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(54) **Curtain wall, and method for making a curtain wall.**

(57) A curtain wall, provided with sheets of glass and/or panels and supporting profiles, in particular metal, wooden or plastic vertical and horizontal members, wherein the supporting profiles are provided with clamping means between which the sheets of glass and/or panels are clamped, wherein between the sheets of glass and the clamping means flexible sealing profiles

are fitted, arranged for connecting the clamping means to the sheets of glass and/ or panels in a substantially fluid-tight manner, wherein between at least one of the sheets of glass and/or panels and a sealing profile engaging the at least one sheet of glass and/or panel, a heat transfer inhibiting layer is applied.

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Description

[0001] The invention relates to a curtain wall.

[0002] The known curtain walls are provided with sheets of glass which are clamped between clamping means of supporting profiles. Generally, the supporting profiles comprise vertical and horizontal members which are preferably wholly or partly manufactured from metal. The weight of the sheets of glass is often carried by these supporting profiles, for instance in that each sheet of glass rests, by one extremity, on a supporting element of a supporting profile designed as a horizontal member. As a rule, the clamping between the clamping means only serves for holding the sheets of glass in a fixed position at least in a direction transverse to the facade. The clamping force applied by the supporting profiles with the clamping means on the sheets of glass can, in that case, be relatively low, such that the sheets of glass cannot become damaged by the clamping force.

[0003] Between the clamping means and the sheets of glass, flexible sealing profiles are provided. These sealing profiles are intended to provide for a leak and wind-proof connection between clamping means and the sheets of glass. Therefore, with the aid of these sealing profiles, for instance rainwater is prevented from penetrating the curtain wall between the clamping means and the sheets of glass, which could seriously damage the facade and the building provided with the facade. Each of the sealing profiles can be manufactured from, for instance, rubber, elastic plastic or such material.

[0004] In practice, the sealing profiles have an additional function, i.e. providing for thermal insulation of the curtain wall. The sealing profiles form a barrier against heat transfer between the clamping means and the supporting profiles, in particular transport through conduction of heat between these parts of the curtain wall. Such insulation is desired for preventing substantial heat flows between surroundings of a building and an inner space of a building bounded by the curtain wall, via the curtain wall.

[0005] A drawback of the known facade is that the sealing profiles provide insufficient thermal insulation. As a result, there is an undesirably large heat flow between inner and outside spaces separated from each other by the facade. As a result, the costs for keeping the temperature of the inner space substantially constant given a variable outside temperature are relatively high. Moreover, for keeping the inside temperature constant, unnecessarily much energy will be used, which is disadvantageous from an environmental point of view.

[0006] The European patent application EP 1004718 A2 describes a facade wherein a sealing foil tape is provided between panes and sealing profiles of a framework. On a pane-side, the sealing foil tape is provided with a sealing mass comprising a number of self-adhesive sealing strips of, for instance, butyl. These sealing strips have been glued between the panes and the seal-

ing profiles of the framework to obtain a water vapor tight connection. The sealing strips are carried by a carrier foil consisting of at least one plastic foil onto which an aluminum foil has been applied.

[0007] The German Utility Model DE 29606125 U1 describes a curtain wall, provided with a membrane of, preferably, butyl, which serves as a vapor block, arranged between a pane and a profile.

[0008] The invention contemplates eliminating the drawbacks of the known curtain wall while maintaining its advantages. In particular, the invention contemplates a curtain wall, wherein a heat flow between the sheets of glass and the clamping means is properly prevented. To that end, the curtain wall is characterized by the features of claim 1.

[0009] The heat transfer inhibiting layer provided between at least one of the sheets of glass and a sealing profile engaging the at least one sheet of glass inhibits heat transfer between these parts of the curtain wall. Surprisingly, it has been found that this heat transfer inhibiting layer provides for a substantial improvement of the heat insulation. Applicant has recognized that between the sheet of glass and the clamping means of the supporting profiles of the known curtain walls, surprisingly, substantial advantages are to be achieved by a decrease of the heat flows. This heat transfer inhibiting layer can be fitted loosely between the sealing profile and the sheet of glass, or on one of these curtain wall parts. Further, the heat transfer inhibiting layer can abut well against the sheet of glass and the sealing profile, so that the substantially fluid tight connection formed by the sealing profile between the clamping means and the sheet of glass is not broken by this layer. This heat transport inhibiting layer, for that matter, can also be applied to the glass, for instance as (adhesive) tape, prior to the placement of the clamping means.

[0010] A highly advantageous embodiment of the invention is provided by the features of claim 2.

[0011] As the heat transfer inhibiting layer comprises a foil, in particular aluminum foil, it can be made of relatively inexpensive design and be applied relatively simply between the at least one sheet of glass and the sealing profile or clamping profile engaging the at least one sheet of glass. The layer can, for instance, be designed in elongated foil strips which can be simply placed at the desired position during assembly of the facade. Furthermore, the layer can be manufactured from one piece of foil, so that possible leakages as a result of interruptions in the layer are avoided.

[0012] A preferred embodiment of the invention is characterized by the features of claim 3.

[0013] The at least one heat radiation reflecting side of the heat transfer inhibiting layer faces the at least one sheet of glass. Thus, heat transfer as a result of radiation is prevented, at least with heat radiation incident on the heat radiation reflecting side. This radiation can come from curtain wall parts situated at an opposite side of the sheet of glass, such as clamping means, one or

more sealing profiles, a supporting profile and/or a heat radiating source situated outside the curtain wall. The heat radiated by these curtain wall parts and/or radiation source is reflected by the heat radiation reflecting side mentioned, which can provide for a particular improvement of the heat insulation.

[0014] An additional advantage is that the heat inhibiting layer can prevent the part of the sealing profile along which the layer extends from becoming excessively heated as a result of incident heat radiation. The sealing profile could become damaged through overheating, which could cause leakage and/or could damage the facade construction. Such an excessive heating could, for instance, result from incident radiation of sunlight or another source of heat located relatively close to the curtain wall.

[0015] A further elaboration of the invention is characterized by the features of claim 4.

[0016] As the heat transfer inhibiting layer extends substantially along an entire side of the sealing profile engaging the at least one sheet of glass, this side is relatively well insulated against heat loss. As a result, the advantages offered by the heat transfer inhibiting layer can be utilized as much as possible.

[0017] The invention also provides a method for manufacturing a curtain wall, which method is characterized by the features of claim 10.

[0018] With this method, a curtain wall can be manufactured in a simple manner, the facade being provided with at least one heat transfer inhibiting layer, which offers the above-mentioned advantages.

[0019] Further elaborations of the invention are described in the subclaims.

[0020] The invention will be described with reference to an exemplary embodiment shown in the drawing. In the drawing:

[0021] Fig. 1 shows a cross sectional view of an exemplary embodiment of the invention.

[0022] The exemplary embodiment represented in the drawing comprises a part of a curtain wall, provided with two pairs of sheets of glass 1 and a supporting profile 2. Each pair of sheets of glass 1 forms a heat insulating double-glass assembly, which is advantageous for the heat insulating effect of the curtain wall. Additionally, it is noted that comparable advantages can be achieved when using closed panels such as sandwich panels in a curtain wall according to the invention. Between the sheets of glass 1 of each pair, a spacer 15 is disposed. The supporting profile 2 represented is designed as a horizontal member supporting two superjacent sheets of glass 1 with a supporting element 11. The exemplary embodiment separates an outside space A from an inner space B, while sheets of glass extending along the outside space A and inner space B, respectively, have reference numerals 1a, 1b respectively.

[0023] The supporting profile 2 comprises a supporting profile clamping flange 10 on which, at right angles, a fastening flange 9 extends, along extremities of the

sheets of glass 1. The fastening flange 9 is located here at a distance from the sheets of glass 1, so that heat insulating intermediate spaces 14 are situated between the flange 9 and the sheets of glass 1. At an extremity of the fastening flange 9 remote from the supporting profile clamping flange 10, a clamping profile 5 is detachably attached by means of bolts 8, one of which is represented in the cross section. The sheets of glass 1 are clamped between, on the one hand, the clamping profile 5 and, on the other hand, the supporting profile clamping flange 10. Further, on the clamping profile 5, a covering profile 13 is fitted, which serves as a finish of the curtain wall.

[0024] Between, on the one hand, the clamping profile 5, the supporting profile clamping flange 10, respectively, and, on the other hand, the sheets of glass 1a, 1b, flexible sealing profiles 3, 12, respectively, are fitted. These sealing profiles 3, 12 are arranged to connect the clamping profile 5 and the clamping flange 10, respectively, to the sheets of glass 1a and 1b, respectively, in a substantially fluid-tight manner. The clamping force exerted by the clamping profile 5 and supporting profile clamping flange 10, is exerted on the sheets of glass 1 via these sealing profiles 3, 12. The sealing profiles 3, 12 can be manufactured from, for instance, rubber, elastic plastic or the like. The curtain wall construction shown, comprising the supporting profile 2, the clamping profile 5 and the sealing profiles 3, 12, can be assembled relatively easily. As the clamping profile 5 is detachably connected to the supporting profile 2, disassembly can also be performed in a simple manner, for instance for replacing a sheet of glass 1.

[0025] The sealing profile 3 has a sealing profile body 6 arranged between the extremity of the fastening flange 9 and the clamping profile 5. The sealing profile body 6 is provided with two sealing profile wings 7 extending along that body 6. The wings 7 extend from the body 6 to the sheets of glass 1a and engage the sheets of glass. Along a side of the sealing profile 3 proximal to the supporting profile clamping flange 10, a heat transfer inhibiting foil 4 is applied. Here, this foil 4 extends along substantially the entire sides of the sealing profile wings 7 proximal to the sheets of glass 1a and the profile 2. The foil 4 provides for a surprising improvement of the heat insulation between the sheets of glass 1A and the clamping profile 5. As a result, heat flows between the outside space A and the inner space B, proceeding, for instance, via the supporting profile 2 and the clamping profile 3, can be considerably reduced. Such heat flows could, for instance, proceed via the sheets of glass 1, the support element 11 and/or the intermediate spaces 14, as by way of heat convection, heat conduction and/or heat radiation. Preferably, the foil 4 is provided with a heat radiation reflecting side, which reflecting side faces the sheets of glass 1a. As a result, the foil can reflect incident heat radiation emitted, for instance, by the supporting profile 10, the opposite sealing profiles 12, the sheets of glass 1b and/or a heat radiation source located

in the inner space B, which increases the insulating effect of the foil 4 considerably. The foil 4 can comprise, for instance, aluminum foil, which is relatively inexpensive and can be applied between the sealing profile 3 and the sheets of glass 1a in a simple manner. Also, a reflecting varnish can be provided.

[0026] The exemplary embodiment can be constructed very simply by applying the heat transfer inhibiting layer 4 along the sealing profile 3 during manufacture of the curtain wall.

[0027] In the exemplary embodiment shown, the foil 4 extends along the entire side of the body 6 proximal to the sheets of glass 1, such that it spans the space 14 between the double sheets of glass 1a, 1b; 1a, 1b. As a result, an even better sealing of this space is obtained so that the insulating effect thereof is even more enhanced. Furthermore, thus, the insulating effect towards the clamping part 9 is further enhanced.

[0028] It is self-evident that the invention is not limited to the exemplary embodiment described. Various modifications are possible within the framework of the invention outlined by the claims.

[0029] The heat transfer inhibiting layer 4 can, for instance, comprise one foil, a heat transfer inhibiting layer of varnish or a combination of such or other materials. In case the layer 4 comprises foil, the foil can be connected to the sealing profile 3 and/or the sheets of glass 1a, with, for instance, a glue connection. Preferably, the foil is arranged loosely between the sealing profile 3 and the sheets of glass.

[0030] The heat transfer inhibiting layer 14 can further be provided with a heat radiation reflecting side in different manners, for instance in that the layer comprises a foil layer with an inherently reflecting side. Also, to that end, the layer can for instance comprise a heat radiation reflecting, mirroring varnish layer.

[0031] Additionally, the invention is not limited to the use of horizontal members, but can also be used in combination with other supporting profiles such as vertical members or diagonally positioned profiles. The profiles can have any desired, suitable form, for instance as known from the state of the art. For instance, they can be manufactured wholly or partly from plastic, or be covered therewith.

[0032] Further, the heat transfer inhibiting layer 4 can be applied along the sealing profile 7 situated adjacent an outside space A and/or a sealing profile 12 situated at the inner space B. The choice of placement of the heat transfer inhibiting layer can, for instance, depend on the wish to keep the inner space B cool or, conversely, warm, in relation to the outside space A. When, for instance, in the outside space A, usually a relatively warm climate prevails, it can, conversely, be advantageous to apply heat transfer inhibiting layers 4 between the sheets of glass 1b and the sealing profiles 12 extending along the inner space B. In that case, the layers 4 are to stop heat coming from the outside space A for the purpose of keeping the inner space B cool.

[0033] Further, between more than one sealing profile 3, 12 of the curtain wall on the one hand and the sheets of glass 1 or panels on the other hand, heat transfer inhibiting layers 4 can be applied. For instance, the entire curtain wall can be provided with heat transfer inhibiting layers 4. The fastening flange 9 can be wholly or partly designed in plastic, for instance through an intermediate profile between the profile part 10 and the supporting profile 2 and body 6. As a result, the heat insulating effect is even more enhanced.

Claims

1. A curtain wall, provided with sheets of glass (1) and/or panels and supporting profiles (2), in particular metal, wooden or plastic horizontal and vertical members, wherein the supporting profiles (2) are provided with clamping means (5, 10) between which the sheets of glass (1) and/or panels are clamped, wherein, between the sheets of glass and the clamping means flexible sealing profiles (3) are fitted, arranged for connecting the clamping means (5, 10) to the sheets of glass (1) and/or panels in a substantially fluid-tight manner, wherein, between at least one of the sheets of glass (1) and/or panels and a sealing profile (3) engaging the at least one sheet of glass and/or panel, a heat transfer inhibiting layer (4) is applied.
2. A curtain wall according to claim 1, wherein the heat transfer inhibiting layer (4) comprises a foil, in particular aluminum foil.
3. A curtain wall according to any one of the preceding claims, wherein the heat transfer inhibiting layer (4) is provided with at least one heat radiation reflecting side, which reflecting side faces the at least one sheet of glass (1) or the at least one panel.
4. A curtain wall according to any one of the preceding claims, wherein the heat transfer inhibiting layer (4) extends substantially along an entire side side of the sealing profile (3) engaging the at least one sheet of glass (1) or panel.
5. A curtain wall according to any one of the preceding claims, wherein at least one sealing profile (3) comprises a sealing profile body (6) and at least one sealing profile wing (7) extending along said body (6), wherein the sealing profile (3) is disposed between the clamping means (5, 10) and the at least one sheet of glass (1), such, that a clamping force of the clamping means (5, 10) is transferred via sealing profile wing (7) to the sheet of glass (1) or the panel, wherein the heat transfer inhibiting layer (4) extends along a side of the sealing profile wing (7) facing the at least one sheet of glass (1) or the

at least one panel.

6. A curtain wall according to any one of the preceding claims, wherein the clamping means comprise clamping profiles (5) which, by means of fastening means (8) are detachably connected to fastening parts (9) of the supporting profiles (2), wherein, further, the clamping means comprise supporting profile clamping flanges (10) of the supporting profiles (2), wherein the sheets of glass (1) and/or panels are clamped between the clamping profiles (5) on the one hand, and the supporting profile clamping flanges (10) on the other hand.

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7. A curtain wall according to claim 6, wherein the fastening parts (9) of the supporting profiles (2) extend along extremities, preferably at a distance, of the sheets of glass (1) and/or panels towards the clamping profiles (5), wherein a sealing profile (3) engaging the at least one sheet of glass (1) and the at least one panel extends partly between a fastening part (9) and a clamping profile (5), wherein the heat transfer inhibiting layer (4) extends along a side of the sealing profile (3), which side faces an opposite supporting profile clamping flange (10).

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8. A curtain wall according to any one of the preceding claims, wherein the facade is provided with at least two parallel positioned sheets of glass (1) and/or panels.

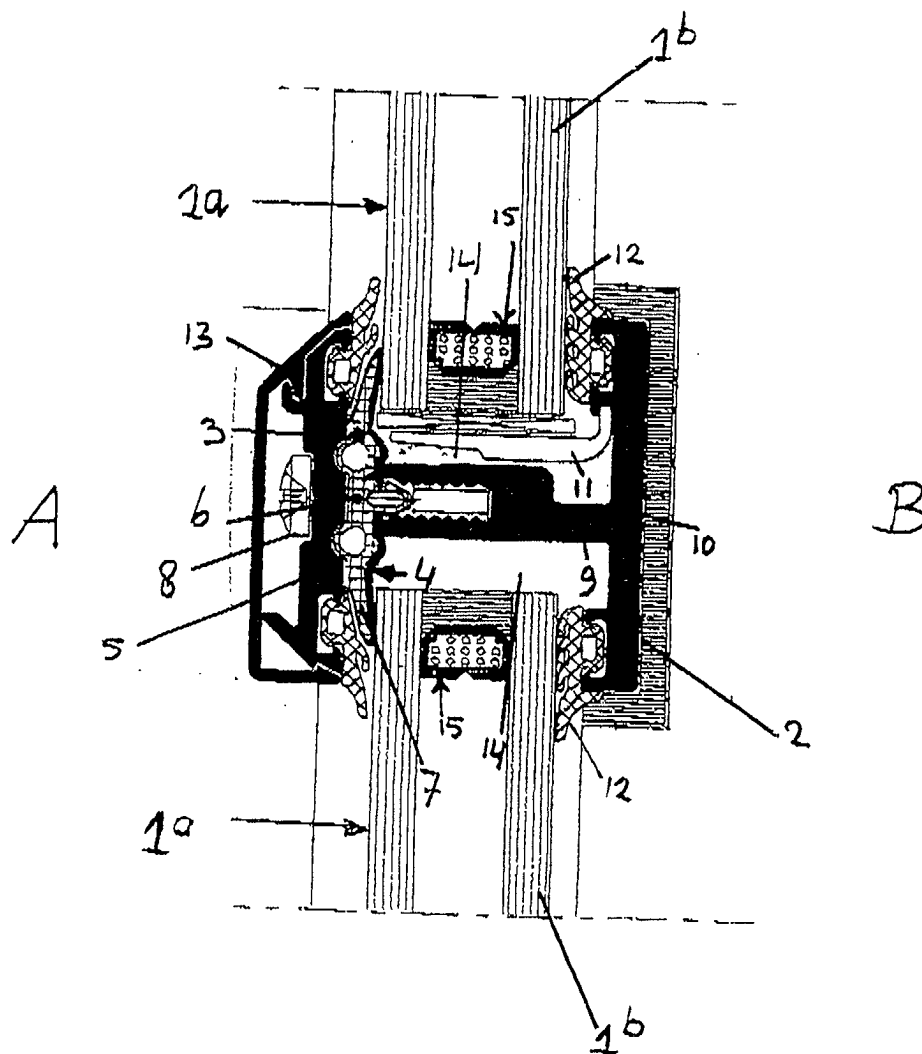
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9. A curtain wall according to any one of the preceding claims, wherein at least two sheets of glass (1a, 1a; 1b, 1b) and/or panels, positioned substantially in alignment with each other, are clamped between clamping means (5, 10) of one supporting profile (2), wherein between these at least two sheets of glass (1a, 1b; 1a, 1b) and/or panels and at least one sealing profile (3) engaging the at least two sheets of glass and/or the panels, a heat transfer inhibiting layer (4) is applied.

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10. A method for manufacturing a curtain wall, wherein at least one sheet of glass (1) or panel is placed between a flexible sealing profile (3) and a supporting profile (2), wherein between the sheet of glass (1) or the panel and the sealing profile (3) a heat transfer inhibiting layer (4) is included, wherein, subsequently, the facade is provided with clamping means (5) which are connected with fastening means (8) to the supporting profile (2) such, that the sheet of glass (1) or the panel is clamped between the supporting profile (2) and the sealing profile (3).

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FIGURE 1





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EUROPEAN SEARCH REPORT

Application Number
EP 02 07 5478

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 1 004 718 A (SCHUECO INT KG) 31 May 2000 (2000-05-31) * paragraph '0003! * * paragraph '0005! * * paragraph '0012! - paragraph '0023!; figures 1,2 *	1-7,10	E04B2/96
X	DE 296 06 125 U (RASMUSSEN MOGENS VILFRED) 20 June 1996 (1996-06-20) * page 6, line 3 - line 9; figures 2,4 *	1,8,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E04B E06B E04D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 5 April 2002	Examiner Zuurveld, G
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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05-04-2002

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 1004718	A	31-05-2000	DE	29820873 U1	21-01-1999
			EP	1004718 A2	31-05-2000
DE 29606125	U	20-06-1996	DK	9500142 U3	09-06-1995
			DE	29606125 U1	20-06-1996

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