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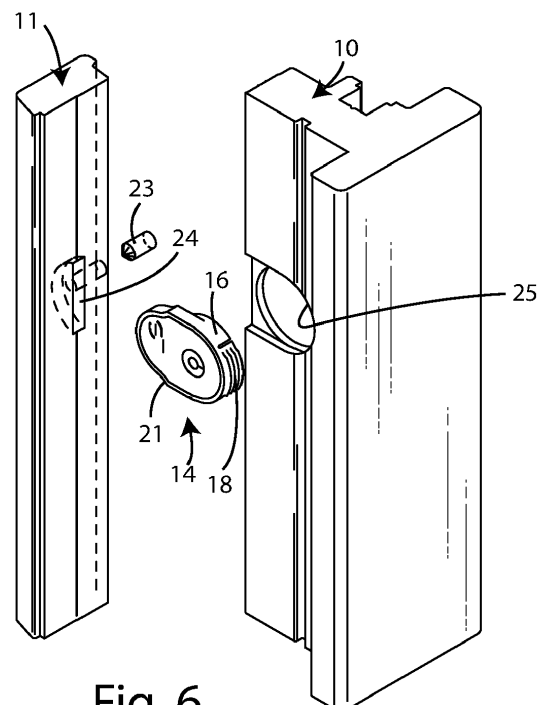
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(54) **WINDOW FRAME WITH JOINING MEANS HAVING A HIGH POSITIONING ACCURACY AND MANUFACTURING METHOD THEREOF**

(57) A window frame with joining means having a high positioning accuracy, comprising a window frame, configured to be anchored recessed into a wall of a building, the window frame comprises two uprights and two crosspieces suitable for defining a plane for laying and installation of the frame. The window frame comprises a main frame and a glass holder frame, which are joined by a plurality of clips, each of which is inserted into a slotted seat made in the main frame. Each clip has a first face comprising a cylinder, which allows centering of each clip in the slotted seat of the main frame, and a second face, which has laterally two parallel planes suitable for allowing alignment of the clip in the slotted seat in a perpendicular direction.



**Fig. 6**

## Description

**[0001]** The present invention relates, in general, to a window frame equipped with easily positionable and demountable joining means, configurate for ensuring high positioning accuracy between the main frame and the glass holder frame of the window frame.

**[0002]** The invention also relates to the relative method of fabrication of the window frame.

**[0003]** In fact, said invention relates to the field of window and door frame manufacturing in general and, in particular, to the fabrication of wooden and/or composite window and door frames.

**[0004]** It is still well known to make wood/aluminum composite structures for window frames, wherein a wood profile is assembled with an aluminum profile, by means of joining means.

**[0005]** Other types of window and door frames, with thermal insulation, comprise a main frame, typically made of wood or PVC, on which an outer covering of aluminum or plastic material is mounted to protect the wood from weathering, such as light, rain, and temperature changes; a layer of insulating material, such as a cork or wood fiber panel, is then embedded between the main frame and the outer covering in order to reduce heat loss between the interior and exterior environments.

**[0006]** The joining means between the wood/aluminum profiles and between the thermal insulation and the interior frame are made of of special spacers, usually made of resin, which have, on one hand, an attachment formation to the wood profile and, on the other hand, an attachment formation to the aluminum profile and/or to the thermal insulation to make the mechanical connection between the structural elements.

**[0007]** Each spacer is normally equipped with an enlarged head, which creates an undercut inferiorly for retaining the thermal insulation or wood profile, and carries mounted externally a respective clip for snap or rotational attachment of the aluminum covering.

**[0008]** A gasket can be attached to the wooden or aluminum profile, or to both, in the case of openable frames, which ensures sufficient rebate sealing of the closed window frame.

**[0009]** The gaskets and/or clips are then attached to the wooden profile by screws, to which the stability of the connection is entrusted.

**[0010]** A first drawback of such structures is that fixing by screws lengthens the assembly time of the window frame and requires the use of special equipment, consequently increasing its installation costs, and is susceptible to possible errors in the positioning of spacers and clips; it also makes it necessary to use assembly jigs and screwdrivers.

**[0011]** In other embodiments, which are also of known and traditional types, the joining means may comprise a plurality of clips, which are arranged in increments along the structural members and connected by a snap and/or interlocking coupling with the first wood structural mem-

ber and by a snap and/or interlocking coupling with the second insulation and/or aluminum structural member, respectively; since the couplings are demountable and the clips constitute the only existing means of restraint between the structural elements, the connection between the structural elements of the window frame is also of the demountable type and does not require applications of screws, nails, or other similar auxiliary means of attachment. A realization of this type allows for fairly rapid and easy assembly, even by personnel who are not particularly experienced, and the absence of screws speeds up the assembly of the window frame; not least, the gasket, clips and some structural elements could also be replaced in part at a later time after installation.

**[0012]** However, even in this case, there are some drawbacks, including a high coefficient of thermal transmittance, the difficulty of accurately making the corners of the window frame, the difficulty of the clips to adapt to the construction tolerances of wood and aluminum structures and to thermal expansion, the complexity and long timing of maintenance work due to the difficulties of disassembling of the clips, and the consequent increase in the production, installation and maintenance costs of the window frame.

**[0013]** In the context of the aforementioned needs, the aim of the present invention is, therefore, to overcome the drawbacks of the prior art complained of above and, in particular, to realize a window frame with joining means having a high positioning accuracy, which is simple, fast and practical to realize and quick to assemble, which can be carried out without the use of special equipment.

**[0014]** Another aim of the present invention is to make a window frame with joining means having a high positioning accuracy, which allows it to be made in a single processing step, so as to require considerably low costs, compared with the prior art, regarding production, assembly and installation.

**[0015]** A further aim of the invention is to make a window frame with joining means having a high positioning accuracy, which is also extremely reliable over time, efficient, economical and functional, compared with the prior art. These and other aims are achieved by making a window frame with joining means having a high positioning accuracy, according to the attached claim 1; further detailed embodiment are described in subsequent claims.

**[0016]** Other features and advantages of a window frame with joining means having a high positioning accuracy, according to the present invention, will be more apparent from the following description, which refers to an illustrative and preferred, but not limiting, embodiment of the window frame in question, and from the attached figures, where:

- figure 1 is an exploded perspective schematic view of a portion of the window frame, according to the prior art;
- figure 2 shows a front and exploded view of a first

embodiment of the window frame with joining means, according to the present invention;

- figure 3 shows a side and exploded view of the window frame of figure 2, according to the present invention;
- figure 4 shows a perspective view of the window frame of figure 2, according to the present invention, in finished and assembled position;
- figures 5A and 5B show two perspective views of a preferred embodiment of the joining means used in the window frame referred to in figures 2, 3 and 4, according to the present invention;
- figures 5C, 5D, 5E, and 5F show two plan views and two side views, respectively, of the joining means of figures 5A and 5B, according to the present invention;
- figure 6 is an exploded, partial and enlarged perspective view of the method of coupling, by means of the joining means of figures 5A-5F, between the main frame and the glass holder frame of the window frame of figures 2, 3 and 4, according to the invention;
- figures 7A, 7B, 8A and 8B show some processing steps of the frames for the subsequent insertion of the joining means in figures 5A-5F;
- figures 9A and 9B are two views, perspective and side views, respectively, in cross section of the frames, made at one of the joining means referred to figures 5A-5F, once the said joining means is fitted.

**[0017]** It should be noted, first of all, that although reference will be made in the following description and in the attached figures to a window frame consisting of a wooden window, it is to be understood that, without thereby departing from the scope of protection of the present invention, the window frame may otherwise consist of a door, French window, skylight, etc., whether or not provided with one or more glass panels.

**[0018]** In particular, the window frame according to the invention comprises, as in the case of traditional windows and doors, a frame, intended to be anchored recessed in a wall of a building, which usually has the shape of a quadrangular frame obtained with at least two uprights and at least two crosspieces suitable for defining a plane for laying and installation of the frame; the window or door frame has an inner side, facing the use space of the building, and an outer side, facing the environment outside the building, to perform functions of separation, protection, insulation of rooms, as well as communication and, if necessary, visual contact between the indoor and outdoor environment, as well as natural ventilation within the rooms. Figure 1 attached shows a portion of a window frame, such as a door or window sash, which basically comprises two distinct elements: a main frame 10 and a glass holder frame 11.

**[0019]** Advantageously, the main frame 10 and the glass holder frame 11, that comprise the window frame, are made from a single initial piece and are held together by a rib of material (preferably wood) at the ends of the

uprights 12 and of the crosspieces 13 of each main frame 10 and of each glass holder frame 11 and, consequently, at the corner portions of the window frame.

**[0020]** Advantageously, the two elements (main frame 10 and glass holder frame 11 are divided only after they are joined by the uprights 12 and crosspieces 13, composing the window frame.

**[0021]** Moreover, the profiling of the main frame 10 and the glass holder frame 11 is advantageously carried out by single processing, using a first tool for profiling the inner side and a second tool for profiling the outer side.

**[0022]** Thus, in the case of a classical frame consisting of two uprights 12 and two crosspieces 13, the pieces that are processed are four, although the finished frame consists of eight elements in total (four in the main frame 10 and four in the glass holder frame 11).

**[0023]** As shown in the attached figures, according to the present invention, a plurality of clips 14 are used to join the glass holder frame 11 (and its glass) to the main frame 10 of the window frame.

**[0024]** Advantageously, as shown in detail in the attached figures, each clip 14 is designed to be inserted into a special slotted seat 25 of the main frame 10 in a manual manner, without the use of special equipment, so as to ensure high positioning accuracy.

**[0025]** In particular, according to the invention, a single working tool 26 is used, that, in the same working cycle and at different depths of the frames 10, 11, is able to perform a drilling and slotting process making a slotted seat 25 in the main frame 10 and a recess 24 on the glass holder frame 11, positioned frontally of the slotted seat 25 (fig. 6, 7A, 7B).

**[0026]** This is in such a way that each clip 14 can be housed in the slotted seat 25 of the main frame 10 and inserted, with its own end, into the recess 24 of the glass holder frame 11 (fig. 8A, 8B, 9A, 9B).

**[0027]** In this regard, advantageously, each clip 14 has a first surface or face 15 and a second surface or face 17, opposite to the face 15.

**[0028]** The surface or face 15 comprises a cylinder 16, which allows the centering of the clip 14 in the seat 25 of the main frame 10, while the face 17 has laterally parallel planes that allow the alignment of the clip 14 in a perpendicular direction within the seat 25.

**[0029]** Advantageously, the cylinder 16 of the face 15 has a knurled sector 18 preferably placed on the opposite side of the glass holder frame 11 (multiple knurled sectors 18 placed on the side surface of the clip 14 may also be provided).

**[0030]** The knurled sector 18 makes beat on the inside of the main frame 10, is aligned with the direction of the clip 14, and is equipped with a snap-fit 19, which is capable of realizing pressure on the clip 14 for a proper seating of the clip 14 in the slotted seat 25.

**[0031]** In addition, clip 14 has a recess 20 in the face 15 allowing proper contact between the surface of clip 14 and the painted wood of the main frame 10 of the window frame.

**[0032]** Finally, clip 14 has a plurality of lateral bevels 21 at one side opposite wherein the knurled sector 18 is provided, to facilitate the insertion of said end into the recess 24 made in the glass holder frame 11.

**[0033]** The attachment of each clip 14 is ensured by the insertion of a screw 23, attached externally to the main frame 10, which is inserted into a hole drilled in the glass holder frame 11 in a direction perpendicular to the surfaces 15 and 17 of the clip 14.

**[0034]** The tip of screw 23 is apt to fit inside a seat 22 provided at the end of the clip 14 housed in recess 24 and opposite to knurled sector 18, so as to realize tightening and stability of clip 14 between frames 10, 11.

**[0035]** The fixing screws of clip 14, since they are inserted externally to the main frame 10, can be easily removed to carry out any maintenance of the window frame.

**[0036]** A further special feature of clip 14, as mentioned above, is that different clips 14 can be inserted at various depths of the main frame 10, thus allowing the pulling force to be applied in the centerline of the glass holder frame 11 even when using crosspieces 13 of significant size, as in the case of French doors.

**[0037]** In practice, it is possible to make the seats of the clips 14 in the main frame 10 with a single processing step, and different clips 14 can be inserted at various depth levels of the main frame 10.

**[0038]** From the description made, the technical characteristics of the window frame with joining means having a high positioning accuracy, which is the object of the present invention, are clear, as are its advantages.

**[0039]** In particular, these advantages are represented by:

- minimal cost of components,
- minimal investment in maintenance,
- speed of assembly and disassembly of the clips,
- simple, functional and intuitive assembly,
- overall reduction in material cost and assembly time compared with the prior art,
- single processing step for obtaining the fixing seats and clips,
- possibility of using unskilled personnel in assembly operations,
- possibility of inserting the clips at various depth levels, allowing the pulling force to be applied in the centerline of the glass holder frame, even in the case of crosspieces with significant dimensions, such as those of French doors.

**[0040]** Finally, it is clear that numerous other variations may be made to the window frame in question, without departing from the principles of novelty inherent in the inventive concept, just as it is clear that, in the practical implementation of the invention, the materials, shapes and sizes of the details illustrated may be any as needed, and the same may be replaced with equivalent ones.

## Claims

1. Window frame with joining means having a high positioning accuracy joining means, comprising a frame configured to be anchored recessed into a wall of a building, wherein said frame comprises at least two uprights (12) and at least two crosspieces (13) plane for laying and installation of the window frame, said window frame being equipped with an inner side, facing the use space of the building, and an outer side, facing the environment outside the building, wherein said inner and outer sides are divided by at least one glass panel, wherein said window frame comprises a main frame (10) and a glass holder frame (11), wherein said main frame (10) and said glass holder frame (11) of the window frame being joined together by a plurality of clips (14), each of said clips (14) is inserted into a slotted seat (25) obtained in said main frame (10), and wherein each of said clips (14) has a first face (15) comprising a cylinder (16), configured to allows the centering of each clip (14) in said slotted seat (25) of said main frame (10), and a second face (17), opposite to said first face (15), said second face (17) has laterally parallel planes configured to allow an alignment of said clip (14) in said slotted seat (25) in a perpendicular direction, **characterized by** the fact that said cylinder (16) of said first face (15) of each clip (14) has at least one knurled sector (18), placed on the opposite side with respect to said glass holder frame (11) and suitable to realize a pressure seal within said slotted seat (25).
2. Window frame as claimed in claim 1, **characterized by** the fact that in said glass holder frame (11) is made a recess (24), positioned frontally to said slotted seat (25) of said main frame (10), so that one end of said clip (14) is inserted within said recess (24).
3. Window frame as claimed in one of the preceding claims, **characterized by** the fact that said at least one knurled sector (18) is equipped with a snap-fit (19), said snap-fit (19) is able to realize pressure on said clip (14) for proper seating in the slotted seat (25).
4. Window frame as claimed in one of the preceding claims, **characterized by** the fact that said clip (14) has a recess (20) on said first face (15) in such a way as to allow proper contact between said first face (15) and said main frame (10).
5. Window frame as at claim 2, **characterized by** the fact that said clip (14) has a plurality of lateral bevels (21), on the opposite side from said at least one knurled sector (18), to facilitate the insertion of said end into said recess (24) made in the glass holder

frame (11).

6. Window frame as claimed in at least one of claims 2 and 5, **characterized in that** a screw (23), fixed externally to said main frame (10), is inserted into a hole drilled in the glass holder frame (11) in a direction perpendicular to said first face (15) and second face (17) of said clip (14), so that the tip of said screw (23) fits inside a seat (22) provided in correspondence with the end of said clip (14).
7. Method of realization of a window frame as claimed in claim 1, **characterized by** the fact that a single working tool (26) is configured to perform drilling and slotting by making a plurality of slotted seats (25) in the same working cycle and at different depth levels of said main frame (10).
8. Method of realization a window frame as claimed in claim 7, **characterized by** the fact that said main frame (10) and said glass holder frame (11) are made from a single piece and are held together by a ribbing of material at the ends of said uprights (12) and crosspieces (13), said ribbing being removed once said uprights (12) and crosspieces (13) are joined.

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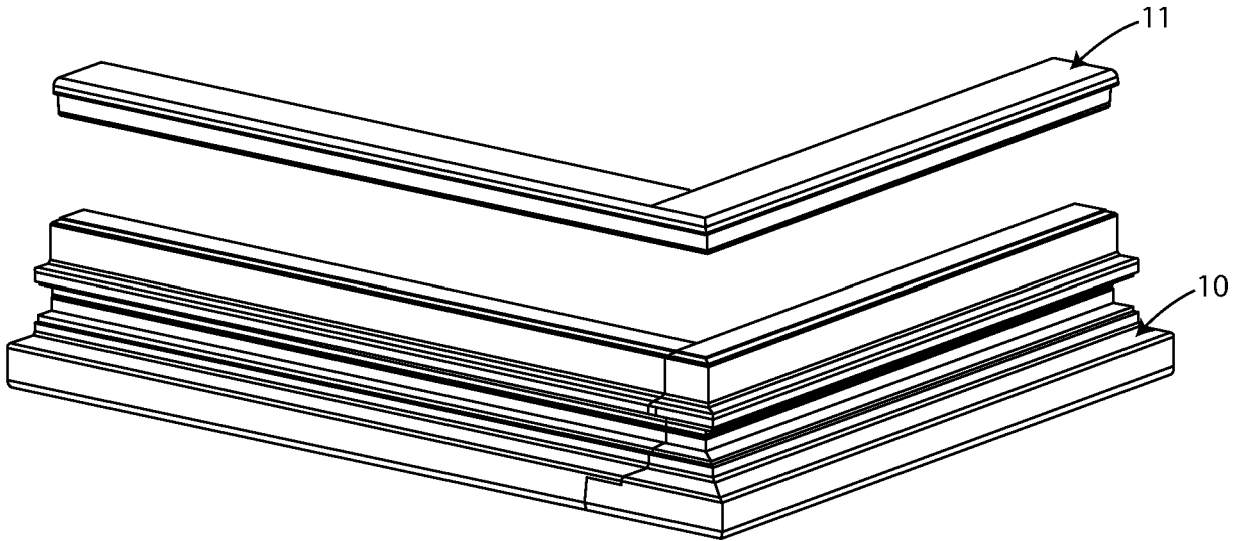


Fig. 1

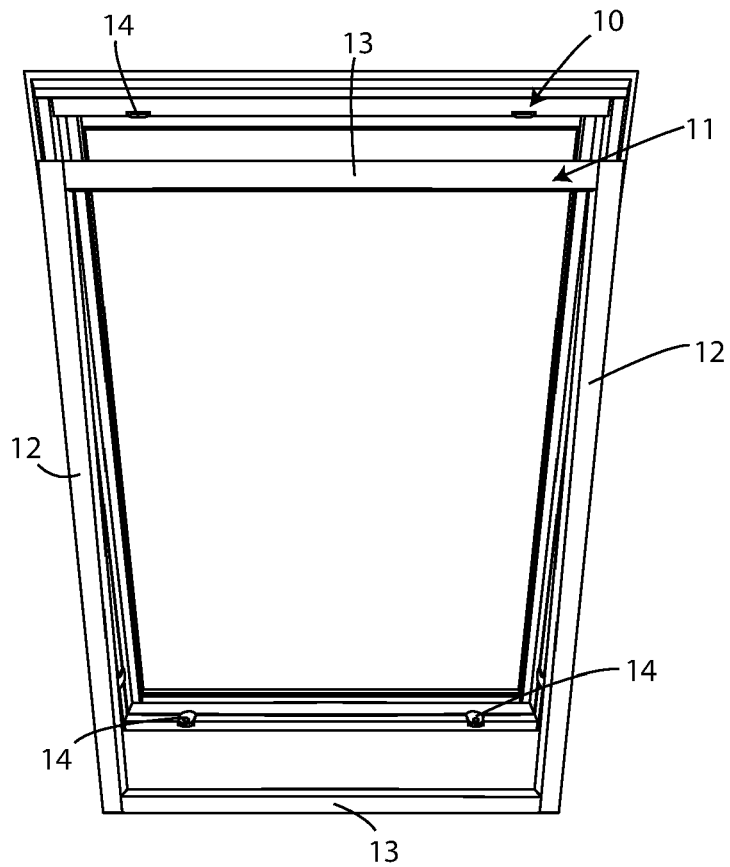
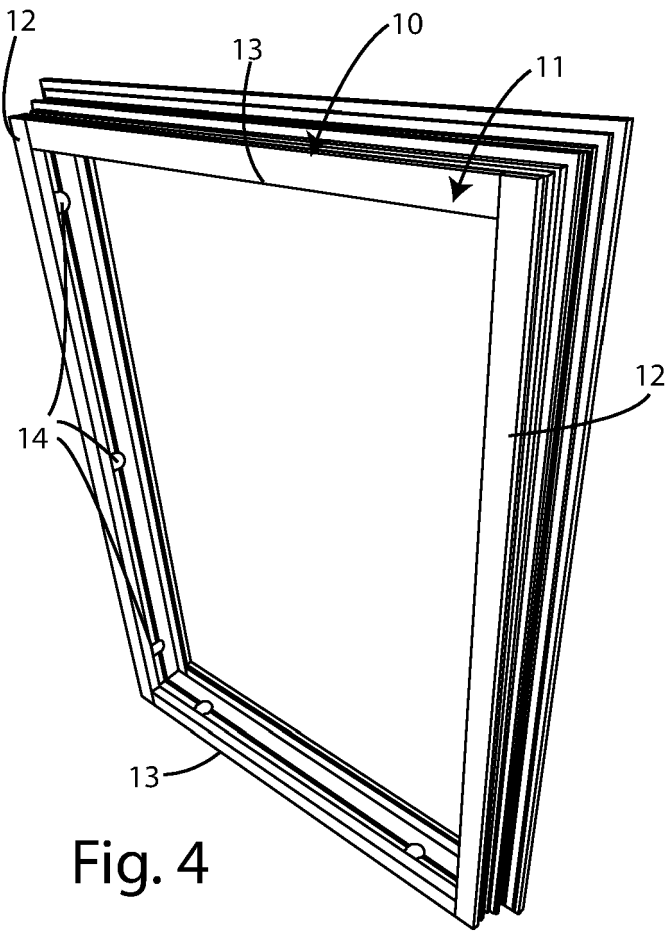
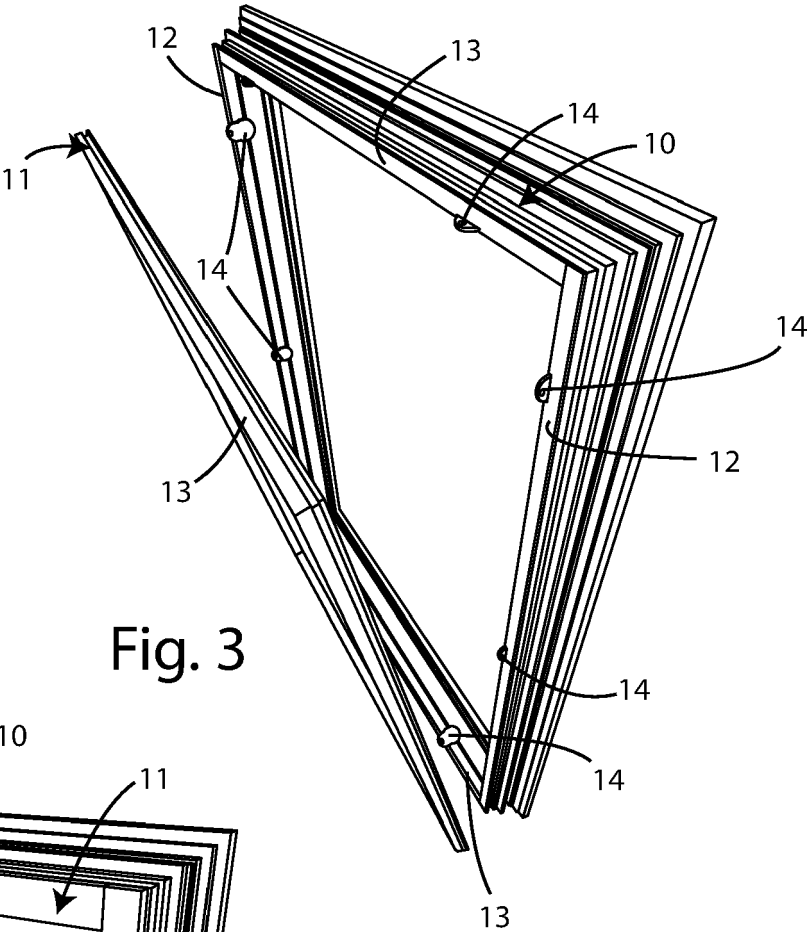


Fig. 2



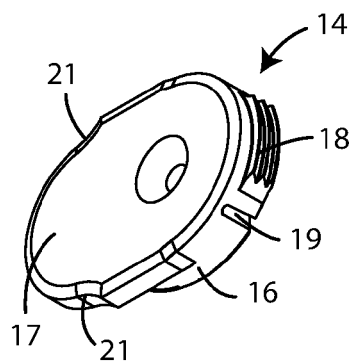


Fig. 5A

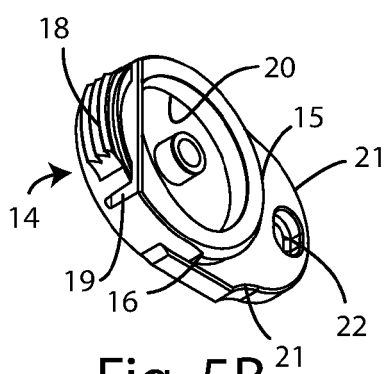


Fig. 5B

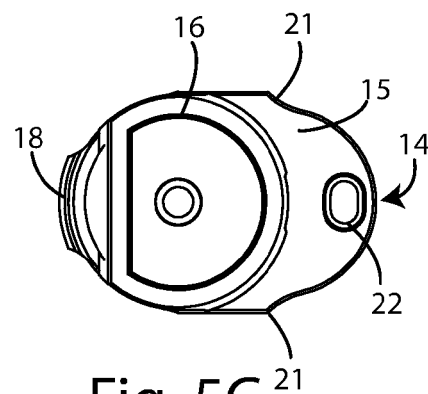


Fig. 5C

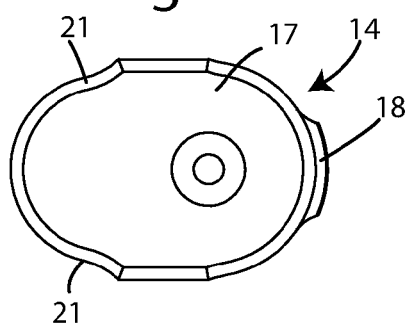


Fig. 5D

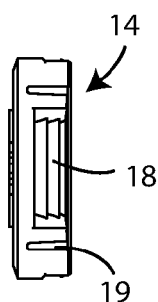


Fig. 5E

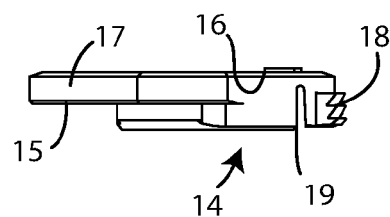


Fig. 5F

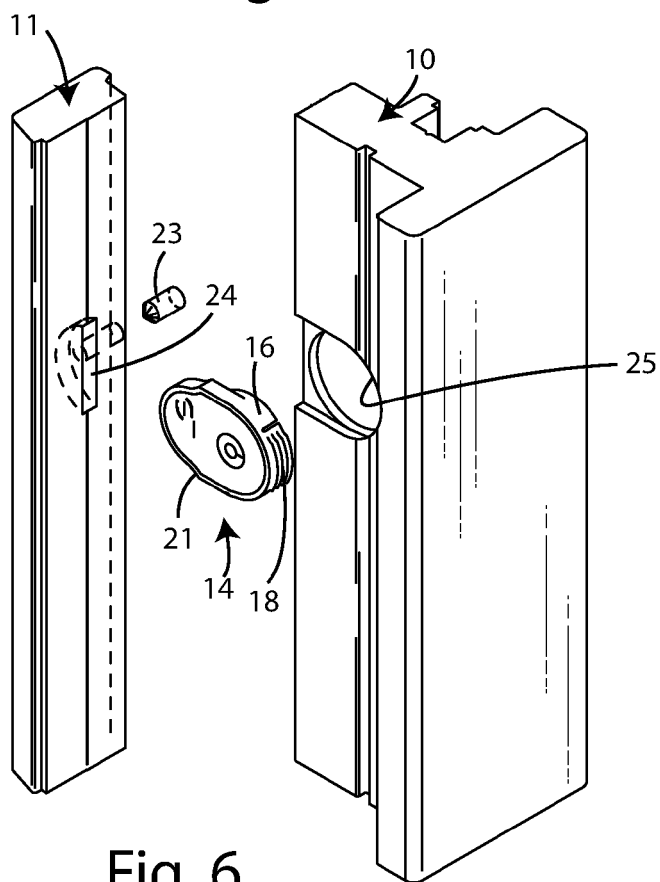
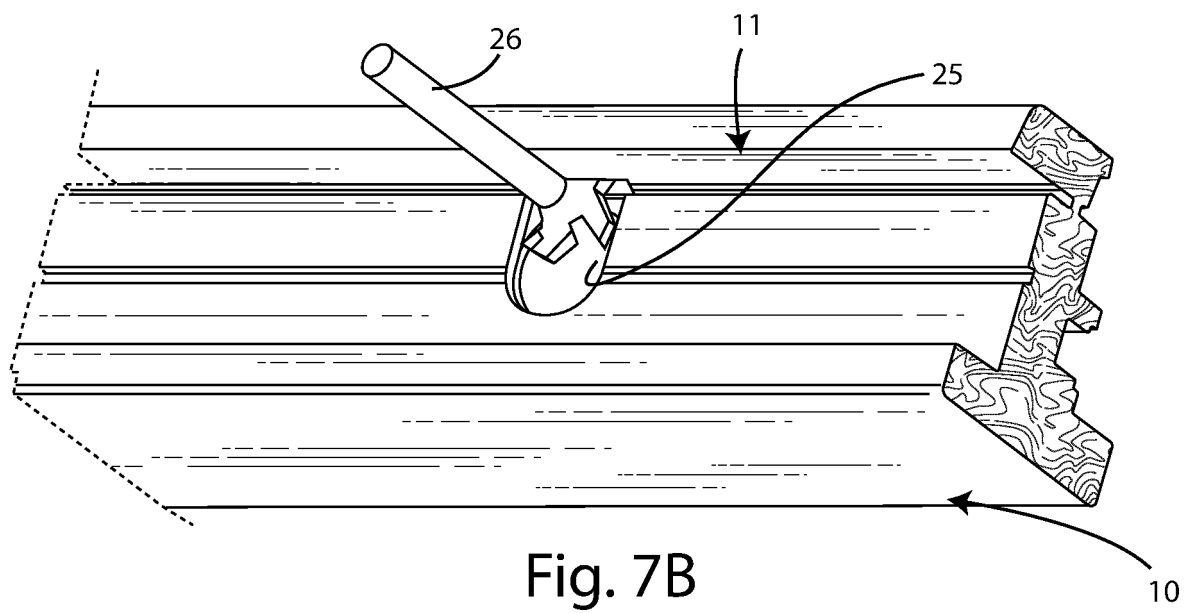
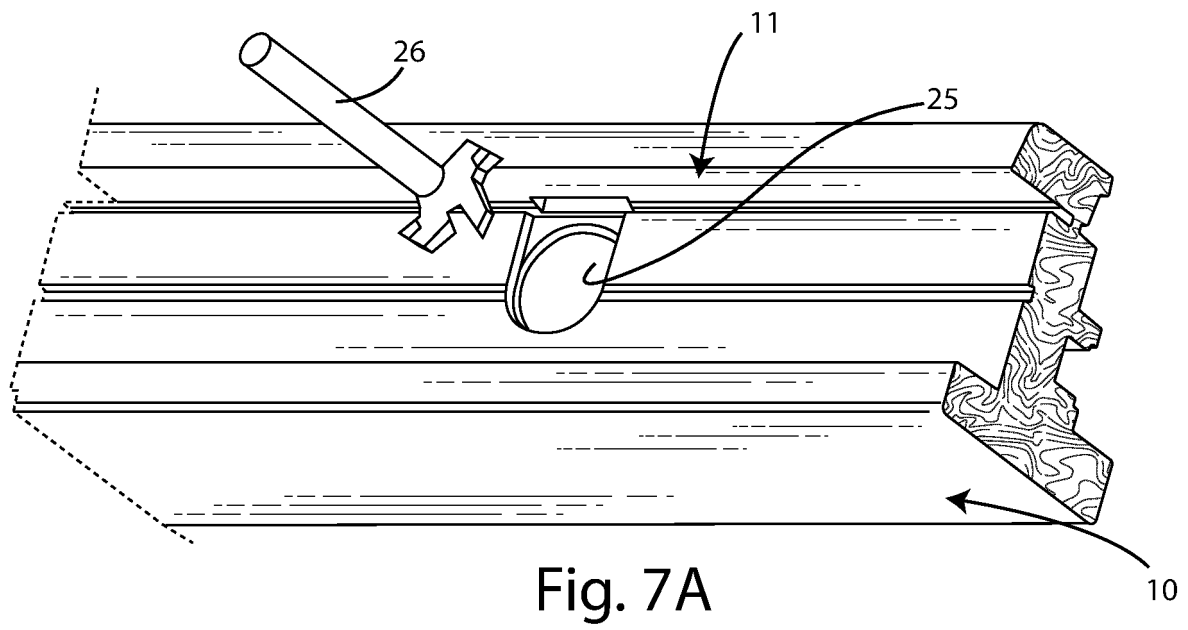
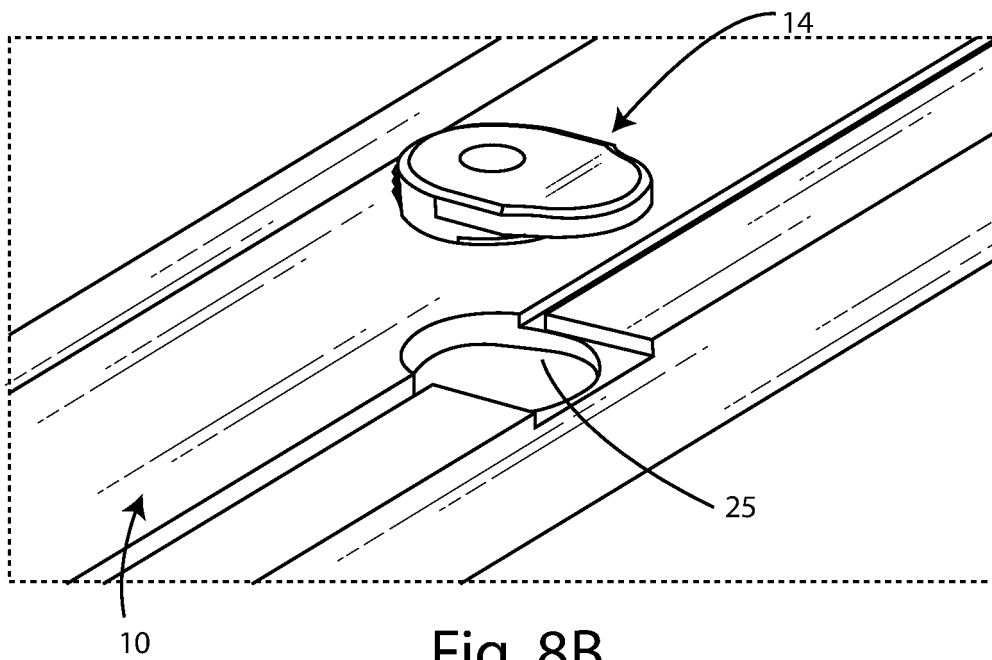
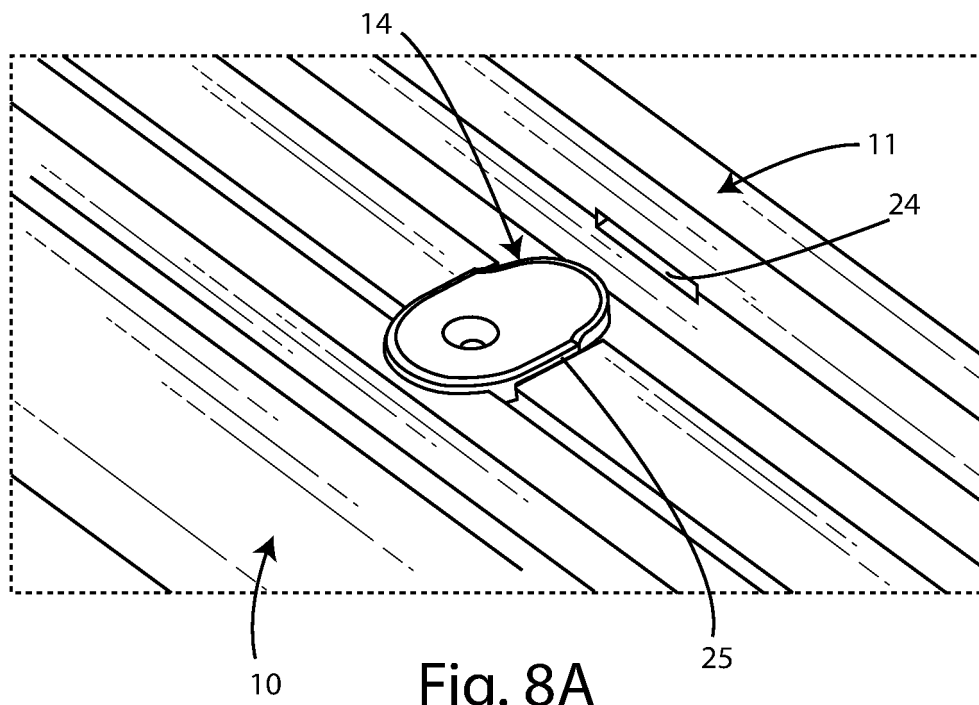


Fig. 6





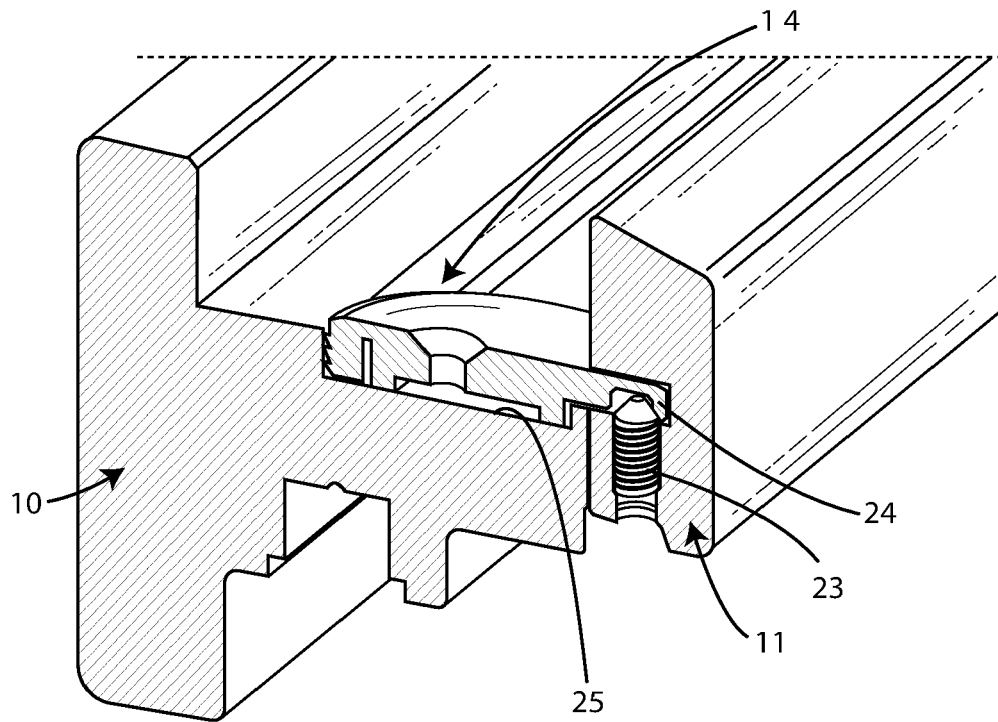


Fig. 9A

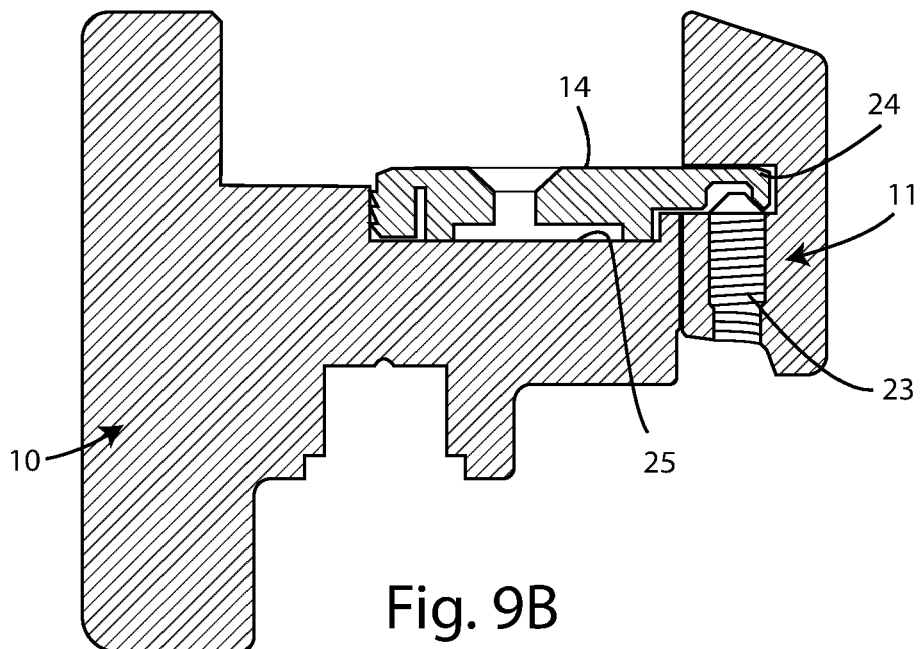


Fig. 9B



## EUROPEAN SEARCH REPORT

Application Number

EP 22 19 3783

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category                                                                                                                                                                                                                | Citation of document with indication, where appropriate, of relevant passages                                             | Relevant to claim                                                                                                                                                                                            | CLASSIFICATION OF THE APPLICATION (IPC)  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| A                                                                                                                                                                                                                       | IT 2019 0000 2820 U1 (UNIFORM S P A [IT])<br>14 February 2021 (2021-02-14)<br>* paragraphs [0058] - [0066]; figures 1-9 * | 1-8                                                                                                                                                                                                          | INV.<br>E06B3/58<br>E06B3/54<br>E06B3/26 |
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|                                                                                                                                                                                                                         |                                                                                                                           |                                                                                                                                                                                                              | TECHNICAL FIELDS SEARCHED (IPC)          |
|                                                                                                                                                                                                                         |                                                                                                                           |                                                                                                                                                                                                              | E06B                                     |
| The present search report has been drawn up for all claims                                                                                                                                                              |                                                                                                                           |                                                                                                                                                                                                              |                                          |
| Place of search                                                                                                                                                                                                         |                                                                                                                           | Date of completion of the search                                                                                                                                                                             | Examiner                                 |
| The Hague                                                                                                                                                                                                               |                                                                                                                           | 27 January 2023                                                                                                                                                                                              | Boufidou, Maria                          |
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| X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                                                                           | & : member of the same patent family, corresponding document                                                                                                                                                 |                                          |

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ANNEX TO THE EUROPEAN SEARCH REPORT  
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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27-01-2023

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