



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

(43) Date of publication:
25.04.2018 Bulletin 2018/17

(51) Int Cl.:
E04B 2/42 (2006.01) E04B 2/02 (2006.01)
E04B 2/00 (2006.01)

(21) Application number: **16810642.5**

(86) International application number:
PCT/BR2016/050111

(22) Date of filing: **19.05.2016**

(87) International publication number:
WO 2016/201537 (22.12.2016 Gazette 2016/51)

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

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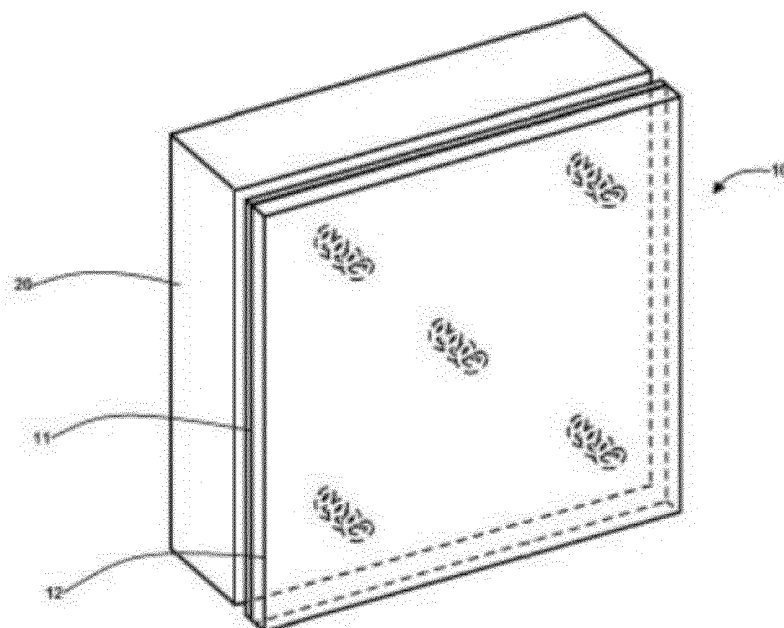
(30) Priority: **16.06.2015 BR 202015141330 U**

(54) **ARCHITECTURAL SHIELDING PLATE**

(57) The present invention relates to a plate of composite material, specially structured to be used as shielding of buildings in general, but also can be used for shielding aircraft, boats, military vehicles and other applications where a shielding system is required. The architectural shielding plate consists of a steel plate (11) on the back

surface of which flexible elastic deformation elements (13) are installed conveniently distributed to provide balanced support for the plate (10) when installed on a vertical wall (20), being said steel plate (11) covered by a finishing layer (12) on its front or frontal surface.

Figure 1



Description

Field of the Invention

[0001] The present invention relates to a plate of composite material, specially structured to be used as shielding of buildings in general, but also can be used for shielding aircraft, boats, military vehicles and other applications where a shielding system is required. More specifically, the architectural shielding plate has a structure of easy production and assembly when compared to the antiballistic materials commonly available on the market.

[0002] The architectural shielding plate according to the present invention is especially and advantageously used to provide protection against ballistic contact, fire, break-in and explosives, being of adequate use to provide protection of lives, organizations and assets of values, such as in consulates, embassies, banks, safes, security cell, aircraft pilot's cabin entry doors, escape routes to oil platforms or chemical industries, etc.

Background of the Invention

[0003] There are several materials used in general shielding and, with regard to architectural shielding, many solutions and special projects are proposed by specialized companies. However, projects and buildings are always executed based on extremely heavy and thick materials. Typical examples are to use shielding materials with thicknesses of the order of 50 cm and weight in the order of 800 kgf/m². Obviously, such materials are difficult to handle, install and extremely expensive due to their size and weight. In addition, they do not allow, for these extremely robust structural reasons, to be used in certain applications, such as aircraft, boats and military vehicles.

[0004] In addition, the use of prior art shields in places where there is no predicted increase in load becomes totally unfeasible, making it impossible to adapt to a conventional construction, because it only makes use of rigid materials and without any flexibility, proving inefficient for its architectural purpose and for the protection of people. For example, when applied in the construction of a shielded wall, any insertion or need to place some accessory or component not provided in its initial assembly, such as a door or a window, the shielding applicator should be called to promote the proper reconciliation of finishes and materials in the promoted intervention.

Summary of the Invention

[0005] Thus considering, the architectural shielding plate object of the present invention has been developed, which is based on a chemical reaction based on the friction of the water molecules in the projectile decreasing its rotation and, consequently, interrupting its punching power, as well as the lightness and the low thickness of the finished product that leaves it practically impercepti-

ble when installed in a building or any other application.

[0006] The composite material of the architectural shielding plate object of the present invention comprises a layer of steel blade, flexible or resilient fastening elements and a plate finishing layer, all structured to form an extremely light and thin body. It should be noted that said flexible or resilient fastening elements are such as to accompany the workability of the composite material structure and may be of various types, such as, but not limited to, springs or pneumatic elements like compressed air-capsules.

Detailed Description of the Drawings

[0007] The architectural shielding plate object of the present invention will be described in detail on the basis of the attached schematic figures, which illustrate:

- Figure 1 is a perspective view of an architectural shielding plate according to the present invention;
- Figure 2 is a side view of the shielding plate shown in Figure 1;
- Figure 3 is an exploded perspective view of the shielding plate shown in Figure 1;
- Figure 4 is a view of a building assembled with the plates according to the present invention.

[0008] As shown in Figure 1, the architectural shielding plate (10) object of the present invention is made of steel plate (11), on the back surface of which flexible elastic deformation elements (13) are installed conveniently distributed to provide balanced support for the plate (10) when installed on a vertical wall (20). Said steel plate (11) is covered by a finishing layer (12) on its front or frontal surface. Advantageously, the flexible elastic deformation elements (13) are spiral springs made from any material that provides adequate impact strength, notably to the impact of a projectile (gun bullet), deforming by compression to avoid impact on the vertical wall structure (20). The number and shape and distribution spacing of the flexible elastic deformation elements (13) on the back surface of the architectural shielding plate (10) will be established in accordance with the established shielding project. As a basic unit, it is preferred that the number of flexible elastic deformation elements (13) is at least five, distributed so that four of them are in the proximal regions of their vertices and an element in the central region of the steel plate (11). Alternatively, said flexible elastic deformation elements (13) are capsule-type pneumatic elements with compressed air.

[0009] The finishing plate 12 should be made of lightweight material and easy to handle, which can provide optimum finishing aesthetics and allow other finishing operations, such as painting application. Suitable materials for the finishing plate (12), although not limiting, are, for example, fiber blend and beneficiated gypsum or the material known commercially as drywall. It is preferred that the finishing layer (12) is in drywall, which consists of

plasterboard screwed into structures of thin profiles of galvanized steel, but light and allowing installations of electrical and hydraulic components through fastening systems. In addition, a finishing layer (12) made of drywall adapts perfectly to the steel structure of the plate (10). Advantageously, the vertical wall (20) is also produced in drywall. Even more advantageously, the vertical wall (20) has the same steel plate structuring (11) covered by a finishing layer (12) on its front or frontal surface, which is preferably also produced in drywall.

[0010] The architectural shielding plates (10) can still be installed, depending on the shielding project, so as to form a double, triple shielding and so on, depending on the desired level for protection. It is preferred, however, that a single plate (10) is sufficient to provide adequate protection.

[0011] The architectural shielding plate (10) may have any thickness dimension according to the shielding project, but it is preferred that the architectural shielding plate (10) is preferably up to 3 mm thick.

[0012] Advantageously, the architectural shield plate (10) object of the present invention is structured to form a body weighing about 120 Kg/m² for a shielding thickness of about 7 to 12 cm.

[0013] The structuring of the architectural shielding plate object of the present invention described above, when in use and attacked by a projectile, the finishing layer (12) causes a friction in the projectile decreasing its rotation and, consequently, preventing perforation of the plate assembly (10).

[0014] Figure 4 shows a form of structuring of a conventional wall building (Z) provided with a security system using the architectural shielding plate (10) object of the present invention at various levels of shielding, from the weakest to the strongest (A, B, C). It should be noted, however, that other levels of shielding not illustrated here may also be obtained by conjugating the number of architectural shielding plates (10).

[0015] It is further emphasized that by not propagating the fire and not changing its performance when subjected to high temperatures, the finishing layer (12) protects the steel blades (11) so that the wall/coating structure does not succumb this very adverse scenario. The same occurs in the attempt of break-in, since there is the attempt of invasion by any sharp, perforating, flammable object, etc., the combination of the malleability and self-extinguishing characteristics prevents drilling and transposition of the shielding system.

[0016] In the case of direct fire, there is also a dual performance of the components of the finishing layer (12), which should protect and maintain the static structure, ensuring its integrity for hours of direct fire resistance.

[0017] Therefore, each and every environment can be protected by the creation of a shielded security cell or the construction and shielding of its entire environment. It is also possible to apply the architectural shielding plate (10) at some place already built or under construction,

where the application of the shielding will occur as a perimeter coating to the construction, creating a housing.

[0018] Once the architectural shielding plate (10) object of the present invention is applied, the persons and / or property held therein shall be protected and safe from possible shots of firearms of civilian or military use, such as fire, break-in and explosives.

[0019] In addition, it is found that the shielding plate object of the present invention is easy to transport and handle, providing rapid installation and excellent performance as structural reinforcement and resistance to high temperatures and inclement weather.

Claims

1. Architectural shielding plate, **characterized in that** it consists of a steel plate (11) on the back surface of which flexible elastic deformation elements (13) are installed, conveniently distributed to provide balanced support for the plate (10) when installed on a vertical wall (20), being said steel plate (11) covered by a finishing layer (12) on its front or frontal surface.
2. Architectural shielding plate, according to claim 1, **characterized in that** the flexible elastic deformation elements (13) are spiral springs made from any material that provides adequate impact resistance.
3. Architectural shielding plate, according to claim 1, **characterized in that** the flexible elastic deformation elements (13) are capsule-type pneumatic elements with compressed air which provide adequate impact resistance.
4. Architectural shielding plate, according to claims 2 or 3, **characterized in that** the number of elastic deformation elements (13) is at least five, distributed so that four of them are in the proximal regions of their vertices and an element in the central region of the steel plate (11).
5. Architectural shielding plate, according to claim 1, **characterized in that** the finishing plate (12) is made of mixture of fibers and improved gypsum or in dry-wall.
6. Architectural shielding plate, according to claim 1, **characterized in that** it is up to 3 mm thick.
7. Architectural shielding plate, according to claim 1, **characterized in that** it is structured to form a body weighing about 120 Kg/m² for a shielding thickness of about 7 to 12 cm.
8. Architectural shielding plate, according to any previous claims, **characterized in that** it is applied to an existing or under construction building, as a perim-

eter coating to the construction in order to create a housing.

9. Architectural shielding plate, according to claim 1, **characterized in that** the vertical wall (20) is also produced in drywall. 5
10. Architectural shielding plate, according to claim 1, **characterized in that** the vertical wall (20) has the same steel plate structuring (11) covered by a finishing layer (12) on its front or frontal surface produced in drywall. 10

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Figure 1

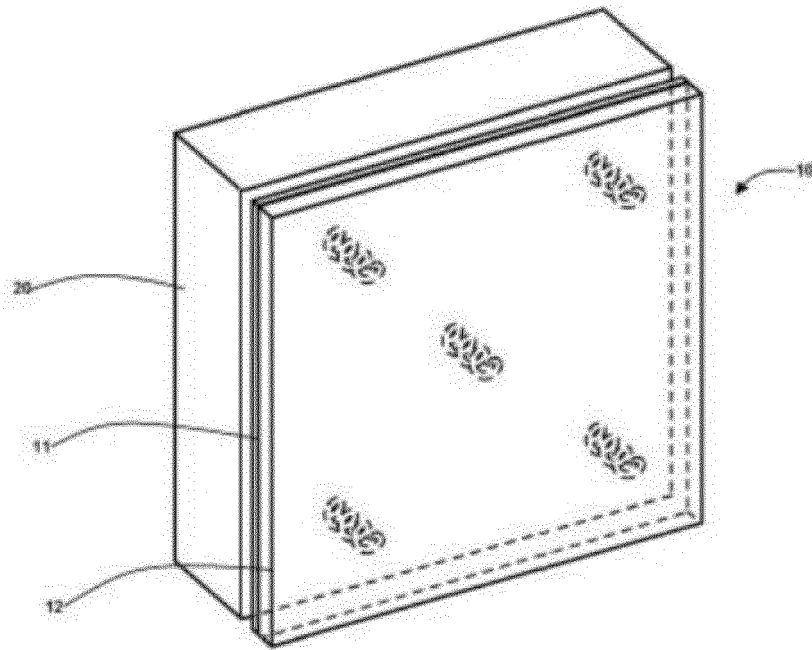


Figure 2

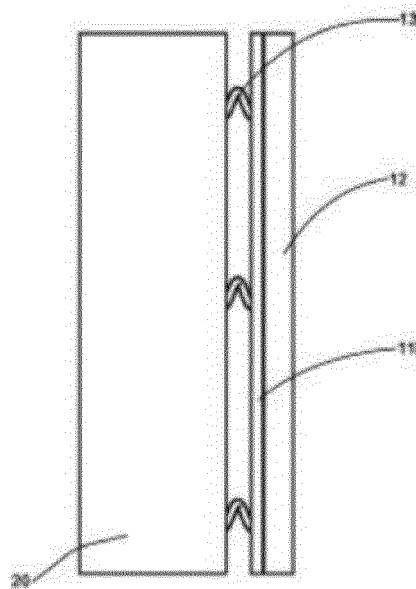


Figure 3

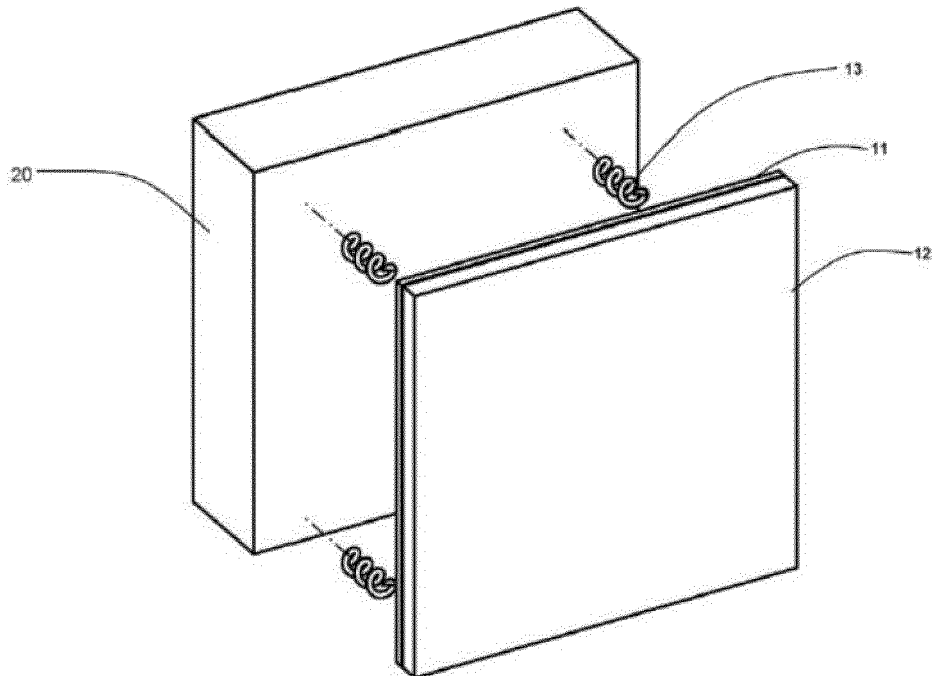
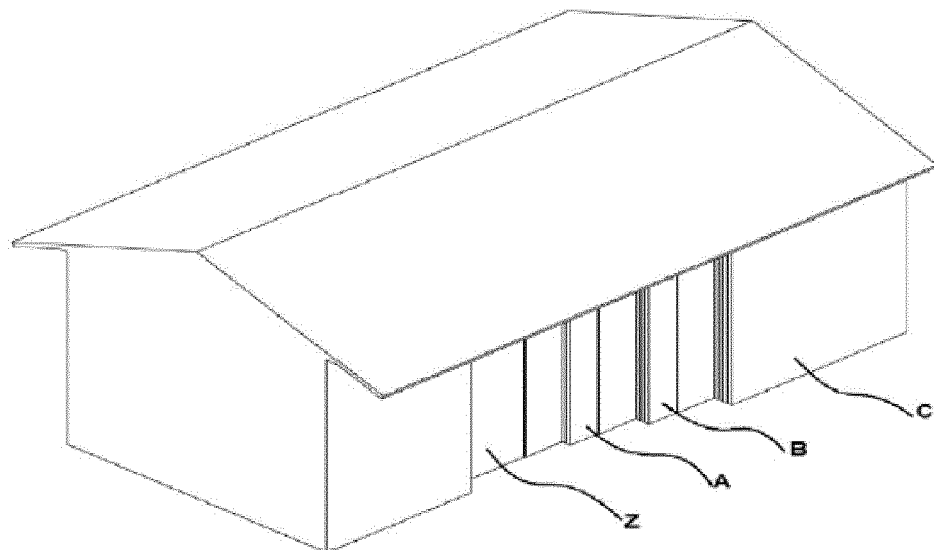


Figure 4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/BR2016/050111

A. CLASSIFICATION OF SUBJECT MATTER

E04B2/42 (2006.01), E04B2/02 (2006.01), E04B2/00 (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)

IPC E04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Banco de Patentes do INPI-BR

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC; ESPACENET

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	CN 105155742 A (SUZHOU XINTAI BUILDING UPHOLSTER CO LTD) 16 DEC 2015 (16.12.2015) The whole document	
Y	JP H0213633 A (MANTEN KK) 18 JAN 1990 (18.01.1990) Abstract, Figures 1 to 6	1 to 10
Y	CN 2622293 Y (FANGDA GROUP CO LTD) 30 JUN 2004 (30.06.2004) Abstract, Figures 1 and 2	1 to 10
A	CN 201512885 U (CHINA CONSTR 3RD ENG BUREAU CO) 23 JUN 2010 (23.06.2010) The whole document	

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

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"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 such 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

08 JUN 2016 (08.06.2016)

Date of mailing of the international search report

08 SEP 2016 (08.09.2016)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/BR2016/050111

CN 105155742 A	2015-12-16	None	
JP H0213633 A	1990-01-18	None	
CN 2622293 Y	2004-06-23	None	
CN 201512885 U	2010-06-23		