that the rails (2) are attached to the bars (1) by means of a dowel screw

(5) which locks the bars in place by passing entirely or partially therethrough; and wherein the brackets (10) have a conical recess (7) for attaching to the longitudinal bar (1) by means of a screw having a conical head (9); and wherein the plate (11) has perforations (12) for anchoring the pillar (6) to the floor with screws (8), as well as threaded holes (13) for leveling said pillar (6) by means of screws (5).

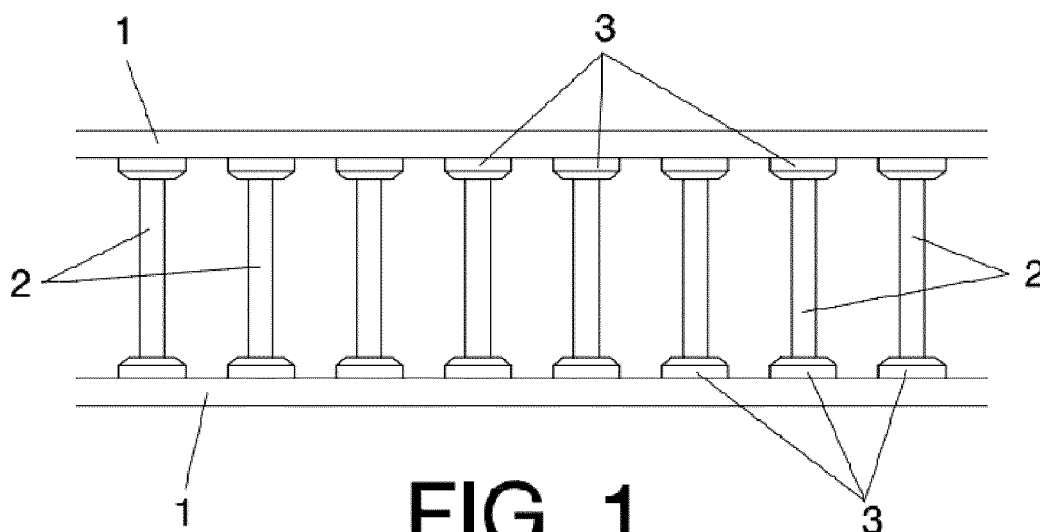


FIG. 1

Description

Object of the Invention

[0001] As expressed in the title of the present specification, the invention relates to a handrail consisting of prefabricated tubes and parts made of stainless steel, which provides significant advantages and novelty features that will be described in detail below, entailing a remarkable improvement of the state of the art with respect to the handrail existing on the market for the same purpose.

[0002] More particularly, the object of the invention is a handrail the configuration of which advantageously allows maximal simplification for the construction of stainless steel balconies and handrails, maximally reducing the manufacturing system, because the number of necessary parts as well as the assembly are successfully reduced in said system compared to existing systems on the market.

Field of Application of the Invention

[0003] The field of application of the present invention is comprised within the technical sector of the industry dedicated to the manufacture of handrails for balconies, stairs and parapets or similar divisions, particularly those made from metallic materials, and also covering the manufacture of garden fences or other metal fittings.

Background of the Invention

[0004] Today, the manufacture of handrails for balconies, stairs and the like entails high labor and material costs due to the complexity often involved both in manufacturing the parts forming them and in assembling them on site.

[0005] On the other hand, concrete, aluminum, iron and stainless steel are the materials generally used for manufacturing said handrails.

[0006] Concrete handrails have iron rods. Since concrete is a porous material, the iron can rust over time giving rise to cracks and subsequent wearing of the handrail.

[0007] Iron handrails are stiff, but in addition to requiring periodic maintenance by means of applying protective layers to prevent them from rusting, they have the drawback that highly skilled labor, which is increasingly scarcer, is required for manufacturing them.

[0008] Aluminum handrails have the drawback of having rather low stiffness and furthermore, in a saline environment (close to coastlines), they can undergo corrosion and wear in a period of about ten to twelve years.

[0009] Like iron handrails, stainless steel handrails are stiff and do not need any type of maintenance even in saline environments. They are the highest-quality handrails that can be placed during construction, however, they have a very high cost, about 150% higher than the

cost of the other materials described, which cost about the same with respect to one another, stainless steel therefore generally being placed only in high-level constructions that seek quality and appearance, no matter the price.

[0010] It would therefore be desirable to significantly reduce stainless steel handrail manufacturing and assembly times in order to be able to match the price thereof to the price of handrails made from other, poorer-quality materials, thus preventing the aforementioned drawbacks.

[0011] In this sense, it must be pointed out that the present applicant is already the proprietor of patent no. 2187389 relating to an "Improved attachment arrangement for manufacturing handrails and balconies from tubes made of stainless steel", in which the objectives indicated as ideal are partially achieved; however, said patent has certain aspects that can be improved in order to achieve all the objectives in a satisfactory manner, this being the main object of the present invention.

[0012] The applicant is aware of the existence of Australian patent AU 7 655 074 and of Canadian patent CA 2 462 360 describing solutions similar to that proposed herein, with the exception that in both cases the solutions are intended for being developed using aluminum as the predominant material, whereas in the case of the invention presented herein, the solution is intended for and developed to be implemented by means of using only stainless steel, with the subsequent increase of mechanical properties associated with said material.

[0013] More specifically, the Australian patent describes flexible plugs which acquire a structural function when inserted in the rails.

[0014] Said Australian patent also has the drawback that said flexible plug is also flexible for assembly and for disassembly, not supporting pressure in the lower bearing and causing the rails to come out of the profile due to a deflection produced in said bearing as a result of a strong impact or pressure, wherein said rails furthermore are not inserted in the bearing in their entirety.

[0015] Finally, the brackets for fastening the handrail to the post are placed on the surface, so the brackets may deform by torsion if they undergo stress.

[0016] To solve said problems, the invention proposed herein optionally uses plugs that do not have a structural functionality but rather help the subsequent assembly. The structural function is completely or partially achieved as a result of a dowel screw locking the rail in place, which in turn means that using plugs is not essential for forming the handrail.

[0017] The use of an embedded bracket with a dimension equal to the inner part of the horizontal bearing prevents any torsional movement. In turn, the use of a screw system for attachment by approximation to the bracket requires the horizontal bearing to be located perfectly alongside the vertical post, no type of joint being formed.

[0018] On the other hand, the Canadian patent uses an anchor plate with a central opening, but it does not

contemplate any leveling means, such as the invention proposed herein.

[0019] Given that the regulations in force that apply to such constructive elements requires achieving certain strength with respect to a horizontal load, an anchor plate needs a level surface in order to have a horizontal support plane and be completely vertical. To that end, the leveling openings present in the invention presented herein allow the plumbing of the post-plate assembly in a much simpler and reliable manner.

[0020] Furthermore, the use of a perforated plate corresponds to the convenience of using a self-leveling fluid poured from the upper part of the post, thus obtaining said level surface.

Description of the Invention

[0021] Therefore, the improved attachment arrangement for constructing balconies and handrails from prefabricated tubes and parts made of stainless steel proposed by the invention satisfactorily achieve the mentioned objectives, by using prefabricated parts, hollow tubes or tubular elements which, by subsequently using conventional fasteners, recesses, perforations and couplings, result in obtaining balconies and handrails constructed in significantly less time than that used with the conventional systems, which allows manufacturing same in stainless steel at a very low cost and allows transporting same in a completely disassembled manner, their coupling being performed in the point of location.

[0022] Based on the foregoing and in a specific manner, the proposed handrail consisting of prefabricated tubes and parts made of stainless steel is essentially configured from respective perforated hollow longitudinal bars arranged opposite one another, the upper bar being perforated in the lower portion and the lower bar being perforated in the upper portion, for receiving a plurality of vertical rails forming the handrail for balconies, stairs or other applications.

[0023] Said rails are housed inside the longitudinal bar and are attached by means of a dowel screw completely or partially locking the rail in place, preventing removal thereof.

[0024] Furthermore, in a non-limiting practical embodiment plugs in the form of a bushing are used (with a configuration and dimensions suited to the section and dimension and shape of the rails used, whether they are circular, square, etc.), and the inner opening of which is open and conical, such that it is open for the passage therethrough of the rail, being locked in place by means of a setscrew.

[0025] The use of a dowel screw completely or partially incorporated in every few rails as a variant for rail fastening which replaces the setscrews in each plug is contemplated, such that the rail is housed in the longitudinal bar without the possibility of removal.

[0026] The handrail is in turn fastened at its ends and/or every certain section, to a pillar which is formed by a

hollow part having in the lower portion an anchor plate with perforations for attaching and leveling said pillar with respect to the floor by means of fasteners.

[0027] Said anchor plate can be square or rectangular, or any other shape. Furthermore, the anchor plate has a perforation with the dimensions of the pillar for welding the latter in the lower portion, such that the pillar is hollow (which would not be possible if it were butt welded). Once the pillar is plumbed as a result of the leveling screws and to prevent the needle effect (support surface rupture), a leveling fluid can be poured from the upper portion of the pillars to obtain that stiff and horizontal surface which enables properly screwing the screws into the floor.

[0028] To increase the strength of the pillars and the balcony as a whole, said pillar can be inserted on other profiles with smaller dimensions which have been previously anchored to the floor.

[0029] The handrail is attached to the pillar by means of a bracket or similar part which is screwed to said pillar and has a conical recess threaded in its deepest portion, locking the handrail to the longitudinal bar with a screw also having a conical head.

[0030] The aforementioned pillars which will preferably have a rectangular section but they can be square for the corners, furthermore have, as indicated above, the particularity of being attached to the floor by means of an anchor plate arranged in the lower portion thereof, providing the pillars with great strength. As a reinforcement for handrail fastening, a wall anchoring is also contemplated in the pillars close to a wall, preferably in the upper portion, by means of making a threaded hole in which there is inserted a rod with a thread having the same depth as the tube which is inserted in the wall by unscrewing it.

[0031] It must be pointed out that the described handrail allows forming garden fences with decorative shapes and designs by using an additional longitudinal bar in the upper portion, the span of which is perforated for the passage therethrough of the vertical rails, having lower and upper plugs attached with setscrews, also being able to incorporate some longer intercalated rails which, passing through the lower longitudinal bar and also having plugs in the lower portion, are used directly for anchoring to the wall, or when said rail is suitably curved in its lower portion, it is used as an anchoring to the concrete stringers of the stairs.

[0032] Finally, the invention envisages a cover arranged in the upper portion of the pillars in which a pin incorporating the banister is secured and locked.

[0033] In view of the foregoing, it must be stated that the described handrail consisting of prefabricated tubes and parts made of stainless steel represents an innovative structure having structural and constitutive features unknown up until now for such purpose, which reasons along with its practical usefulness give it sufficient grounds for obtaining the exclusive privilege that is sought.

Description of the Drawings

[0034] To complement the description that is being made of the handrail object of the invention and for the purpose of aiding to better understand the features distinguishing the invention, a set of drawings is attached as an integral part of the present specification in which the following has been depicted in an illustrative and non-limiting manner:

Figure 1 shows a schematic elevational view of a first embodiment of the handrail object of the invention.

Figures 2-A, 2-B and 2-C respectively show a bottom plan view, an elevational section view and a top plan view of a circular example of the plug for vertical rail attachment.

Figure 3 shows the way of coupling the plug shown in the preceding figures with the rail to the longitudinal bars of the handrail.

Figures 4-A and 4-B show respective elevational section and plan views of another example of the plug, in this case having a quadrangular configuration.

Figures 5-A and 5-B show an alternative way of fastening rails with the plugs, in which the setscrews are replaced with a dowel screw completely or partially covering the rail.

Figure 6 shows a perspective view of the pillar attaching the handrail, showing the attachment bracket for attaching the longitudinal bars and the anchor plate to the floor.

Figure 7 shows the anchor plate of the pillar with the holes attaching it to the floor by means of screws and the smaller holes in which leveling setscrews are inserted.

Figures 8-A and 8-B show respective section and perspective views, respectively, of the attachment bracket for attaching to the pillar.

Figure 9 shows a detail of the attachment of the pillars to the longitudinal bars of the handrail by means of the attachment bracket.

Figures 10-A and 10-B show the system for anchoring the handrail to a vertical wall by means of a threaded rod which is inserted in a bore made in the wall.

Figure 11 shows an example of the handrail of the invention with an intermediate longitudinal bar incorporated therein.

Figure 12 shows an elevational view of an example of anchoring the handrail on a stair with the rails anchored to the concrete stringers of the steps.

Figure 13 shows a section view of a detail of the upper cover incorporated in the pillars of the handrail.

Preferred Embodiment of the Invention

[0035] In view of the mentioned drawings and accord-

ing to the adopted numbering, a preferred embodiment of the invention which comprises the parts and elements that are described in detail below can be seen therein.

[0036] Therefore, as seen in Figure 1, the handrail of the present invention that can be applied for forming the parapet of balconies or for partially enclosing stairwells, windows, accesses to the outdoors, horizontal gaps, etc., is essentially configured from at least two hollow longitudinal bars (1) arranged opposite one another, which are suitably perforated to receive the vertical rails (2) that are attached thereto by means of using plugs (3).

[0037] As seen in Figures 2-A, 2-B and 2-C, these plugs (3) are in the form of a bushing, are inserted in the aforesaid perforations of the bars (1), and have a conical inner through opening (4), such that it is open for the passage therethrough of the rail (2), being attached by means of a setscrew (5) locking the rail (2) to the plug (3), as seen in Figure 3.

[0038] Logically, this plug (3) has a configuration and dimensions suited to the section and dimension of its intended rails (2) in each case, said plug therefore being able to have a circular layout, as in the example depicted in Figures 2-A, 2-B and 2-C, a square layout, as seen in the example of Figures 4-A and 4-B, or any other shape.

[0039] Furthermore, the handrail of the invention contemplates a variant for fastening the rails (2), in which said setscrews in each plug (3) are replaced by incorporating a dowel screw (5) which locks the rail (2) to the plug (3), completely or partially passing through both elements and which is only incorporated every few rails, as can be seen in Figures 5-A and 5-B.

[0040] The proposed handrail in turn contemplates the existence of a series of pillars (6) so that it is fastened at its ends and/or every certain distance to the floor, particularly when it is placed in a balcony.

[0041] Said pillars (6) are formed by a hollow tube and, as seen in Figure 6, incorporate brackets (10) attached such that they coincide with the longitudinal bars (1) by means of conventional screws (8), to which brackets the ends of said longitudinal bars (1) are attached.

[0042] To that end, as seen in Figures 8-A and 8-B said brackets (10) have in the projecting flange thereof a conical recess (7) threaded in the deepest part thereof which allows attaching to the longitudinal bar (1) by means of a screw also having a conical head (9), as can be seen in detail in Figure 9. The bracket (10) also has in the flange thereof which is located against the pillar (6) two openings for attaching to the pillar by means of conventional screws (8), as mentioned above.

[0043] These pillars (6), which will preferably have a rectangular section but they can be square for the corners, as can be seen in Figure 6, have the particularity of being attached to the floor by means of an anchor plate (11) having a central opening (11a) with the dimensions of the pillar to be welded internally, remaining hollow. Furthermore, this plate (11) also has perforations (12) for anchoring the pillar to the floor with conventional screws (8), as well as threaded holes (13) which allow

leveling said pillar by means of setscrews (5).

[0044] As a reinforcement to the vertical wall, the proposed handrail contemplates the incorporation of a simple attachment system consisting of a partially threaded rod (14) or similar part which is housed inside the pillar (6) by means of a threaded hole and provided with a nut (15), which can be unscrewed for being inserted in a bore made for such purpose in the wall, as shown in Figures 10-A and 10-B, being able to be attached thereto by means of a chemical resin or the like.

[0045] As seen in Figure 11, the handrail of the invention also contemplates the possibility of incorporating an additional longitudinal bar (1'), the span of which is perforated for the passage therethrough of the vertical rails (2), having lower and upper plugs (3) attached by means of setscrews or dowel screws, thus allowing the construction of balconies, handrails or garden fences with decorative shapes and designs.

[0046] Similarly, some of the rails (2) can be longer, passing through the lower bar (1), and also having plugs (3) in the upper and lower portions, and they are used directly for anchoring to the wall or, when suitably curved in the lower portion therefore, they are used for anchoring the handrail to the concrete stringers of the stairs, as seen in Figure 12.

[0047] Optionally, the handrail of the invention envisages the placement of a cover (16), which is attached to the pillar (6) at its upper end by means of a setscrew (5), in which a pin (17) incorporating the banister (18) is secured and locked, as seen in Figure 13.

[0048] Having sufficiently described the nature of the present invention as well as the manner of putting it into practice, it is not considered necessary to further describe the invention so that any person skilled in the art can comprehend the scope thereof and advantages derived from it, hereby stating that it could be carried out to practice within its essential features in other embodiments differing in detail from that indicated by way of example, and such embodiments would be covered by the protection that is sought provided that the fundamental principle thereof is neither altered, changed nor modified.

Claims

1. A handrail consisting of prefabricated tubes and parts made of stainless steel, applicable for forming the parapet of balconies or for partially enclosing stairwells, windows, accesses to the outdoors, horizontal gaps, etc., being of the type essentially configured from at least two longitudinal bars (1) arranged opposite one another and a plurality of vertical rails (2), wherein the longitudinal bars (1) are hollow and perforated to receive the tightly inserted vertical rails (2), and wherein in order to attach the handrail to the floor a series of pillars (6) formed by a hollow tube are provided at the ends thereof and/or

every certain distance, the longitudinal bars (1) are attached to said pillars by means of brackets (10) screwed thereon, said pillars (6) being attached to the floor by means of an anchor plate (11) having a central opening (11a) with the dimensions of the pillar to be welded internally; and **characterized in that** the rails (2) are attached to the longitudinal bars (1) by means of a dowel screw (5) which locks the bars in place by passing entirely or partially therethrough; and wherein the brackets (10) have a conical recess (7) with a thread in the deepest part thereof for attaching to the longitudinal bar (1) by means of a screw also having a conical head (9); and wherein the plate (11) in turn has perforations (12) for anchoring the pillar (6) to the floor with screws (8), as well as threaded holes (13) which allow leveling said pillar (6) by means of screws (5).

2. The handrail consisting of prefabricated tubes and parts made of stainless steel according to claim 1, **characterized in that** the rails (2) are attached to the longitudinal bars (1) by means of plugs (3) in the form of a bushing, said plugs being inserted in the perforations present in the bars (1) and having a conical and open inner through opening (4), such that it is open for the passage therethrough of the rail (2) and is locked by means of a setscrew.

3. The handrail consisting of prefabricated tubes and parts made of stainless steel according to claim 1, **characterized in that** it incorporates, as a reinforcement for vertical wall attachment, a partially threaded rod (14) which is housed inside the pillar (6) by means of a threaded hole and provided with a nut (15) for being inserted in a bore made for such purpose in the wall.

4. The handrail consisting of prefabricated tubes and parts made of stainless steel according to any of the preceding claims, **characterized in that** it incorporates an additional longitudinal bar (1') the span of which is perforated for the passage therethrough of the vertical rails (2), and which has lower and upper plugs (3) attached thereon.

5. The handrail consisting of prefabricated tubes and parts made of stainless steel according to any of the preceding claims, **characterized in that** some rails (2) are longer and pass through the lower longitudinal bar (1) incorporating a plurality of plugs (3) which are used directly for anchoring to the wall or, when curved in their lower portion, for anchoring the handrail to concrete stringers of stairs.

6. The handrail consisting of prefabricated tubes and parts made of stainless steel according to any of the preceding claims, **characterized in that** it envisages the placement of a cover (16), which is attached to

the pillar (6) at its upper end by means of a setscrew (5), in which a pin (17) incorporating the banister (18) is secured and locked.

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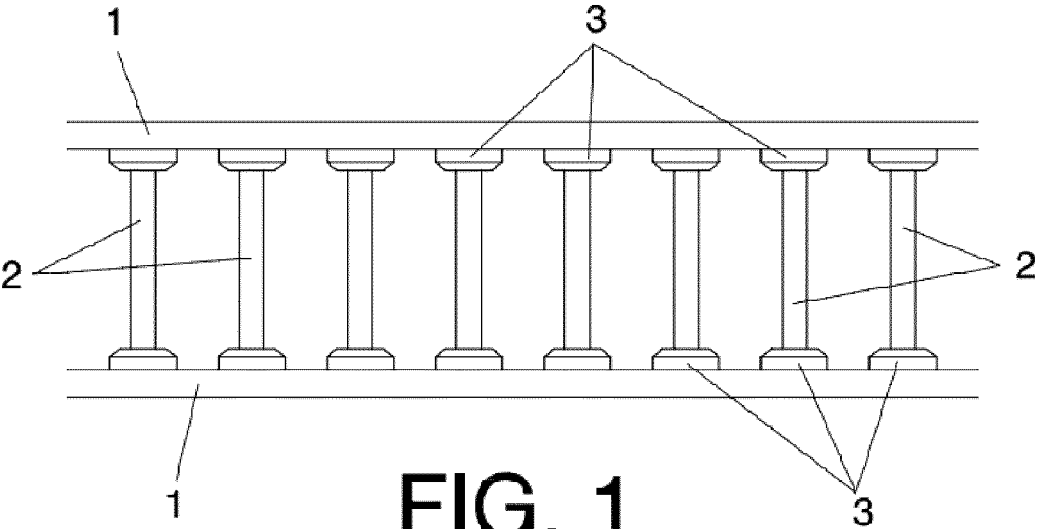


FIG. 1

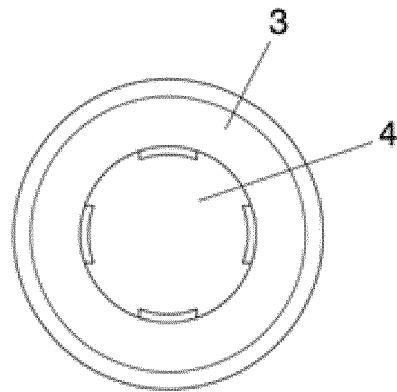


FIG. 2-A

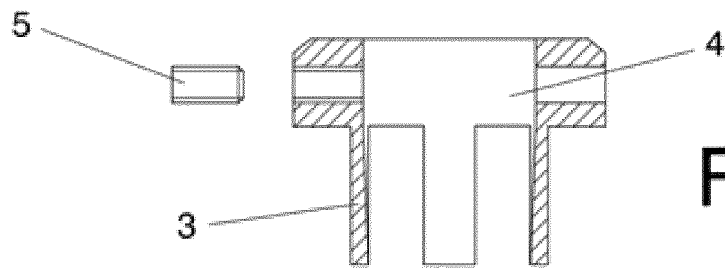


FIG. 2-B

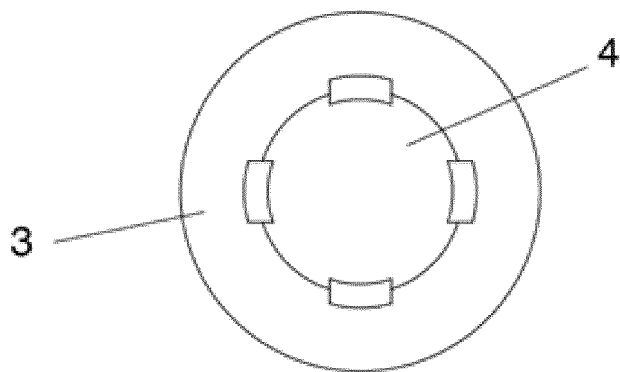


FIG. 2-C

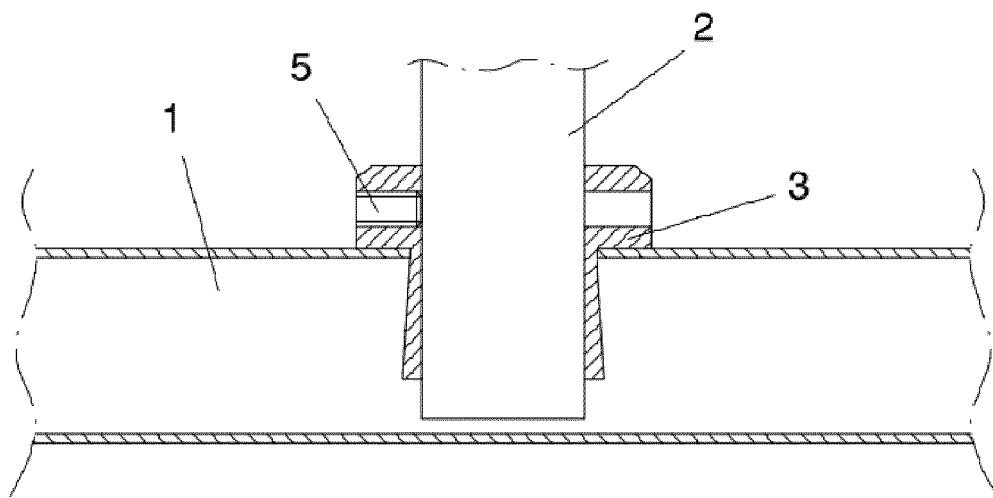


FIG. 3

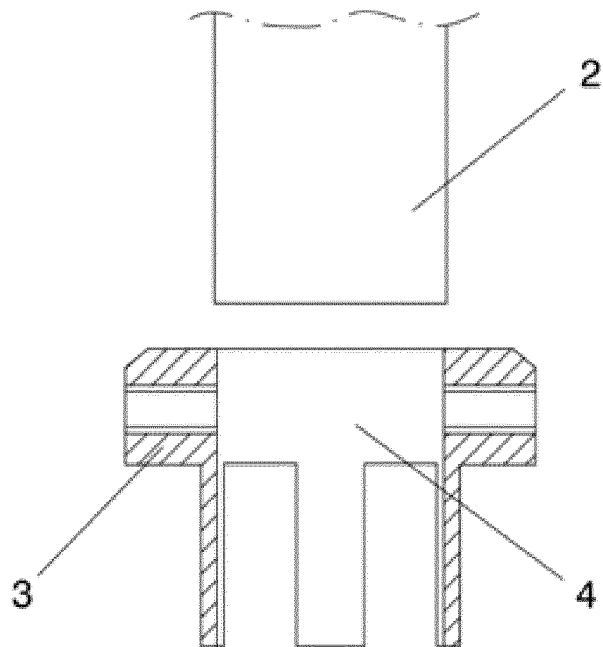


FIG. 4-A

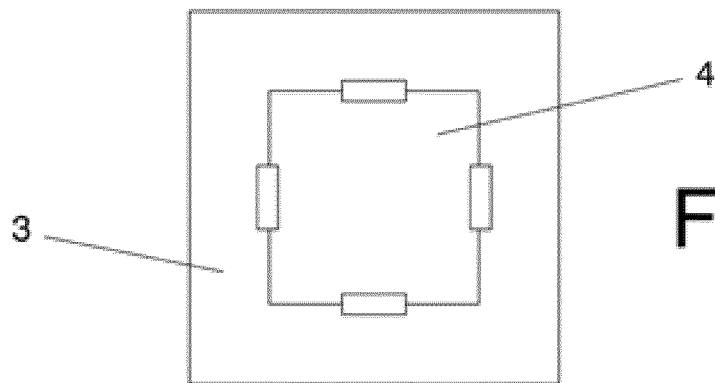


FIG. 4-B

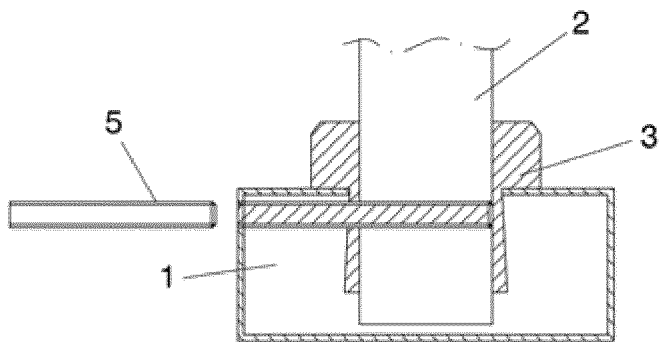


FIG. 5-A

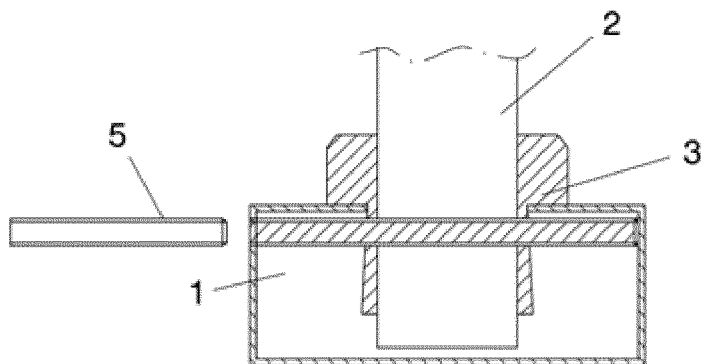


FIG. 5-B

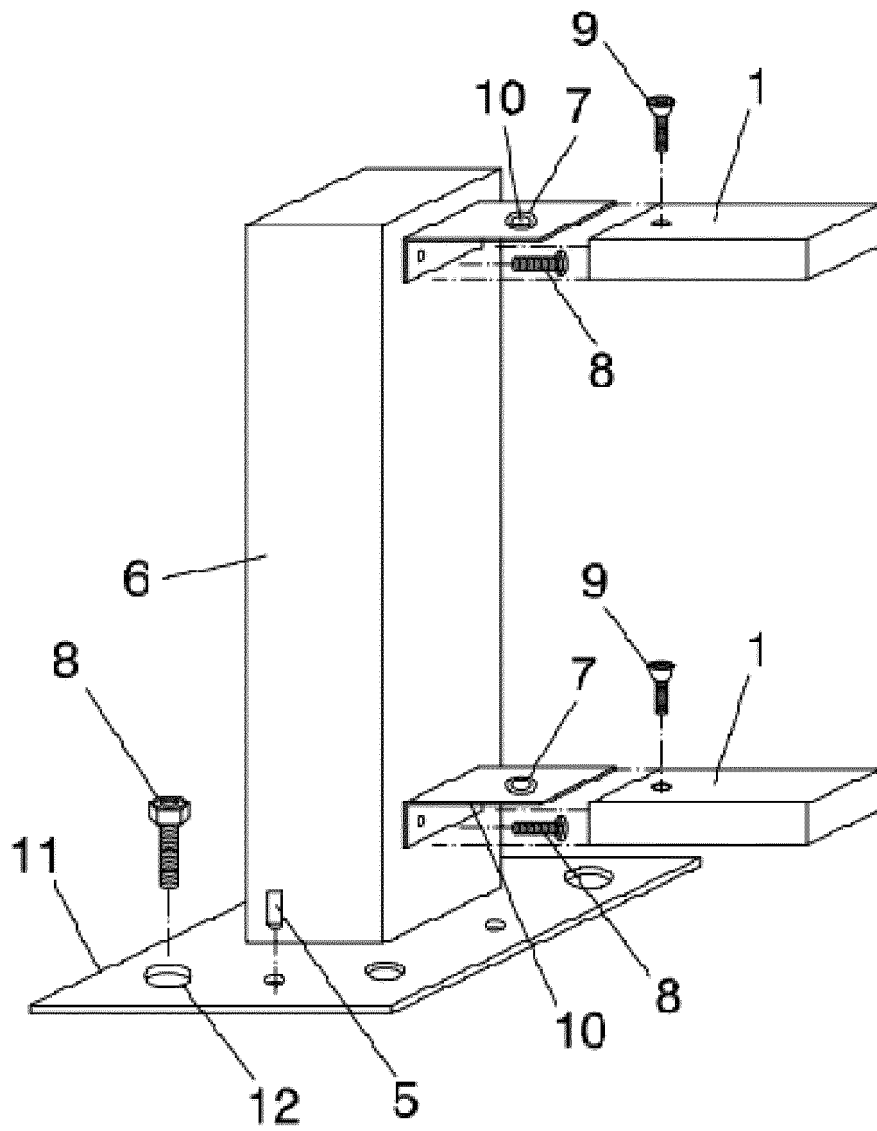


FIG. 6

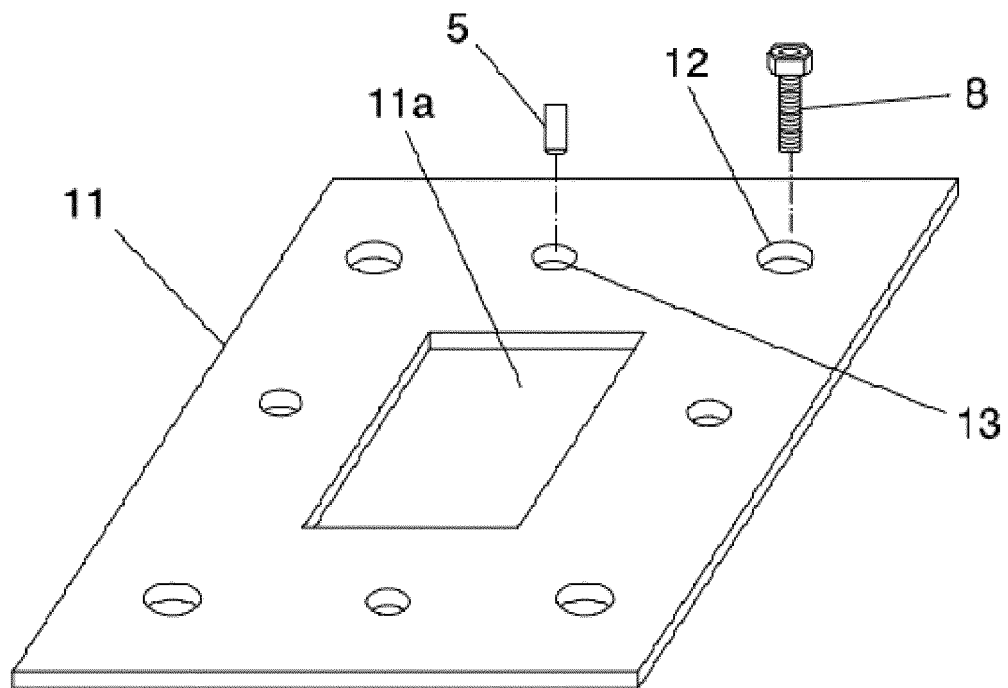


FIG. 7

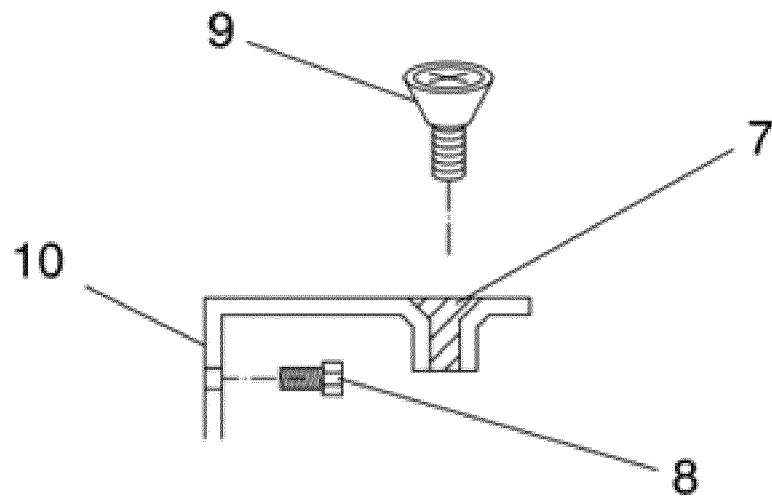


FIG. 8-A

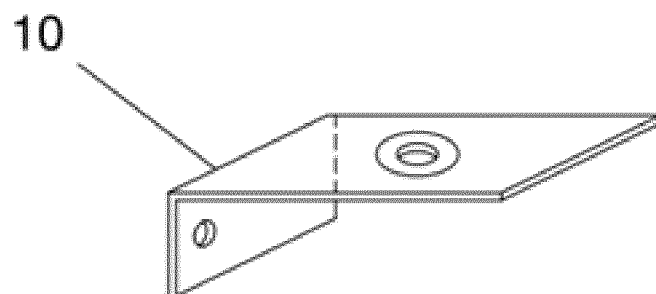


FIG. 8-B

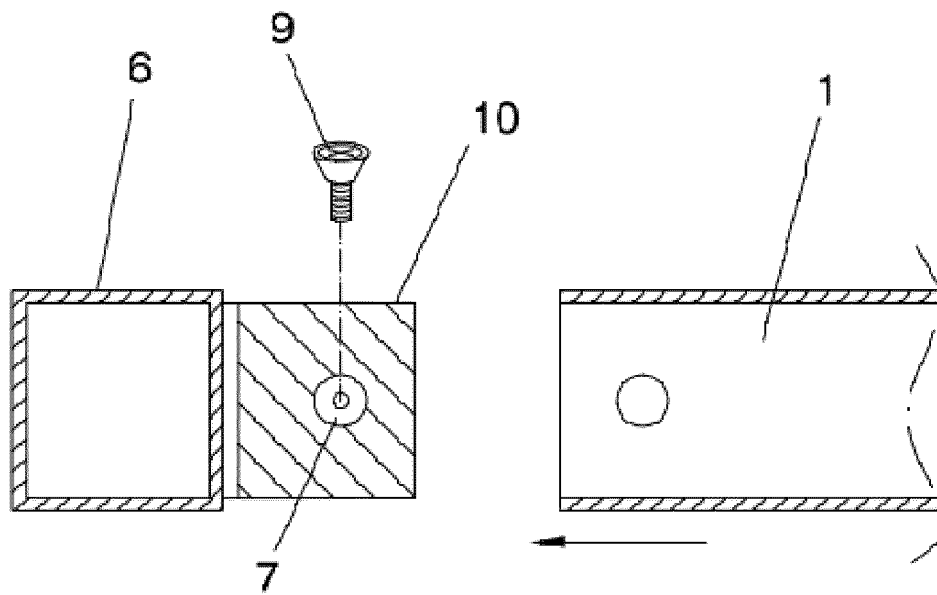


FIG. 9

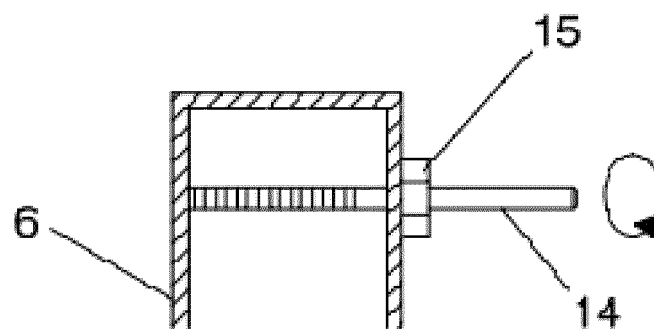


FIG. 10-A

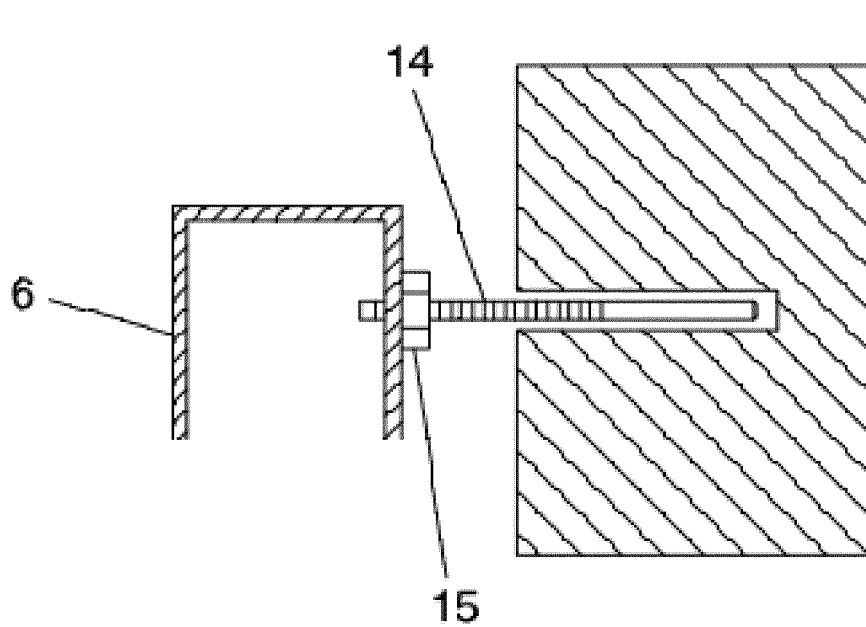


FIG. 10-B

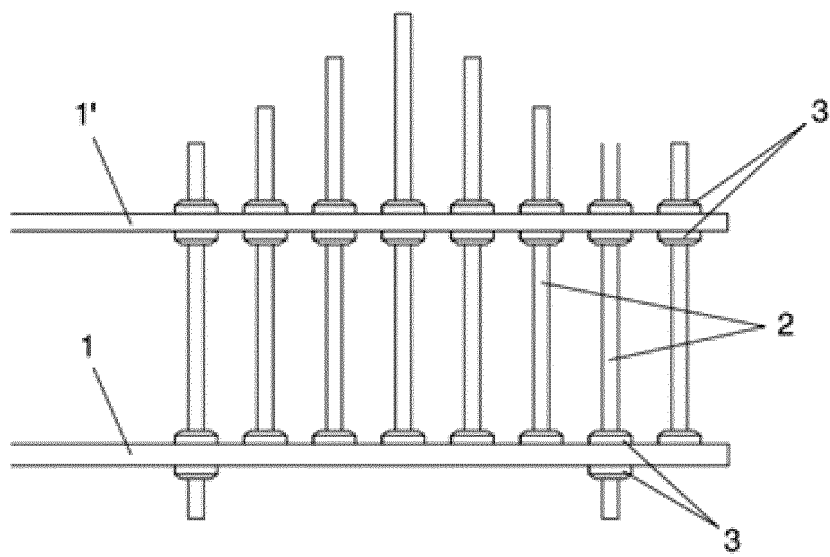


FIG. 11

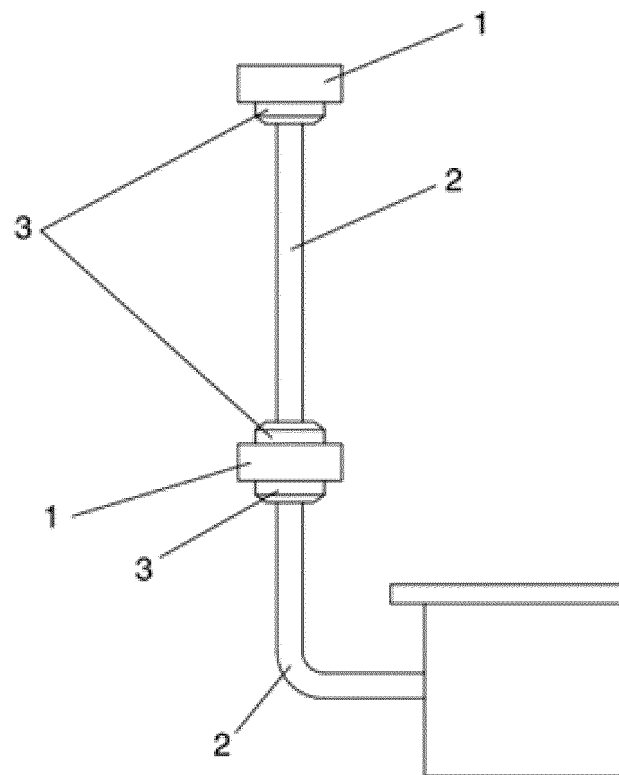


FIG. 12

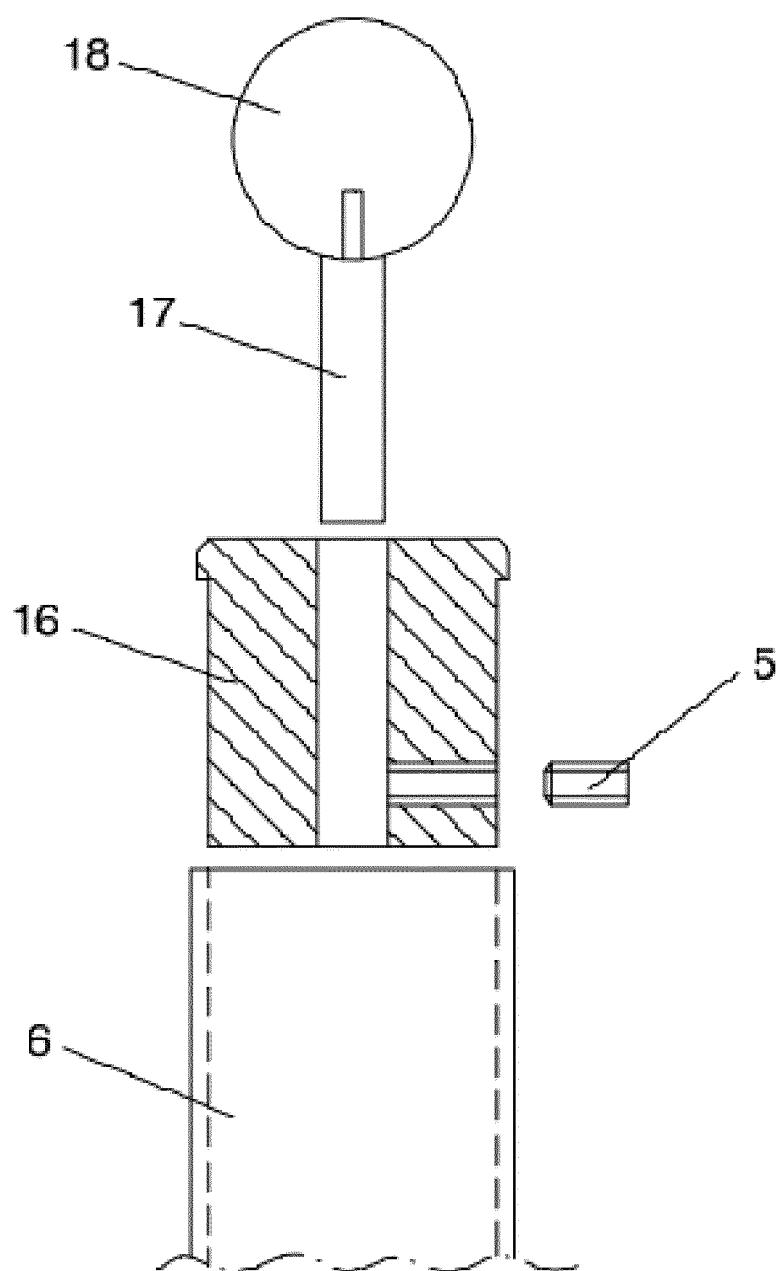


FIG. 13

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2012/070629

A. CLASSIFICATION OF SUBJECT MATTER

E04F11/18 (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)

E04F

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.
Y	CA 2462360 A1 (WALKER SIMON) 01/10/2005, page 4, line 30 - page 6, line 24; figures.	1-6
Y	DE 29605377 U1 (SCHUECO INT KG) 15/05/1996, figures.	1-6
A	AU 7655074 A (TUBEMAKERS AUSTRALIA) 17/06/1976, page 2, line 21 - page 3, line 23; page 4, line 9 - page 5, line 7; figures.	1,2
A	FR 2048324 A5 (MARTINEZ RAPHAEL) 19/03/1971, figures.	1,4
A	US 3918686 A (KNOTT KEN E ET AL.) 11/11/1975, figures.	1-6

☒ 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
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Date of the actual completion of the international search
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(12/11/2012)

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Authorized officer
R. Peñaranda SanzoOFICINA ESPAÑOLA DE PATENTES Y MARCAS
Paseo de la Castellana, 75 - 28071 Madrid (España)
Facsimile No.: 91 349 53 04

Telephone No. 91 3493051

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2012/070629

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2559192 A1 (COUTIER CHARLES ETS) 09/08/1985, abstract; figures.	1-6

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2012/070629

Information on patent family members

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
CA2462360 AC	01.10.2005	AU2005228921 A AU2005228921 B WO2005095737 A MXPA06011252 A CN1961125 A US2007209316 A US7677000 B NZ550172 A	13.10.2005 27.05.2010 13.10.2005 08.03.2007 09.05.2007 13.09.2007 16.03.2010 28.10.2011
DE29605377 U	15.05.1996	NONE	
AU7655074 A	17.06.1976	NONE	
FR2048324 A	19.03.1971	DE2052659 A	15.07.1971
US3918686 A	11.11.1975	NONE	
FR2559192 AB	09.08.1985	NONE	

Form PCT/ISA/210 (patent family annex) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2187389 A [0011]
- AU 7655074 [0012]
- CA 2462360 [0012]