

9

Description

The present invention relates to a thermally insulating sash frame member comprising a pair of spaced interior and exterior bars made of metal and a thermally insulating connector bar interconnecting said interior and exterior bars. Said interior and exterior bars have a pair of confronting inner walls and each comprises a pair of upper and lower longitudinal gripping flanges projecting from and spaced transversely of one of said confronting inner walls and each having an upper face, a lower face and an end face. Said connector bar is gripped at opposite sides by said gripping flanges and is constituted by an elongate main body made of rigid thermally-insulating material and comprising an upper and a lower pairs of longitudinal projections each disposed adjacent to said first and second gripping flanges and each having an upper face, a lower face and an end face. The lower face of said upper gripping flanges is inclined downwardly towards the end face and the upper face of said upper projections is inclined upwardly towards the end face while the upper face of said lower gripping flanges is inclined upwardly towards the end face and the lower face of said lower projections is inclined downwardly towards the end face. The said main body of the connector bar further comprises an additional longitudinal projection projecting downwardly between the end faces of said lower gripping flanges and having two opposite side faces and an end face.

For assembly of such a known thermally insulating sash frame member (FR—A—1 489 331) the connector bar is placed between the interior and exterior bars, and then the two pairs of gripping flanges are forced or bent to grip the connector bar at opposite sides through the length thereof. However, if the connector bar is made of rigid material such as rigid polyvinyl chloride (see DE—A—2 235 790), the gripping flanges can engage with the connector bar with only inadequate weathertightness. For the same reason, firm connection between the connector bar and the interior and exterior bars is difficult to achieve.

Another known thermally insulating sash frame member (DE—A—2 724 377) needs for assembling an interior and an exterior bars, two separate insulating connector bars. After the bars have been loosely assembled, four rubber pads are inserted, in symmetrical positions, between parallel surfaces of the connector bars and the interior and exterior bars, in order to prevent longitudinal movements between the bars.

That known sash frame member does not provide a rigid and firm connection between the bars and requires tedious and time-consuming assembly.

The present invention seeks to provide a thermally insulating sash frame member which enables a good weathertightness and a firm interconnection of the interior and exterior bars by a single connector bar.

In the sash frame member according to the invention, the opposite side faces of the additional projection of the connector bar are inclined towards each other towards the end face, the end faces of the lower gripping flanges of the interior and exterior bars are inclined downwardly towards each other, and four pads made of soft, thermally insulating material extending along the main body of the connector bar, through the length thereof, are carried on the inclined upper faces of the upper projections of the connector bar and on the inclined opposite side faces of said additional projection respectively, and are engaged by the lower faces of the upper gripping flanges and the end faces of the lower gripping flanges respectively.

Other objects and advantages will appear from the following description of an example of the invention, when considered in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

Figure 1 is a fragmentary, vertical cross-sectional view of a fixed sash window employing a thermally insulating sash frame member according to the present invention; and

Figure 2 is a transverse cross-sectional view, on a reduced scale, of the sash frame member, showing the manner in which the sash frame member is assembled.

Figure 1 shows a lower portion of a fixed sash window generally indicated by the numeral 10. The sash window 10 comprises a thermally insulating sash frame (described below) adapted to be mounted within an opening in a building wall and defining a window opening, and a pair of panes of glass 11 fixedly mounted within the sash frame by means of attachment bars 12, 13 via weather strips 41, 41. The sash frame includes a pair of upper and lower horizontal members and a pair of vertical side members connected to the horizontal members at their ends. Of these four frame members, only the lower horizontal member 14 (hereinafter called sash frame member) is shown.

The sash frame member 14 comprises a pair of spaced interior and exterior bars 15, 16 made of metal such as aluminum and interconnected by a thermally insulating connector bar 17, as described below. The interior and exterior bars 15, 16 has a pair of confronting inner vertical walls 18, 19, respectively, between which the connector bar 17 is disposed.

The interior bar 15 also has an outer vertical wall 20 disposed remotely from the inner wall 18, and an intermediate vertical wall 21 disposed centrally between the inner and outer walls 18, 20. The intermediate wall 21 is connected at opposite edges to the respective upper edges of the inner and outer walls 18, 20 by a pair of first and second horizontal walls 22, 23. The exterior bar 16 also has a pair of upper and lower walls 24, 25 projecting exteriorly from the inner wall 19. The upper wall 24 has an upwardly angled end 24a (as viewed in cross section) which serves to support

10

the attachment bar 13. The lower wall 25 has a sloping surface 25a which serves as a throating.

Each of the interior and exterior bars 15, 16 has a pair of longitudinal first and second (upper and lower) gripping flanges 26, 27 projecting from and spaced vertically or transversely of a respective one of the inner walls. Each of the gripping flanges 26, 27 has a generally triangular shape in transverse cross section and thus has three sides 26a, 26b, 26c and 27a, 27b, 27c. Each of the interior and exterior bars 15, 16 also has an upwardly inclined intermediate flange 28, 29 projecting from a respective one of the confronting inner walls 18, 19 so as to provide a pair of longitudinal channels 30, 31 between the upper and lower gripping flanges 26, 27. The flanges 26, 27, 28 of the interior bar 15 are disposed opposite to the flanges 26, 27, 29, respectively, of the exterior bar 16 in symmetrical or mirror-image relation. At the interior bar 15, the (end) side 26b of the upper gripping flange 26 slopes steeply down to the right. The upper side 26c of the same flange 26 gently slopes down to the base portion 26d, while the lower side 26a slopes up (at about 45°) to the base portion 26d. The (end) side 27b of the lower gripping flange 27 (of the interior bar 15) steeply slopes down to the left. The upper side 27a of the same flange 27 gently slopes down to the right, while the lower side 27c lies horizontally. At the exterior bar 16, the (end) side 26b of the opposite upper gripping flange 26 slopes steeply down to the left. The upper side 26c of the latter flange 26 gently slopes down to the base portion 26d, while the lower side 26a slopes up (at about 45°) to the base portion 26d. The (end) side 27b of the lower gripping flange 27 (of the exterior bar 16) steeply slopes down to the right. The upper side 27a of the latter flange 27 gently slopes down to the left, while the lower side 27c lies horizontally. The end and upper sides 26b, 26c and 26b, 26c of the opposite upper gripping flanges 26, 26 and the upper portions of the interior and exterior bars 15, 16, jointly define a longitudinal space 47 (Figure 2) of a generally T-shape cross section.

The connector bar 17 includes an elongate main body 32 made of a rigid thermally-insulating material such as rigid polyvinyl chloride and also four pad portions 33, 33, 34, 34 made of a soft-thermally-insulating material such as soft polyvinyl chloride. Each of the pad portions 33, 33, 34, 34 is in the form of a strip extending on and along the main body 32 through the length thereof and transversely inclined with respect to the inner walls 18, 19. The main body 32 has a contour literally complementary to the flanges 26, 27, 28, 29 and thus has four longitudinal projections 35, 35, 36, 36 received one in each of the longitudinal channels 30, 30, 31, 31, the upper longitudinal projections 35, 35 each carrying one of the pad portions 33, 33. The connector bar 17 is gripped at opposite sides one by each pair of upper and lower gripping flanges 26, 27 and 26, 27, the upper gripping flanges 26, 26 having been forced or bent down one against each of the pad portions 33, 33, as described below. Because of

softness of the pad portions, one (26a) of the three sides of each upper gripping flange 26 fits or engages with a respective one of the pad portions 33, 33 with sufficient weathertightness.

The connector bar 17 has a further longitudinal projection 37 carrying a pair of additional pad portions 34, 34 one at each side and received in a space between the opposed lower gripping flanges 27, 27. One side 27b (of the three sides) of each lower gripping flange 27 also weathertightly fits or engages with a respective one of the additional pad portions 34, 34. The lower sides 27c, 27c of the lower gripping flanges 27, 27 are horizontally aligned with each other.

The main body 32 of the connector bar 17 is in the form of a hollow structure having a longitudinal hole 32a of a cross-shaped cross section.

For assembly, as shown in Figure 2, the interior and exterior bars 15, 16 are placed on a base 42 (preferably of a jig) with a space between their confronting inner walls 18, 19. The connector bar 17 is then inserted longitudinally into the space between the inner walls 18, 19 such that the four longitudinal projections 35, 35, 36, 36 are received in the longitudinal channels 30, 30, 31, 31, respectively. At that time edge surfaces 43, 44 of the connector bar 17 are slightly spaced from the respective inner walls 18, 19. The pad portions 34, 34 also are slightly spaced from the respective sides 27b, 27b of the lower gripping flanges 27, 27.

Subsequently, the upper gripping flanges 26, 26 are forced (or bent at their neck portions 26d, 26d) down by a ram or punch 45 against the connector bar 17 to such an extent that the lower side 26a (of the triangular shape) of each gripping flange 26 fits or engages with a respective one of the pad portions 33, 33 with adequate tightness. Before having been forced or bent down, the upper gripping flanges 26, 26 had been in upwardly-angled or stand-up position as shown in Figure 2. This downward forcing causes the inclined lower side 26a of each upper gripping flange 26 to slide downwardly along the inclined surface of a respective one of the pad portions 33, 33, thus bringing upper portions of the confronting inner walls 18, 19 closely to the connector bar 17. At the same time this downward forcing also causes the inclined lower side 36a of each longitudinal projection 36 to engage with a respective one of the inclined upper sides 27a, 27a of the lower gripping flanges 27, 27 and to slide downwardly along the same, thus bringing the confronting inner walls 18, 19 in contact with or closely to the edge surfaces 43, 44 of the connector bar 17. As a result, the side 27b of each lower gripping flange 27 is brought into engagement with a respective one of the pad portions 34, 34 with sufficient tightness. The connector bar 17 has thus been gripped at opposite sides by the two pairs of gripping flanges 26, 27 and 26, 27 with a space 47 therebetween along the top of the connector bar 17. The space 47 is filled with a thermally insulating material 46 (Figure 1) such as foamed polyurethane.

With this arrangement, because the main body 32 of the connector bar 17 is made of rigid thermally-insulating material, the interior and exterior bars 15, 16 can be interconnected by the connector bar 17 with sufficient firmness. Further, since the pad portions 33, 34 of the connector bar 17 are made of soft thermally-insulating material, the gripping flanges 26, 27 and 26, 27 of the interior and exterior bars 15, 16 can fit or engage with the pad portion 33, 34 and 33, 34, respectively, with adequate weathertightness.

It will be understood that various changes in the details, material, and arrangement of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

Claims

1. A thermally insulating sash frame member (10) comprising a pair of spaced interior and exterior bars (15, 16) made of metal and having a pair of confronting inner walls (18, 19), each of said interior and exterior bars (15, 16) comprising a pair of upper and lower longitudinal gripping flanges (26, 27) projecting from and spaced transversely of one of said confronting inner walls (18, 19) and each having an upper face (26c; 27a), a lower face (26a, 27c) and an end face (26b, 27b), and a thermally insulating connector bar (17) interconnecting said interior and exterior bars (15, 16) and gripped at opposite sides by said gripping flanges (26, 27), said connector bar (17) being constituted by an elongate main body (32) made of rigid thermally-insulating material and comprising an upper and a lower pairs of longitudinal projections (35, 36) each disposed adjacent to said first and second gripping flanges (26, 27) and each having an upper face, a lower face and an end face, the lower face (26a) of said upper gripping flanges (26) being inclined downwardly towards the end face (26b) and the upper face of said upper projections (35) being inclined upwardly towards the end face while the upper face (27a) of said lower gripping flanges (27) is inclined upwardly towards the end face (27b) and the lower face of said lower projections (36) is inclined downwardly towards the end face, the said main body (32) of the connector bar (17) further comprising an additional longitudinal projection (37) projecting downwardly between the end faces (27b) of said lower gripping flanges (27) and having two opposite side faces and an end face, characterized in that the opposite side faces of said additional projection (37) are inclined towards each other towards the end face, that the said end face (27b) of said lower gripping flanges (27) are inclined downwardly towards each other, and that four pads (33, 34) made of soft, thermally insulating material extending along the said main body (32) through the length thereof are carried on the said inclined upper faces of said upper projections (35) and on the said inclined opposite

side faces of said additional projection (37), respectively, and engaged by the lower faces (26a) of the upper gripping flanges (26) and the end faces (27b) of the lower gripping flanges (27), respectively.

2. A sash frame member according to claim 1, each of said interior and exterior bars (15, 16) further having an intermediate flange (28, 29) projecting from one of said inner walls (18, 19) so as to provide a pair of longitudinal channels (30, 31) between said upper and lower gripping flanges (35, 36), characterized in that said intermediate flanges (28, 29) are inclined upwardly towards each other.

Patentansprüche

1. Ein wärmeisolierender Fensterrahmenglied (16), bestehend aus einem Paar von im Abstand angeordneten inneren und äußeren Metallstäben (1, 16) mit einem Paar einander gegenüberliegender Innenwände (18, 19) wobei die inneren und äußeren Metallstäbe (15, 16) jeweils ein Paar oberer und unterer längsverlaufender Einspannflansche (26, 27) besitzen, die jeweils von einem der einander gegenüberliegenden Innenwänden (18, 19) vorstehen und in Querrichtung in Abstand davon angeordnet sind und jeweils eine obere Fläche (26b, 27a) haben und aus einem wärmeisolierenden Verbindungsstab (17), der die genannten inneren und äußeren Stäbe (15, 16) verbindet und an gegenüberliegenden Seiten von den genannten Einspannflanschen (26, 27) eingespannt wird, wobei der genannte Verbindungsstab (17) aus einem länglichen Hauptstück (32) aus steifem, wärmeisolierendem Material besteht, welches obere und untere längsverlaufende Vorsprungpaar (35, 36) besitzt, die jeweils neben den genannten ersten und zweiten Einspannflanschen (26, 27) angeordnet sind und jeweils eine obere Fläche, eine untere Fläche und eine Stirnfläche haben, wobei die untere Fläche (26a) der genannten oberen Einspannflansche (26) nach unten zur Stirnfläche (26b) geneigt ist und die obere Fläche der genannten oberen Vorsprünge (35) nach oben zur Stirnfläche geneigt ist, während die obere Fläche (27a) der genannten unteren Einspannflansche (27) nach oben zur Stirnfläche (27b) geneigt ist und die untere Fläche der genannten Vorsprünge (36) nach unten zur Stirnfläche geneigt ist, wobei das genannte Hauptstück (32) des Verbindungsstabes (17) ferner einen zusätzlichen längsverlaufenden Vorsprung (37) besitzt der sich nach unten zwischen die Stirnfläche (27b) der genannten unteren Einspannflansche (27) erstreckt und zwei gegenüberliegende Seitenflächen und eine Stirnfläche aufweist, dadurch gekennzeichnet, daß die gegenüberliegenden Stirnflächen dieses zusätzlichen Vorsprungs (37) zur Stirnfläche zugeneigt sind, daß die Stirnflächen (27b) der unteren Einspannflansche (27) nach unten einander zugeneigt sind, und daß vier aus weichem wärmeisolierenden Material bestehende, sich an dem Hauptteil (32) entlang über dessen ganze Länge erstreckende

With this arrangement, because the main body 32 of the connector bar 17 is made of rigid thermally-insulating material, the interior and exterior bars 15, 16 can be interconnected by the connector bar 17 with sufficient firmness. Further, since the pad portions 33, 34 of the connector bar 17 are made of soft thermally-insulating material, the gripping flanges 26, 27 and 26, 27 of the interior and exterior bars 15, 16 can fit or engage with the pad portion 33, 34 and 33, 34, respectively, with adequate weathertightness.

It will be understood that various changes in the details, material, and arrangement of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

Claims

1. A thermally insulating sash frame member (10) comprising a pair of spaced interior and exterior bars (15, 16) made of metal and having a pair of confronting inner walls (18, 19), each of said interior and exterior bars (15, 16) comprising a pair of upper and lower longitudinal gripping flanges (26, 27) projecting from and spaced transversely of one of said confronting inner walls (18, 19) and each having an upper face (26c; 27a), a lower face (26a, 27c) and an end face (26b, 27b), and a thermally insulating connector bar (17) interconnecting said interior and exterior bars (15, 16) and gripped at opposite sides by said gripping flanges (26, 27), said connector bar (17) being constituted by an elongate main body (32) made of rigid thermally-insulating material and comprising an upper and a lower pairs of longitudinal projections (35, 36) each disposed adjacent to said first and second gripping flanges (26, 27) and each having an upper face, a lower face and an end face, the lower face (26a) of said upper gripping flanges (26) being inclined downwardly towards the end face (26b) and the upper face of said upper projections (35) being inclined upwardly towards the end face while the upper face (27a) of said lower gripping flanges (27) is inclined upwardly towards the end face (27b) and the lower face of said lower projections (36) is inclined downwardly towards the end face, the said main body (32) of the connector bar (17) further comprising an additional longitudinal projection (37) projecting downwardly between the end faces (27b) of said lower gripping flanges (27) and having two opposite side faces and an end face, characterized in that the opposite side faces of said additional projection (37) are inclined towards each other towards the end face, that the said end face (27b) of said lower gripping flanges (27) are inclined downwardly towards each other, and that four pads (33, 34) made of soft, thermally insulating material extending along the said main body (32) through the length thereof are carried on the said inclined upper faces of said upper projections (35) and on the said inclined opposite

side faces of said additional projection (37), respectively, and engaged by the lower faces (26a) of the upper gripping flanges (26) and the end faces (27b) of the lower gripping flanges (27), respectively.

2. A sash frame member according to claim 1, each of said interior and exterior bars (15, 16) further having an intermediate flange (28, 29) projecting from one of said inner walls (18, 19) so as to provide a pair of longitudinal channels (30, 31) between said upper and lower gripping flanges (35, 36), characterized in that said intermediate flanges (28, 29) are inclined upwardly towards each other.

Patentansprüche

1. Ein wärmeisolierendes Fensterrahmenglied (16), bestehend aus einem Paar von im Abstand angeordneten inneren und äußeren Metallstäben (1, 16) mit einem Paar einander gegenüberliegender Innenwände (18, 19) wobei die inneren und äußeren Metallstäbe (15, 16) jeweils ein Paar oberer und unterer längsverlaufender Einspannflansche (26, 27) besitzen, die jeweils von einem der einander gegenüberliegenden Innenwänden (18, 19) vorstehen und in Querrichtung in Abstand davon angeordnet sind und jeweils eine obere Fläche (26b, 27a) haben und aus einem wärmeisolierenden Verbindungsstab (17), der die genannten inneren und äußeren Stäbe (15, 16) verbindet und an gegenüberliegenden Seiten von den genannten Einspannflanschen (26, 27) eingespannt wird, wobei der genannte Verbindungsstab (17) aus einem länglichen Hauptstück (32) aus steifem, wärmeisolierendem Material besteht, welches obere und untere längsverlaufende Vorsprungpaar (35, 36) besitzt, die jeweils neben den genannten ersten und zweiten Einspannflanschen (26, 27) angeordnet sind und jeweils eine obere Fläche, eine untere Fläche und eine Stirnfläche haben, wobei die untere Fläche (26a) der genannten oberen Einspannflansche (26) nach unten zur Stirnfläche (26b) geneigt ist und die obere Fläche der genannten oberen Vorsprünge (35) nach oben zur Stirnfläche geneigt ist, während die obere Fläche (27a) der genannten unteren Einspannflansche (27) nach oben zur Stirnfläche (27b) geneigt ist und die untere Fläche der genannten Vorsprünge (36) nach unten zur Stirnfläche geneigt ist, wobei das genannte Hauptstück (32) des Verbindungsstabes (17) ferner einen zusätzlichen längsverlaufenden Vorsprung (37) besitzt der sich nach unten zwischen die Stirnfläche (27b) der genannten unteren Einspannflansche (27) erstreckt und zwei gegenüberliegende Seitenflächen und eine Stirnfläche aufweist, dadurch gekennzeichnet, daß die gegenüberliegenden Stirnflächen dieses zusätzlichen Vorsprungs (37) zur Stirnfläche zugeneigt sind, daß die Stirnflächen (27b) der unteren Einspannflansche (27) nach unten einander zugeneigt sind, und daß vier aus weichem wärmeisolierendem Material bestehende, sich an dem Hauptteil (32) entlang über dessen ganze Länge erstreckende



Polster (33, 34) an den geneigten oberen Flächen der oberen Vorsprünge (35) und an den geneigten gegenüberliegenden Seitenflächen des zusätzlichen Vorsprungs (37) angeordnet sind, und mit den unteren Flächen (26a) der oberen Einspannflansche (26) und den Stirnflächen (27b) der unteren Einspannflansche (27) zusammenwirken.

2. Ein Fensterrahmenglied gemäß Anspruch 1, wobei jede der genannten inneren und äußeren Stäbe (15, 16) ferner einen Zwischenflansch (28, 29) hat der von einer der genannten Innenwände (18, 19) vorspringt so daß ein Paar längsverlaufende Kanäle (3, 31) zwischen den genannten oberen und unteren Einspannflanschen (35, 36) entstehen, dadurch gekennzeichnet, daß die genannten Zwischenflansche (28, 29) nach oben einander zugeneigt sind.

Revendications

1. Élément calorifuge de châssis de fenêtre (10), comprenant une paire de barres intérieure et extérieure (15, 16) espacées, fabriquées en métal et comportant une paire de parois intérieures en regard (18, 19), chacune desdites barres intérieure et extérieure (15, 16) comprenant une paire de brides de serrage longitudinales supérieure et inférieure (26, 27) faisant saillie et espacées transversalement de l'une desdites parois intérieures en regard (18, 19), chaque bride présentant une face supérieure (26c, 27a), une face inférieure (26a, 27c) et une face d'extrémité (26b, 27b), et une barre d'assemblage calorifuge (17) assemblant entre elles lesdites barres intérieure et extérieure (15, 16) et saisie à ses côtés opposés par lesdites brides de serrage (26, 27), ladite barre d'assemblage (17) étant constituée d'un corps principal allongé (32), fabriqué en matière calorifuge rigide et comprenant une paire supérieure et une paire inférieure de saillies longitudinales (35, 36) qui sont chacune adjacente auxdites première et seconde brides de serrage (26, 27), chacune des saillies présentant une face supérieure, une face

inférieure et une face d'extrémité, la face inférieure (26a) de ladite bride de serrage supérieure (26) étant inclinée vers le bas et dirigée vers sa face d'extrémité (26b) et la face supérieure de ladite saillie supérieure (35) étant inclinée vers le haut et dirigée vers sa face d'extrémité, tandis que la face supérieure (27a) de ladite bride de serrage inférieure (27) est inclinée vers le haut et dirigée vers sa face d'extrémité (27b) et que la face inférieure de ladite saillie inférieure (36) est inclinée vers le bas et dirigée vers sa face d'extrémité, ledit corps principal (32) de la barre d'assemblage (17) comprenant en outre une saillie longitudinale supplémentaire (37) s'étendant vers le bas, disposée entre les faces d'extrémité (27b) desdites brides de serrage inférieures (27) et présentant deux faces latérales opposées et une face d'extrémité, caractérisé en ce que les faces latérales opposées de ladite saillie supplémentaire (37) sont inclinées l'une vers l'autre vers sa face d'extrémité, en ce que lesdites faces d'extrémité (27b) desdites brides de serrage inférieures (27) sont inclinées vers le bas et dirigées l'une vers l'autre et en ce que quatre coussinets (33, 34) fabriqués en matière calorifuge souple, s'étendant sur toute la longueur dudit corps principal (32), sont supportés respectivement par lesdites faces supérieures inclinées desdites saillies supérieures (35) et par lesdites faces latérales inclinées opposées de ladite saillie supplémentaire (37) et coopèrent respectivement avec les faces inférieures (26a) des brides de serrage supérieures (26) et avec les faces d'extrémité (27b) des brides de serrage inférieures (27).

2. Élément de châssis de fenêtre selon la revendication 1, chacune desdites barres intérieure et extérieure (15, 16) comprenant en outre une bride intermédiaire (28, 29) faisant saillie d'une desdites parois intérieures (18, 19) de manière à former une paire de rainures longitudinales (30, 31) entre lesdites brides de serrage supérieure et inférieure (35, 36), caractérisé en ce que lesdites brides intermédiaires (28, 29) sont inclinées vers le haut et dirigées l'une vers l'autre.

