



(11)

EP 3 604 725 A1

(12)

EUROPEAN PATENT APPLICATION

published in accordance with Art. 153(4) EPC

(43) Date of publication:
05.02.2020 Bulletin 2020/06

(51) Int Cl.: **E05F 15/632** ^(2015.01) **E06B 3/46** ^(2006.01)

(21) Application number: **18777568.9**

(86) International application number:
PCT/ES2018/000040

(22) Date of filing: **02.04.2018**

(87) International publication number:
WO 2018/178424 (04.10.2018 Gazette 2018/40)

(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:
KH MA MD TN

(71) Applicant: **Cabañero, S.L.**
46980 Paterna (Valencia) (ES)

(72) Inventor: **MARTINEZ CABAÑERO, Pascual**
46980 Paterna (Valencia) (ES)

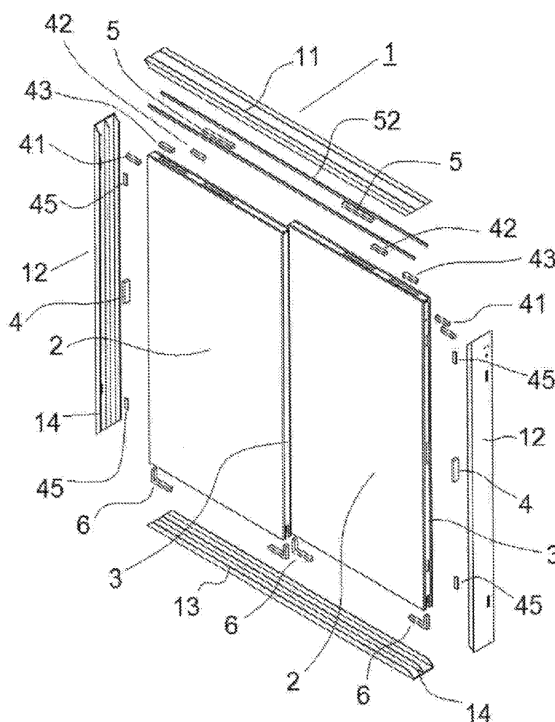
(74) Representative: **Sahuquillo Huerta, Jesús**
JESANA IP
C/ Reverendo José Noguera 33-14
46017 Valencia (ES)

(30) Priority: 31.03.2017 ES 201700349

(54) **BREAK-IN-RESISTANT INTELLIGENT SLIDING ENCLOSURE**

(57) The invention relates to a break-in-resistant intelligent sliding enclosure for windows and doors, comprising a closed frame or fitting groove that is concealed in the wall facing, allowing the leaves to slide by means of bearings that can be removed at the side without disassembling the leaves from the frame, the upper segment thereof being formed by three interconnected sections, two of which can be removed in order to facilitate the positioning of the leaves, thereby reducing clearance and preventing the leaf from being forced open. Each leaf takes the form of two fully glazed planes, equipped with a fitting groove and components housed and concealed between the glazed planes, allowing the leaves to be locked and released, and closed and opened in a motorised manner, while also being equipped with a series of electronic, audiovisual and telecommunications devices, as well as technical films that can be used to view images and texts superimposed over the outside view.

Fig.2



Description

Field of the invention

[0001] This invention relates to an enclosure of one or more break-in-resistant sliding leaves; the enclosure may be both for a door and for a window, where there is a closed fitting channel, which allows the lateral displacement of the leaves, hidden in the insertion wall. This enclosure is provided with motorisation and activation mechanisms by means of an electronic board connected to a plurality of hidden sensors along the frame of the enclosure, which makes this enclosure an intelligent system.

[0002] The field of application of this invention is the industrial sector related to the production, distribution and marketing of enclosure systems, mainly the sector related to metal carpentry intended for building enclosures.

State of the art

[0003] The use of carpentry, whether metal, wood or polymer, for doors and windows is known to the general public; this carpentry is used for both practicable and sliding enclosures. Within these types of enclosures, the sliding enclosures have been focused on certain rooms due to lower sealing or insulation capacities compared to practicable enclosures, while sliding enclosures have the advantages over the practicable ones that they do not invade space and make it possibly easy to achieve large continuous glazed surfaces.

[0004] Taking into account these positive aspects of this type of enclosures, a solution is sought that addresses the problem of the lower water-tightness of the enclosure, which makes it necessary to place an exposed joint profile in the thickness of the leaf or the frame to provide water-tightness at the edges. These enclosures are also exposed to inclement weather, therefore, it is necessary to seek as smooth an enclosure geometry as possible so that the elements do not undergo degradation. On the other hand, sliding enclosures, by allowing large glazed surfaces, are heavyweight enclosures that require more exact and secure preparation of the support, such that leaves and frame have to be physically separated, to guarantee the alignment of their guide and levelling of their base, and to achieve adequate verticality values at their lateral ends. In this sense, due to those such high weights, the incorporation of motorised elements avoids the need for costly fittings and large-dimension profiles. Regarding security against break-ins, these enclosures lack a system preventing the leaf from being able to be removed, levering it on the profile of the lower frame, which remains one of the most-used break-in methods. As a preliminary conclusion, it can be seen that there is no adequate solution for all the foregoing specifications, and in this sense, there arises the need to develop a new type of sliding enclosure that resolves the foregoing problem.

[0005] It is worth mentioning here some examples of types of enclosures related to this invention. For example, the US3425163 record that discloses a conventional sliding enclosure system, one of those commonly used in stores, which has upper guides and a lower bearing system is highlighted. This type of enclosures has the previously defined problem of water-tightness and the need for profiles to maintain an adequate structure configuration. Moreover, it does not provide any solution to the problem of break-ins.

[0006] Related to the previous background, the document FR2719335, discloses a wall in which the glass itself is self-supporting, is highlighted. Therefore, the carpentry of the window is reduced. This record requires elements such as handles or knockers, therefore the carpentry is not smooth. Besides not solving the problems of water-tightness, it does not allow a motorised actuation system, and does not provide solutions to the problem of break-ins.

[0007] In the case of the type of enclosures such as that disclosed in document CH7038S2, the insulation is enhanced by combining glass plates and wooden profiles, thus the insulation of the leaf improves and the carpentry is reduced; but as in the previous case, a non-smooth carpentry is required, which does not support motorisation, nor does it present any solution to the problem of break-ins.

[0008] Document DE20319006U, which discloses an enclosure based on a combination of closures and hinges that are applied to the frame of the enclosure, is also highlighted. Specifically, the closure consists of a tab that generates a physical barrier. This document presents a break-in-resistant solution but does not solve the problem or the water-tightness, it does not allow a motorised actuation, nor does it ensure the closure and it also requires large profiles to keep the structure stable.

[0009] Finally, document EP0822310 is highlighted, which discloses the commonly known type of sliding enclosure for access to premises, which, in order to improve thermal insulation, is configured with an internal air chamber and visible lateral elements against inclement weather. As is known by the general public, these doors may be motorised, but the problem lies in the fact that they lack their own elements for closing and blocking the engine, and do not provide a solution to the break-in problem because they can be levered in a simple manner on the profile of the lower frame.

[0010] In view of the types of known slide enclosures and the existing problem, and to achieve optimum performance of the enclosure as an assembly against the problems of water-tightness, motorisation, overall weight of the profiles, stability of the assembly, and to present a break-in-resistant solution; below, a slide or sliding-type enclosure is described, the frame of which is hidden in the insertion wall, the carpentry configuration allows its leaves to be large-sized, which does not require exterior elements that may be exposed to the elements and presents a smooth surface, it presents a motorised and

autonomous solution, and the air and water passage surface between the leaves and the frame is reduced, which increases the water-tightness, security during assembly, use and mainly hinders possible break-in from outside.

Description of the invention

[0011] The invention relates to an intelligent sliding or slide enclosure of one or more sliding or break-in-resistant sliding leaves, the enclosure being able to be both a window and a door, where a closed fitting channel that allows the sliding and blocking of the leaves, forming part of the carpentry assembly of the enclosure and being hidden in the insertion wall, and where each leaf is configured as two planes, continuous and fully glazed separated from each other by one or more air chambers, and in whose carpentry or perimeter it allows to house all the complementary elements of the system, hiding all this between the glazed surfaces. In turn, this enclosure is provided with mechanisms of motorisation of displacement and locking / unlocking operated by means of an electronic board as a response to a series of sensors also hidden behind the glass.

[0012] In this sense, the enclosure is developed to house one or more sliding break-in-resistant leaves; therefore, in the case of a single leaf, the frame has a single rail of length equivalent to twice the length of the leaf, allowing half of it and the leaf itself to hide in the insertion wall next to the hole. In the case of two leaves, and two rails, the frame has a length approximately equal to the sum of the two leaves in which case the free passage gap is equivalent to the length of the leaf of shorter length, and if they are equal to that of one of these, while, if the frame has a longer length, both can hide overlapping within the wall.

[0013] Similar combinations are obtained with a greater number of leaves and / or rails, either by hiding the leaves in the wall, or by overlapping each other in part of the glazed enclosure. The leaves of this type of enclosure can have variable dimensions, and the installation of large leaves is allowed, since by placing the glass plates covering any fittings channel element, mechanisms, fittings and other components hiding them, sufficient inertia is generally achieved for the dimensions used in building. This makes it possible to reduce the cutting and length of joints.

[0014] Plate-shaped glass is a material that is especially resistant to environmental conditions, both in direct contact with the exterior and interior, however its edges and rims are easily damaged during assembly, which together with the need to reduce the Air and water passage surface between leaves and frame, leads us to the new solution of this invention which consists of dividing the upper frame profile into parallel pieces that will be assembled on site as the leaves are placed. That is, if it is desired to proceed with the assembly of the carpentry from the inside, overlapping it on the main leaf of the enclosure, or embedding it in it, the frame is complete

with the two parts of the upper profile to be assembled: whereas, if assembly from the outside is desired due to setbacks, or for other reasons, the complete frame is made by reversing the position of said parts. In reality, the framework would be identical in both cases, with the exception of the slots and drain elements of the lower channel, which would be in a symmetrical position.

[0015] Going into the detail of the components of the sliding enclosure, it is emphasised that this is located in an insertion wall, which is the hole in a surface in which the enclosure is incorporated. The enclosure is inserted into this face, and said enclosure is composed of:

- a closed frame profile, which is the frame that fits into the insertion wall, and which consists of profiles, which can be metal, polymer or a combination of the above, which configures a space normally with a predominance of its long or tall dimensions. Said frame is coupled to the insertion wall by overlapping or embedding, depending on the construction option that the user desires. In itself, the frame profile is constituted by an upper profile, configured by three profiles joined together, two of which are removable to facilitate the placement of the leaves, two vertical side profiles and a lower profile, all of them have a series of longitudinal grooves for housing and guiding the supporting profiles of the leaves or other sealing elements such as gaskets, rubber bands or doormats;
- one or more sliding leaves, in which each leaf is preferably made of glass plates, or in the case of polymer materials, in such a way that each leaf is configured as two continuous planes completely glazed and separated from each other by one or more air chambers;
- the support structure of each leaf is constituted by a support profile, which is closed and with the configuration of the leaves it supports. Internally it has an intercalary profile, the ends of which are extended internally to separate the plates located externally and internally in the support profile and along the entire perimeter. The support profile has a section that has an internal channel of fittings and components. At this point it should be noted that an intercalary profile is the name with which in this industrial sector the profile that acts as intermediary support is known;
- the internal channel of fittings and components is the space enabled perimetrically in the support profile, and is constituted by metal, polymer profiles or combination of the previous ones, and its section allows to house and protect the complementary elements of the enclosure system and hide them from the outside;
- a motorisation system for locking and unlocking the

leaves, which allows immobilising and allowing the movement of the leaves respectively. This system is incorporated into the support profile, and consists of a motorisation and transmission cell, a processing and communications module, a power supply and detection sensors, a plurality of closing fittings or bolts distributed throughout the perimeter of the profile support, and all these intercom elements;

- a displacement motorisation system, which allows the displacement of each leaf within the frame following its directive. This system is also incorporated in the support profile, and consists of a motorisation and transmission cell, a processing and communications module, a power supply, actuation sensors, and the corresponding interconnections, and having a rail at the top displacement transmitter. These elements in common, preferably, are shared with the locking motorisation system;
- some displacement trolleys, at least two for each leaf, and incorporated in the support profile in its lower part, which have a plurality of wheels or bearings that facilitate the movement of the leaves within the lower profile of the frame; and
- additionally, it is possible to include elements implemented in the support profile and intercalated within it, consisting of electronic and telecommunications equipment, as well as films or technical films for projection of images, texts and data, which interacts with the user, and communicates through a more enveloping response and greater accessibility. For this, internally in the support profile you can include an electronic processing device for video management and audiovisual elements connected to a camera, a speaker, a microphone and at least one technical film, such as an interactive touch film, all protected and hidden by the leaves or glass plates.

[0016] Within the different possible embodiments, the locking and unlocking system is preferably located in the support profile of the leaves, while it could also be located in the frame; in the same way, the motorisation system is preferably located in the support profile of the leaves, while it could also be located in the frame; like enclosure, it may or may not incorporate the implemented electronic and telecommunications elements, as well as the technical film or film that allows the vision of images, texts, and data, pixelated and in colour in superposition with the vision of the exterior.

[0017] Taking into account the description of the elements that make up this enclosure, it can be said that the following advantages are obtained: adjust the dimensions of the channel to the real needs of operation of the leaves, by separating width and depth of the channels of the frame where the leaves of the traditional assembly manoeuvre are housed; adjust the depth of the channel

in each frame profile to the height of the edge of the leaf according to the fittings, components and intercalations used, so that the transparent part of the leaf occupies the entire available gap, when the frame is placed hidden; achieve better thermal and acoustic insulation performance, by reducing the clearance between leaf and frame at the transverse level; it increases durability and facilitates cleaning since when resorting to completely smooth and glazed leaves, the sealing and protection elements do not generate appreciable surface wear and offer less resistance to the advance of the leaf, it adheres the adhesion and deposition of dirt, still protecting more of this to those elements and components already protected frontally by the glass plate; maintenance is facilitated by not making it necessary to remove the leaf to replace the bearings; increases the safety of assembly on site, since the leaves are placed directly supporting them in their housing channel: prevents damage to the leaves and the same frame, as well as other elements during the assembly on site, when resorting to a single and easy manoeuvre of installation of the leaves, where it is not necessary to rotate the leaf inside the upper frame and the drag of its lower edge to its final position within the channel of the lower profile of the frame; hinder break-in, by not allowing to resort to the lifting of the leaf as a method to remove it from its position since the operating clearance is much lower than the height of protection of the edge of the channel and overlap of the leaf; it avoids costly fittings, large profile sections and risky lifting of the leaf to overcome the resistance to the advance of the leaf and offer water-tightness when it is closed as in the elevators, since both benefits are achieved by keeping the height of the leaf on its scroll wheels; avoids during the opening and closing manoeuvres, injuries and damages on the user mainly derived from the inertia that generates its weight and the lack of controlled retention and braking element, by resorting to motorised operation of the leaves with obstacle protection system; avoids and eliminates levers, nails, cranks and other elements of drag, closing and opening of the leaves facilitating its manufacture, in addition to reducing the separation space with other elements of habitual presence in doors and windows such as curtains, blinds, Venetian and others, as well as achieve the total overlap of the leaves and/or their disappearance in the face when resorting to integrated motorisation; and it serves as support for the incorporation of films, technical films and other devices that allow the superposition of functions integrating its elements and devices in the window or door itself.

[0018] In order to complete the description that is being made and in order to help a better understanding of the characteristics of the invention, a set of drawings is attached as an integral part thereof, where the following has been represented by way of illustration and is not exhaustive:

Fig. 1 is a free perspective representation of the enclosure.

Fig. 2 is a free perspective representation of the enclosure of in the previous exploded figure.

Fig. 3 is a free perspective representation of a leaf of the enclosure in the previous exploded figures.

Fig. 4. is a representation of the horizontal section of a leaf of the enclosure attached to the frame that is housed within the insertion face.

Fig. 5. is a representation of the vertical section of a leaf of the enclosure attached to the frame that is housed within the insertion face.

[0019] Figures 1 and 2 are the free perspective representation of the preferred embodiment of the sliding enclosure, the closed figure being seen in the first figure and an exploded view in the second.

[0020] Figure 3 is the representation of an embodiment, which based on the main structure of the previous figures, internally incorporates electronic and telecommunications equipment.

[0021] Figures 4 and 5 are two sections of a type window, based on the structure of a type enclosure of the first two figures, in which it is possible to observe how the enclosure is incorporated in the insertion face.

[0022] Taking these aspects into account, the typical embodiment of a general structure of the enclosure is represented in Figures 1-5, with the proviso that Figure 3 incorporates an embodiment with electronic equipment, and it can be seen that the enclosure, which has its smooth surface and without elements such as handles or keys, and that is constituted by:

- a closed channel or frame (1) consisting of profiles, and preferably configured by three profiles joined together, two of which are removable to facilitate the placement of the leaves (2), reducing the necessary clearances between leaves and frame and preventing the leaves from being leveraged; this frame being the frame that fits into the insertion face (10), and which is constituted by an upper profile (11), two vertical lateral profiles (12) and a lower profile (13), all of them have a series of longitudinal grooves (14) for the accommodation and guidance of the supporting profiles of the leaves or other sealing elements such as sealing profiles (15) weather-strips, rubbers or mats, as can be seen in particular in Figures 4 and 5;
- one or more leaves (2), in which each leaf is preferably made of glass plates (20) or planes, such that each leaf (2) is configured as at least two completely glazed continuous plates (20) separated from each other by one or more air chambers (21) or other technical gases;
- the support structure of each leaf is constituted by a support profile (3), which is closed and with the configuration of the leaves (2) that it supports internally has an interleaved profile (31), whose ends are ex-

tended internally to separate the plates (20) located externally and internally in the support profile (3) and along the entire perimeter. The support profile has a section that has an internal channel of fittings (32) and components;

- the internal channel of fittings and components is the space enabled perimetrically in the support profile (3), and is constituted by metal, polymer profiles or combination of the previous ones, and its section allows to house and protect the complementary elements of the enclosure system and hide them from the outside;
- a motorisation system for blocking (4) and unblocking (2) the leaves, which allows immobilising and allowing the movement of the leaves (2) respectively. This system is incorporated into the support profile (3), and consists of a motorisation (41) and transmission cell, a processing (42) and communications module, a power supply (43) and detection sensors (44), a plurality of closing fittings (45) or bolts distributed throughout the perimeter of the profile support, and all these unique and elements intercommunicated with their respective connections;
- a displacement motorisation system (5), which allows the displacement of each leaf (2) within the frame (1) following its guide. This displacement motorisation system (5) is also incorporated in the support profile (3), and consists of a motorisation (41) and transmission cell, a processing (42) and communications module, a power supply (43), which it preferably shares with the blocking motorisation system (4), and actuation sensors (51), and the corresponding interconnections, there being a displacement transmitter rail (52);
- some displacement trolleys (6), at least two for each leaf (2), and incorporated in the support profile (3) at the bottom, which have a plurality of wheels or bearings that facilitate the movement of the leaves within the lower profile of the frame; and
- as can be seen in Figure 3, in a second embodiment, the enclosure has elements implemented internally in the support profile (3), specifically it has an electronic processor device (7) for managing films and audiovisual elements connected to a camera (71), a loudspeaker (72), a microphone (73) and at least one interactive touch film (8) or similar performance screen, all interconnected by the internal fittings channel of the support profile and thus remaining all protected and hidden.

Claims

1. Break-in-resistant intelligent sliding enclosure, intended for enclosures such as windows and doors, consisting of a closed fitting channel or frame (1) that allows the sliding of one or more leaves (2), which is a frame that is hidden in an insertion face (10), and which is constituted by an upper profile (11) configured by three profiles joined together, two of which are removable to facilitate the placement of the leaves (2), reducing the necessary clearances between leaves and frame and preventing the leaves from being leveraged; two vertical lateral profiles (12) and a lower profile (13), and all of them have a series of longitudinal grooves (14) for the accommodation and guidance of the supporting profiles of the leaves (2), in which each leaf (2) is preferably made of plates (20) or glass planes, so that each leaf (2) is configured as at least two continuous plates (20) fully glazed and separated from each other by one or more chambers of air (21) or other technical gases; in which every outer surface is smooth; and in which the enclosure is **characterised by** the fact that it is constituted by:

- a support profile (3) on each leaf (2), which internally of an interleaved profile (31), whose ends are extended internally to separate the plates (20) located externally and internally in the support profile (3) and along of the entire perimeter, and in which there is an internal channel that houses, conceals and protects fittings and components;

- a blocking motorisation system (4) of the leaves (2), which is incorporated in the support profile (3);

- a displacement motorisation system (5), which is also incorporated in the support profile (3); and

- at least two travel carts (6) for each leaf (2), which are incorporated in the support profile (3) in its lower part.

2. Break-in-resistant intelligent sliding enclosure, according to the characteristics of claim 1, **characterised in that** the internal channel of fittings and components is constituted by metallic, polymer profiles or combination of the foregoing.

3. Break-in-resistant intelligent sliding enclosure, according to the characteristics of claim 1. **characterised in that** the displacement carriages (6) have a plurality of wheels or bearings in their contact area the lower profile (13) of the frame (1) and that can be removed laterally without having to remove the leaves (2) from the frame (1).

4. Break-in-resistant intelligent sliding enclosure, according to the characteristics of claim 1, **character-**

ised in that it has an electronic and telecommunications equipment internally implemented in the support profile (3).

Fig. 1

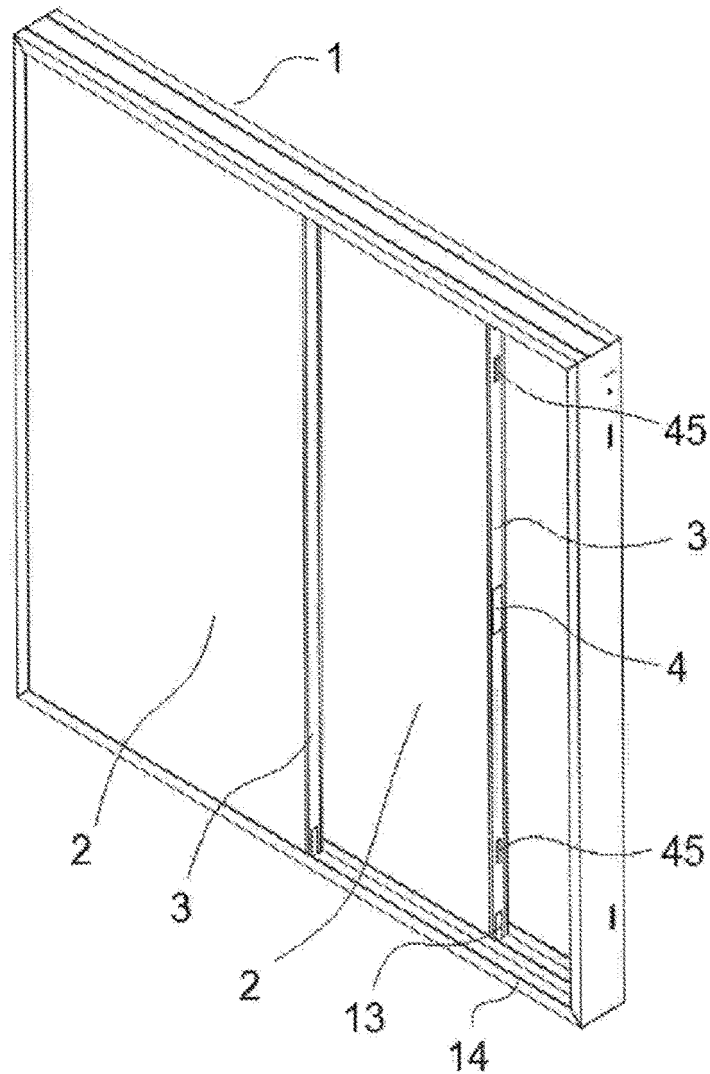


Fig.2

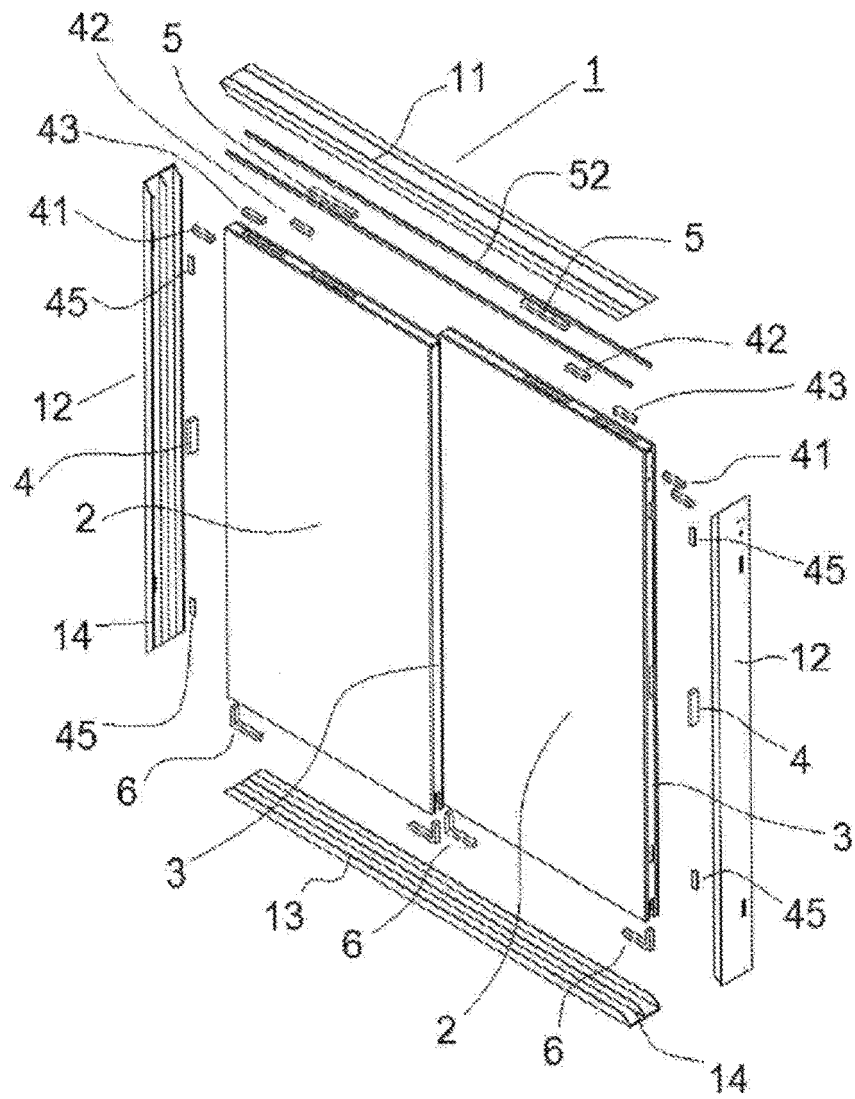


Fig.3

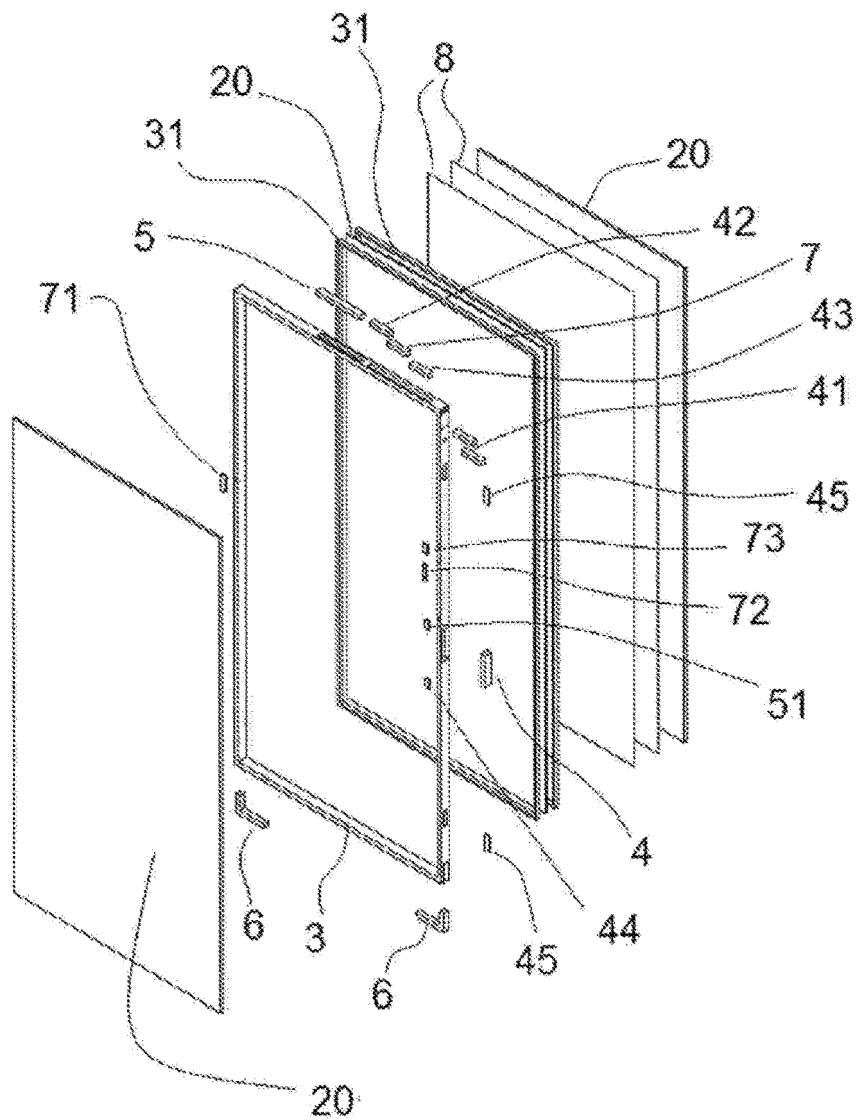


Fig.4

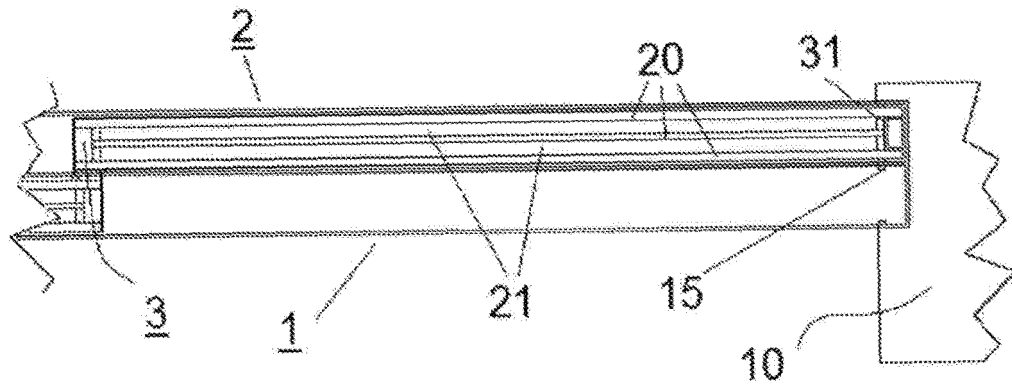
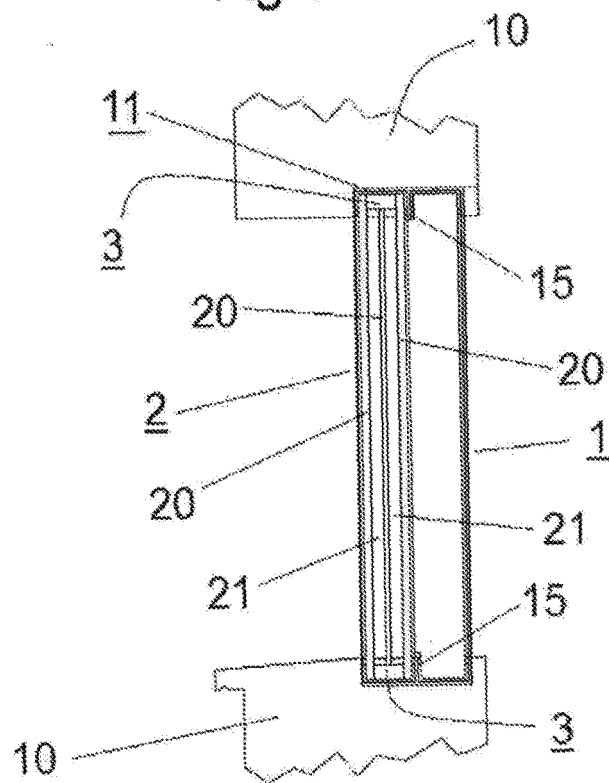


Fig.5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2018/000040

A. CLASSIFICATION OF SUBJECT MATTER

E05F15/632 (2015.01)

E06B3/46 (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)

E05F, 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.
Y	US 2010242365 A1 (LANGNER ROBERT CHARLES ET AL.) 30/09/2010, paragraph [7]; paragraphs 54 - 58]; paragraphs [84-93]; figure 1, figures 6 - 7.	1-4
Y	US 6581332 B1 (KIM HAK KYUM) 24/06/2003, column 5, lines 55 - 66; column 6, lines 21 - 41; column 14, lines 6 - 13; figures 1 - 2, figure 16,	1-4
A	US 2007271850 A1 (MICKELSON BRAD) 29/11/2007, the whole document.	1-4
A	CN 202073442U U (KINGPOWER ALUMINUM INDUSTRY CO LTD) 14/12/2011, abstract; figures 1 - 2.	1-4

☒ 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.

"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

"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

08/08/2018

Date of mailing of the international search report

(22/08/2018)

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

A. Fernández Pérez

Telephone No. 91 3498539

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2018/000040

C (continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	
Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2015159427 A1 (DUTSCH BEAT ET AL.) 11/06/2015, the whole document.	1-4
A	KR 20170022288 A (LG HAUSYS LTD) 02/03/2017, abstract;	1-4

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2018/000040

Information on patent family members

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
US2010242365 A1	30.09.2010	NZ583546 A AU2010100406 A4 AU2010100406B B4 AU2008291694 A1 AU2008291694B B2 WO2009026634 A1	21.12.2012 27.05.2010 01.09.2011 05.03.2009 27.03.2014 05.03.2009
US6581332 B1	24.06.2003	KR19990068755 A KR100278319B B1 KR200194351Y Y1 KR20000030085 A KR100300546B B1 KR200175856Y Y1 WO0079689 A2 WO0079689 A3 JP2003502535 A EP1114231 A2 EP1114231 A4 CN1319155 A CN1300438C C AU5253900 A	06.09.1999 15.01.2001 01.09.2000 05.06.2000 02.11.2001 15.03.2000 28.12.2000 15.03.2001 21.01.2003 11.07.2001 04.06.2008 24.10.2001 14.02.2007 09.01.2001
US2007271850 A1	29.11.2007	NONE	
CN202073442U U	14.12.2011	NONE	
US2015159427 A1	11.06.2015	CN104411904 A EP2864566 A1 WO2013189749 A1	11.03.2015 29.04.2015 27.12.2013
KR20170022288 A	02.03.2017	NONE	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 3425163 A [0005]
- FR 2719335 [0006]
- CH 7038S2 [0007]
- DE 20319006 U [0008]
- EP 0822310 A [0009]