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(72) Inventor: **DEL CAMPO Y RUIZ DE ALMODOVAR, Cesar**  
**11500 El Puerto de Santa Maria (Cádiz) (ES)**

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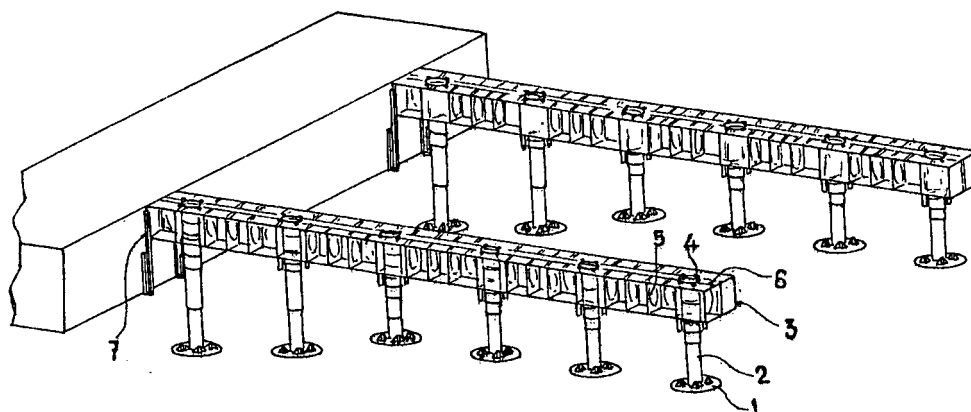
(74) Representative: **Garcia-Cabrerizo y del Santo, Pedro Maria**  
**Oficina Garcia Cabrerizo, S.L., Vitruvio, 23**  
**28006 Madrid (ES)**

(71) Applicant: **Grupo De Ingenieria Oceanica, S.L. Tenerife, Islas Canarias (ES)**

(54) **UNIVERSAL FLOATING AND LAUNCHING SYSTEM AND OPERATING METHOD**

(57) Universal refloating and launching system and method comprising one or several platforms on which the load desired to be immersed or extracted from the sea will be placed. For introducing a load in water, the platform has to be fixed to the dock, through a system that allows it to move up and down in height, then fixing

it to the bottom, through pillars and piles, and finally placing the load thereon. With the load placed, the platform is lowered so that the load is slightly immersed and may float. If the aim is to extract a load from the water, the operations will be reversed: starting with the immersed platform, the load is placed above and then the platform is lifted, so that the load can be moved to the dock.



**FIGURE 1**

## Description

### Technical field of the invention

[0001] The technical field wherein the invention belongs is that corresponding to different systems for re-floating and launching ships or platforms, either in sea or inland waters.

### Background of the invention

[0002] Currently, there are four main systems for launching and hoisting different types of ships or floating platforms.

- Slipway: it is the more primitive system, currently used for smaller ships of small burden. It consists of an inclined plane on which the object to be immersed or lifted is moved.
- Dry dock: it is a lock wherein the ship is introduced, and once closed the water is pumped from inside until placing the boat on a bed or keel block.
- Floating dock: This is a naval appliance that by flooding tanks, it sinks the structure allowing the boat to be repaired or built to pass through. Once in place, these tanks get smaller causing the elevation of the assembly, thus achieving the put into dry dock.
- *Sincrolift*: it is a system of articulated beams or winches having mechanical hooks at their ends. The assembly can be synchronously operated generating a lifting platform for large burden.
- There is another system that only serves for launching ships or floating appliances, which is the slip that is nothing more than an inclined plane on which the ship or appliance to be refloated is built on lubricated skids.

[0003] All these systems are expensive and not very flexible or versatile and above all there are few facilities, whereby refloating ships and appliances of new construction or repairing or performing maintenance works on those existing, must necessarily be therein wherein there are long distances towards the final installation site or from the usual workplaces. An economical and simple installation that can be installed on any existing dock extraordinarily eases the performing the reparation or maintenance works on resident or operating fleet around, and manufacturing production platforms and floating appliances of any kind around the installation site.

[0004] Therefore, the present invention is intended for describing a refloating regardless of size or weight thereof, nor the type of soil of the location, and which would be done in an economically viable manner.

### Description of the invention

[0005] The launching system object of the present invention provides a fully flexible and multi-purpose sys-

tem.

[0006] This system comprises one or several platforms on which the load (boat, platform or floating structure ...) desired to be immersed or removed from the sea will be supported. If it is a large size or weight cargo, two or more platforms may be installed in parallel and with sufficient length for said load. On the other hand, for example if a small boat is desired to be launched, a single platform not too long would be enough.

[0007] In order to introduce a load into the water, the platform has to be fixed to the dock at the first place, through a system that allows it to be lifted and lowered in height, and comprises vertical slide guides fixed to the edge thereof.

[0008] Then the platform is supported on the bed, through telescopic pillars. If the bottom of the dock is sludge or a material with little load capacity, the system has tubes for driving and automatically inserting the piles, on which the base of each column of telescopic tubes will be supported in the future ensuring the load capacity and eliminating uneven settlements. Platform is supported on the ground on piles previously executed, by simply injecting water into the cylinders making up the set for telescopic supporting on the ground. Under pressure water is continuously injected until the pillars move down and the platform moves up until leveling the dock.

[0009] Once the platform(s) are leveled with the dock, the load is put on them with a load transfer system.

[0010] With the load placed, the platform is lowered, by simply opening the valves retaining the water inside the cylinders. Then the valves of the ballast tanks of the launching platform are opened, which aim to keep it immersed under the load floating level, so that said load loses contact with the platform, starts floating and is capable of being towed.

[0011] If the aim is to extract a load from water, the operations will be reversed: starting with the immersed platform, the load is placed above and then the platform is lifted, first by emptying the ballast tanks and then by injecting water under pressure inside the telescopic hydraulic cylinders, until leveling it with dock and the load can be transferred to land through the previously installed load transfer system.

[0012] In the detailed description the structural details of the claimed invention are described in detail.

[0013] Addressing the problems mentioned in the previous section, the solution that has been developed and which protection is requested has the following advantages over that existing in the state of art:

- Multi-purpose: since it serves for all types of loads, regardless of weight or size.
- Easy to be mounted and demounted.
- Reusable and transferable to another port

### Description of the figures

[0014] In order to complete the description being made

and for helping to a better understanding of the features of the invention, a set of drawings is accompanied, wherein with an illustrative and not limitative manner, the following has been representative:

Figure 1: Perspective of the refloating system with two support platforms.

Figure 2: Elevation of the refloating system.

Figure 3: Plan of the refloating system.

Figure 4: Details of the connection to the dock of the refloating system.

Figure 5: Platform with two rows of support pillars.

**[0015]** A list of references used in the figures is provided below:

- (1) Support plate
- (2) Telescopic pillars
- (3) Load beam
- (4) Auxiliary pilot tubes
- (5) Internal structure
- (6) Sliding rails
- (7) Guides in the dock

#### Detailed description of the invention

**[0016]** In order to achieve a better understanding of the invention the claimed refloating and launching system is now described based on the presented figures.

**[0017]** As shown in Figure 1, the system consists of one or several support platforms (two shown in the figure) of the length that is required depending on the size of the load. On these support platforms the load desired to be set afloat will be placed. For larger loads, platforms can have two or more rows of telescopic pillars, such as shown in Figure 5.

**[0018]** These support platforms are fixed to the dock through vertical guides (7) screwed in a direction perpendicular to the water surface. Guides (7) are composed of two U-section rails between which a cylinder having the ends of larger in diameter than the center bar (i.e., dumb-bell-shaped) is fitted. The objective pursued when the cylinder is thus designed is that those wider ends be those engaging the U-shaped guides and sliding along them, being able of moving up and down. In the center of the cylinder an axis that will connect the support platform to the dock is articulated by a ball-joint or equivalent joint. The fact that said axis is connected by a joint, gives the support platform one degree of freedom, so that the movement thereof has a game letting it slightly oscillates from up to down.

**[0019]** Moreover the support platform may go up and down, as will be explained later, to any height desired by sliding along the guides (7) fixed to the dock.

**[0020]** Each support platform comprises a load beam of the box type (3) stiffened with an internal structure (5). At the top of the beam (3) sliding rails (6) are located, which will allow the load to be refloated slides along them

until placing at the required location.

**[0021]** Each beam (3) has a series of supports of the telescopic pillar type (2) base of which is formed by a plate so-called support plate (1).

5 **[0022]** This support plate (1) has a series of drill-holes (in Figure 3 four are shown) so-called auxiliary pilot tubes (4) that are matched with as many through drill-holes or auxiliary tubes (4) that the beam (3) has around the pillar.

10 **[0023]** The objective of said auxiliary tubes (4) is to introduce through them, from the beam (3), some piles for being driven and inject into the bottom to the depth needed to create a firm base for the plate support of the structure when working, preventing differential settlements regardless of the type of ground.

15 **[0024]** Now what would be the method of operation of the device in case introducing a boat, platform or any kind of structure in the sea is explained. The method comprises the following steps:

- 20 - For any installation, the appropriate platforms have been previously designed and built, depending on their intended use: if they are to repair and maintenance the operative fleet around its characteristics and whether these are for manufacturing platforms or appliance, depending on their weights and dimensions.
- 25 - Then the vertical displacement guides of each platform are fixed to the dock edge. For this purposes, two U-shaped guides are screwed, with steel and epoxy raw plugs, perpendicular to the water surface, at the dock and through which a cylinder (with the ends of larger diameter) sliding along the guides, moving up and down is introduced.
- 30 - In the center of the cylinder an axis connecting the support platform with the guides (7) and, consequently, with the dock is held by a joint.
- 35 - Once the support platform is fixed to dock, water is introduced through valves into the pillars (2), which by being telescopic, will be unfolding and moving down until the support plate (1), which is in their base, rests on the bottom. If this were not enough consistent, piles would be driven and injected to the required depth in the seabed and coronation of which will be at the level of support plate, for this purpose through tubes (4) specially designed for this end would be used on the platform.
- 40 - At this time the structure is already fixed and guided to the dock and supported on piles or on the bottom, then, seawater is injected until leveling the platform with the dock. The roads previously installed on the dock and platform will be perfectly aligned and at the same level.
- 45 - The load desired to be refloated is moved on the platforms, using specially arranged support roads. The placement is done very quickly and easily by using a sliding system based on rolling (6), which is installed along the load beam (3).
- 50 - With the load placed, the platform is lowered, by sim-
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ply opening the valves retaining the water inside the pillars (2). Then the valves of the ballast tanks of the launching platform, which aim to keep it immersed under the load floating level are opened, so that said load loses contact with the platform, starts floating and can be towed .

- Once the load has been refloated, the water is completely taken out the pillars (2) using a pump.

[0025] Support platforms can remain afloat, joined to the dock and with the telescopic pillars (2) lifted. The fact that the axis connecting to the dock allows an up and down game because of the joint, is designed for this position, wherein the support platform floats on the water surface and can oscillate with the waves.

- The pillars folded with some sort of sheath to prevent their damage can be protected, if they are to be extended over a long period of time.

[0026] With this the method for refloating any type of facility or boat at sea is detailed.

[0027] If the aim is to extract a load from the sea, operations would be the same but starting with the pillars (2) and the platform immersed in water, so that the load can put thereon, once the load is supported, the pillars (2) are filled with water using valves, so that the support platform rises to the desired level and it is removed from the water through the load sliding system (6).

[0028] As you can see, this system is completely valid for refloating or extracting any type of boat or structure, regardless of its sizes, since only the number of support platforms, the number of telescopic pillars, which as mentioned can have two, three or even more rows of telescopic pillars parallel or spaced, or the diameter of the pillars have to be varied in order to adapt to the type of load desired to be immersed or extracted from the water.

## Claims

1. Universal refloating and launching system **characterized in that** it comprises one or several platforms for supporting the load having the capacity of being lifted or immersed in water through a vertical guides system (7) connecting the platform to the dock and to telescopic pillars (2) serving as support on the bottom.
2. Universal refloating and launching system according to claim 1, **characterized in that** the vertical guides (7) are screwed to the dock in a direction perpendicular to the water surface, and are composed of two U-section rails between which a cylinder having the ends of larger diameter than the center rod is fitted, so that said ends are those engaging the U-shaped guides and sliding along them, being able of moving up and down.

3. Universal refloating and launching system according to claim 2, **characterized in that** an axis connecting the support platform to the dock is articulated at the center of the cylinder by a ball joint or equivalent joint.

4. Universal refloating and launching system according to claim 1, **characterized in that** each support platform comprises a load beam of box type (3) stiffened with an internal structure (5), sliding rails (6) being located at the top of the beam (3) so that the load to be refloated slides along them until placing in the required place.

5. Universal refloating and launching system according to claim 4, **characterized in that** each beam (3) has a series of supports of the pillar telescopic type (2) base of which is formed by a plate so-called support plate (1) having a series of drill-holes, so-called auxiliary pilot tubes (4) matching with many other through drill-holes or auxiliary tubes (4) that the beam (3) has around the pillar.

6. Method of operation of the universal refloating and launching system according to that described in preceding claims comprising the following steps:

- Previous and built designing the appropriate platforms, in terms of the intended use.
- Then the vertical displacement guides of each platform are fixed to the dock edge. For this purposes, two U-shaped guides are screwed, with steel and epoxy raw plugs, perpendicular to the water surface, at the dock, and through which a cylinder (with the ends of larger diameter) sliding along the guides, moving up and down, is introduced.
- In the center of the cylinder an axis connecting the support platform with the guides (7) and, consequently, with the dock is held by a joint.
- Once the support platform is fixed to dock, water is introduced through valves into the pillars (2), which by being telescopic, will be unfolding and moving down until the support plate (1), which is in their base, rests on the bottom. If this were not enough consistent, piles would be driven and injected to the required depth in the seabed and coronation of which will be at the level of support plate, for this purpose through tubes (4) specially designed for this end would be used on the platform.
- At this time the structure is already fixed and guided to the dock and supported on piles or on the bottom, then, seawater is injected until leveling the platform with the dock.
- The load desired to be refloated is moved on the platforms, using specially arranged support roads.
- With the load placed, the platform is lowered,

by simply opening the valves retaining the water inside the pillars (2). Then the valves of the ballast tanks of the launching platform, which aim to keep it immersed under the load floating level are opened, so that said load loses contact with the platform, starts floating and can be towed .

- Once the load has been refloated, the water is completely taken out from the pillars (2) using a pump.

- Support platforms can remain afloat, joined to the dock and with the telescopic pillars (2) lifted.

7. Method of operation of the universal refloating and launching system according to claim 6 **characterized in that** if the pillars (2) will be extended over a long period of time these are protected with some type of sheath in order to avoid their deterioration.

#### Amended claims under Art. 19.1 PCT

1. Universal refloating and launching system **characterized in that** it comprises one or several platforms for supporting the load having the capacity of being lifted or immersed in water through a vertical guides system (7) connecting the platform to the dock and wherein each support platform comprises a load beam of the box type (3), which has a series of supports on the bottom, being such supports telescopic pillars (2) the bases of which are formed by a plate so-called support plate (1) having a series of drill-holes matching with many other through drill-holes that each beam (3) has around the pillar for the insertion of auxiliary pilot tubes.
2. Universal refloating and launching system according to claim 1, **characterized in that** the vertical guides (7) are screwed to the dock in a direction perpendicular to the water surface, and are composed of two U-section rails between which a cylinder having the ends of larger diameter than the center rod is fitted, so that said ends are those engaging the U-shaped guides and sliding along them, being able of moving up and down.
3. Universal refloating and launching system according to claim 2, **characterized in that** an axis connecting the support platform to the dock is articulated at the center of the cylinder by a ball joint or equivalent joint.
4. Universal refloating and launching system according to claim 1, **characterized in that** load beam of box type (3) is stiffened with an internal structure (5), sliding rails (6) being located at the top of the beam (3) so that the load to be refloated slides along them until placing in the required place.
5. Method of operation of the universal refloating and

launching system according to that described in preceding claims comprising the following steps:

- Previous and built designing the appropriate platforms, in terms of the intended use.

- Then the vertical displacement guides of each platform are fixed to the dock edge. For this purposes, two U-shaped guides are screwed, with steel and epoxy raw plugs, perpendicular to the water surface, at the dock, and through which a cylinder (with the ends of larger diameter) sliding along the guides, moving up and down, is introduced.

- In the center of the cylinder an axis connecting the support platform with the guides (7) and, consequently, with the dock is held by a joint.

- Once the support platform is fixed to dock, water is introduced through valves into the pillars (2), which by being telescopic, will be unfolding and moving down until the support plate (1), which is in their base, rests on the bottom. If this were not enough consistent, piles would be driven and injected to the required depth in the seabed and coronation of which will be at the level of support plate, for this purpose through tubes (4) specially designed for this end would be used on the platform.

- At this time the structure is already fixed and guided to the dock and supported on piles or on the bottom, then, seawater is injected until leveling the platform with the dock.

- The load desired to be refloated is moved on the platforms, using specially arranged support roads.

- With the load placed, the platform is lowered, by simply opening the valves retaining the water inside the pillars (2). Then the valves of the ballast tanks of the launching platform, which aim to keep it immersed under the load floating level are opened, so that said load loses contact with the platform, starts floating and can be towed .

- Once the load has been refloated, the water is completely taken out from the pillars (2) using a pump.

- Support platforms can remain afloat, joined to the dock and with the telescopic pillars (2) lifted.

6. Method of operation of the universal refloating and launching system according to claim 5 **characterized in that** if the pillars (2) will be extended over a long period of time these are protected with some type of sheath in order to avoid their deterioration.

#### Statement under Art. 19.1 PCT

#### Amendments made

The following amendments have been made to the

claims:

- The characteristics of initial claim 5 have been included in claim 1.
- Consequently, initial claim 5 has been removed. 5
- The drafting of claim 4 has been slightly amended.

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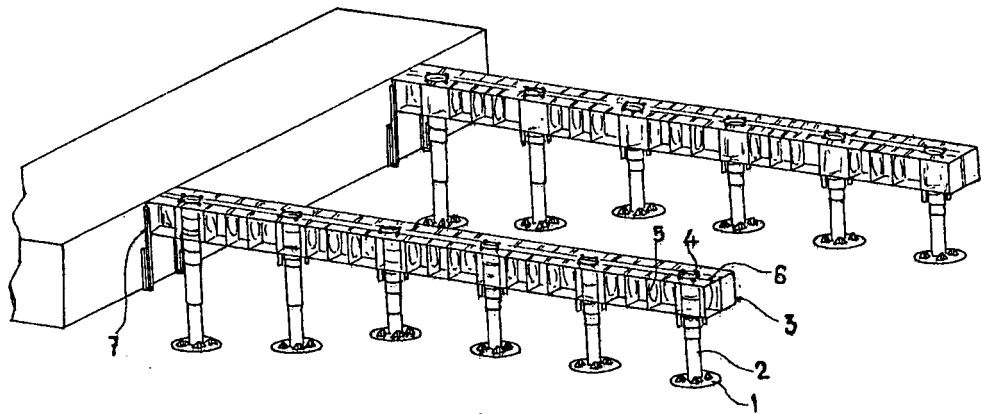


FIGURE 1

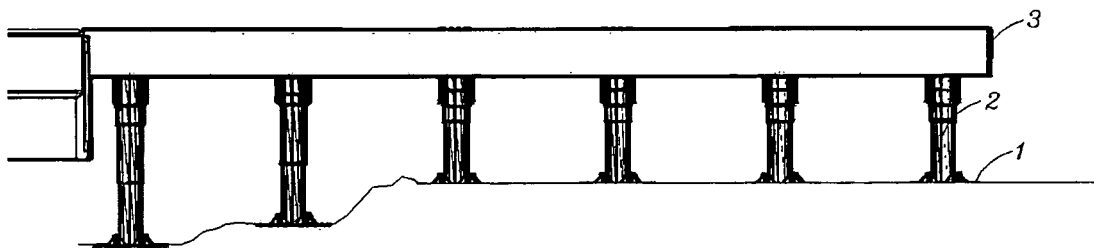


FIGURE 2

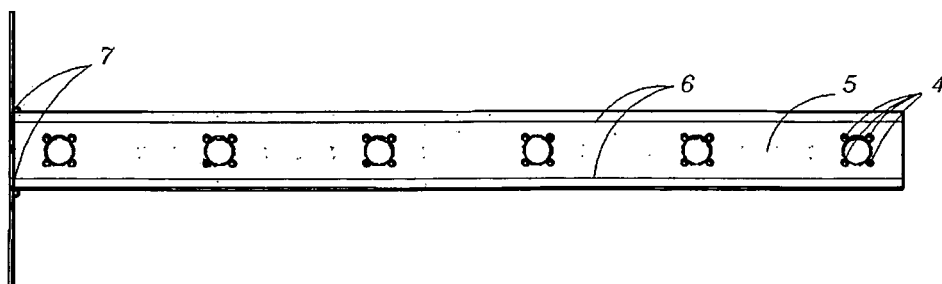


FIGURE 3

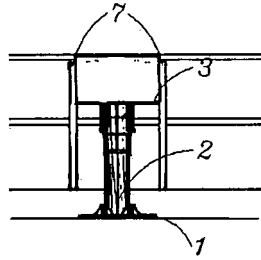


FIGURE 4

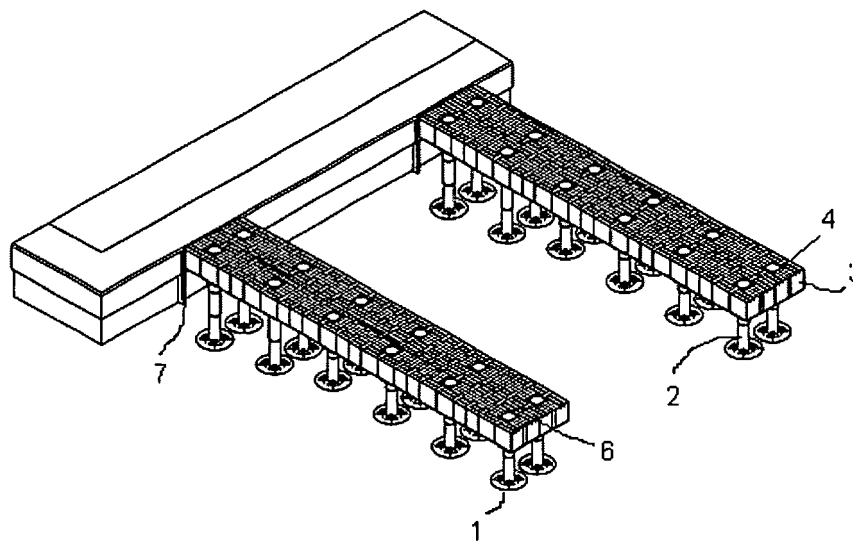


FIGURE 5

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/ES2010/000503

A. CLASSIFICATION OF SUBJECT MATTER		
<b>B63C3/06</b> (2006.01) <b>E02C5/02</b> (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) B63C, E02C		
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	US 4708081 A (AMIRIKIAN ARSHAM ) 24/11/1987, column 2, lines 6 - 46; figures 1 - 3.	1-7
Y	FR 1385516 A (ALSTHOM CGEE ) 15/01/1965, page 1, paragraph[13] - page 2, paragraph[1]; figure 2.	1-7
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A	US 6547485 B2 (ELSON, TODD A) 15/04/2003, column 2, lines 8 - 34; figures 4 - 6.	1,2 y 3
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 "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 "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 24/05/2011		Date of mailing of the international search report (25/05/2011)
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 F. Jara Solera  Telephone No. 91 3498606

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