

Description

This invention relates to a window sash assembly comprising an outer sash framework, an inner sash framework positioned and assembled indoors adjacent said outer sash framework, and a peripheral edge member for covering the adjacent open end of said inner sash framework, said outer sash framework is made of metal such as aluminium. Said inner sash framework includes outer portions overlapping said outer sash framework.

A window of this type is disclosed in JP—U—87640/1979.

In the window sash assembly comprising the outer sash and inner sash, it has been known to form the outer sash of metal such as aluminum and the inner sash of adiabatic material such as synthetic resin to improve the adiabatic property of the sash assembly.

However, when the inner sash is formed of adiabatic material such as synthetic resin, there is the disadvantage that the upper and lower rail frames and the door boxing frames which form the inner sash wear out seriously and lack sufficient durability and also it is impossible to provide an inner sash framework of sufficient strength.

In order to remedy this drawback the window sash assembly according to EP—A—0 003 042 discloses metal rails secured within said inner sash of adiabatic material.

Furthermore, in recently developed window sash assemblies in which the peripheral edge member is positioned about the indoor end of the inner sash to cover the adjacent open end of the indoor wall member, since the abutment ends of the peripheral edge member must be bevelled at 45° and abut against each other to form a square framework, the inner sash and peripheral edge member are generally formed as separate members.

Examples of the window sash assembly of this type are disclosed in Japanese Utility Model Publication Nos. 2055/1979, and 8002/1979 and Japanese Utility Model Laid-Open No. 109633/1976, for example.

However, when the inner sash and peripheral edge member are formed as separate members, since the two members are required to be separately positioned, it makes the mounting of the window sash assembly in a building window opening inefficient.

Furthermore, since the peripheral edge member is required to be positioned about the inner sash, the area where the peripheral edge member and inner sash contact with each other is visible from the inside (indoors) and dust and/or debris tend to accumulate at the contact area to give an unsightly appearance to the sash assembly.

And as disclosed in Japanese Utility Model-Laid-Open No. 87640/1979, a window sash assembly has been known in which the peripheral edge member and inner sash are directly

connected together to simplify the mounting operation of the sash assembly in a building window opening. However, in the window sash assembly of this type, when the inner sash is formed of adiabatic material, since the inner sash has insufficient strength, the framework provided by the inner sash and peripheral edge member also has insufficient strength and the framework tends to twist and/or deform when the window sash assembly is installed in a building window opening which makes the installation operation difficult.

Thus, the present invention is to provide a window sash assembly which can effectively eliminate the disadvantages inherent in the conventional window sash assemblies.

One principal object of the present invention is to provide a window sash assembly which has excellent adiabatic property and the inner sash of which has improved durability, which provides a framework of sufficient strength and is easier to install, the completed sash assembly having a pleasing appearance.

These problems are solved by a window sash assembly which comprises an outer sash framework slidably receiving a first pair of sliding windows, an inner sash framework positioned and assembled indoors adjacent said outer sash framework, said inner sash framework slidably receiving a second pair of sliding windows and a peripheral edge member positioned about the inner end of said inner sash framework to cover the adjacent open end of said inner sash framework, said outer sash framework being made of metal and the inner sash framework is made of an adiabatic material is integral with said peripheral member, said inner sash framework including outer portions overlapping said outer sash framework and includes a metal framework made of metal upper, lower, left-hand and right-hand rail frames secured within said inner sash framework by means of L-shaped connector members applied against their respective corners. One edge of the connector members is fitted within engaging portions of said peripheral edge member, the inner end of the peripheral edge member protruding outwardly of the connector member. Each said connector member is screwed to said inner sash framework and to said metal framework by screws cooperating respectively with threaded portions of said metal framework and said inner sash framework and with threaded recesses of said peripheral member.

The above and other objects and attendant advantages of the present invention will be more readily apparent to those skilled in the art from a reading of the following detailed description in conjunction with the accompanying drawings which show one preferred embodiment of the present invention for illustration purpose only, but not for limiting the scope of the same in any way.

Fig. 1 is a vertically sectional view of the window sash assembly constructed in

accordance with the present invention as installed in a building window opening;

Fig. 2 is a cross-sectional view of the window sash assembly shown in Fig. 1;

Fig. 3 is a fragmentary front elevational view of the connection between the adjacent corners of the upper frame and vertical frame;

Fig. 4 is a plan view of Fig. 3;

Fig. 5 is a cross-sectional view taken substantially along the line V—V of Fig. 4;

Fig. 6 is a cross-sectional view taken substantially along the line VI—VI of Fig. 4;

Fig. 7 is a cross-sectional view taken substantially along the line VII—VII of Fig. 4; and

Fig. 8 is a cross-sectional view of the connection between the lower frame and vertical frame.

The present invention will now be described referring to the accompanying drawings which show one preferred embodiment of the invention.

The window sash assembly which essentially comprises an outer sash 5, an inner sash 6 and a peripheral edge member 7 is installed in a building window opening 4 which is defined by a lintel 1, a window platform 2 and a pair of pillars 3, 3.

The outer sash 5 is formed of metal such as aluminum and comprises a horizontal upper frame 8, a horizontal lower frame 9 and a pair of spaced vertical frames 10, 10 extending vertically between and interconnecting the upper and lower frames 8, 9 to provide a square framework. The upper frame 8 comprises a vertical mounting piece 8a adapted to be secured to the outdoor side 1a of the lintel 1 and a horizontal mounting piece 8b extending along the lower surface 1b of the lintel 1. The lower frame 9 comprises a vertical mounting piece 9a adapted to be secured to the outdoor side 2a of the window platform 2 and a horizontal mounting piece 9b extending along the top surface 2b of the window platform 2. The pair of vertical frames 10 each comprises a mounting piece 10a adapted to be secured to the outdoor side 3a of the associated pillar 3 the mounting piece 10b extending along the inside 3b of the pillar 3. A pair of sliding doors 11, 11 is slidably received within the outer sash 5.

The inner sash 6 comprises a horizontal upper frame 12, a horizontal lower frame 13 and a pair of vertical frames 14, 14 extending vertically between and interconnecting the upper and lower frames 12, 13 to provide a square framework. The upper frame 12 includes a main body 12₁ formed of adiabatic material such as synthetic resin and an upper rail frame 16 formed of metal such as aluminum or the like and engaging an anchoring portion 15 of the main body 12₁. The upper rail frame 16 has upper rails 16a, 16a integrally formed therewith and the outer portion 12_{1a} of the main body 12₁ overlaps the horizontal mounting piece 8b of the outer sash 5. The inner portion 12_{1b} of the upper frame main body 12₁ is contiguous to and integral with an upper portion 7₁ of the peripheral edge member 7 to provide an upper sash main frame 17₁.

Similarly, the lower frame 13 includes a main

body 13, formed of adiabatic material and a metal lower rail frame 19 engaging an anchoring portion 18 on the lower frame main body 13, and having integral lower rails 19a, 19a. The outer portion 13_{1a} of the main body 13, overlaps the horizontal mounting piece 9b of the outer sash 5 and the inner portion 13_{1b} of the lower frame main body 13, is contiguous to and integral with a lower portion 7₂ of the peripheral edge member 7 to provide a lower sash main frame 17₂.

Similarly, the pair of vertical frames 14, 14 each comprises a main body 14, formed of adiabatic material and a metal door boxing frame 21 adapted to engage and to be secured to an anchoring portion 20 on the vertical frame main body 14. The outer portion 14_{1a} of the main body 14, overlaps the mounting piece 10b of the vertical frame 10 and the inner portion 14_{1b} of the main body 14, is contiguous to and integral with a vertical portion 7₃ of the peripheral edge member 7 to provide a vertical sash main frame 17₃. A pair of sliding doors 22, 22 is slidably received in the inner sash 6.

The upper, lower and vertical portions 7₁, 7₂, 7₃ of the peripheral edge member 7 each includes an indoor portion 7a covering the adjacent open end of an indoor wall member 23 and an inclined portion 7b interconnecting the indoor portion 7a and the main body inner portions 12_{1b}, 13_{1b} or 14_{1b}. The inclined portions 7b each has screw receiving recesses 24₁ and 24₂ which extend perpendicularly to each other.

In short, the upper, lower and vertical portions 7₁, 7₂, 7₃ which form the peripheral edge member 7 are integrally formed of adiabatic material such as synthetic resin with the main bodies 12₁, 13₁ and 14₁ of the upper, lower and vertical frames 12, 13 and 14 of the inner sash 6, respectively, and these main bodies 12₁, 13₁ and 14₁ extend outwardly toward the mounting pieces 8b, 9b and 10b of the outer sash 5 respectively, and upper, lower and door boxing frames 16, 19 and 21 of the metal are secured to the inside of the main bodies 12₁, 13₁ and 14₁ to thereby integrally form the inner sash 6 and peripheral edge member 7 and then the inner sash 6 is assembled with the outer sash 5.

In the illustrated embodiment, the upper, lower and vertical sash main frames 17₁, 17₂ and 17₃ have been formed by the employment of the same one mold.

The manner in which the inner sash 6 and peripheral edge member 7 are assembled will be described hereinbelow.

First of all, the upper and lower rail frames 16 and 19 and the left-hand and right-hand door boxing frames 21, 21 are suitably secured to the upper, lower and vertical sash main frames 17₁, 17₂ and 17₃, respectively. To put it more precisely, it is only necessary that the engaging portions 16b, 19b and 21a on the upper and lower rail frames 16, 19 and the door boxing frames 21 be snapped into the anchoring portions 15, 18 and 20 on the upper, lower and vertical sash main frames 17₁, 17₂ and 17₃, respectively or alternatively the

engaging portions on the upper and lower rail frames and door boxing frames may be slid into the respectively corresponding engaging portions on the upper, lower and vertical sash main frames, respectively, in the longitudinal direction and attached therebetween respectively.

Next, an L-shaped connector member 30 is applied against the adjacent connection corners of the upper, lower and vertical sash main frames and screws are screwed into the aligned thread holes or recesses formed in the upper, lower and vertical sash main frames 17₁, 17₂ and 17₃, the upper and lower rail frames 16 and 19 and the left-hand door boxing frames 21 through the connector member 30 to connect the components together to provide a square framework assembly.

Thereafter, it is only necessary to fit the inner sash 6 and peripheral edge member 7 of the thus formed square framework assembly into the building window opening 4 from indoors and attach therebetween.

The construction of the framework of the inner sash 6 and peripheral edge member 7 will be described hereinbelow referring to Figs. 3 to 8 inclusive.

Figs. 3 to 7 show the connection between the upper frame 12 and vertical frame 14 in the inner sash 6. The L-shaped connector member 30 is applied against the adjacent corners of the upper frame 12 and vertical frame 14 with the indoor end 30a of the member 30 fitted between the engaging portions 7c, 7c (Fig. 5) on the upper and vertical portions 7₁ and 7₃ of the peripheral edge member 7 and the inner end 7a of the peripheral edge member 7 protruding outwardly of the connector member 30. Thereafter, screws 32 are screwed into the threaded holes 31 formed in the upper rail frame 16 through the aligned holes (not shown) formed in the vertical leg 30b of the L-shaped connector member 30, the vertical frame 14 and the door boxing frame 21, and a screw 32' is screwed into the threaded recess 24, formed in the upper portion 7₁ of the peripheral edge member through the vertical leg 30b of the L-shaped connector member 30 to cause the end face 16c of the upper rail frame 16 to abut against the inner side 21b of the door boxing frame 21 (Fig. 7). Finally, screws 34 are screwed into the threaded holes 31 formed in the upper rail frame 16 through the aligned holes (not shown) formed in the upper frame 12, and a screw 34' is screwed into the threaded recess 24₂ formed in the vertical portion 7₃ of the peripheral edge member 7 to thereby connect the upper frame 12 (the upper sash main frame 17₁) and the vertical frame 14 (the vertical sash main frame 17₃) together.

In this way, the adjacent abutment end faces 7d, 7d of the peripheral edge member 7 which are bevelled at 45° abut precisely against each other and the entire framework is reinforced.

The lower frame 13 and the vertical frame 14 are connected together in a manner similar to that described in connection with the connection between the upper frame 12 and the vertical

frame 14. As more clearly shown in Fig. 8, screws 36 are screwed into the thread recesses 35 formed in the lower rail frame 19 through the aligned holes (not shown) formed in the vertical leg 30b of the L-shaped connector member 30, the vertical frame 14 and the door boxing frame 21, a screw 36' is screwed into the threaded recess 24, formed in the lower portion 7₂ of the peripheral edge member 7 through the aligned hole formed in the vertical leg 30b of the connector member 30, and screws 38 are screwed into the threaded recesses 37 formed in the lower rail frame 19 through the aligned hole formed in the lower frame 13 to thereby connect the lower frame 13 and the vertical frame 14 together.

With the above-mentioned construction and arrangement of the components of the window sash assembly of the present invention, since the main portion of the inner sash 6 and the peripheral edge member 7 are integrally formed of the adiabatic material, the metal upper and lower rail frames 16, 19 and the metal door boxing frames 21 are connected to the inner periphery of the main portion of the inner sash 6 and the upper and lower rail frames 16, 19 and the left-hand and right-hand door boxing frames 21 are assembled into a framework to thereby form the core for the window sash assembly, notwithstanding the fact that the sash main frame is formed of adiabatic material to improve the adiabatic property of the window sash assembly, the frame assembly is rigid and the strength of the framework provided by the inner sash and peripheral edge member is increased by that of the framework provided by the metal rail frames and door boxing frames. Thus, the window sash assembly can be installed in a stabilized state in the building window opening without twisting and the mounting operation of the window sash assembly is accelerated.

Thus, the window sash assembly of the present invention has improved strength and mounting characteristics as well as improved adiabatic property.

And since the peripheral edge member 7 and inner sash 6 are formed as an integral structure, but not laid one upon another, no dust and/or debris are trapped between the peripheral edge member 7 and the inner sash 6, and the whole has a pleasing appearance. And since the peripheral edge member 7 and inner sash 6 are not required to be positioned relative to each other, the installation of the window sash assembly in the building window opening is accelerated.

And since the upper and lower rail frames 16, 19 and the left-hand and right-hand door boxing frames 21 are formed of metal, the window sash assembly of the invention has improved resistance to wear.

While only one embodiment of the invention has been shown and illustrated in detail, it will be understood that the same is for illustration purpose only and not to be taken as a definition of the invention, reference being had for that purpose to the appended claims.

Claims

1. A window sash assembly comprising an outer sash framework (5) slidably receiving a first pair of sliding windows (11, 11), an inner sash framework (6) positioned and assembled indoors adjacent said outer sash framework (5), said inner sash framework (6) slidably receiving a second pair of sliding windows (22, 22) and a peripheral edge member (7) positioned about the inner end of said inner sash framework (6) to cover the adjacent open end of said inner sash framework (6) said outer sash framework (5) being made of metal and said inner sash framework (6) including outer portions (12_{1a}, 13_{1a}, 14_{1a}) overlapping said outer sash framework (5), characterized in that said inner sash framework (6) is made of an adiabatic material, is integral with said peripheral member (7), and includes a metal framework made of metal upper, lower, left-hand and right-hand rail frames (16, 19, 21) secured within said inner sash framework (6) by means of L-shaped connector members (30) applied against their respective corners, one edge of the connector members being fitted within engaging portions (7c) of said peripheral edge member (7), the inner end (7a) of the peripheral edge member protruding outwardly of the connector member, each said connector member (30) being screwed to said inner sash framework and to said metal framework by screws (32, 32', 34, 34') cooperating respectively with threaded portions (31) of said metal framework and said inner sash framework and with threaded recesses (24, 24₂) of said peripheral member.

2. The window sash assembly as set forth in Claim 1, characterized in that said metal framework is formed by framing the same upper and lower frame members and the same left-hand and right-hand frame members.

3. The window sash assembly as set forth in Claim 1 or 2, characterized in that the adjacent ends of said metal framework are bevelled at 45° and abut against each other to form the framework.

4. The window sash assembly as set forth in Claim 2, or 3 characterized in that said upper and lower rail frames and left-hand and right-hand door boxing frames are respectively fixed to corresponding frame members of said metal framework by snapping or sliding the formers into the latters.

Patentansprüche

1. Fensterrahmen, enthaltend ein äußeres Rahmenteil (5), das ein erstes Paar Schiebefenster (11, 11) verschiebbar aufnimmt, ein inneres Rahmenteil (6), das zum Zimmerinnern zu an das genannte äußere Rahmenteil (5) angebaut ist, wobei das genannte innere Rahmenteil (6) ein zweites Paar Schiebefenster (22, 22) verschiebbar aufnimmt, und ein umfangmäßig angeordnetes Umrandungsglied (7), das um das innere Ende des genannten inneren Rahmentails (6) ange-

ordnet ist um das anliegende offene Ende des genannten inneren Rahmentails (6) abzudecken, wobei das genannte äußere Rahmenteil (5) aus Metall gefertigt ist und das genannte innere Rahmenteil (6) das genannte äußere Rahmenteil (5) überlappende äußere Teile (12_{1a}, 13_{1a}, 14_{1a}) einschließt, dadurch gekennzeichnet, daß das genannte innere Rahmenteil (6) aus einem adiabatischen Material besteht, aus einem Stück mit dem genannten Umrandungsglied (7) besteht und ein metallisches Rahmenteil, bestehend aus metallischen oberen, unteren, linken und rechten Schienenrahmen (16, 19, 21) einschließt, die mittels L-förmiger gegen ihre entsprechenden Ecken angebrachte Verbindungsglieder (30) innerhalb des genannten inneren Rahmentails (6) befestigt werden, wobei eine Kante der Verbindungsglieder innerhalb eingreifender Teile (7c) der genannten Umrandungsglieder (7) eingepaßt ist, das innere Ende (7a) des Umrandungsglieds nach außen über das Verbindungsglied hinaus vorsteht, jedes der genannten Verbindungsglieder (30) mittels Schrauben (32, 32', 34, 34'), die mit Gewindeteilen (31) des genannten Metallrahmens und des genannten inneren Rahmentails und mit Gewindeausnehmungen (24, 24₂) des genannten Umrandungsglieds zusammenwirken, an das genannte innere Rahmenteil angeschraubt ist.

2. Fensterrahmen gemäß Anspruch 1, dadurch gekennzeichnet, daß das genannte metallische Rahmenteil durch aneinanderfügen der leichen oberen und unteren Glieder und der gleichen linken und rechten Glieder gebildet wird.

3. Fensterrahmen gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß die anliegenden Enden des genannten metallischen Rahmentails mit 45° abgeschrägt sind und aneinander anliegen um so den Rahmen zu bilden.

4. Fensterrahmen gemäß Anspruch 2 oder 3, dadurch gekennzeichnet, daß die genannten oberen und unteren Rahmenschielen und linken und rechten Kastenrahmen an entsprechende Rahmenglieder des genannten metallischen Rahmentails durch Einrasten bzw. Einschieben der ersteren in die letzteren befestigt sind.

Revendications

1. Ensemble de châssis de fenêtre, comprenant un châssis extérieur (5), logeant à coulissement une première paire de fenêtres coulissantes (11, 11), un châssis intérieur (6), mis en place et assemblé de l'intérieur, de façon adjacente audit châssis extérieur (5), ledit châssis intérieur (6) logeant à coulissement une seconde paire de fenêtres coulissantes (22, 22), et un élément de bordure périphérique (7) disposé autour de l'extrémité intérieure dudit châssis intérieur (6), de manière à recouvrir l'extrémité ouverte adjacente dudit châssis intérieur (6), ledit châssis extérieur (5) étant métallique et ledit châssis intérieur (6) comprenant des portions extérieures (12_{1a}, 13_{1a}, 14_{1a}) recouvrant ledit châssis extérieur (5), caractérisé en ce que ledit châssis intérieur (6) est



fabriqué dans un matériau adiabatique, fait partie intégrante de l'élément périphérique (7) et comprend un bâti métallique constitué de structures métalliques supérieure, inférieure, gauche et droite (16, 19, 21) formant rails, fixées à l'intérieur dudit châssis intérieur (6) au moyen d'éléments de raccordement (30) en forme de L appliqués contre leurs coins respectifs, un bord de chaque élément de raccordement étant monté dans des portions d'accrochage (7c) dudit élément de bordure périphérique (7), l'extrémité intérieure (7a) de l'élément de bordure périphérique faisant saillie à l'extérieur de l'élément de raccordement, chacun desdits éléments de raccordement (30) étant vissé audit châssis intérieur et audit bâti métallique au moyen de vis (32, 32', 34, 34') coopérant respectivement avec des parties taraudées (31) dudit bâti métallique et dudit châssis intérieur et avec des évidements taraudés (24, 24₂) dudit élément périphérique des évidements taraudés (24, 24₂) dudit élément périphérique.

2. Ensemble de châssis de fenêtre selon la revendication 1, caractérisé en ce que ledit bâti métallique est formé en assemblant des éléments de structure supérieur et inférieur identiques et des éléments de structure gauche et droite identiques.

3. Ensemble de châssis de fenêtre selon les revendications 1 ou 2, caractérisé en ce que les extrémités adjacentes dudit bâti métallique sont biseautées à 45° et portent l'une contre l'autre pour former le bâti.

4. Ensemble de châssis de fenêtre selon les revendications 2 ou 3, caractérisé en ce que lesdites structures supérieure et inférieure formant rails et les structures gauche et droite formant chambranles sont fixées respectivement auxdits éléments: chambranles sont fixées respectivement auxdits éléments de structure correspondants dudit bâti métallique, par encliquetage ou en faisant coulisser les premières dans les seconds.

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