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(54) **BOLT FOR DOUBLE-LEAF FIREPROOF DOORS WITH TWO LEAVES**

(57) For the purpose of preventing the door from opening in the event of a fire, thus preserving the sealing of the enclosure against fire, and allowing the door to be opened by the occupants of the enclosure in the event of an evacuation, the present invention is designed.

The pin for double-leaf fire doors is composed of two metal parts: a tab and a latch plate, which are mechanically attached to the door leaves and facing each other, so that the assembly couples perfectly when closing the door and leaves sufficient play between the parts that allows them to disengage without problems when pushing the door.

Two further possible embodiments are envisaged: a pin formed by two alike tabs and one formed by a modified latch part and a catch.

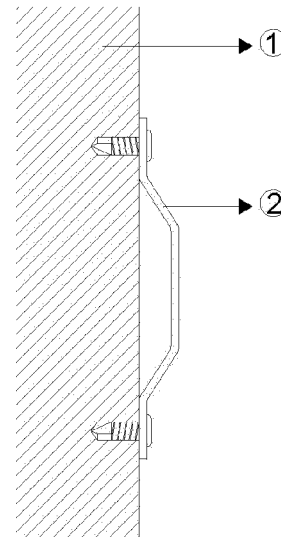


FIG. 1

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Description**OBJECT OF THE INVENTION**

[0001] The present invention relates to a new pin for double-leaf fire doors designed with two objectives: to prevent the door from opening in the event of a fire, thus preserving the sealing of the enclosure against fire, and, at the same time, to allow the door to be opened quickly by the occupants of the enclosure in case of evacuation.

BACKGROUND OF THE INVENTION

[0002] The invention technically falls within in the construction sector, in particular, the manufacture of double-leaf fire doors with a steel frame.

[0003] The factors that must be taken into account in the design of fire doors are basically: pressure, temperature and time. These three conditioning factors are what produce both deformations and dilations in this type of door.

[0004] The deformations depend on the type of material, the temperature and the dimension of the element subject to fire. These deformations are caused by buckling and torsion stresses, which cause warps and curvature in the door assembly.

[0005] The major deformations are found in the central area of the door, where the lock is located, so that the action of the fire opens the door if these mechanical forces are not prevented.

[0006] The state of the art discloses well-known door locking devices, which manually close the door. This is the case of latch, bolt or catch type pins, which are characterized by having a through element or rod, which runs a small distance until fitting into the retaining piece and are usually secured by springs, hooks, special pieces or other elements. These pins have the disadvantage that they also need to be opened manually when the door is to be unlocked. Thus, in an evacuation in case of fire, the occupants of the affected enclosure would have to discontinue the evacuation route to stop and unlock the door in order to be able to exit, which, besides not being allowed according to the current legislation (CTE DA DB-SI / 3, Article 2), is a major inconsistency.

[0007] Such is the case of inventions ES 1 025 338 U and ES 1 018 296 U, which consist of a rod which slides longitudinally and secures the door leaves closing them, but with the disadvantage that these types of devices prevent the evacuation of the occupants in an enclosure in case of fire, since if the door is closed, it cannot be unlocked by simply pushing it, but the pin must return to the opposite position to allow exit, which prevents the free passage of occupants along an escape route to the exit, so furthermore, these inventions are not included in the technical sector of the present invention. Another problem posed by these inventions is that they are not horizontally and vertically adjustable, so that sometimes failures occur due to the installation of these pins, since

the different parts do not adapt perfectly to one another.

DESCRIPTION OF THE INVENTION

[0008] The invention consists of an adjustable pin for double-leaf fire doors, designed with the intention of solving the problems posed: to ensure the closing of the door in case of fire; preserving the protected enclosure and the mechanical properties of the fire door and allowing, at the same time, the exit of the occupants out of the enclosure to a safe space, thus complying with the current regulations.

[0009] These parts are screwed in the central part of the door, namely, on the sides of the lock and counterlock respectively: a tab is screwed to the side of the door lock, tab being a part made of metal with a Z-shaped section, while to the side of the counter-lock, a latch plate is screwed, this being a part made of metal with a meander-shaped section. These parts are intended to be adjustable, so that they can be perfectly coupled to each other, thus avoiding possible failures in the installation. This adjusting is achieved thanks to the design of the sections of both parts. In this way, the pin will act when closing and opening the door, since the tab enters the latch plate upon closing and exits from it upon opening, eliminating the need to include any other accessory to the present invention.

[0010] The mechanism of action of the pin is very simple: when closing the door, the two parts engage fitting perfectly, but allowing sufficient play between them, so that, when the door is opened by the handle or the panic bar, they disengage without effort for the occupants of the premises who are attempting to exit. Thus, the door leaves are allowed to open normally; an ordinary person would not notice the difference between the pin being placed or not, but in the event of fire, the invention acts as a safety mechanism while the door is closed, creating an additional lock that prevents the door from opening by the action of fire.

[0011] The tab, which represents the main novelty of the invention, slides inside the latch part when the door opens and closes, without needing to install any other element, so that the installation time with respect to other solutions incorporating a rod, is shorter.

[0012] This invention also enhances the integrity of the door against fire, since, structurally, the pin becomes a point of constraint that allows rotation, but prevents vertical and horizontal displacements at that point, so that we are speaking of a structural support point. This means that in the event of a fire, the door at that point will provide greater resistance to deformation, specifically to buckling and torsion, and will tend to withstand the fire without opening for longer.

DESCRIPTION OF THE DRAWINGS

[0013] In order to enable a better understanding of this specification, and forming an integral part thereof, two

figures are provided in which the object of the invention has been represented by way of illustration and not limiting the scope of the invention.

Figure 1.- Shows a profile view of the latch part of the pin.

Figure 2.- Shows an elevation view of the latch part of the pin.

Figure 3.- Shows a plan view of the latch part of the pin.

Figure 4.- Shows a profile view of the pin tab.

Figure 5.- Shows an elevation view of the pin tab.

Figure 6.- Shows a plan view of the pin tab.

Figures 7 and 12.- Show a profile view of the pin tabs.

Figures 8 and 10.- Show an elevation view of the pin tabs.

Figures 9 and 11.- Show a plan view of the pin tabs.

Figure 13 Shows a profile view of the latch part of the pin.

Figure 14 Shows an elevation view of the latch part of the pin.

Figure 15.- Shows a profile view of the pin catch.

Figure 16.- Shows an elevation view of the pin catch.

PREFERRED EMBODIMENT OF THE INVENTION

[0014] The invention is applicable to double-leaf fire doors with a steel frame, wherein the pin parts are fixed to the door in the central part, namely in the central side of each of the door leaves: primary (4) and secondary (1). It is foreseen that one or more pins may be screwed to the door leaves.

[0015] Once the door is installed on site, with the two door leaves mounted in the frame and adjusted, the pin will be coupled to them. It is envisaged that, first, the latch part, which is made of metal and has a meander-shaped section (2), will be screwed, on the side of the counter-lock of the secondary door leaf (1), piercing the door leaf and, once this part is fixed, the tab, which is made of metal and has a Z-shaped section (3) is screwed analogously at the homologous point of the primary door leaf (4). The parts must be screwed through the pre-set holes (6) which allow the necessary vertical and horizontal adjustment, so that the parts couple perfectly: they must face each other in the central area of the door, so that when the two door leaves are closed, the parts couple, as the tab (3) will enter the latch part (2) naturally.

[0016] The latch part (2) acts as a counter-link, since its meander shape allows it to couple to the door leaf (4) leaving a clearance where the tab (3) can engage. This tab (3) has been designed so that the folding of the Z-shaped section allows it to couple to the latch (2) and at the same time allows it to naturally separate when the door (1) is pushed.

[0017] A second optional embodiment of the invention is that instead of a latch part and a tab, two tabs with Z-shaped sections and made of metal (5) alike, are screwed

to the primary (4) and secondary (1) door leaves by means of pre-set holes (6), which allow perfect vertical and horizontal adjustment of the parts.

[0018] A third optional embodiment of the invention is to screw to the secondary door leaf (1) a metal modified latch part (7) with a cut such as to allow a metal catch (8) fixed to the secondary door leaf (4) to engage thereon and, at the same time, naturally separates when the door (1) is pushed.

[0019] Having sufficiently described the nature of the present invention and the manner of its implementation, it is not considered necessary to extend its explanation for any person skilled in the art to understand its scope and the advantages deriving therefrom. Within its essentiality, it may be implemented in other embodiments which differ in detail from that indicated by way of example, and which will also attain the protection sought provided that its fundamental principle is not altered, changed or modified.

Claims

1. A pin for double-leaf fire doors **characterized by** a tab (3) screwed to the primary door leaf (4) by means of pre-set adjustment holes (6) and a latch part (2) screwed to the secondary door leaf (1) by means of pre-set adjustment holes (6) and facing each other, so that the assembly couples perfectly when the door is closed, and leaves sufficient play between the parts which allows them to disengage without problems when the door is opened.
2. A pin for double-leaf fire doors according to claim 1, **characterized by** a tab (3) with a Z-shaped section made of metal and screwed to the side of the lock of the primary door leaf (4), by means of pre-set adjustment holes (6), so that it couples perfectly to the latch part (2) fixed to the secondary door leaf (1).
3. A pin for double-leaf fire doors according to claim 1, **characterized by** a latch part (2) with a meander-shaped section, made of metal and screwed to the side of the counter-lock of the secondary door leaf (1), by means of pre-set adjustment holes (6) so as to allow the tab (3) to engage when the door is closed with a play such that it allows the pin to disengage when opening the primary door leaf (4).
4. A pin for double-leaf fire doors according to claim 1, **characterized by** a set of two alike tabs (5), made of metal, screwed to the sides of the primary (4) and secondary (1) door leaf, by means of pre-set adjustment holes (6), facing each other so that they couple when the door closes, and disengage when the door opens.
5. A pin for double-leaf fire doors according to claim 1,

characterized by a modified latch part (7) with a cut such that it allows a catch (8) fixed to the secondary door leaf (4) to engage thereon and, at the same time naturally separates when the door (1) is pushed.

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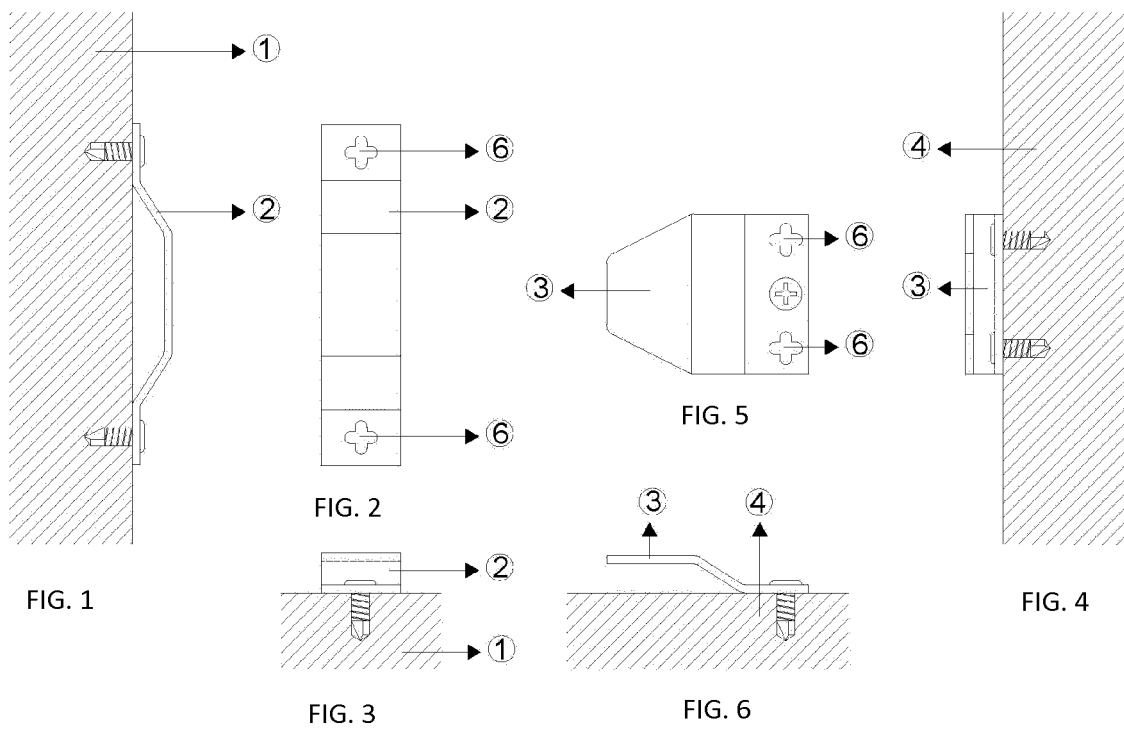
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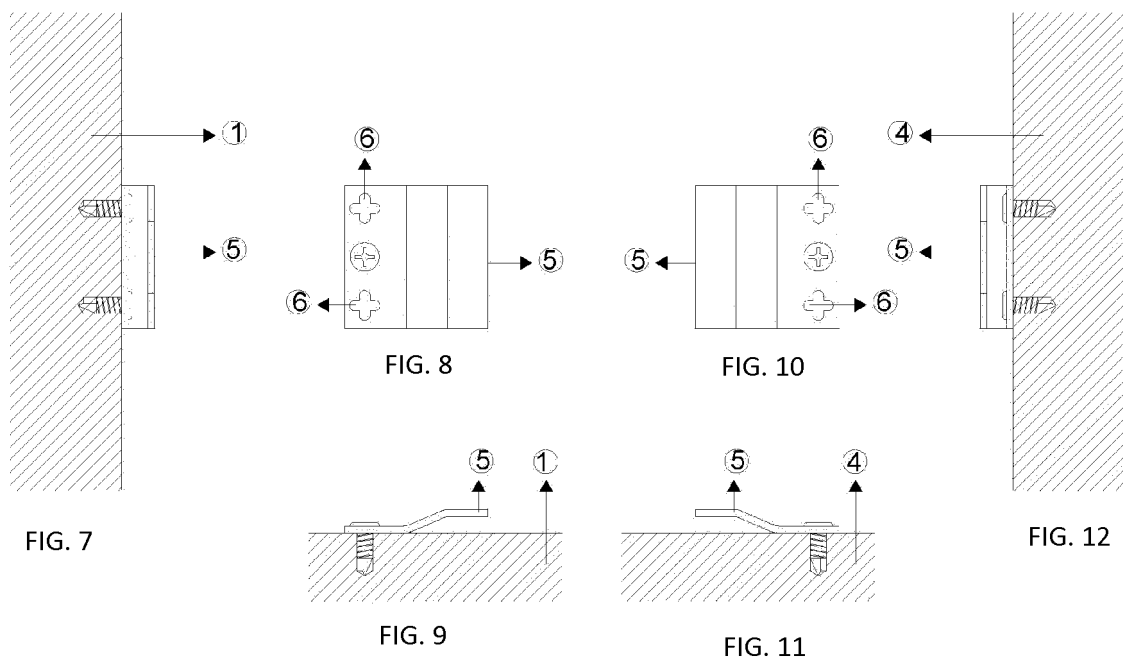
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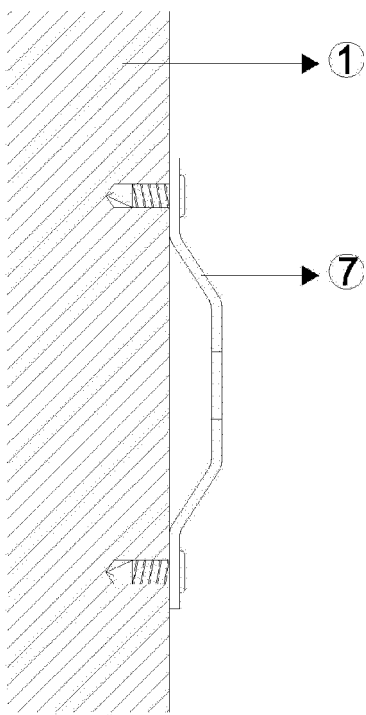


FIG. 13

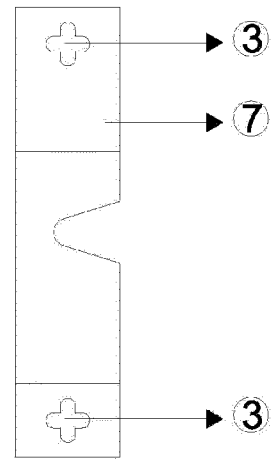


FIG. 14

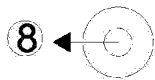


FIG. 16

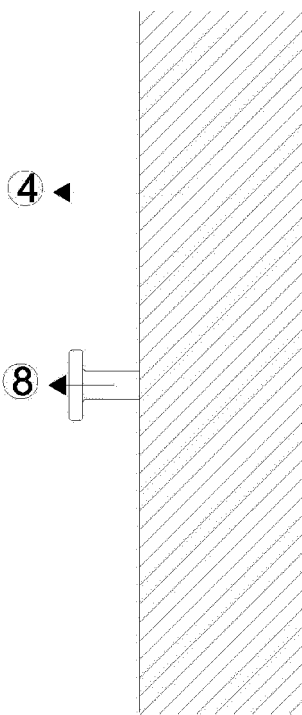


FIG. 15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2015/000052

A. CLASSIFICATION OF SUBJECT MATTER

E06B5/16 (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)

E06B

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.
A	DE 202011004674U U1 (H & K TECKENTRUP KG) 09/06/2011, description; figures.	1-5
A	EP 2395192 A1 (LOCHER GEBHARD MEINRAD) 14/12/2011, paragraphs[12 - 26]; figures.	1-4
A	EP 0736662 A1 (NOVOFERM STAHLBAUWERK KG) 09/10/1996, description; figures.	1,5

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

* Special categories of cited documents:

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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 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
22/06/2015

Date of mailing of the international search report
(26/06/2015)

Name and mailing address of the ISA/

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Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2015/000052

Information on patent family members

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
DE202011004674U U1	09.06.2011	NONE	
EP2395192 A1	14.12.2011	ITMI20101029 A1	10.12.2011
EP0736662 A1	09.10.1996	CZ9600965 A3 AT593U U1	16.10.1996 25.01.1996

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES 1025338 U [0007]
- ES 1018296 U [0007]