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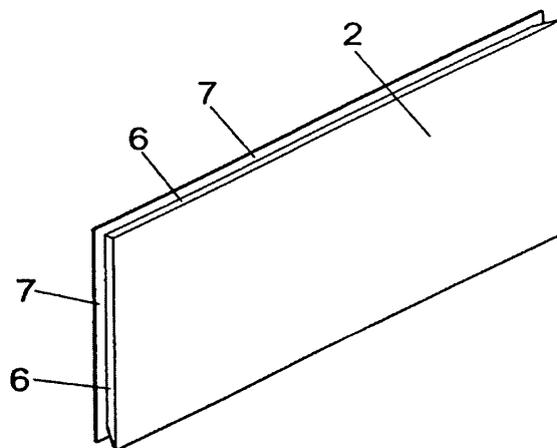
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(54) **EXTERNAL FINISHING PANEL FOR VENTILATED FACADES WITH PLEATED SYSTEM AND IMPROVED ASSEMBLY**

(57) External finishing panel for ventilated facades with a pleated system and improved assembly, of the single or composite type, consisting of a rectangular, metallic, sheet-like body (1), the top, bottom and lateral sides of which are folded towards a same side forming a tray (2), whereby folding of said sides forms a Z-shaped pleat, obtained by means of respective folding lines, i.e. an in-

ner line (3) and outer line (4), which are parallel to the edge (5) of the said body (2), resulting in a corresponding middle zone (6) and outer zone (7) which, after folding has been performed, remain oblique and parallel relative to the plane of the body of the tray (2). The outer zones (7) of the Z-shaped pleat are suitable for fixing, by means of screws (8), directly to the fastening profile (9) of the facade, remaining parallel thereto.



**FIG. 1**

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## Description

### OBJECT OF THE INVENTION

[0001] The invention, such as the title of the present specification states, relates to an external finishing panel for ventilated facades with pleated system and improved assembly.

[0002] In particular, the object of the invention focuses on a metallic panel, both single sheet and composite-type sheet, of the type applicable as external finishing to ventilated facades, which has the peculiarity of being provided with an innovative "Z"-pleated system for its sides providing outstanding advantages, when performing the assembly thereof, compared to the systems currently known in the market for the same purpose.

### APPLICATION FIELD OF THE INVENTION

[0003] The application field of the present invention is within the construction sector. Namely, within the construction of buildings with ventilated facade.

### BACKGORUND OF THE INVENTION

[0004] As it is known, the system with ventilated facade consists of a facade (outer envelope of a building) with an air chamber between the different layers of materials making it up, which further has the characteristic of being ventilated. That is, it includes openings, usually in the bottom of the facade and at the top, which generate a ventilation circuit that significantly improves the heat and tightness conditions of the facade. It also provides combinations of designs and materials other than those used in traditional facades.

[0005] The key elements forming a ventilated facade are two:

- Finishing material
- Assembling system

[0006] The completion and finishing materials, i.e., the external material of the building used for this type of facades is often mainly of three types:

- Metallic. Being single sheets of a single material (aluminum, copper, zinc, steel, etc.) of variable thickness and generally between 0.5 mm and 2mm, or either composite type sheets, usually composed of two metallic sheets with a thickness of 0.5 joined through a plastic (PVC type) material that provides rigidity and stability to the panel, with an approximate thickness of 3/4mm, forming a composite element of an overall thickness of 4/5mm. The dimensions of each of the panels can be very diverse, with widths ranging from minimum measures up to 6m, and panel heights from 10cm to 1.5m, depending on the measures of the lamination coil of the material and fastening system

used in the facade.

- Stone and ceramic. Made from stone slabs or ceramic elements with a thickness of between 1cm (common in porcelain compact stoneware ceramic tiles) and 10cm, which could be a stone slab; although for this material the most common thicknesses range between 2 and 4cm. Among these materials the extruded ceramic materials are also, with the possibility of hosting pockets within the panel, which in turn increase the insulating capacity of the facade. The panel sizes are conditioned by the material and in a lesser extent by the fastening system, measures of 1m of wide and 0.5m tall being still common, usually assuming a 50% variation from this measure.
- Clusters. Made from resins either combined with stone-based materials (dry type) or with wood chips or pulp. Within this group of the compact concrete type materials or phenolic resins are found. The panel sizes are similar to those of the stone elements for dry-based clusters being able of significantly increasing up to measures of approximately 3m in the case of wood pulp chips- based clusters.

[0007] Moreover, all fastening systems have a very similar structure. These are vertical or horizontal profiles, usually metallic (aluminum or steel) that are fasten to the base facade of the building, or either to the structural elements thereof (columns, beams, framings...). The exact mapping of the facade explicitly depends of this part of the construction process. From there, the variation of each system depends on how the material is fastening to said profiles. Two fastening systems of the panel to the profile can be commonly found:

- Mechanical system. It consists of any kind of fasteners (clips, screws, bolts...) that do not use chemical elements. These can be seen or hidden and there are a variety of systems at the moment, depending mainly on the type of finishing material.
- Chemical system. It is based on adhesives and glues.

[0008] The combination of composite type metallic sheets with a fastening system based on mechanical elements is one of the most common in ventilated facades. Generally, it consists of panels that are machined, milled, and pleated forming a tray; which sides of said tray are used to locate the machinings used to hang the system, allowing the front of the building's facade offers only the cutting up of the used material, without seen the fastening elements thereof.

[0009] The disadvantage during the assembly is the requirement of a precise location of the hanging systems, having difficulty of varying in case of error, since the millings of the tray sides have an exact position. On the other hand, the system itself involves indirect measures in the assembly, since it does not sit the position of the panel, but the measure of the panel ends to the fastening points

thereof; the constant use of mathematical operations, although simple, for the location usual causes errors in the assembly.

**[0010]** Moreover, the position of the tray, with this hanging system must necessarily be horizontal, because, basically, the trays are hanging elements with possible horizontal displacement, which does not allow tilted design cuttings on the facade.

**[0011]** The vertical section of the trays forms an "L" on top thereof and a "U" or inverted "L" at the bottom, so that each overlaps the next, assembling the top one on the lower one and preventing the entry of water into the inner chamber of the facade. The disadvantage of this system is that the replacement due to a failure, defect or damage of one of the panels necessarily involves the disassembly of all panels that are vertically above from that to be replaced.

**[0012]** The facades that employ this type of materials are commonly called "self-cleaning", because the extremely smooth surface prevents the settling of dust and pollution thereon, and the rain itself is able of eliminating the few remains that might be adhered thereto. However, the shape of the trays, with their horizontal joint, offers a small shelf wherein environmental pollution is easily deposited, which is dragged and trampled by the facade when rainfall occurs, causing the opposite effect to that originally designed, this being one of the biggest aesthetic handicaps so are the economic ones, since this raise the cost of building maintenance, given the high complexity of the cleaning systems to be used.

**[0013]** It is therefore a clear need to create a system that avoids the aforementioned drawbacks presented in this type of panels, this being the essential objective of the external finishing panel for ventilated facades with pleated system and improved assembly proposed by the present invention, moreover having noted that the applicant is not aware of the existence any other having technical, structural and similar configuration characteristics.

## DESCRIPTION OF THE INVENTION

**[0014]** Thus, the external finishing panel for ventilated facades with pleated assembly and improved system proposed by the invention is configured as a remarkable improvement over the systems currently known in the market, since according to its implementation reaching the objectives above described as appropriate can be accomplished in an exhaustive manner, with the characterizing and distinguishing details that make it possible being appropriately reflected in the final claims accompanying the present specification.

**[0015]** In particular, it is a metallic panel (simple or composite type) for ventilated facades innovative pleated system of which improves and simplifies the assembly system, solving the problem of dirt on the facade, providing greater assurances of tightness and providing developments in the cutting design of building facades.

**[0016]** To this end, said pleated plate system differs

from the one used so far. It consists of using a "Z" shaped pleat at the edge of the panel, obtaining a panel symmetrical in both vertical and horizontal axes. Said folding method allows the dust and pollution, accumulated on the tray shelf to be dragged inward when rainfalls occur, and from there the water is drained, by the gravity effect itself, towards the tray sides, from which runs along the vertical joint to the bottom end of the facade, continually dragging the dirt through not visible zones thereof, until its total evacuation.

**[0017]** In addition, this form of the edge of the tray causes the appearance of a small plate surface, parallel to the fastening profile, so there is no longer to depend on auxiliary elements for assembly, such as clips or bolts, but a direct screwing can be made in the fastening profile, with the possibility of screwing around the entire perimeter of the plate, thus greatly facilitating the fastening system and the possible variation of the layout of the fixing profiles.

**[0018]** It should be noted that the system is valid for both single sheets, consisting of a single metal such as steel, copper, zinc, aluminum ... and composite sheets, very common on the market, consisting of a double aluminum sheet attached by a PVC inner sheet.

**[0019]** Optionally, the Z-shaped pleat can be only applied at the top and bottom of the panel, keeping the pleat in an "L"-shape on the sides thereof; so that the existing fastening and hanging systems can be still used, but introducing a modification in the panel design that ensures the characteristic of "self-cleaning" facade.

**[0020]** Additionally, and optionally, the panel may have a pleat with a slight side inclination on the tray shelf, so that rainwater entering therein is more easily evacuated.

**[0021]** Finally, and also optionally, the panel may have water drainage holes in the horizontal shelf, which in no case will affect the tightness of the facade, and which will serve for blocking the minimum accumulation of water.

**[0022]** In view of the foregoing, the advantages for applying the proposed panel in currently used systems are found remarkable, and said advantages can be grouped in four main blocks:

- Clean facade, notable aesthetic improvement.

**[0023]** The new panel prevents accumulated dirt from being dragged on the facade joints towards the outside thereof. Evacuate the water of the joint and therefore the pollution towards the interior channels of the facade, eliminating any possibility of appearance of remains in the facade.

**[0024]** This will significantly reduce the costs of building maintenance, since for cleaning these surfaces lifting or suspension elements must be used, which can only be used qualified personnel.

- Improvement of the assembly system and consequent cost reduction.

**[0025]** By constituting a tray element with a symmetric shape, having the same pleat at top and bottom joint, allows greater convenience in storage and on-site installation, as its position is as equally as valid and rotated 180°, which is a great advantage, especially considering that the placement of the panels is usually performed on lift trucks with limited space for maneuverability and high occupational risk conditions.

**[0026]** Screws are only used for the fastening, without depending on special features such as clips or bolts, which, in addition to lower the cost of the overall system, ensures an easier assembly.

**[0027]** It is easy disassembled and replaced, since it does not require the replacement of all panels that are vertically placed on a panel that does not need to be replaced, since each panel is not overlapped on the next one, but the fastening system is produced at the front thereof.

**[0028]** It allows errors in the vertical alignment of the fastening profiles, in one of its planes. It is obvious that the facade plane has to be maintained, but by requiring no specific fastening elements, but direct screwing, the profiles allow slightly left or right inclinations.

**[0029]** It allows errors in the panel fastening, given the availability of a continuous screwing surface and no specific milling points in the panels.

**[0030]** There are savings in milling and machining because the fastening system is a simple screw; the panels only need linear machining for forming trays.

**[0031]** It reduces the risk of errors in manufacturing, by making no special machining.

**[0032]** It reduces the risk of errors in the assembly, since the sitting of the panel is directly made, and not by indirectly measuring the position of the hanging machining. It improves the manual transport capacity of the panel, since the "Z"-shape ensures the support manual with more comfort and less effort than the "L"-shape.

- Improvement of the design possibilities.

**[0033]** It allows the design of cross-cut joints and not just continuous horizontal and vertical joints. This is because no special clip- or bolt-type hanging systems are used, which for positioning the cross-cut panels have to use twice as fastening systems, thus increasing the costs and the assembly difficulty.

**[0034]** It allows the design of inclined cutting up with respect to the horizontal, since the panels are not hung but fasten, and therefore have no horizontal scrolling game.

- Improvement of tightness conditions.

**[0035]** The horizontal joint causes a large drop effect much more effective than existing systems, because the water after slipping along the panel cannot go up through the bottom pleat thereof and therefore keeps slipping until completing its route on the facade. This does not occur

in existing systems, since the lower edge is horizontal, and therefore causes the entry of a greater amount of water to the groove.

**[0036]** The joint parallel to the profile is much more waterproof than existing systems, since the fastening profile is completely overlapped.

**[0037]** The described external finishing panel for ventilated facades with pleated system and improved assembly thus represents an innovative structure with constituent and constructive features previously unknown for this purpose, which reasons linked to its practical usefulness, provide it sufficient grounds for obtaining the exclusive privilege that is requested.

## 15 DESCRIPTION OF THE DRAWINGS

**[0038]** To complement the description being made and in order to help to a better understanding of the features of the invention, a set of layouts is attached to the present specification as an integral part thereof, in which with an illustrative and not limitative manner, the following has been represented:

Figure 1. - Shows a perspective view of an embodiment example of the panel object of the invention, wherein the general configuration thereof is shown.

Figure 2. - Shows a plant and unfolded representation of the example of a panel shown in the previous figure, as well as the respective vertical and horizontal sections of the panel once folded.

Figure 3. - Shows another embodiment example of the panel, according to the invention, also represented in plant and unfolded and with the vertical and horizontal sections already folded, in this case with a "Z"-shaped pleat only in their upper and lower edges, the sides being "L"-shaped.

Figure 4. - Shows an unfolded plant view similar to that of the previous one and with the vertical and horizontal sections of another example of the panel of the invention, in this case the pleats are slightly inclined in order to facilitate the drainage of rain.

**[0039]** The Figure 5. - Shows a detail enlargement of the joint between two panels according to the invention, showing their relative positioning as well as the fastening way to the fixing profile.

**[0040]** Figures 6, 7 and 8. - Show three examples for placing the panels, according to the invention, these being respectively represented with the horizontal and vertical aligned joints, with the locknuts joints and with the joints vertically inclined from the horizontal plane.

## PREFERRED EMBODIMENT OF THE INVENTION

**[0041]** In view of the aforementioned figures, and according to the numbering adopted, it can be seen among these a preferred embodiment example of the invention, which covers parts and elements listed and described in

detail below.

**[0042]** Thus, as shown in Figure 1, the panel in question is a metallic laminar body (1) with rectangular planar configuration, which can be of single or composite type, i.e. formed by two metallic sheets with an inner sheet made of a plastic material such as PVC, sides of which, both top, bottom and sides are folded towards one side forming a tray (2), having the peculiarity that the pleat of said sides consists of a "Z"-shaped fold or pleat

**[0043]** It should be noted that said "Z"-shaped pleat, determined from some folding lines, an inner one (3) and outer one (4), parallel to the edge (5) of the mentioned body (2), results in corresponding middle (6) and outer (7) zones, as shown in Figure 2, which, after folding the lines (3) and (4) are oblique and parallel, respectively, to the plane of the central body of the tray (2), as well as to the facade, once placed the panel.

**[0044]** It should be noted that, optionally, the lateral sides of the tray (2) may have a simple fold shaped as an "L" formed from a single inner folding line (3), being in such a case, only "Z"-shaped on the bottom and top edges of the tray (2), such as shown in Figure 3.

**[0045]** Likewise, also optionally, the outer folding line (4) may have a slight deviation from the interior folding line (3) and the edge (5) of the body (2) such as shown in Figure 4, purpose of which is to provide certain inclination to the "Z"-shaped pleat on the edge of the tray (2) in order to facilitate the slipping to one side or another of the water that may be accumulated thereon.

**[0046]** Thus, by the described "Z"-shaped pleat of the edges of the tray (2), the assembly of the panels, such as shown in Figure 5, is directly made through the application of screws (8) fixed on the outer zone (7) of said pleat and which is parallel to the body of the tray (2) as well as parallel to the fixing profile (9) of the facade, in said fixing profile (9), the oblique zone (6) of pleat forming the space wherein water or pollution could be accumulated and which, because of its inclination, said water or pollution will not emerge to the surface of the facade, being dragged into the sides thereof, especially in the case of having provided it with the described inclination in the "Z"-shaped pleats.

**[0047]** Moreover, in addition, the invention contemplates the creation of drain holes (10) next to the folding lines (3) and (4) of the "Z"-shaped pleat of the tray (2) in order to prevent its excessive accumulation.

**[0048]** Having sufficiently described the nature of the present invention, as well as the way of implementing thereof, it is not considered necessary to extend its explanation for any expert in the field to understand its scope and the advantaged derived from thereof, stating that, within its essentiality, it can be put into practice in other embodiments that differ in detail from that indicated by way of example, and which will also reach the protection claimed as long as its fundamental principle is not altered, changed or modified.

## Claims

1. External finishing panel for ventilated facades with pleated system and improved assembly, in particular a metallic sheet, both of the single or composite type, consisting of a metallic sheet-like body (1) with rectangular, planar configuration, the top, bottom and lateral sides of which are folded towards a same side forming a tray (2), **characterized by** the fact that the folding of said sides forms a "Z"-shaped pleat, obtained by means of respective folding lines, an inner line (3) and outer line (4), which are parallel to the edge (5) of the said body (2), resulting in a corresponding middle (6) and outer (7) zones which, after the lines (3) and (4) has been folded, remain oblique and parallel, respectively, relative to the plane of the central body of the tray (2), in that the outer zones (7) of the Z-shaped pleat are suitable for fixing, by means of screws (8), directly to the fastening profile (9) of the facade, remaining parallel thereto.
2. External finishing panel for ventilated facades with pleated system and improved assembly, according to claim 1, **characterized by** the fact that, optionally, the lateral sides of the tray (2) have, instead of a "Z"-shaped pleat, a single "L"-shaped pleat, formed from a single interior folding line (3).
3. External finishing panel for ventilated facades with pleated system and improved assembly, according to claim 1, **characterized by** the fact that, optionally, the exterior folding line (4) has a slight deviation from the interior folding line (3) and the edge (5) of the body (2), providing certain inclination to the "Z"-shaped pleat of the edge of the tray (2) in order to facilitate the slipping to one side or another of the water that may be accumulated thereon.
4. External finishing panel for ventilated facades with pleated system and improved assembly, according to claim 1, **characterized by** the fact that, additionally, the creation of drain holes (10) next to the folding lines (3) and (4) of the "Z"-shaped pleat of the tray (2) is forecasted.

## Amended claims under Art. 19.1 PCT

1. External finishing panel for ventilated facades with pleated system and improved assembly, in particular a metallic sheet, both of the single or composite type, consisting of a metallic sheet-like body (1) with rectangular, planar configuration, the top, bottom and lateral sides of which are folded towards a same side forming a tray (2) and wherein the folding of said sides consists of a "Z"-shaped pleat, obtained by means of respective folding lines, an inner line (3) and outer line (4), which are parallel to the edge (5)

of the said body (2), resulting in a corresponding middle (6) and outer (7) zones which, after the lines (3) and (4) has been folded, remain oblique and parallel, respectively, relative to the plane of the central tray (2), **characterized in that** it directly fixed to the fastening profile (9) of the façade and to the body of the tray (2), needing no extra elements for fastening and without overlapping other external finishing panels. 5

2. External finishing panel for ventilated facades with pleated system and improved assembly, according to claim 1 **characterized in that** the screws (8), through which the external finishing panel is fixed to the fastening profile (9), are screwed to the profile in an inclined and not perpendicularly manner to the plane of the fastening profile (3). 10  
15
3. External finishing panel for ventilated facades with pleated system and improved assembly, according to claim 1 **characterized by** the fact that, optionally, the lateral sides of the tray (2) have, instead of a "Z"-shaped pleat, a single "L"-shaped pleat, formed from a single interior folding line (3). 20
4. External finishing panel for ventilated facades with pleated system and improved assembly, according to claim 1, **characterized by** the fact that, optionally, the exterior folding line (4) has a slight deviation from the interior folding line (3) and the edge (5) of the body (2), providing certain inclination to the "Z"-shaped pleat of the edge of the tray (2) in order to facilitate the slipping to one side or another of the water that may be accumulated thereon. 25  
30
5. External finishing panel for ventilated facades with pleated system and improved assembly, according to claim 1 **characterized by** the fact that, additionally, the creation of drain holes (10) next to the folding lines (3) and (4) of the "Z"-shaped pleat of the tray (2) is forecasted. 35  
40

(5) are fixed to the fastening profile (9) in an inclined manner and not perpendicular to the plane of said profile (9).

• Initial claims 2, 3 and 4 are now claims 3, 4 and 5 respectively.

#### Amended claims under Art. 19.1 PCT

The following amendments have been included in the enclosed claims (as can be verified in the comparative text also enclosed): 45

- Modification of claim 1: the structural characteristics of the external finishing panel have been included in the preamble of claim 1 and the novel assembly features, based on the description and without adding new matter, have been included in the characterizing part of claim 1. 50
- A new claim has been included, (current claim 2), which is referred to the way the screws of the plate are fixed. This characteristic is clearly illustrated in the text, figure 5, where the screws 55

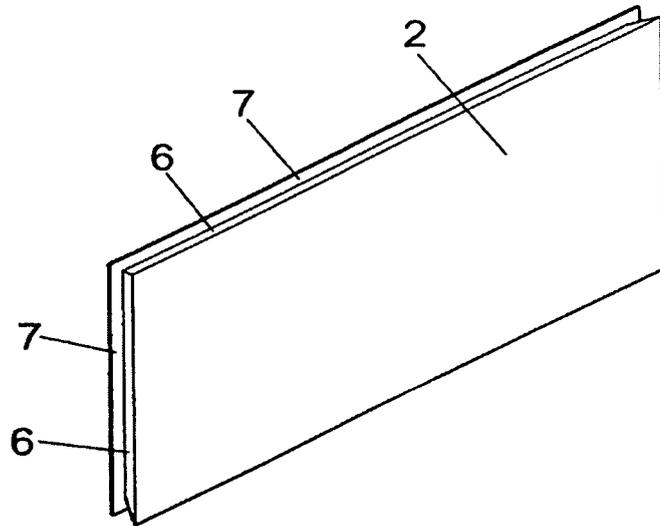


FIG. 1

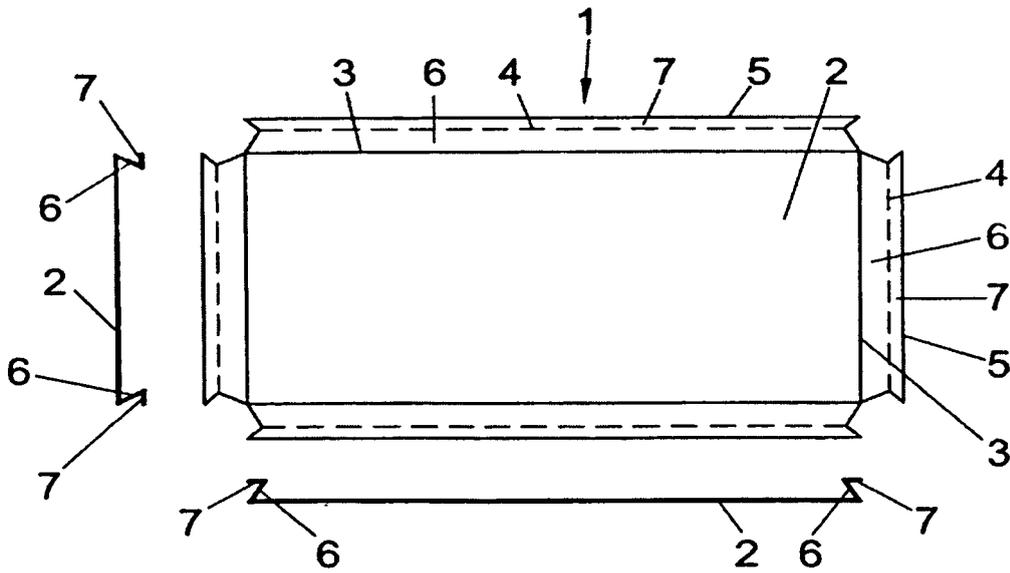


FIG. 2

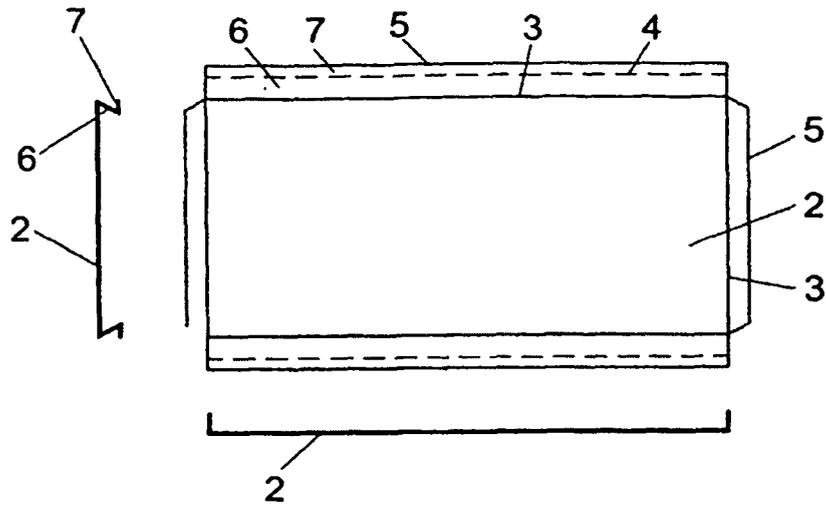


FIG. 3

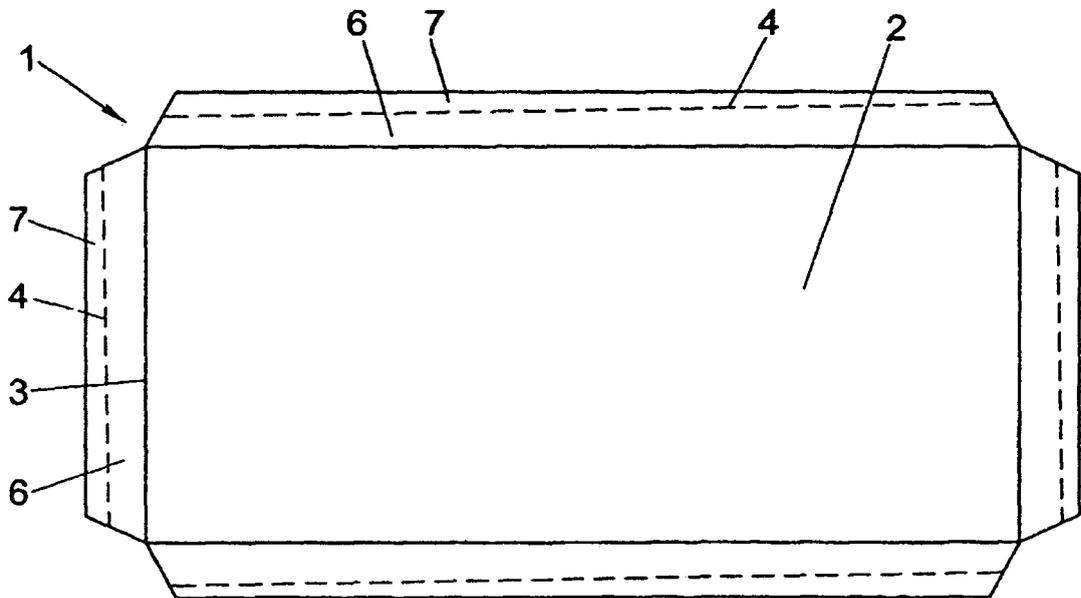


FIG. 4

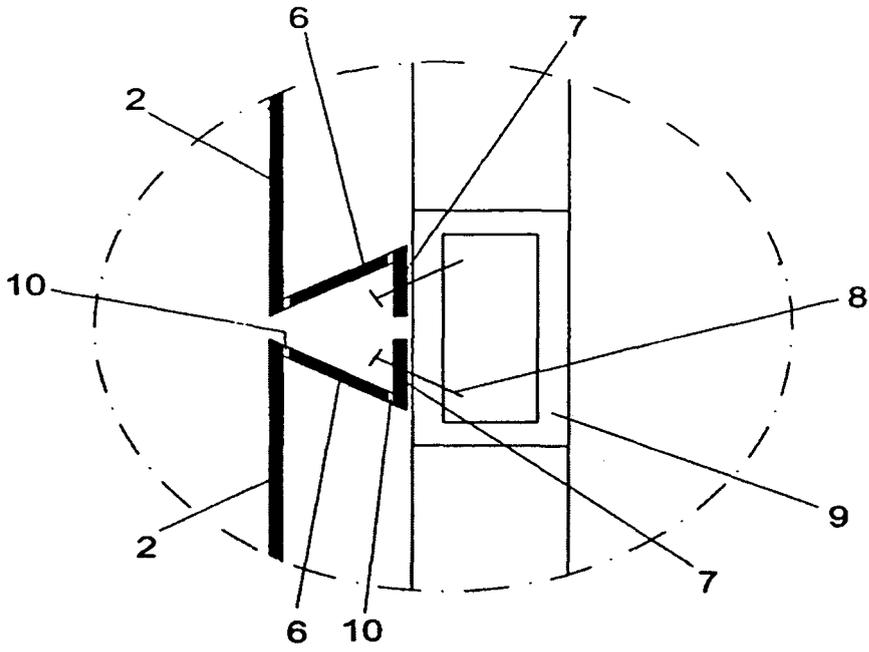


FIG. 5

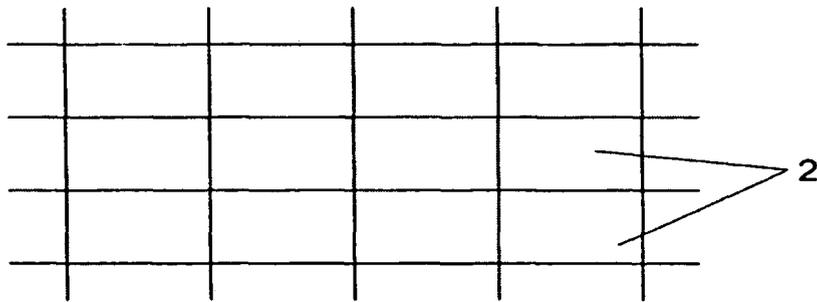


FIG. 6

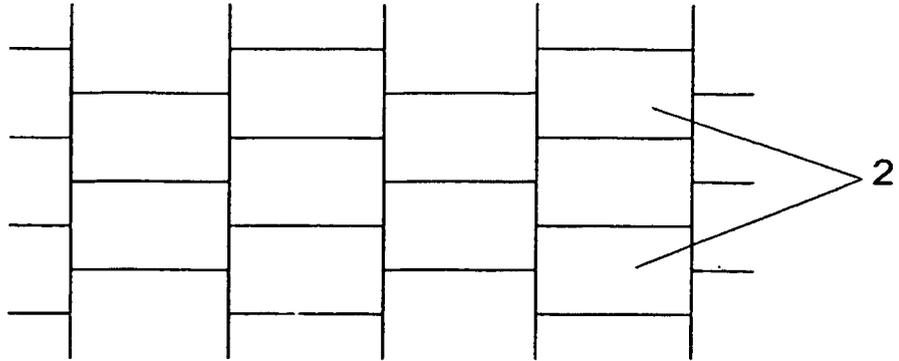


FIG. 7

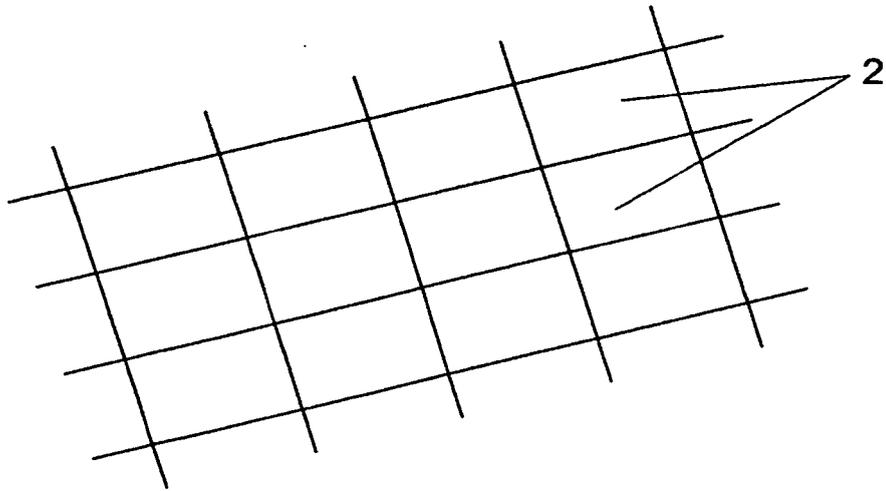


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/ ES 2009/000477

A. CLASSIFICATION OF SUBJECT MATTER		
see extra sheet		
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) E04F13/12, E04C2/08; EC: E04F13/12, E04C2/08		
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.
X Y	US4962612 A (NISSHIN STEEL CO LTD)16.10.1990, column 1, lines 6-12; column 5, lines 44-60; column 6, lines 1-11,31-35; figures 12,3,5.	1 2-4
X	US2148858 A (FREEMAN N. M; KORB C. H.)28.02.1939, page 2, lines 18-22; page 1, lines 4,5; figures 1, 4-8.	1
X	US640593 A (RUSSELL G.) 02.01.1900, page 1, lines 67-77; page 2, lines 1-14; figures 1-6.	1
Y	EP1422357 A2 (HUNTER DOUGLAS IND BV) 26.05.2004, paragraphs [0018],[0019]; figures 1, 1a, 6b.	2-4
A	JP4052366 A (TOKYU KENSETSU KK)20.02.1992, figures 1 a 3.	1,2
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* "A" "E" "L" "O" "P"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance. earlier document but published on or after the international filing date 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) document referring to an oral disclosure use, exhibition, or other means 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 25 January 2010 (25.01.2010)		Date of mailing of the international search report (29/01/2010)
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 54 31

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No. PCT/ ES 2009/000477
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Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
US 4962612 A	16.10.1990	WO 8808473 A JP 1021155 A JP 7084641 B JP 2059984 C DE 3890319 T GB 2212820 AB KR 920010783 B DE 3890319 C	03.11.1988 24.01.1989 13.09.1995 10.06.1996 03.05.1989 02.08.1989 17.12.1992 25.08.1994
US 2148858 A	28.02.1939	NONE	-----
US 640593 A	00-00-0000	NONE	-----
EP 1422357 AB	26.05.2004	EP 20030257291 AT 422014 T ES 2318094 T	19.11.2003 15.02.2009 01.05.2009
JP 4052366 A	20.02.1992	NONE	-----

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

INTERNATIONAL SEARCH REPORT

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PCT/ES 2009/000477

CLASSIFICATION OF SUBJECT MATTER

*E04F 13/12* (2006.01)

*E04C 2/08* (2006.01)