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(71) Applicant: **B. Bras & Goncalves-Sistema de Caixilharia, LDA**
4740-010 Gemeses (PT)

(72) Inventor: **Rainha, Hugo Miguel Machado**
4470-097 Gueifães (PT)

(74) Representative: **Pereira da Cruz, Jorge Afonso**
J. Pereira da Cruz, S.A.
Rua Vitor Cordon, 14
1249-103 Lisboa (PT)

(54) Framework for manufacturing doors or windows of large dimensions

(57) This invention relates to an aluminium framework intended for the manufacturing of doors or windows, which is applied into the opening of a building's door or window. It is comprised of, at least, one fixed rim (1) and also of stationary or movable panels (5), which are provided with the central (6) and reinforcing (7) studs, puller (9) and flapless puller (10), rim covers (3) and, at the centre, the sealants (4). The locking system (2) of the panels (5) is incorporated into the aluminium profiles of the fixed rim (1) and allows the number of the locking points to be adapted to the panels' (5) size. The panels (5) comprise an active acoustic absorption integrated system, which is aimed at reducing the noise pollution coming from the outside of the building, and which can be adjusted according to the location and the type of noise to be mitigated or eliminated. The framework system, which is the object of the present invention, allows the panels' (5) movement to be motorized with no need to replace any of the profiles from the fixed rim (1).

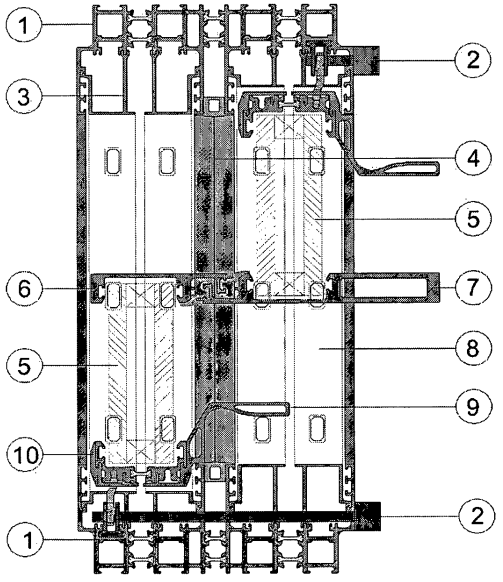

Figure 23

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Description

Technical scope of the invention

[0001] This invention relates to a framework intended for the manufacturing of large-area doors or windows, which falls within the scope of mechanical engineering applied to civil engineering, and more particularly of fixed construction elements. As regards the International Patent Classification, this invention is within the scope of E06B7/22,14; E05F7/08; E06B5/11; E06B3/00,96,30,46; E05C9/20; E05D15/06.

State of the art of the invention

[0002] When searching the state of the art of the invention, the following patent documents were identified, which are distinct from this invention as highlighted herein:

- EP 1619343 A2 - discloses a system of aluminium framed door and window panels for buildings, which is characterized by a perimetrical locking capacity, a novel configuration of reinforcing angular members employed in clamping together two sides of the frame or wing sides and provisions for air tightness and heat and sound proof capacity of such door or window panels;

- WO 2011001321 A1 - relates to a sliding panel, comprising, on at least one of the sides thereof in the direction of its movement, the reinforcing member consisting of two aluminium sections connected by a polyamide thermal break, and having two edges that define the longitudinal groove having the same width from one end of the member to the other end thereof. It comprises a longitudinal inverted channel section, wherein the guides are placed in stationary positions on the benches belonging to the profile sections of the frame of the sliding window or glass door. Each guide comprises, in the center of contact, the vertical rod having, on the top end thereof, ball bearings;

- DE 10021332 A1 - discloses a frame which comprises a wooden inner profile attached to an outer profile by means of connecting elements and forming a stop-piece for the outer surface of the glass panel. The outer profile, made from water-resistant material, preferably aluminium, has at least one fixture-arm through which the connecting elements penetrate the inner profile to join the inner and outer profiles together.

[0003] When compared to the aforementioned state of the art, this invention has the following advantages:

a) maximum allowed dimensions being manufactured per frame;
b) maximum allowed weight of each stationary/movable panel (5);
c) improved insulation protecting from wind, water and sound;
d) possibility of manufacturing stationary/movable panels (5) with variable thickness ranging from 36 to 100 mm;
e) possibility of moving the panels (5) in perpendicular plans;
f) there are no visible fixing elements, such as bolts, female parts, rivets or other;
g) possibility of having central studs' profiles with a visible thickness of 18 mm.

[0004] This invention comprises an active acoustic absorption system, which allows the noise coming from the outside of the building to be fully or almost fully eliminated, this being also a characteristic distinguishing it from the prior state of the art. Additionally, one or more stationary/movable panels (5) can be automated with this invention, not requiring outer profiles to be coupled to the fixed rim (1).

Description of the invention

[0005] This invention relates to an aluminium framework intended for the manufacturing of doors or windows, which is applied to an opening of a building's door or window, preferably comprising one door with two sliding panels (A) (B).

[0006] This invention is comprised of, at least, one fixed rim (1) and only one or several stationary or movable panels (5), which are inserted into the fixed rim (1) and laterally moved in parallel or perpendicular plans. The panels (5) can be provided with manual or motorized movement and be comprised of panels made from single-, double- or triple-glass or other type of material. The panels (5) include a central stud (6) and/or a reinforcing central stud (7), as illustrated in Figure 9, which can have profiles with a visible thickness of 18 mm in one of the edges. In the other edge, it can be provided with either a puller with flap (9) or a flapless puller (10).

[0007] The fixed rim (1) is perimetrical and usually comprised of a rectangular or square-shaped aluminium hard frame. All sides of the fixed rim (1) are formed by the same profile and they are attached to each other by any means known in the art. It is provided with rim covers (3,11) in one edge, as illustrated in Figure 9, and sealants (4) in the central area.

[0008] In all of the aforementioned cases, the fixed rim (1) profile to be used is always the same. These panels can have a thickness ranging from 36 to 100 mm of total width. The fact that this invention is modular will allow the panels (5) to be manufactured with a nominal thickness within a size interval as mentioned above. The variation of thickness is made possible by changing only the polyamide profiles (13) which create the thermal break

and join the different profiles forming the fixed rim (1). This invention also allows the panels (5) to be manufactured and used with weights up to 2000 kg per linear metre.

[0009] The panels (5) may be manually or automatically operated. The profiles forming the fixed rim (1) were developed so as to enable the automated sliding of the panels (5), without the need to add any other profiles to the system.

[0010] In order to cause the panels (5) to be moved without a huge effort, an aluminium profile was specially developed to this system, in which bearings were incorporated. This profile is known as sliding rule (12) and is accommodated in the lower section of the fixed rim (1), in slots which are specifically arranged for that purpose. The number of bearings to be used in each sliding rule is directly dependent from the weight of the panels (5).

[0011] The locking system (2) of the movable panels is incorporated into the aluminium profiles of the fixed rim (1) and allows the number of locking points to be arranged according to the size of the movable panels. The locking system (2) is a multipoint one, so the number of locking points is adjusted to the height and weight of the panels (5). Once assembled, the locking system has no visible fixing elements, which is a distinguishing characteristic as regards the current state of the art.

[0012] This invention further comprises a pneumatic sealing system between the panels (5) and the fixed rim (1), when the window/door is closed, with which the protection against wind and water is substantially improved, as well as the acoustic performance. Inside the fixed rim (1) there is an air chamber (14) which was specially developed for this purpose, since it expands in order to adapt itself to the inner surface of the fixed rim profiles and to the panel profiles, being filled with air (15) by means of a mini compressor, when the window/door is closed. When filled with air, the chamber expands until contacting with the panels (5), thus making the sealing between the fixed rim (1) and the panels (5) to be greater than the one that was previously possible. The panels (5) have an active acoustic absorption integrated system, which allows the noise pollution coming from the outside of the building to be reduced, and which can be adjusted according to the location and the type of noise to be mitigated or eliminated. In effect, there is a receiver (16) placed in the outer section of the panel (5), turning it into a big 'microphone' which is connected to a wave generator, processing the information received and generating counter-phase sound waves (19) which are then sent to a sound wave emitter (17) which is attached to the inner section of the panel, causing the latter to act as a large sound column. The result of the addition of the entering sound waves to the counter-phase generated waves is zero, which can be translated into a nullification of the sound coming from the outside environment.

[0013] The framework system which is the object of this invention allows the movement of the stationary/movable panels (5) to be motorized, with no need to replace any of the profiles from the fixed rim (1). In the fixed rim (1) profile, a track was created in order to hold and guide a "traction carriage" which fits in the panel (5). The said "traction carriage" (20) is fastened to a belt (21) which is inserted into the upper profile of the fixed rim (1) and runs over two pulleys (22). In order to insert the pulleys (22) into the profile of the fixed rim (1), a machining is performed thereof. One of the said pulleys (22) is connected to an electric motor which, when actuated, causes the carriage (20) to move, and consequently, the panel (5) also moves.

[0014] Rainwater's elimination on windy days is a problem affecting the frameworks in general. For this particular framework, a water extractor (23) was designed which solves that problem. This innovation consists of a component which is fastened to the holes performed in the fixed rim (1) in order to eliminate rainwater. These components are provided with blades which freely rotate around a shaft. When in the presence of wind, the blades will rotate and the water will be extracted from the inside of the fixed rim (1) in a more efficient way than with the prior state of the art. The sliders (24,25), which are fitted into the lower and upper sections of the panels (5), remaining fastened to the four corners thereof, will promote the movement of the panels (5) and neutralize the resulting noise, thus providing for an effortless, smooth and silent sliding.

[0015] The other purpose of this component is to eliminate the noise when the movable panel is being moved. The noise is similar to the one heard when travelling in a train and it passes over the rail joints. The same happens in the case of the sliding frames. The problem occurs while the movable panels are being moved and whenever the lower section of the panel initially touches the bearings, a slight stroke is heard. The noise is eliminated thanks to a ramp track (26) which was arranged in the sliders (24,25), promoting a smooth contact between the bearings of the sliding rule (12) and the lower section of the movable panels. In addition to the use of sliders, a brass bar (27) is also used, which is fastened to the lower section of the panel. The brass bar (26) is aimed at avoiding wear of the aluminium profiles forming the panels (5).

Description of the drawings

Indication of reference numbers

[0016]

- perimetrical fixed rim (1) ;
- locking system (2) of movable panels;
- rim covers (3,11);
- rim sealants (4);
- movable/stationary panels (5);
- central stud (6);
- reinforcing central stud (7);
- sliding rule (8);

- puller (9);
- flapless puller (10);
- sliding rules (12);
- polyamide profiles (13);
- air chamber in empty position (14);
- air chamber in full position (15);
- sound waves receiver (16);
- sound waves emitter(17);
- sound waves from the outside environment (18);
- sound waves generated in counter-phase (19);
- traction carriage (20);
- belt (21);
- pulleys (22);
- water extractor (23);
- sliders (24) (25);
- ramp track (26);
- brass bar (27).

Figure 1 - Graphic representation of the perimetrical fixed rim (1).
Figure 2 - Graphic representation of the locking system (2) of the panels (5).
Figure 3 - Graphic representation of the rim cover (3).
Figure 4 - Graphic representation of the rim sealant (4).
Figure 5 - Graphic representation of movable/stationary panels (5).
Figure 6 - Graphic representation of the central (6) and the reinforcing central (7) studs.
Figure 7 - Graphic representation of the puller (9) and the flapless puller (10).
Figure 8 - Graphic representation of the rim cover (11).
Figure 9 - Horizontal cross-section view of the framework, wherein the different components of the system are represented. The frame herein illustrated is a sliding door with two movable/stationary panels (5).
Figure 10 - Graphic representation of sliding rules (12).
Figure 11 - Graphic representation of polyamide profiles (13).
Figure 12 - Vertical cross-section view of the same frame, this figure showing the capacity of the invention to vary the thickness of the panels.
Figure 13 - Graphic representation of an optional embodiment of this invention, in which the lower section of the panel (5) is intended for 36 mm glass, also illustrating the polyamide profiles (13) and sliding rules (12).
Figure 14 - Graphic representation of an optional embodiment of this invention, in which the lower section of the movable/stationary panel is intended for larger glass units (5b) and having its perimetrical rim (1b) modified with larger polyamide profiles (13b), in order to accommodate larger movable/stationary panels, and illustrating also the sliding rules (12).
Figure 15 - Graphic representation of the air chambers in empty position (14) and full position (15).
Figure 16 - Horizontal cross-section view of this invention, wherein the operation of the pneumatic sealing system is illustrated, in which on side A the pneumatic sealing is deactivated at the left, and activated at the right.
Figure 17 - Vertical cross-section view of this invention, in which on side A the pneumatic sealing is deactivated at the left, and activated at the right.
Figure 18 - Horizontal cross-section view of this invention, wherein the operation of the active acoustic absorption system is illustrated, in which on side A are depicted the sound waves receiver (16) and the sound waves emitter (17), both made from piezoelectric material, as well as the sound waves from the outside environment (18) and the sound waves generated to be in counter-phase (19) with sound waves coming from the outside (18).
Figure 19 - Detailed view of the motorization system, in which the traction carriage (20), the belt (21) and the pulleys (22) are illustrated.
Figure 20 - illustration of the water extractor (23) - on the left; cross-section view of the water extractor (23) - at the centre; and the water extractor (23) mounted over the fixed rim (1) - on the right.
Figure 21 - illustrates the sliders (24) (25).
Figure 22 - Detailed view of the fitting of the sliders into the panels, and of the brass bar (27) - on the left; Detailed view of the ramp track (26) and of the brass bar (27).
Figure 23 - Corresponds to the figure for publication.

Claims

1. A framework intended for the manufacturing of large-area doors or windows, which is **characterised in that** it comprises:

a) at least one fixed rim (1) comprised of an aluminium hard frame, wherein all the sides of the fixed rim (1) are comprised of four elements with the same profile and joined together;
b) at least one panel (5), which is movable or stationary, inserted into the fixed rim (1), comprising a central stud (6) and/or a reinforcing central stud (7), a puller (9) and/or a flapless puller (10), and being comprised of sections with a thickness ranging from 36 mm to 100 mm;
c) a sliding rule (12) which is accommodated in the lower section of the fixed rim (1) into slots;
d) a locking system (2) of the panels (5) incorporated into the fixed rim (1), which is a multipoint one;
e) an air-chamber (14) located inside the fixed rim (1);
f) a sound waves receiver (16) placed into the outer section of the panel (5) and a sound waves emitter (17) fastened to the inner section of the

panel (5);
g) sliders (24,25) which are fitted into the lower and upper sections of the panels (5), fastened to the four corners of the panels (5), and comprising a ramp track (26) which guides the panels (5);
h) a traction carriage (20) sliding over the fixed rim (1) fastened to the belt (21) which is inserted into the upper profile of the fixed rim (1) and rests over two pulleys (22) which are connected to an electric motor;
i) a brass bar (27) fastened to the lower section of the panel (5).

2. A framework according to claim 1, **characterized in that** the aluminium hard frame of the fixed rim (1) is rectangular or square-shaped.

3. A framework according to claim 1, **characterized in that** the central stud (6) and the reinforcing central stud (7) have 18 mm thickness profiles.

4. A framework according to claim 1, **characterized in that** the panels' (5) movement is manual or motorized.

5. A framework according to claim 1, **characterized in that** the panels (5) are made of single-, double- or triple-glass, or other type of material.

6. A framework according to claim 1, **characterized in that** the fixed rim (1) has holes to which are fastened the water extractors (23).

1

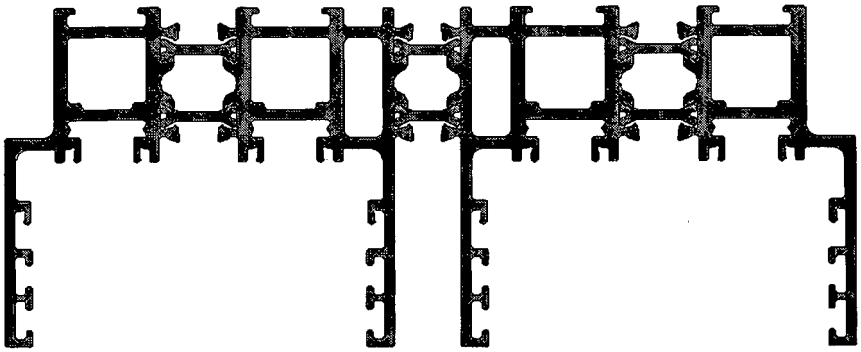

Figure 1

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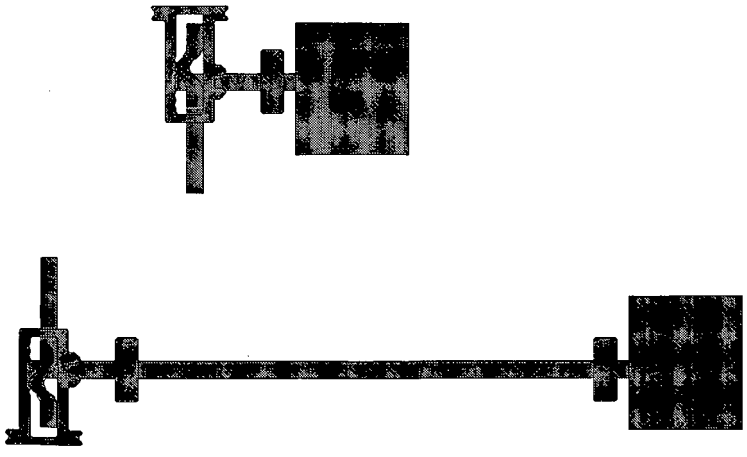

Figure 2

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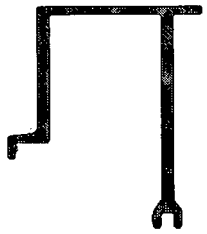

Figure 3

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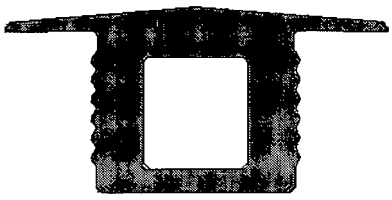

Figure 4

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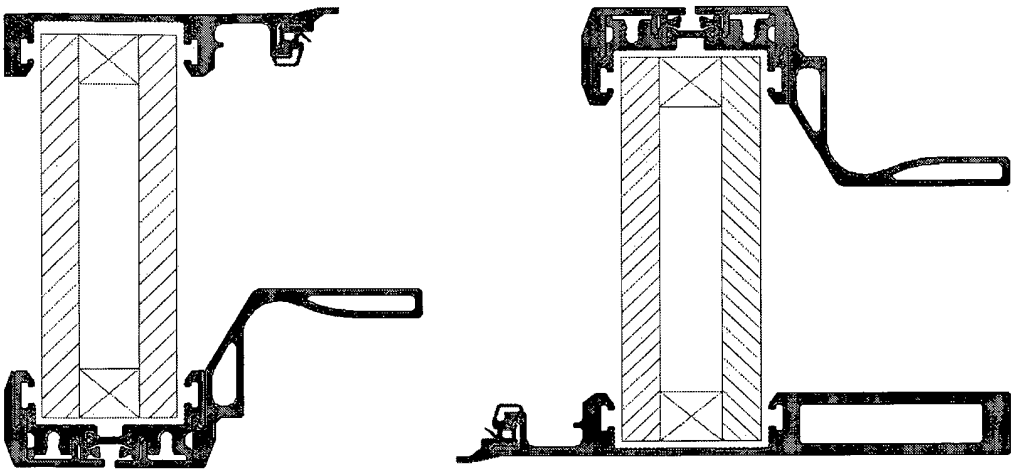

Figure 5

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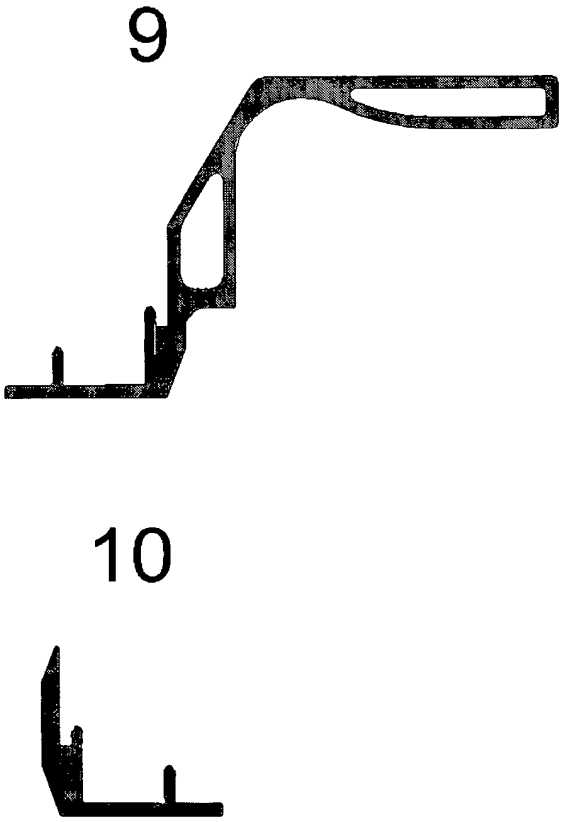
Figure 6



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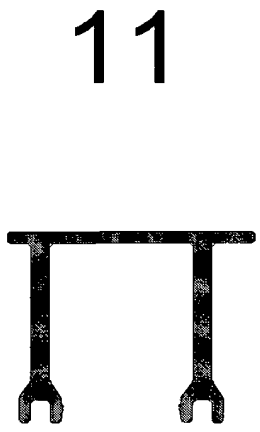

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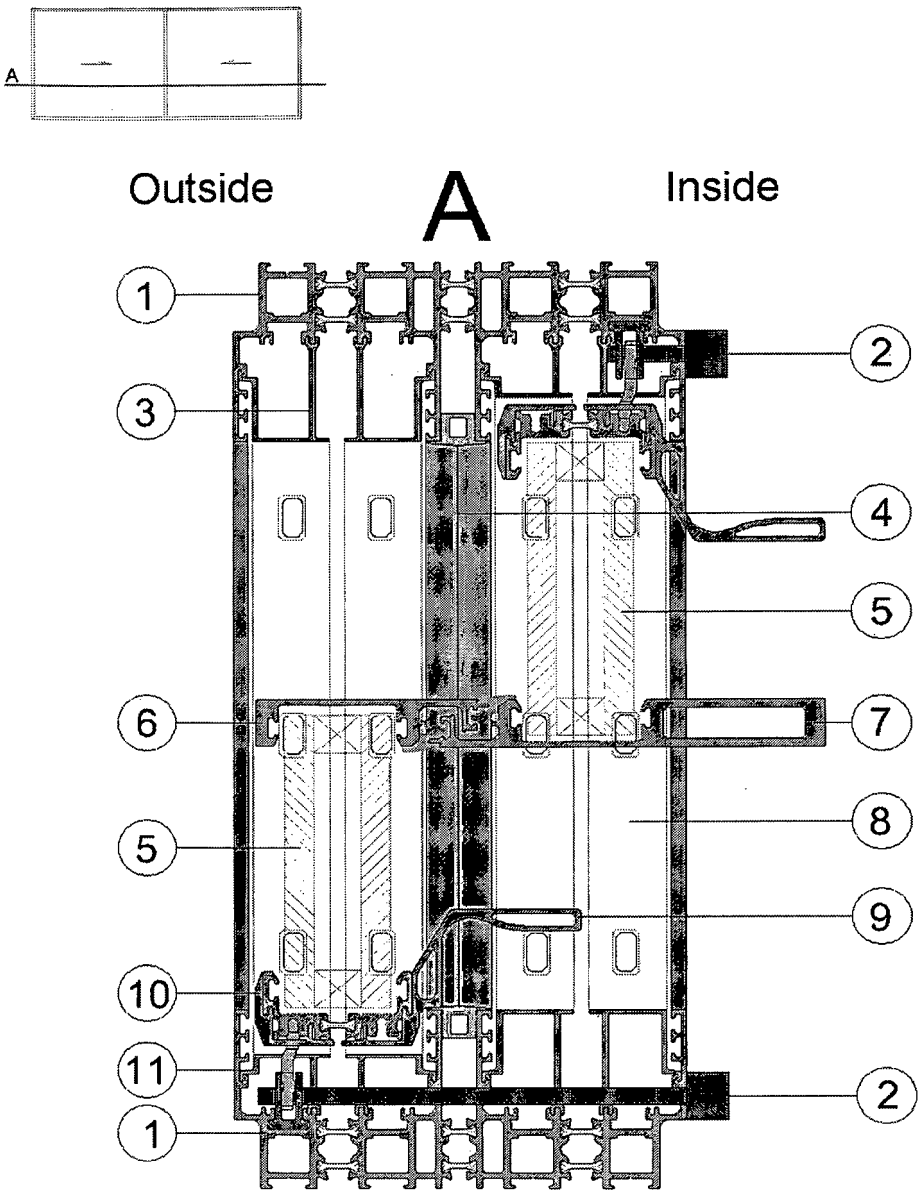

Figure 9

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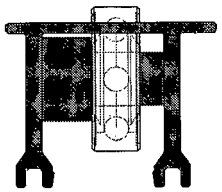

Figure 10

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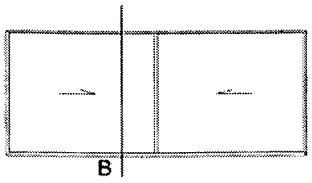
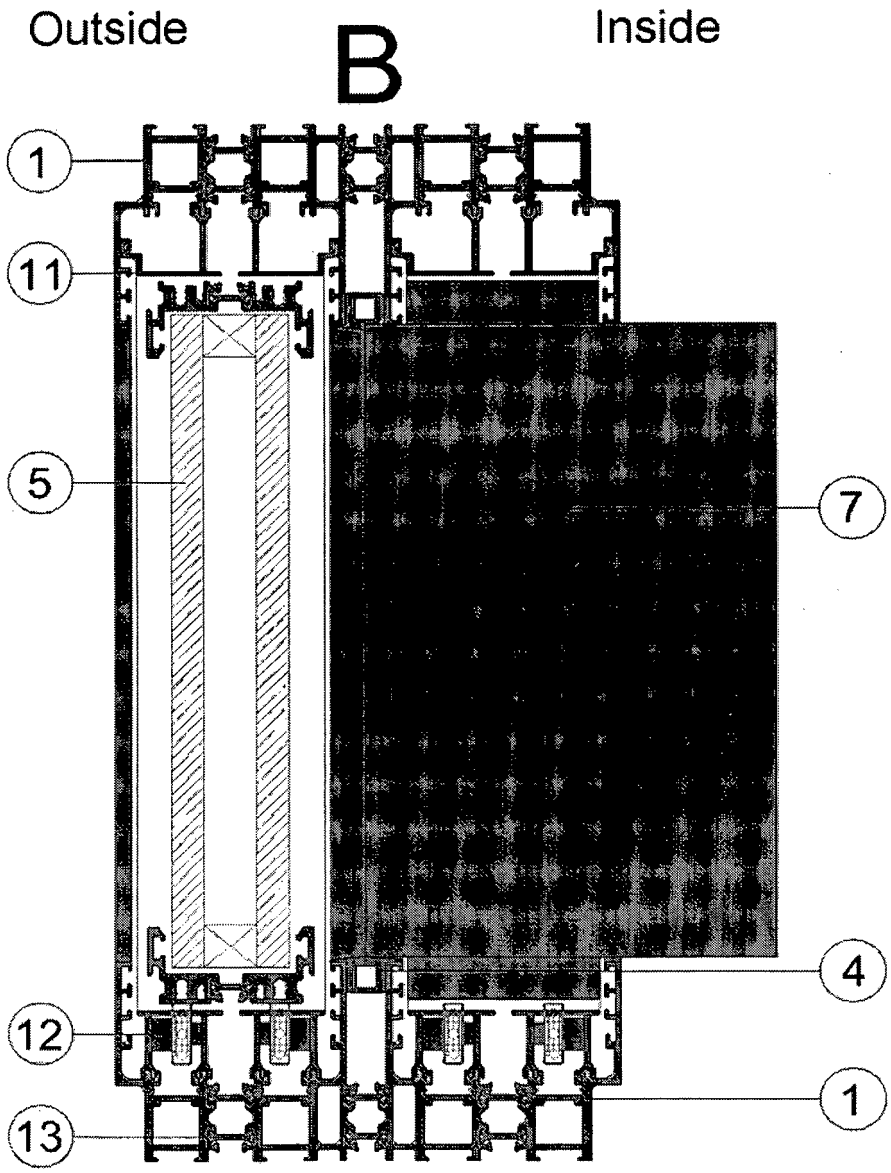
Figure 11





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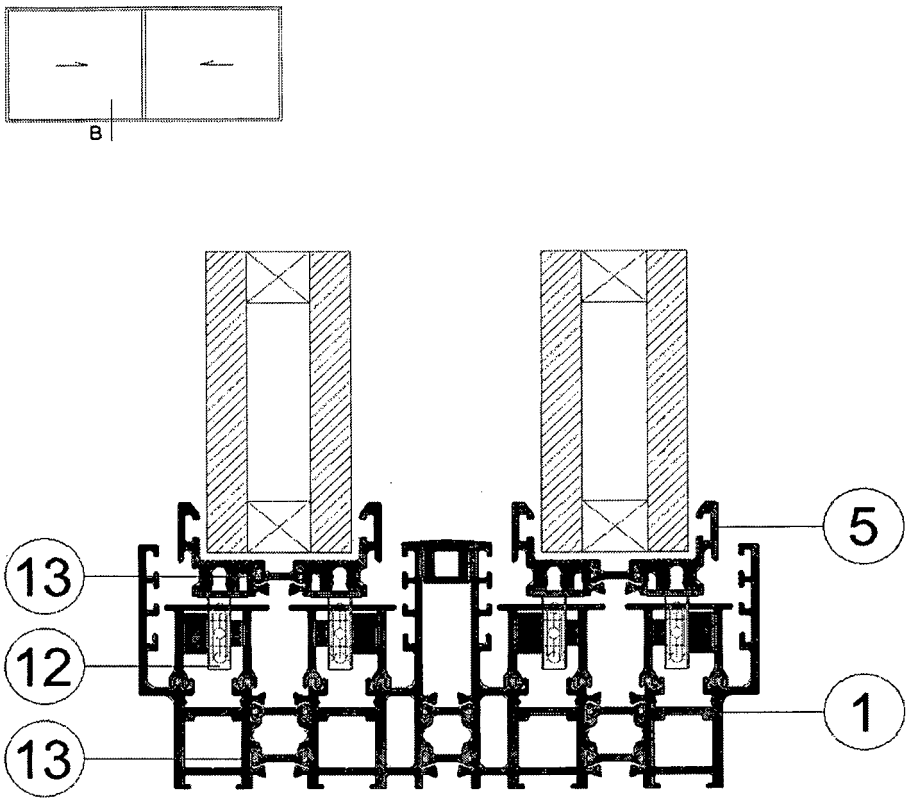

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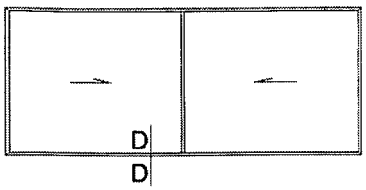

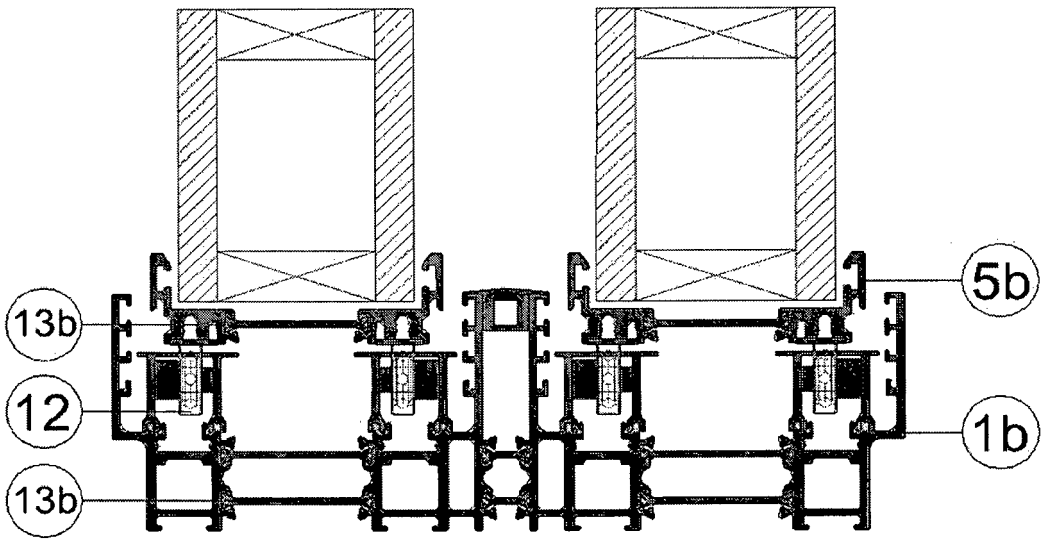

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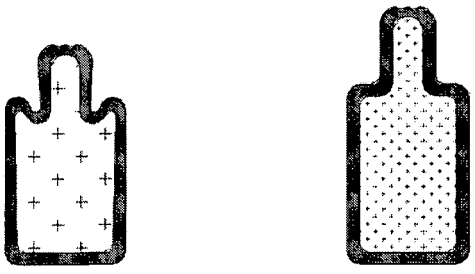

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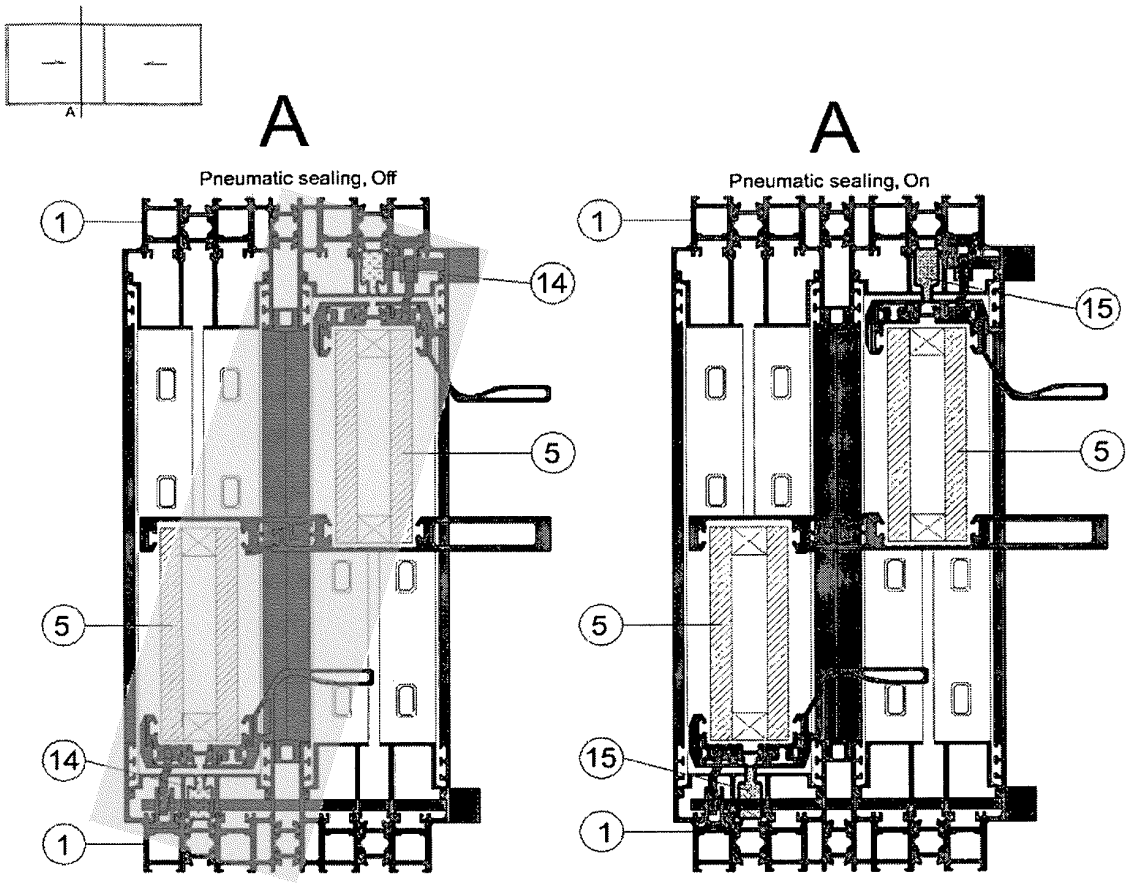
A
A
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Pneumatic sealing, On
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Figure 16

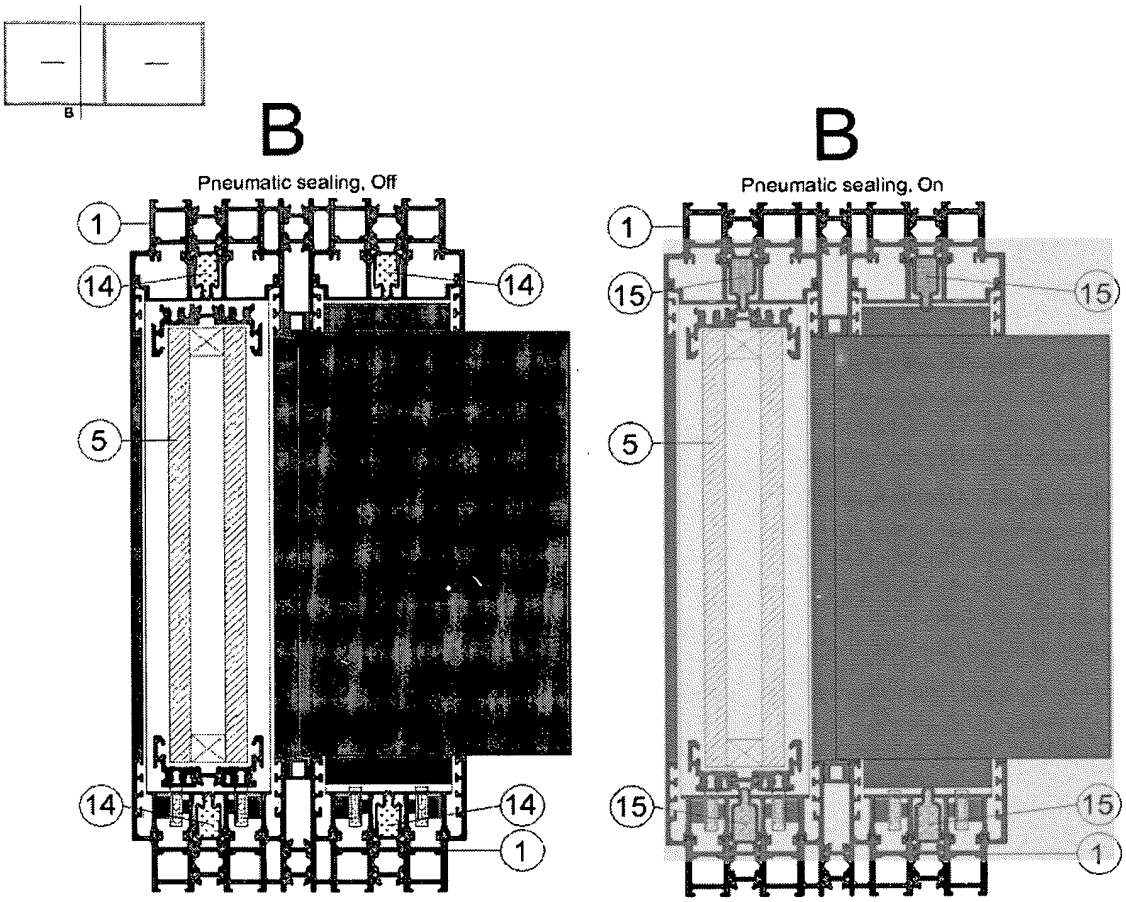
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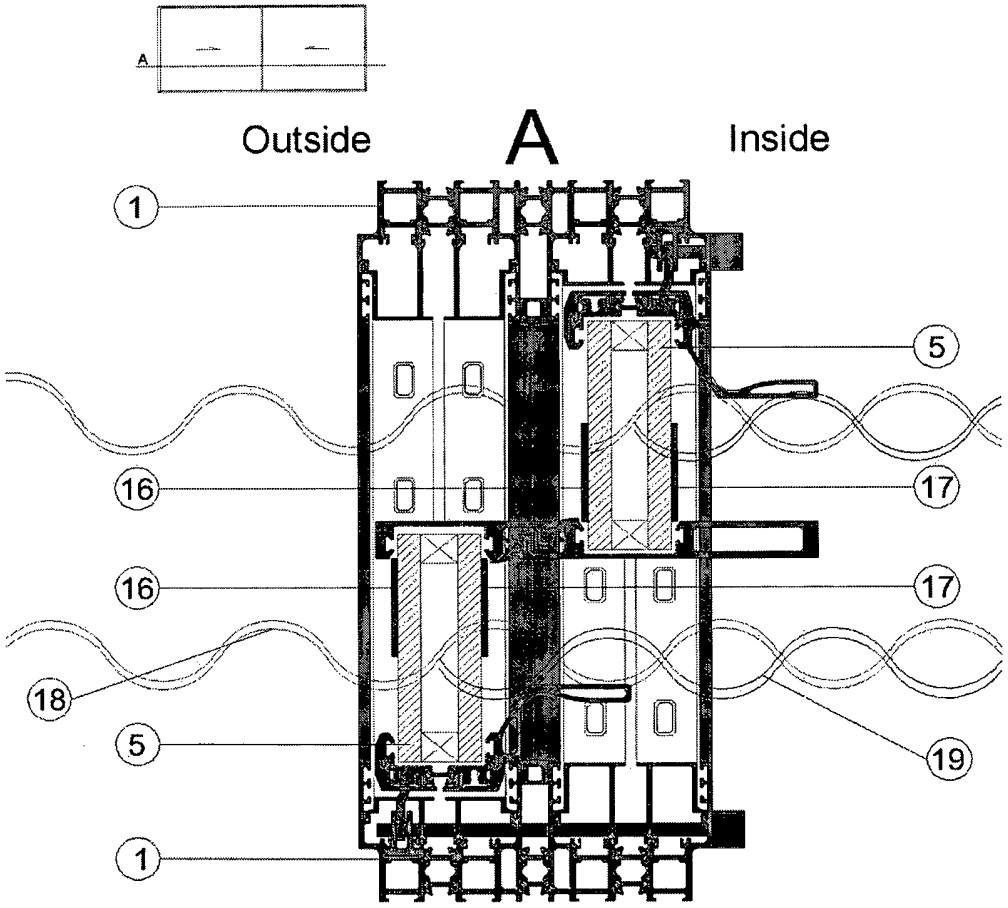
Figure 17



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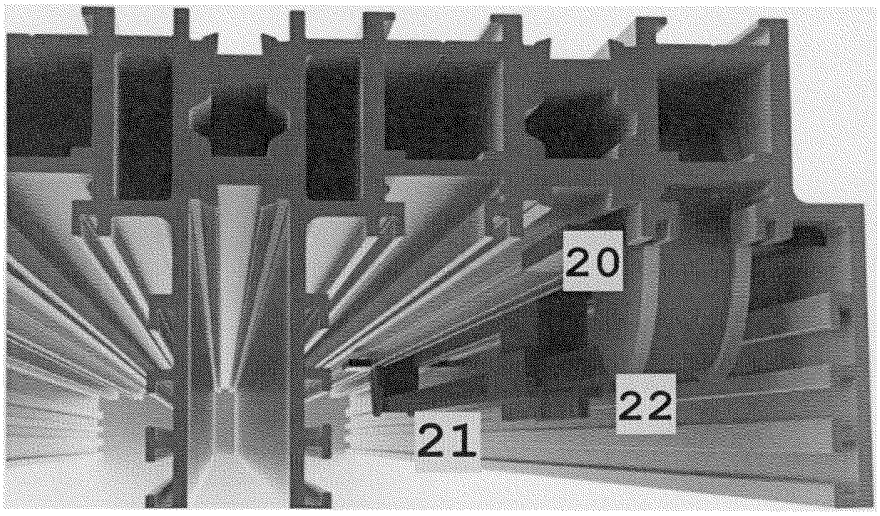
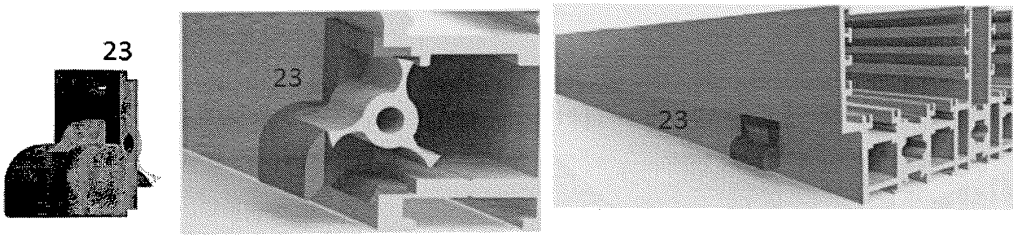


Figure 19



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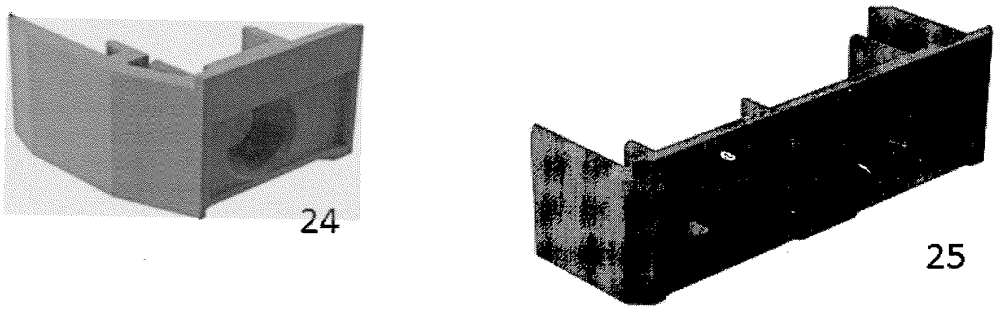

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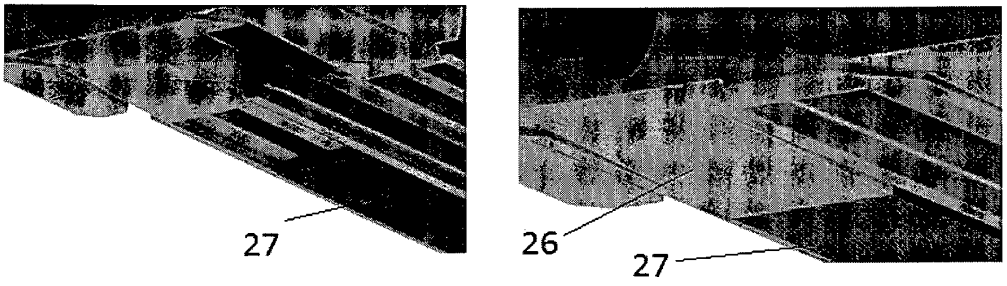

Figure 22

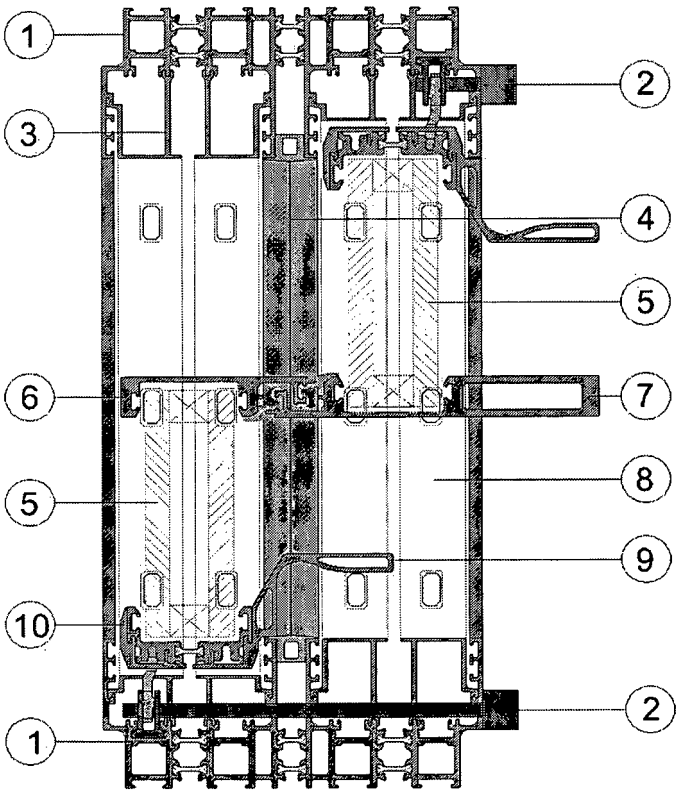

Figure 23

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- WO 2011001321 A1 **[0002]**
- DE 10021332 A1 **[0002]**