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(71) Applicant: **Fatec, S.A.**
Méntrida (Toledo) (ES)

(72) Inventors:
- **SÁNCHEZ REÑASCO, JESÚS**
45930 MÉNTRIDA (TOLEDO) (ES)
- **SÁNCHEZ REÑASCO, JOSÉ MARíA**
45930 MÉNTRIDA (TOLEDO) (ES)

(74) Representative: **Polo Flores, Luis Miguel**
Polopatent S.L.
Doctor Fleming, 16
28036 Madrid (ES)

(54) FORMWORK FOR PRISMATIC COLUMNS

(57) Based on the conventional structure of formwork comprising an externally cylindrical tubular core (1), which, within, defines a prismatic housing (2), with a leak-tight lining (3), said core being housed inside a surround (4) provided with hinging regions so that the formwork can be folded up when stored or transported, the features of the invention focus on the fact that the inner surround extends, with respect to the upper and also the lower end wall of the formwork, in the form of as many fins (6) as faces have been provided for the column or pillar, between which, when the formwork is assembled, an annular, laminar body (7), obtained from cardboard, plastic, wood or another material of suitable stiffness, externally encloses same, the internal dimensions whereof will be adapted to the dimensions of said column, and the thickness or external dimensions whereof will be sufficient to constitute a formwork-stabilizing element, for which purpose provision has been made for said fins (6) to be able to fold and to attach to the surface of the annular body (7).

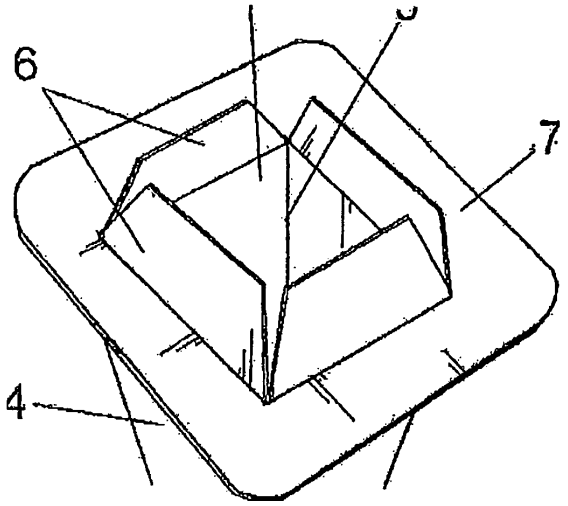

FIG. 3

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Description

OBJECT OF THE INVENTION

[0001] This invention pertains to a formwork of the type used in construction for producing prismatic columns, preferably of quadrangular section, although applicable to the production of columns with any polygonal section and with or without truncated vertices, a single-use formwork that can be eliminated at the time of stripping.

[0002] The object of the invention is to provide an extremely light, foldable formwork that is supplied in totally finished form, meaning that there is no need for specialized labor to assemble it or for additional materials such as adhesive tape and the like. Nor is there a need for intermediate assembly stages, so that final on-site assembly is extremely simple, with an equiangular distribution between the vertical faces of the prism corresponding to the column or pillar to be produced, as well as facilitating stabilization of the device in its emplacement and perfectly positioning the vertices of each column according to the desired orientation.

BACKGROUND OF THE INVENTION

[0003] Numerous types of formworks for prismatic columns are known, based on a cylindrical, tubular surround of sufficient stiffness, with a core that is also tubular, externally cylindrical in correspondence with said surround, and internally prismatic in correspondence with the column to be produced. The inner surface has a lining made from a plastic laminate or similar material, one adequate in any event to prevent the moisture in the column's constituent materials from damaging the formwork's structure while it is fulfilling its function.

[0004] The outer surround is generally made from cardboard, plastic, and aluminum, while the inner tubular core is made from four cylindrical segments of high-density expanded polystyrene, duly lined, either directly joined by their edges or with their edges discernibly distanced in order to produce bevels corresponding to the column edges.

[0005] As can be deduced from the structure described, the formwork leaves the factory with a cylindrical configuration of slightly greater diameter than the diagonal of the column to be produced. In other words, the formwork's volume is exactly the same when in storage or transport as it is when in use.

[0006] In an attempt to get round this storage and transport problem, formworks of the type mentioned above are known in which both the outer surround and the tubular core are cut along their generatrices, allowing independent storage and transport of both parts and permitting nested storage of multiple surrounds, minimizing occupation of space, and also allowing to some extent the dovetailing of their inner cores, also to save space. However, this solution presents a problem of great importance, the fact that a formwork structured in this way cannot be directly used by the building contractor, but requires an intermediate operational stage that generally has to be performed by a company working with the manufacturer and involves locking the tubular core onto itself, using, for example, an adhesive strip that is applied to the marginal area of the edges of the plastic laminate interior to said core at the same time that it is externally stabilized using a second adhesive tape, generally applied helicoidally.

[0007] This results in a notable increase in costs, a loss of time that delays delivery of the formworks, and above all, a loss of the formwork's internal surface continuity, which will have subsequent negative repercussions for the column's aesthetics.

[0008] Aiming to solve these problems, the applicant is the holder of invention patent PCT/ES2004/000235, which describes a formwork of the type discussed above, but with the difference that the tubular core is foldable at the storage and transportation stages, with a notable reduction in volume, the outer cover having at least one cut along one of its generatrices, allowing it to be mounted and dismounted on the tubular core at the time the formwork is used, with the aid of straps or locking elements that keep the tubular cover immobile in its working position or position for the pouring of concrete.

[0009] Said locking elements can take the form of straps or metal rings that encircle the formwork externally. The fundamental problem presented by this kind of formwork is the complexity of assembly of said locking elements when they are in the form of metal rings, given that said rings' inner diameter must be equal to the outer diameter of the tubular core's outer cover, in order to avoid gaps when assembled. This renders the insertion of said rings over the surround of the tubular core much more difficult, an operation that must be carried out by qualified personnel, resulting in loss of time and higher costs.

[0010] Likewise, it should be emphasized that when said locking elements take the form of straps provided with tightening elements or the like, said elements' lack of stiffness is an obstacle to ensuring the formwork's correct positioning and setup, allowing the internal walls or the walls corresponding to the prismatic column to lack the correct parallelism or equiangularity between faces.

[0011] In an attempt to work around these problems, the applicant is also the holder of invention patent 200602568/6, in which is described a formwork of similar structural characteristics, but with the difference that the formwork's outer surround is complemented by at least one semi-rigid ring with an inner diameter that matches the outer diameter of the surround. The ring fits tightly to the surround and has hinging regions along its generatrices that, in their storage or transport position, fit together with the hinging regions of the outer surround, while in the formwork's assembled position they are dephased from one another by turning the ring to a particular angle.

[0012] Even though this solution fulfils the function for which it was designed, in practice it presents assembly

problems, to which must be added the positioning of the formwork, and more specifically that of the vertices of the column or pillar to be produced, by means of external markings on said formwork.

DESCRIPTION OF THE INVENTION

[0013] The formwork for prismatic columns proposed by the invention provides a completely satisfactory solution to the problems described above, in each of the aspects commented on.

[0014] For this purpose, and based on the configuration described above, in which there is a foldable inner tubular core, constituted on the basis of four or more cylindrical segments made of light, thermally formed products, in accordance with the polygonal prismatic configuration to be given to the column or pillar to be produced, which cylindrical segments are externally attached by their curved faces to a likewise outer surround made of a sufficiently strong and flexible material, for example raffia, Kraft paper, etc., of cylindrical configuration, capable of adopting a flattened configuration thanks to the joined edges of the cylindrical segments attached to said surround, these segments having at least one leaktight lining on their inner faces in order to conveniently seal the chamber or receptacle in which the column will be shaped, which column may or may not have beveled edges, the invention is characterized by the fact that said formwork is supplied together with a laminate, annular piece of a configuration in accordance with the geometry of the column or pillar to be produced, made of cardboard, wood, plastic, or another material of suitable stiffness for said element, with an inner section having dimensions in accord with those of the column to be produced, and with appropriate external dimensions to enable stabilization of the formwork once assembled, as will be seen below.

[0015] As a complement to the structure described, the formwork's inner faces extend into folding tabs, so that when the formwork is unfolded, said tabs are introduced into the cavity of the annular piece, in such a way that for said coupling to be effected properly, the formwork must present the exact assembly configuration for pouring the concrete or mixture in question, ensuring a perfect coplanarity between the opposed faces of the column's constituent prism.

[0016] Therefore, the formwork will be supplied with two annular pieces, to which the tabs that emerge from both ends of the formwork will be internally coupled. For greater stabilization, said fins fold outward onto said annular piece, being attached to it by any conventional means, such as clamps, nails, adhesives, etc.

[0017] Once the fins have been attached to the annular pieces, the formwork can be attached to the floor or immobilized via said annular pieces, preventing the formwork from moving during the production of the column in question, by bracing with planks or any conventional means.

[0018] In accord with another of the invention's characteristics, said annular pieces have markings on their surfaces indicating the exact positioning of each of the column or pillar vertices, in order to enable exact positioning and alignment of the formwork during setup, ensuring parallelism between contiguous pillars.

DESCRIPTION OF THE DRAWINGS

[0019] To complement this description and for the better comprehension of the invention's characteristics, in accordance with a preferred embodiment of the same, a set of illustrations accompany said description as an integral part thereof. In these, by way of illustration and not of limitation, are represented the following:

Figure 1.- Shows a perspective view of a formwork for prismatic columns made in accord with the object of the invention, in its transport and storage mode.

Figure 2.- Shows a perspective view of the device in an initial stage of assembly.

Figure 3.- Shows a view similar to the previous figure, corresponding to an intermediate stage of assembly.

Figure 4.- Shows a view similar to the previous figure, corresponding to the final stage of assembly.

Figure 5.- Shows a perspective detail of the device's mounting position in place for use.

Figure 6.- Shows several plane views of an invention variant in which the annular bodies are subdivided into two elements attachable to one another in different positions, like those shown in the figure, in order to enable application to formworks of different sizes.

PREFERRED EMBODIMENT OF THE INVENTION

[0020] Looking at the figures, it can be seen how the proposed formwork starts with the basic structure of the formworks previously described, constituted on the basis of a tubular core (1) internally defining a prismatic housing (2), quadrangular in the chosen embodiment, but adaptable to any other polygonal configuration. The core (1) is externally cylindrical, constituted on the basis of cylindrical segments of expanded polyurethane or a similar light material, with a leaktight inner lining (3) in order to conveniently seal the chamber or housing (2), said core being housed and stabilized in the cavity of a surround (4) made of a sufficiently strong material, such as paper, plastic, or aluminum, without this enumeration being in any way limiting, and having hinging regions corresponding to the edges (5) of the prismatic column for folding the formwork for storage or transport, allowing minimal occupation of space.

[0021] Based on the structure described above, the

invention is characterized by the fact that the inner surround (3), which determines each of the prismatic column's faces, extends beyond the formwork's lower and upper bases in the form of fins (6). In the chosen embodiment these have an isosceles trapezoidal configuration, but a rectangular configuration could equally be used, without affecting the essence of the invention

[0022] Complementing the described structure, the formwork has a pair of annular bodies (7), in this case quadrangular, and in all cases with geometry in accord with the section of the column to be produced, these laminate, annular bodies (7) being made from cardboard, plastic, wood, or another material of suitable stiffness, the internal dimensions whereof will be appropriate for the dimensions of said column and the thickness whereof will be sufficient to determine the means of stabilizing the formwork, in such a way that the length of said fins will be appropriate for said thickness of the annular body (7).

[0023] More specifically, and as can be seen in the sequence of figures 1 to 5, once the formwork has been unfolded, pressure is exerted on it in such a way that the fins (6) adopt a disposition in which they face one another in pairs, forming orthogonal planes between the contiguous fins, as shown in figure 2, so that in this position, said annular body (7) can be fitted over said fins at both the upper and lower ends of the formwork, said body being supported on the ends or bases of the core (1), so that once each body (7) has been mounted, equiangularity is guaranteed between the formwork's internal faces, which determine the column to be produced.

[0024] Thereafter, as shown in figure 4, the fins are folded onto the surface of each side of the annular body (7), being attached to it by means of adhesive, clamps, nails, or any other conventional means.

[0025] Once this process has been completed for both ends of the formwork, it can be stabilized at its place of use by supporting it on said annular body (7), which acts as a supporting base that can be attached to the floor by bracing with planks or any other conventional means.

[0026] To enable easy and precise identification of where the determining vertices of the column or pillar edges will be positioned, said annular bodies (7) will have markings (8) on their surfaces in the form of an extension of the internal edges of said ring and which will extend out to the external edge of the same, aiding said identification.

[0027] It should equally be emphasized that, as is conventional with this type of formwork, it may or may not be supplied with means for scoring it for elimination when the column is completely finished.

[0028] In accord with a second embodiment of the invention, shown in figure 6, in order to reduce manufacturing costs, the annular body (7) can be divided into two L-shaped elements, attachable to one another using any conventional means (9), both at their ends and along their lengths, in different positions, as for example those shown in said figure 6, in order that said assembly can be adapted to different-sized formworks. This is done in such a way that, in any case, attaching said elements in an L will produce an annular frame of appropriate section for the formwork in question, onto which the formwork's fins (6) can be likewise folded and attached.

Claims

1. - Formwork for prismatic columns, of the type constituted on the basis of a tubular core (1) internally defining a prismatic housing (2), which core (1) is externally cylindrical, made up of cylindrical segments of a heat-formed product or other similar light material, with a leaktight inner lining (3), said core being housed and stabilized in the cavity of a surround (4) made of a sufficiently strong material and provided with hinging regions corresponding to the edges or bevels, as appropriate, of the prismatic column, so that the formwork can be folded to reduce space requirements when stored or transported, **characterized in that** the inner surround extends, with respect to both the upper and the lower base of the formwork, in as many fins (6) as the column or pillar is to have faces, over which fins, when the formwork is assembled, there fits externally an annular, laminate body (7), made of cardboard, plastic, wood, or another material of suitable stiffness, the internal dimensions whereof will be appropriate for the dimensions of said column, and the thickness or external dimensions whereof will be sufficient to constitute a formwork-stabilizing element following the folding and attachment of the fins (6) onto the surface of said annular body (7).

2. - Formwork for prismatic columns according to claim 1, **characterized in that** the annular body (7) has markings (8) on its surface to identify the positioning of the vertices determining the column edges with respect to the position of the formwork.

3. - Formwork for prismatic columns according to claim 1, **characterized in that** the annular body (7) is optionally subdivided into two pieces (7') and (7**"**) in an L configuration, attachable to one another by any conventional means, both at their ends and along their lengths, in order to allow the formation of different-sized frames adaptable to formworks of likewise multiple sections.

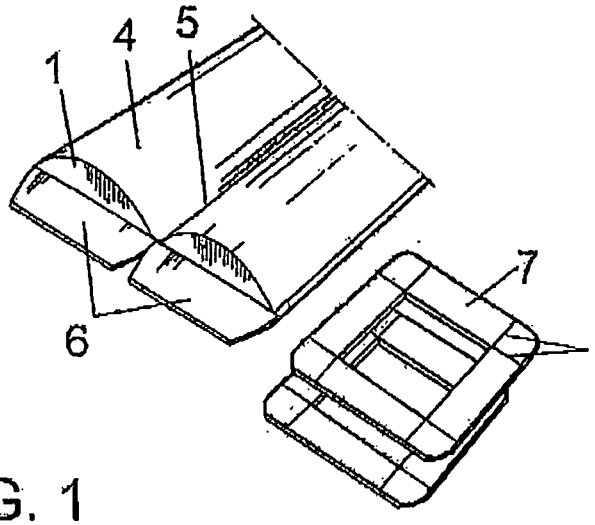

FIG. 1

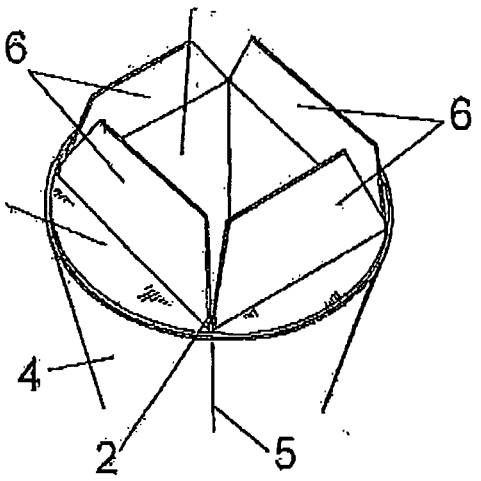

FIG. 2

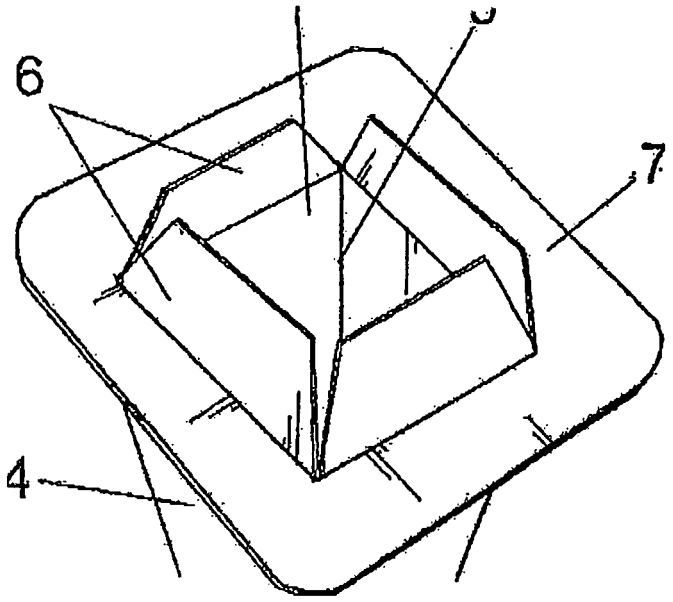

FIG. 3

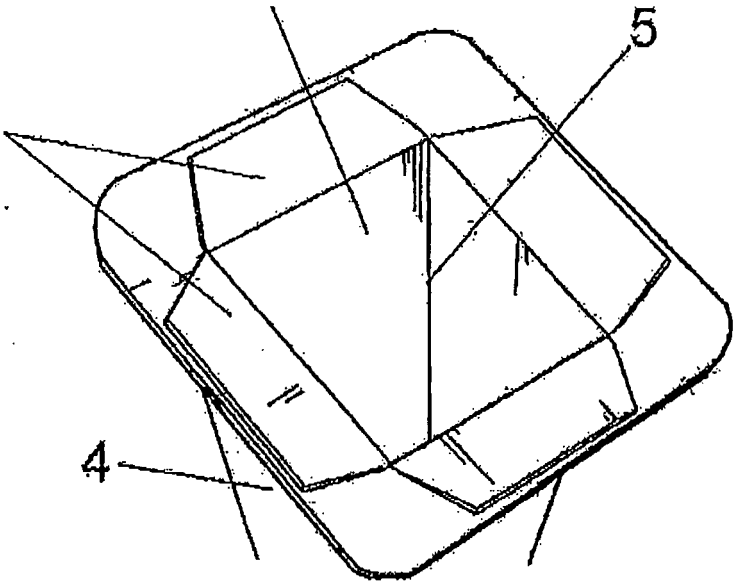

FIG. 4

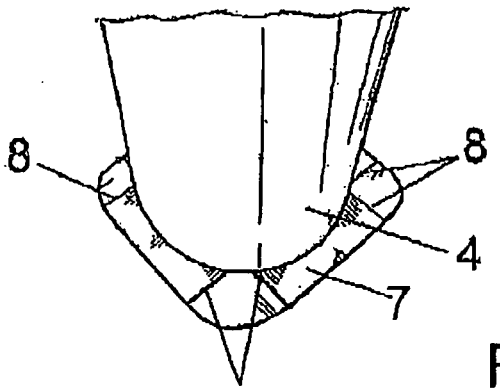

FIG. 5

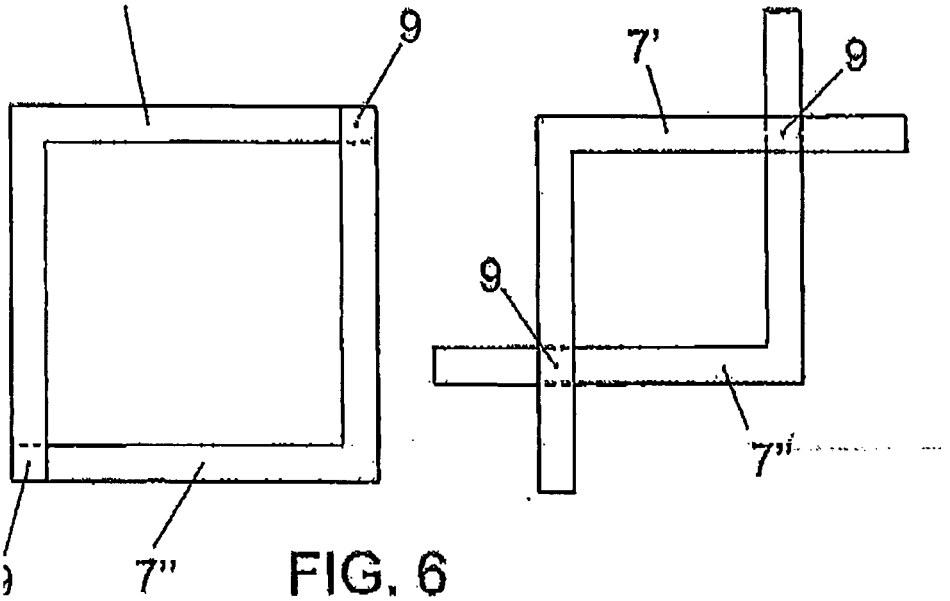

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2008/000725

A. CLASSIFICATION OF SUBJECT MATTER

E04G 13/02 (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)
E04G13/02

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)

INVENES,EPODOC,WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2005066592 A (HARTMAN; HUBER) 31.03.2005, paragraphs [0022], [0025] a [0028]; figures 1 a 4.	1
A	WO 9622431 A (KROKEN I MO AKTIEBOLAG) 25.07.1996, abstract; claims 1,6,8; figures 5,6,7.	1
A	EP 1482106 A (PLAKABETON COFFRATEC S.A.) 01.12.2004, abstract; paragraphs [0013] a [0020]; figures 1 a 4.	1
A	US 5390464 A (WEST MARK) 21.02.1995, column 5, line 1- column 6, line 20; figures 1 a 4.	1
A	WO 2005083199 A (SÁNCHEZ REÑASCO) 09.09.2005, abstract; figures 1 and 2.	1

☐ 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.
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"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
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"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
13.March.2009 (13.03.2009)	**(07/04/2009)**
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304	Authorized officer M. Sánchez Robles Telephone No. +34 91 349 5431

Form PCT/ISA/210 (second sheet) (July 2008)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ ES 2008/000725

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
US 2005066592 A	31.03.2005	NONE	
WO 9622431 A	25.07.1996	SE 9500126 A	18.07.1996
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		ES 2264313 AB	16.12.2006
		ES 2270651 AB	01.04.2007
		ES 2277479 AB	01.07.2007

Form PCT/ISA/210 (patent family annex) (July 2008)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES 2004000235 W **[0008]**