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(71) Applicant: **Cuhadaroglu Metal Sanayi Ve
Pazarlama A.S.**

Büyükçekmece/Istanbul (TR)

(72) Inventors:

• **Yilmaz, M., Çuhadaroglu Metal Sanayi ve
Pazarlama
Büyükçekmece
Istanbul (TR)**

• **Gökdemir, H., Çuhadaroglu Metal Sanayi ve
Pazarlama
Büyükçekmece
Istanbul (TR)**

(74) Representative: **Dereligil, Ersin**

**Destek Patent, Inc.,
Tophane Ortapazar Cad. No: 7
16040 Osmangazi Bursa (TR)**

(54) **Doors, windows, curtain walls composed of high thermal insulated, wooden-aluminium composite profiles, and production method thereof**

(57) The present invention relates to a window, door, and curtain wall embodiment composed of light-weighting, high thermal insulated, wooden-aluminium composite profiles for use in buildings, said embodiment comprising at least one metal frame inner profile (4) and at least one frame outer profile (5), at least one vent inner profile (7) and at least one vent outer profile (8), and at least one central guide profile (10), which are mechanically joined by means of thermal breaks (6) for heat insulation purposes, and which have proper slots for fastening or connecting the accessories allowing for maximum vertical and horizontal clearances and making the embodiment completely fulfill its main functions; wooden profiles (1, 2), which make sensible the heat that is physiologically provided by such wooden materials, and which is not exposed to external environmental conditions (such as water, wind, high temperature, cold, dirt, sunlight, etc.); and wooden glazing bead profiles (3) and metal glazing bead profiles (9).

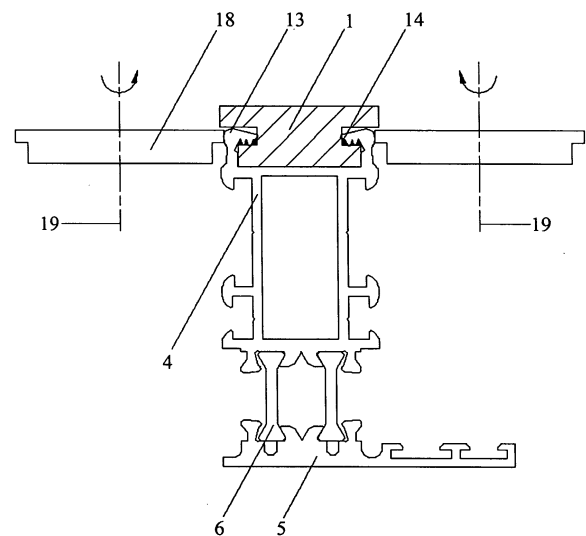


FIGURE 5

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Description

Technical Field

[0001] The present invention relates to windows, doors, and curtain walls composed of wooden-aluminum composite profiles.

[0002] The present invention more particularly relates to windows, doors, and curtain walls composed of light-weighting and high thermal insulated, wooden-aluminum composite profiles.

Background of Invention

[0003] In the production of wooden-aluminum doors, windows, and curtain walls, generally five types of production methods have been implemented so far in order to combine the wooden and aluminum profiles as following: metal covered wooden profiles, composite metal covered wooden profiles, wooden-aluminum double profiles, metal covered wooden profiles with renewed substrate frame profiles, and wooden covered metal profiles.

[0004] The first of these methods is generally known as metal covered wooden profiles, wherein the exterior of wooden profiles are covered with metal profiles. In suchlike applications, the wind's positive and negative charges are directly transferred to wooden profiles by means of the glazing. Such wooden doors/windows are produced by engaging such metal profiles on connection devices that are assembled on wooden profiles, such devices having different characteristics, geometries, and materials. Whilst the wooden profiles' susceptibility against external conditions is thus minimized, the wind's positive and negative charges etc. are transferred to wooden profiles. This feature gives the opportunity to produce such wooden doors/windows in certain heights and widths only, due to the characteristics of wooden materials, causing to difficulties in manufacturing, to high costs, and maintenance requirements. Patens EP0961002 published on 1999/12/02, US3815285 published on 1974/06/11, EP1486636 published on 2004/12/15, and CH596426 published on 1978/03/15, can be cited as relevant examples for suchlike applications.

[0005] Second type of doors/windows is generally known as composite metal covered wooden profiles, or wooden windows/doors. In suchlike wooden doors/windows, the exterior of wooden profiles are covered with aluminum profiles. Such wooden doors/windows are produced by engaging such aluminum profiles on connection devices that are assembled on wooden profiles, such devices having different characteristics, geometries, and materials. Whilst the wooden profiles' susceptibility against external conditions is thus minimized, only the wind's positive charges etc. are transferred to the wooden profile. The wind's negative charges and the charges from the connections of wooden profiles are encountered by aluminum covering profiles and connection devices.

In addition to the drawbacks met in metal covered wooden doors/windows, the transferring of wind's negative charges to connection devices and metal profiles, allows only to certain heights and clearances. As the heights of the building of application increase, it becomes more crucial with increasing wind pressures. Patents EP09907061 published on 2000/04/05, EP1178177 published on 2002/02/06, DE10154058 published on 2003/05/15, FR2789111 published on 2000/08/04, and EP0796973 published on 1997/09/24, can be cited as relevant examples for such type of applications. There are other applications coverable under this type of profile embodiments, wherein, however, foam is provided between the aluminum profile and wooden profile, and in another one, a profile of a further material is positioned between such aluminum profiles and wooden profiles.

[0006] Third type of windows/doors is generally known as wooden-aluminum double profiles. In suchlike windows/doors, there are provided a composite wooden/aluminum frame, and two vents, of which at the exterior is composed of aluminum, and of which at the interior is composed from wood. There are further employed special accessories in order to unite such two profiles, due to the different thermal expansions of two materials, and the diffusion of water vapor to the wooden profile. Such frame profiles are produced by engaging such aluminum profiles on connection devices that are assembled on wooden profiles, such devices having different characteristics, geometries, and materials. Two vents, one wooden and the other aluminum, are connected to the frame profile by means of special accessories. Whilst the susceptibility of wooden profiles—making up the frame—against external conditions is thus minimized, the wind's positive and negative charges is encountered solely by the wooden profiles for the frame, whereas the aluminum vent and wooden vent encounter them via the glazing for the vent. The fact that two vents are employed, brings along the drawbacks of cost, workmanship, and assembly for this type of profile embodiments. Patent DE10138731 published on 2003/03/06 can be cited as a relevant example for such application.

[0007] Forth type of profiles is generally known as metal covered wooden profiles with renewed substrate frame profiles. In such kind of profiles, the encountering of wind-like charges is alike with the first and second types of profiles. While the substrate frame profile is composed of thermal insulated aluminum profile, the vent profiles are alike with the first and second type of profiles, yet again possessing the drawbacks thereof. Patent US4432179 published on 1984/02/21 can be cited as a relevant example.

[0008] Except such four general types of profiles for windows/doors, special profiles are also available as following: profile types, where metal profiles are embedded into laminated wooden profiles with reinforcing purposes; profile types, where laminated wooden profiles are covered with the metal of water drainage channels; profile types, where metal profiles are covered on wooden pro-

files, and another wooden profile is assembled on these metal profiles; and profile types, where metal profiles are mounted between two wooden profiles.

[0009] Concerning the fifth type of profiles, they are generally known as wooden covered metal profiles. In suchlike profiles, the metal window/door profiles are united with wooden profiles to be in contact with the interior. The most striking distinction differentiating said profiles from each other is the manner the wooden profiles are united with metal profiles. Such uniting operation is carried out generally by means of adhering, engaging, or by making use of special uniting materials. For instance, a wooden-metal composite profile can be obtained, first, by fastening a rotary connection device to the metal profile in a rotating manner, and then, engaging it to the wooden profile. In another embodiment, a wooden-metal composite profile is obtained by engaging wooden profiles to metal profiles with the aid of a uniting apparatus screw-connected to wooden profiles. In a further embodiment, a wooden-metal composite profile is obtained by sliding or engaging wooden profiles to metal profiles with the aid of a connection apparatus assembled to channels on wooden profiles by means of engaging or adhering. Yet in a further embodiment, a wooden-metal composite profile is obtained by uniting wooden profiles with metal profiles with the aid of a bar that is passed through a connection apparatus screw-assembled onto wooden profiles. Still in a further embodiment, a wooden-metal composite profile is obtained by injecting a binding material between metal profiles and wooden profiles. In another embodiment, a wooden-metal composite profile is obtained by engaging the channels opened on the surfaces of wooden profiles that are to be united with metal profiles to proper protrusions in line with such channels on the metal profiles, and then adhering such union.

[0010] When the union or assembly manners of metal and wooden profiles of the fifth type of wooden-aluminum composite profiles are taken into consideration, the following significant drawbacks are encountered: the thickness of wooden cross-sections; the case that the adhesives employed in uniting such surfaces shall fail in fulfilling their functions in time; the case that the connection apparatuses used between wooden and metal profiles shall affect the workmanship and cost criteria negatively; the fact that the glazing bead in most of such embodiments is entirely wooden, and therefore, united to stationary or Vent profiles by means of nailing or screwing; the fact that the wooden and aluminum profiles are united by being cut separately in many embodiments; and temperature- and time-related problems probably to be encountered in the corner unions of especially thick cross-sectioned wooden profiles, due to the different thermal expansion characteristics of two distinct materials.

[0011] When the characteristics of the wooden-aluminum composite window/door profile under the patent US4875316 published on 1989/10/24 is considered, it may be regarded as a thermal insulated, wooden-covered metal profile. In said window/door profile embodi-

ment, the metal profiles and wooden profiles, whereon channels are opened to drive said metal profiles, are tightly and mechanically united to each other. While the metal profiles placed into the channels opened on wooden profiles tightly unite with said wooden profiles by means of protrusions, the elongation distinctions between the metal and wood due to the different thermal expansions of materials could not be compensated. A certain operation clearance (gap) is mentionable in uniting such two materials. Since the thickness of wooden profiles shall relatively more highlight the different thermal expansion affects of two distinct materials, the excess in used material will bring along the cost and workmanship drawbacks. Also since the glazing bead is entirely wood, it requires the use of screws or nails to provide the union. This matter causes a user to see such screw or nail form the indoors. Stationary and two different glazing bead profiles are used in the vent. This situation negatively affects the cost and workmanship criteria.

Brief Description of Invention

[0012] Under the light of the foregoing information on the background art, the objective of the present invention is to eliminate the current drawbacks by developing a special geometrically cross-sectioned, wooden-covered, high thermal insulated wooden-metal composite window/door profile, in which the positive and negative charges/loads (wind etc.) are encountered by means of supporting metal profiles; in which the entire supporting function is not delivered to wooden profiles, by covering such profiles with aluminum profiles, thereby allowing to the widest horizontal and vertical clearances; in which no extra equipment, apparatus, and connection element is required between wooden and aluminum profiles; in which the aluminum profiles are in contact with the exterior, i.e. the outer environment, and the wooden profiles are not exposed to external factors such as high temperatures, cold, humidity, water, dirt, sunlight, etc.; in which the union between the aluminum and wood made solely with an adhering method is not allowed to become dried or withered and separated; in which the workmanship and costs are minimized by making use of the same glazing bead composite profile at the stationary and vent; in which the glazing bead profile is not fastened with nails or screws, and thus in which the connection screws or nails do not disturb the user; and in which the metal profiles are united within the channels opened on wooden profiles by means of sliding, tightening, and adhering, and thus, in which the expansion problems in unions carried out solely by mechanical means are avoided.

[0013] In order to achieve said objectives, a window, door, and curtain wall embodiment is carried out consisting of light-weighting and high thermal insulated wooden-aluminum composite profiles, said embodiment comprising at least one frame inner profile and at least one frame outer profile, at least one vent inner profile and at least one vent outer profile, and at least one central mullion

profile, which are mechanically united by means of a thermal break for heat insulation purposes, and which have proper slots for fastening or connecting the accessories allowing for maximum vertical and horizontal clearances and making the embodiment completely fulfill its main functions; wooden profiles, which make sensible the temperature/heat that is physiologically provided by such wooden materials, and which is not exposed to external environmental conditions (such as water, wind, high temperature, cold, dirt, sunlight, etc.); and wooden composite glazing bead profiles and metal glazing bead profiles connected to each other.

[0014] In a preferred embodiment of the present invention, special geometrically cross-sectioned compressing jaws are embodied on said frame inner profile and vent inner profile, said jaws being penetrated into and fastened to the slots of said wooden profiles.

[0015] In another preferred embodiment of the present invention, thermal breaks are employed to unite said frame inner profile and said frame outer profile, said vent inner profile and said vent outer profile and/or said central mullion profile and said frame inner profile in order to provide heat insulation.

[0016] In a further preferred embodiment of the present invention, an adhesive is employed between said compressing jaws and the slots in said wooden profiles in order to unite said frame inner profile and said vent inner profile to said frame wooden profile and said vent wooden profile, respectively.

[0017] Yet in a further preferred embodiment of the present invention, pivoting fixation disks are employed in order to fasten said compressing jaws to the slots in said frame wooden profile and vent wooden profile by exerting force to said compressing jaws.

Brief Description of Figures

[0018] The subject high thermal insulated, wooden-aluminum composite profiles embodied in order to achieve the objectives of the present invention are illustrated in annexed figures, wherein

Figure 1 shows a cross-section of the subject frame-vent;

Figure 2 shows a cross-section of the subject vent-central mullion;

Figure 3 shows a cross-section of the frame-wall union;

Figure 4 shows the assembled cross-section of wooden profiles and metal profiles before they are tightened; and

Figure 5 shows the united and tightened cross-section of wooden profiles and metal profiles.

Reference Numbers in Figures

[0019]

- 5 1) Frame wooden profile
- 2) Vent wooden profile
- 3) Glazing bead wooden profile
- 4) Frame inner profile
- 5) Frame outer profile
- 10 6) Thermal break
- 7) Vent inner profile
- 8) Vent outer profile
- 9) Glazing bead profile
- 10) Central guide-outer profile
- 15 11) Inner glazing gasket
- 12) Outer glazing gasket
- 13) Compressing jaws
- 14) Adhesive
- 15) Central gasket
- 20 16) Stop gasket
- 17) Glazing
- 18) Fixation disks
- 19) Axis

25 Detailed Description of Invention

[0020] Special geometrically cross-sectioned frame inner profile (4), frame outer profile (5), vent inner profile (7), vent outer profile (8), glazing bead profile (9), and central guide-outer profile (10) making up the subject high thermal insulated, wooden-aluminum composite profile, as illustrated in figures 1 and 2, is produced in extrusion presses so as to have proper slots in line with the accessories and union pieces. Said inner and outer profiles (4, 5, 7, 8, 9, 10) are united mechanically by means of thermal breaks (6).

[0021] The frame wooden profile (1) and vent wooden profile (2) driven and positioned between the special geometrically cross-sectioned compressing jaws (13) of the frame inner profile (4) and the vent inner profile (7) are united thereat by means of an adhesive (14) and mechanically pressed, so that the composite window/door profile shown in figures 4 and 5 is obtained. Then the composite frame profiles (4, 5), composite vent profiles (7, 8), and composite central mullion profile (10) cut in desired dimensions with proper union angles are united with conventional methods and brought into a frame and vent body.

[0022] The glazing bead wooden profile (3) is positioned on said aluminum glazing bead profile (9). An inner glazing gasket (11) is positioned between said aluminum glazing bead profile (9) and glazing (17), whereas an outer glazing gasket (12) is positioned between said vent outer profile (8) and glazing (17). In addition, a central gasket (15) is placed between said frame inner profile (4) and said vent inner profile (7). A stop gasket (16) is placed between said frame outer profile (5) and vent outer profile (8) and/or said vent outer profile (8) and said cen-

tral guide-outer profile (10).

[0023] As seen in Figure 5, fixation disks (18), capable to rotate around their own axes (19), are embodied in order to fix said compressing jaws (13) into the slots in the frame wooden profile (1) by exerting force on said compressing (13) jaws in (x) and (y) directions.

[0024] Said frame inner and outer profiles (4, 5), said vent inner and outer profiles (7, 8), said glazing bead profiles (9), and said central mullion profile (10) are preferably manufactured from aluminum material.

[0025] The present invention is not to be restricted with the representative embodiments given hereinabove. Any alternative embodiments to be carried out by persons skilled in the art based on annexed claims shall be deemed an infringement of the present invention.

Claims

1. A window, door, and curtain wall embodiment composed of light-weighting, high thermal insulated, wooden-aluminum composite profiles for use in buildings, said embodiment **characterized in** comprising at least one frame inner profile (4) and at least one frame outer profile (5), at least one vent inner profile (7) and at least one vent outer profile (8), and at least one central mullion profile (10), which are mechanically joined by means of thermal breaks (6) for thermal insulation purposes, and which have proper slots for fastening or connecting the accessories allowing for maximum vertical and horizontal clearances and making the embodiment completely fulfill its main functions; frame and vent wooden profiles (1, 2), which make sensible the heat that is physiologically provided by such wooden materials, and which is not exposed to external environmental conditions (such as water, wind, high temperature, cold, dirt, sunlight, etc.); and wooden glazing bead profiles (3) and metal glazing bead profiles (9) connected to each other.
2. A window, door, and curtain wall embodiment according to Claim 1, **characterized in that** special geometrically cross-sectioned compressing jaws (13) are comprised that are embodied on said frame inner profile (4) and vent inner profile (7), said jaws being penetrated into and fastened to the slots of said frame and vent wooden profiles (1, 2).
3. A window, door, and curtain wall embodiment according to claims 1 and 2, **characterized in that** thermal breaks (6) are comprised that are employed to unite said frame inner profile (4) and said frame outer profile (5), said vent inner profile (7) and said vent outer profile (8) and/or said central mullion profile (10) and said frame inner profile (4) in order to provide thermal insulation.

4. A window, door, and curtain wall embodiment according to any of the foregoing claims, **characterized in that** an adhesive (14) is comprised that is employed between said compressing jaws (13) and the slots in said wooden profiles (1, 2) in order to unite said frame inner profile (4) and said vent inner profile (7) to said frame wooden profile (1) and said vent wooden profile (2), respectively.
5. A window, door, and curtain wall embodiment according to any of the foregoing claims, **characterized in that** at least one wooden glazing bead profile (3) and at least one metal glazing bead profile (9) are comprised that fix the glazing (17) by solely being driven and fastened to fixed or vent body profiles composed of composite window/door profiles.
6. A window, door, and curtain wall embodiment according to any of the foregoing claims, **characterized in that** at least one inner glazing gasket (11) is comprised that is positioned between said aluminum glazing bead profile (9) and the glazing (17).
7. A window, door, and curtain wall embodiment according to any of the foregoing claims, **characterized in that** at least one outer glazing gasket (12) is comprised that is positioned between said vent outer profile (8) and the glazing (17).
8. A window, door, and curtain wall embodiment according to any of the foregoing claims, **characterized in that** at least one central gasket (15) is comprised that is positioned between said frame inner profile (4) and said vent inner profile (7).
9. A window, door, and curtain wall embodiment according to any of the foregoing claims, **characterized in that** at least one stop gasket (16) is comprised that is placed between said frame outer profile (5) and said vent outer profile (8) and/or between said vent outer profile (8) and said central guide-outer profile (10).
10. A window, door, and curtain wall embodiment according to any of the foregoing claims, **characterized in that** fixation disks (18), capable to rotate around their own axes (19), are comprised that are employed in order to fasten said compressing jaws (13) to the slots in said frame wooden profile (1) and vent wooden profile (2) by exerting force to said compressing jaws (13) in (x) and (y) directions.
11. A window, door, and curtain wall embodiment according to any of the foregoing claims, **characterized in that** said frame inner and outer profiles (4, 5), said vent inner and outer profiles (7, 8), said glazing bead profiles (9) and said central mullion profile (10) are preferably produced from aluminum mate-

rial.

12. A window, door, and curtain wall embodiment according to any of the foregoing claims, **characterized in that** wooden profiles (1, 2) are comprised having proper channels driven into, and thereby engaged to said frame inner profile (4) and vent inner profile (7) for positioning said compressing jaws (13).

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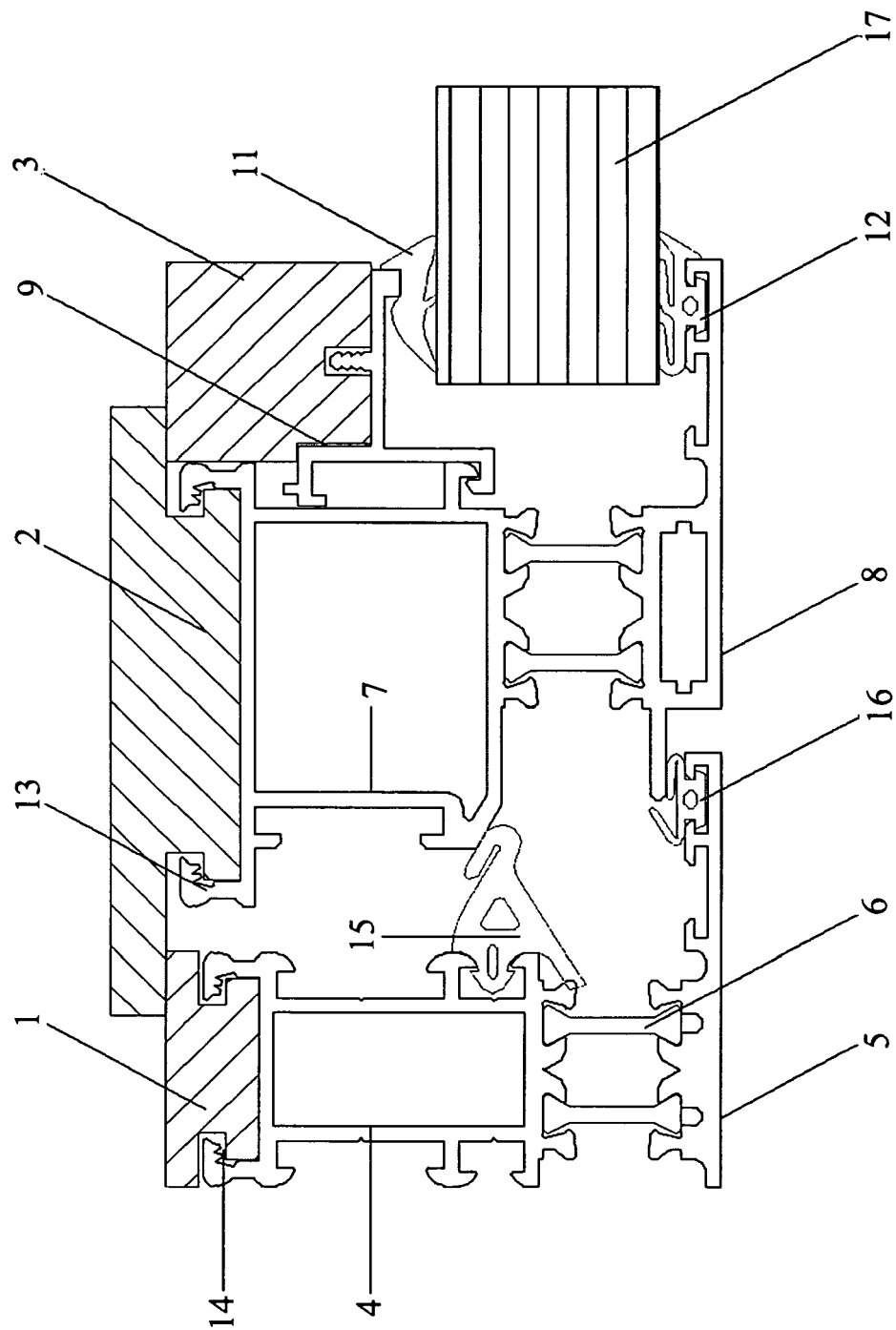


FIGURE 1

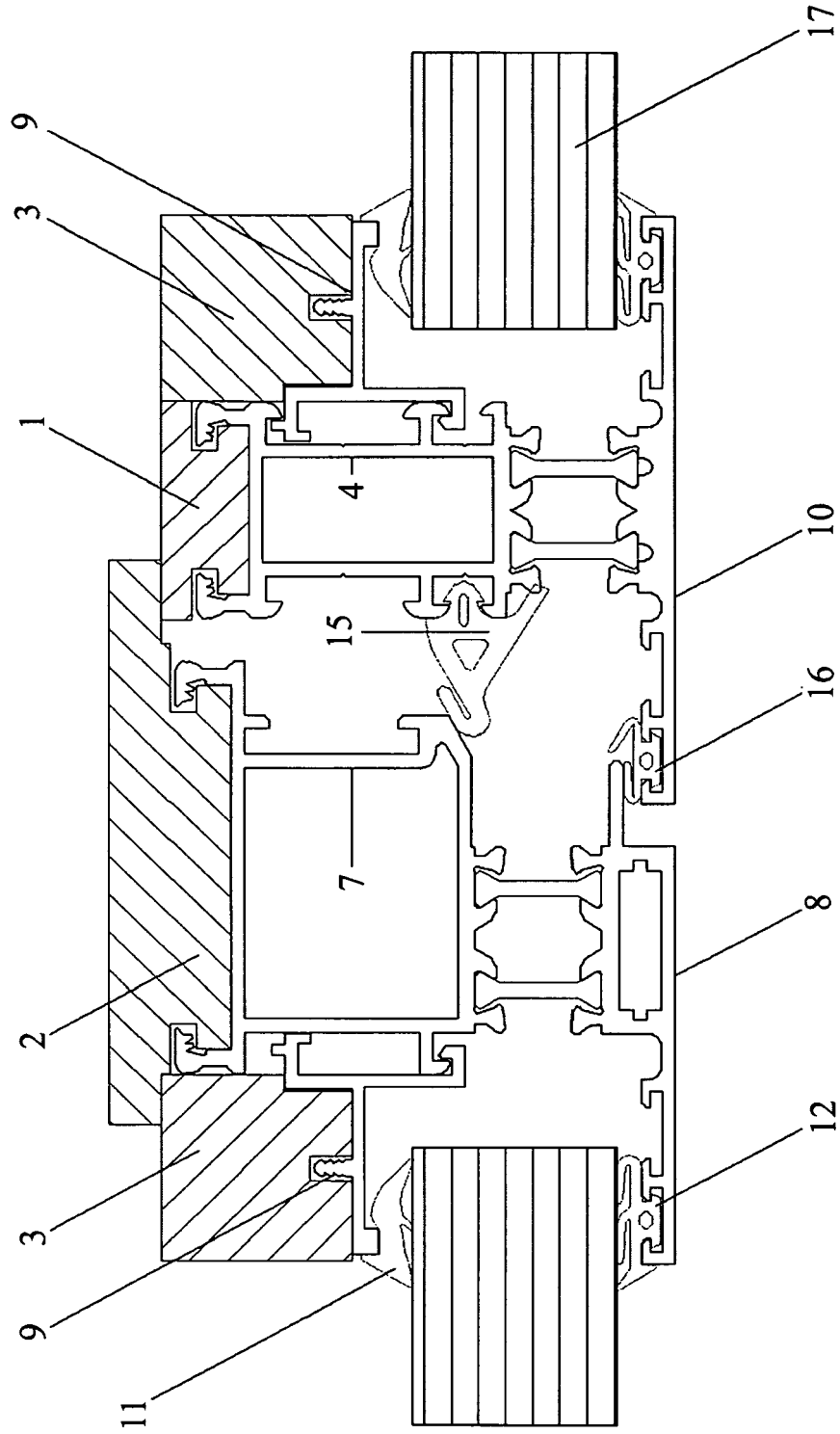


FIGURE 2

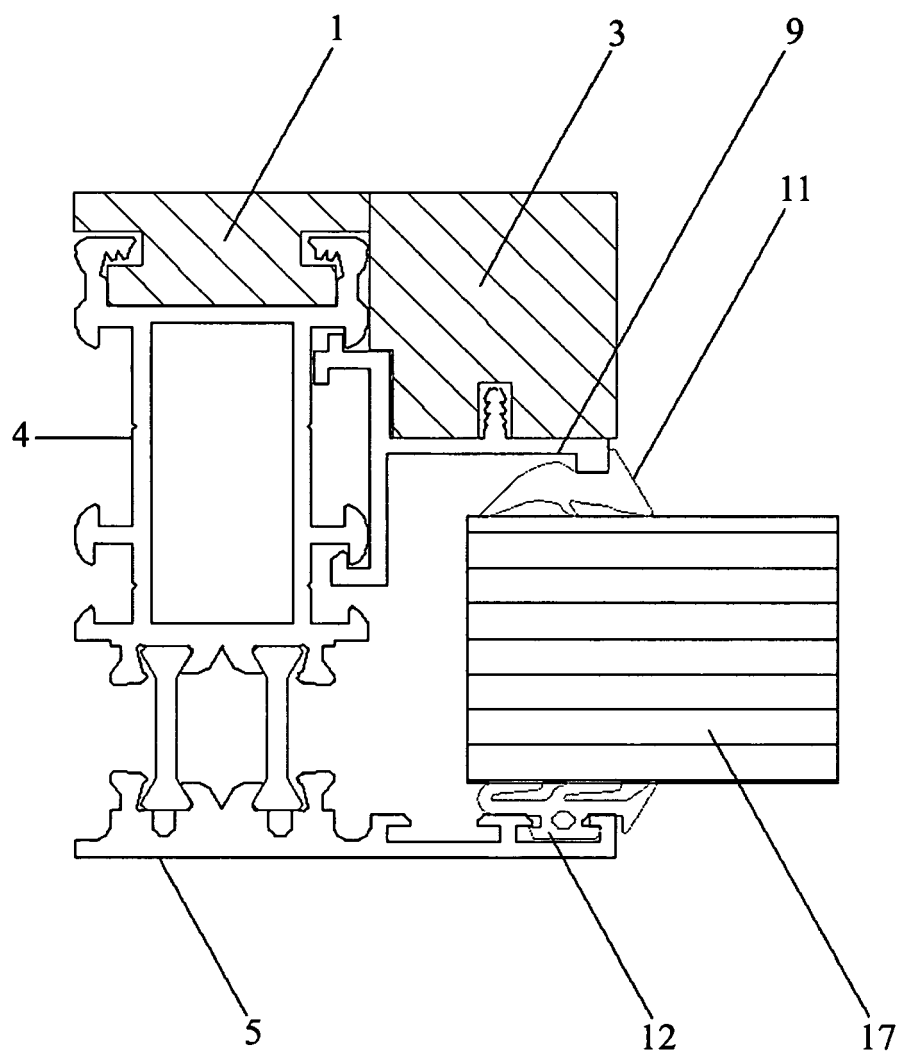


FIGURE 3

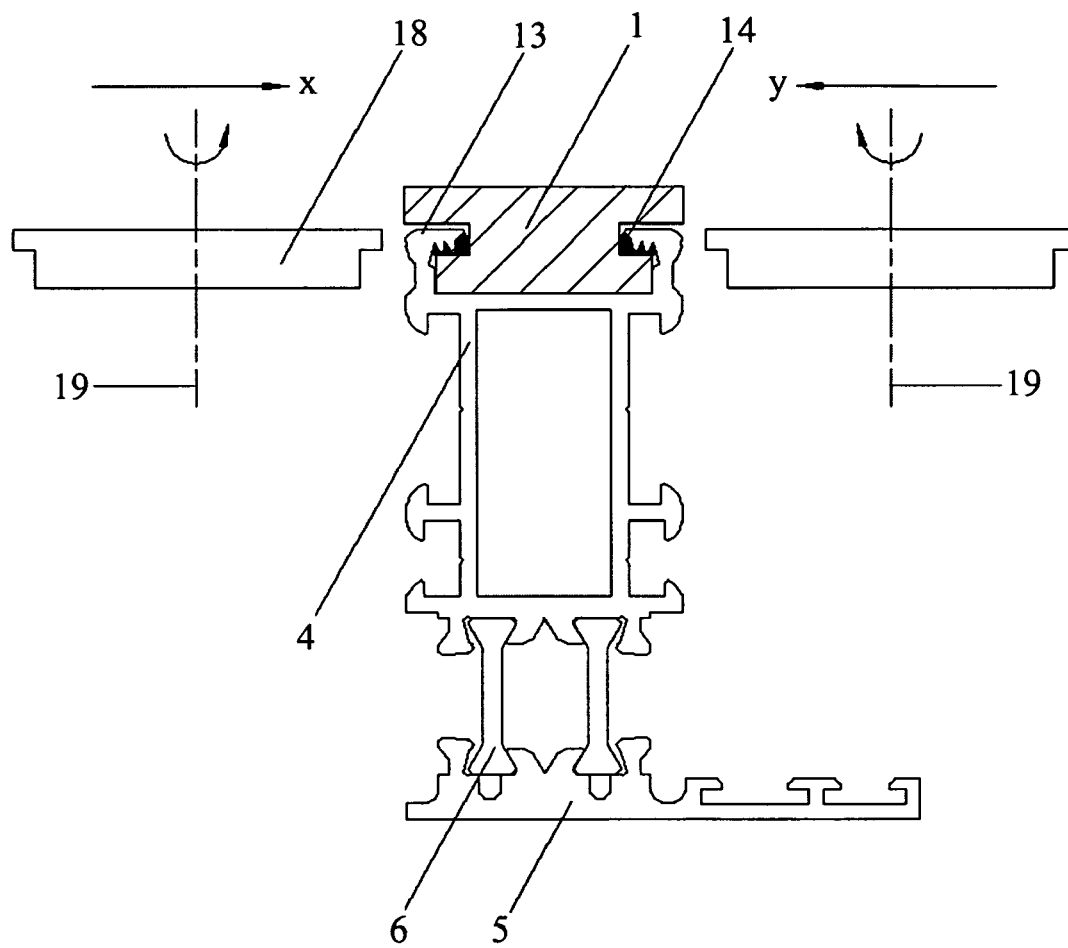


FIGURE 4

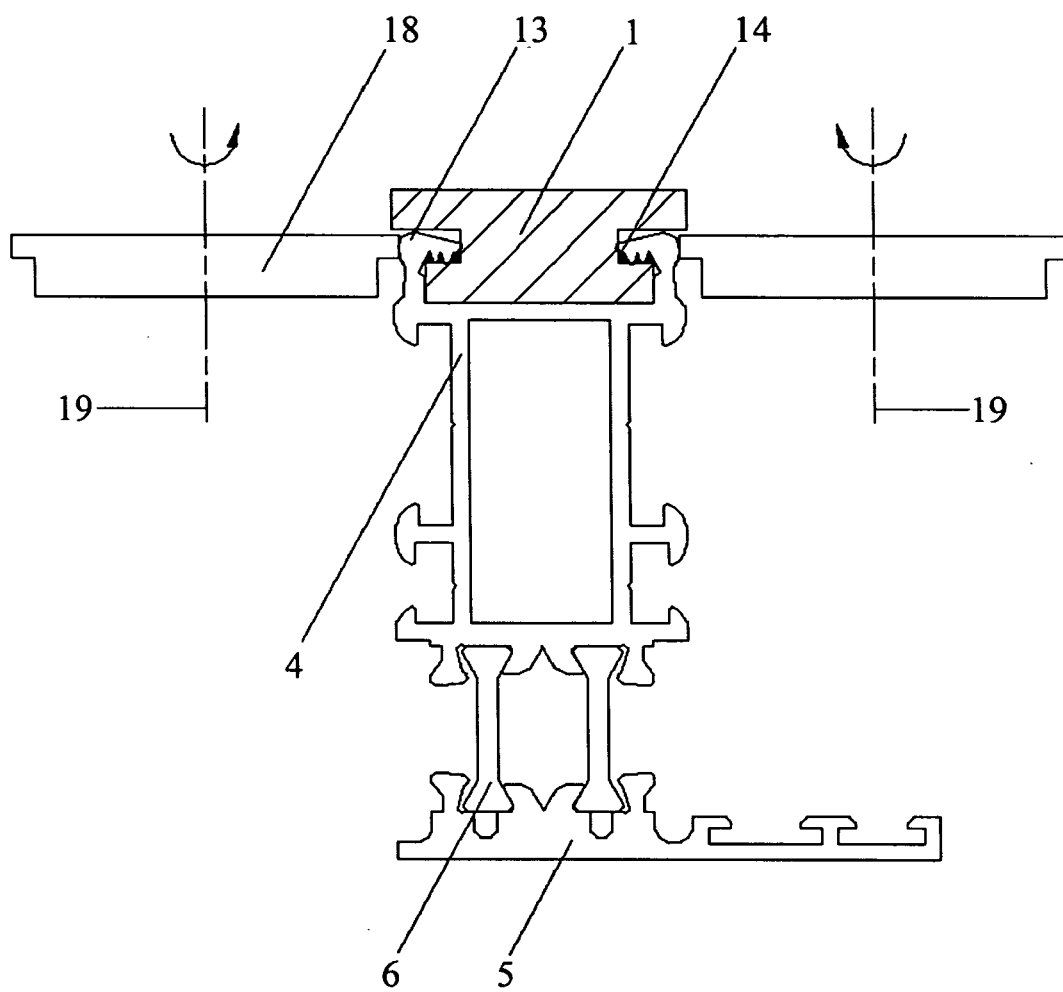


FIGURE 5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 01 4854

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 03/001015 A (ANODIL - EXTRUSAO E DISTRIBUICAO DE ALUMINIO, S.A; MAIA DE SOUSA, ANTO) 3 January 2003 (2003-01-03) * figure 1 *	1-12	E06B3/30
Y	----- US 4 918 810 A (ANDERSON ET AL) 24 April 1990 (1990-04-24) * figures 12,13 *	1-12	
A	----- US 5 095 679 A (GASSER ET AL) 17 March 1992 (1992-03-17) * figure 1 *	1	
A	----- GB 2 269 622 A (* CARADON EVEREST LIMITED) 16 February 1994 (1994-02-16) * figure 1 *	1	

The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
Place of search		Date of completion of the search	Examiner
The Hague		20 December 2005	Verdonck, B
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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20-12-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 03001015 A	03-01-2003	EP 1451432 A1 PT 102640 A	01-09-2004 31-12-2002
US 4918810 A	24-04-1990	NONE	
US 5095679 A	17-03-1992	CA 1307976 C WO 8705657 A1 EP 0261159 A1 IT 1192053 B	29-09-1992 24-09-1987 30-03-1988 31-03-1988
GB 2269622 A	16-02-1994	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0961002 A [0004]
- US 3815285 A [0004]
- EP 1486636 A [0004]
- CH 596426 [0004]
- EP 09907061 A [0005]
- EP 1178177 A [0005]
- DE 10154058 [0005]
- FR 2789111 [0005]
- EP 0796973 A [0005]
- DE 10138731 [0006]
- US 4432179 A [0007]
- US 4875316 A [0011]