

SECTION FOR BUILDING AND CURTAIN WALL

This invention relates to a section for building used for vertical frame members and horizontal frame members for a curtain wall or a window sash, and more particularly to a section for building in which a batten is connected to a section body.

In the past, the section for building of this kind known is a section in which a batten is connected to a section body through a heat insulating material. However, if the construction merely comprises an arrangement wherein the batten is connected to the section body through the heat insulating material, there involves inconveniences in that the mounting position of the batten is uneven, that the connecting strength is weak, and that sufficient heat insulating effect is not obtained.

The present invention has been made in view of the above-described circumstances, and it is an aspect of the invention to provide a section for building in which a batten is positioned and mounted on a section body, and thereby the connecting strength may be increased, and further sufficient heat insulating effect may be obtained.

According to a first aspect of the present invention there is provided a section for building used as vertical and horizontal members and mounted around a panel in the form of a rectangular frame, the section comprising: a frame body; a batten disposed across from a mounting piece integrally formed on the outside facing side wall of said frame body and fixedly secured through a screw bolt to the mounting piece so as to leave a predetermined space between the batten and the mounting piece; a relatively large connecting body formed of heat insulating material disposed in said space; and at least one connecting plate substantially smaller than said connecting body disposed in said space between the batten and the mounting piece and fitted in small mounting recesses formed in an outside wall of said mounting piece and in an inside wall of said batten opposite to the outside wall of the mounting piece, said connecting plate being separated from said connecting body to block a hollow space fully between said connecting plate and said connecting body to prevent air convection within the layer of air adjacent said connecting body in said hollow space; said panel being mounted at one side of said space between the batten and the mounting piece and said connecting plate being mounted at the other side of said space relative to the interposition of said connecting body.

(15)

Preferably a plurality of said connecting plates are used, said connecting plates being inserted into a plurality of small recessed grooves formed in an external end surface of said mounting piece and into a  
5 plurality of small recessed grooves formed in an internal end surface of said batten, respectively.

Preferably said connecting plates and said connecting body are formed of a heat insulating material.

According to a second aspect of the present invention  
10 there is provided a curtain wall comprising two mutually adjacent curtain wall units each comprising a respective rectangular frame and a respective panel, with one side of one frame next to one side of the other frame, said one side of each frame comprising a generally  
15 rectangular section having two relatively long sides and two relatively short sides, with one of the short sides facing the exterior of the curtain wall and joined integrally to a mounting piece which projects outwardly of said one short side, a respective one of two battens  
20 being connected to the mounting piece by connecting means passing through a body of thermally insulating material which spaces the batten away from the mounting means, an edge of each panel being received between said one short side of the section and the batten said one  
25 side of each frame also being provided with at least one

connecting plate of thermally insulating material which interconnects the batten and the mounting piece and is spaced from the body so as to form an enclosed thermally insulating space between the block and the connecting plate(s), the connecting plate(s) of one frame also being spaced apart from the connecting plate(s) of the other frame, with space therebetween.

The invention will be described by way of examples with reference to the accompanying drawings, wherein:-

10 Fig. 1 is a front view showing a curtain wall;

Fig. 2 is a sectional view of a section;

Figs. 3 and 4 are sectional views taken on line III-III and line IV-IV, respectively, of Fig. 1; and

15 Figs. 5 and 6 are respectively partial sectional views of other embodiments.

Fig. 1 is a front view showing a curtain wall, which has a construction wherein curtain wall units Aa, Ab, Ac, Ad are mounted in plural number at top and bottom and left and right.

20 The curtain wall unit Aa has a shape in which a pair of

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vertical members 1a, 1b, an upper horizontal member 2a, a pair of intermediate horizontal members 2m<sub>1</sub>, 2m<sub>2</sub> and a lower horizontal member 2c are connected in the form of a rectangular frame.

- 5 A section for constituting the vertical members 1a, 1b and the horizontal members 2a, 2m<sub>1</sub>, 2m<sub>2</sub>, 2c has a shape as shown in Fig. 2.

That is, a section body 14 in the form of a hollow rectangular-sectioned elongate member is composed of both long side walls 10, 11 and both short side walls 12, 13. One of the short side walls 12 is formed integrally with an outside mounting piece 15, while the other short side 13 is formed with a longitudinally continuous hollow portion 16 and a recess 17 open towards the long side wall 10. The mounting piece 15 has one side wall 15a formed with a first mounting recess 18. An end wall 15b perpendicular to the side wall 15a is formed with second and third small mounting recesses 19, 20, the end wall 15b is formed with a shoulder 21. The other side wall 15c and the long side wall 12 of the section body 14 constitute a shoulder 22. The short side wall 12 is integrally formed with a pair of locking projections 23 and 24.

In case of being used as the vertical frame member, the

section is mounted so that the side wall 10 is directed outwardly as shown in Fig. 3 which shows the vertical frame members 1a, 1b adjacent to left and right of each other, and a seal material 30 such as a packing band is mounted between the first large mounting recesses 18, 18 of the vertical frame members 1, 1 of the unit curtain walls Aa, Ab adjacent to top and bottom and left and right to connect a pair of vertical frame members 1a, 1b in a lateral direction.

In Fig. 3, a vertical batten 32 is mounted on the end wall 15b of said mounting piece 15 by means of a screw 33 through a connecting body 31 formed of a heat insulating material, which spaces the batten 32 away from the mounting piece 15. A panel 34 is held and mounted between an outer side wall 32a of the vertical batten 32 and the short side wall 12 of the vertical frame member 1b, the vertical batten 32 having the outer side wall 32a integrally formed with a wall 32b bent into a hook-shape to form a large recess 35, the bent wall 32b being formed with fourth and fifth small mounting recesses 36 and 37 opposed to the second and third small mounting recesses 19, 20 of the mounting piece 15, and connecting plates 38, 38 formed of a heat insulating material are fitted in and mounted on the fourth and fifth small recesses 36, 37 and the second and third small mounting recesses 19 and 20, a seal

material 39 such as a packing band is fitted and mounted between the large recesses 35, 35 of the vertical battens 32, 32 opposed to each other, and a seal material 41 such as a packing band is fitted and mounted  
5 between the large recesses 17 and 17 of the vertical frame members through a fitting 40.

With this arrangement, when the batten 32 is connected to the section body 14 through the connecting body 31, positioning is properly made by the connecting body 31,  
10 the connecting plates 38 and the recesses 19, 20, 36, 37 to provide an accurate connection at a required position and a layer of air shielded from outside can be formed between the connecting body 31 and the connecting plates 38 to thereby prevent convection of air within the air  
15 layer to provide an excellent heat insulating effect.

An edge of a panel 34 is mounted between the outer side wall 32a of the batten 32 and the short side wall 12 of the body 14.

In case of being used as the horizontal frame member, as  
20 shown in Fig. 4, the section forming the upper horizontal frame member 2a of the lower curtain wall unit is mounted so that the long side wall 10 thereof is directed upwardly whereas the lower horizontal frame member 2c of the upper unit curtain wall unit Ac is

mounted so that the long side wall 10 thereof is directed downwardly, and upper and lower ends of a sill member 50 are fitted in and mounted between the opposed first large mounting recesses 18, 18 through spacer members 51, 51.

That is, the sill member 50 is provided with an upper wall 52, a lower wall 53, and inner and outer vertical walls 54, 55, the inner vertical wall 54 being continuously formed with a pair of upper and lower projections 56 and 57, the upper wall 52 being integrally formed with a hook 58, the outer vertical wall 55 extending downwardly and being formed at the end thereof with a recess 59 in which a seal 80 is fitted. The upper and lower projections 56, 57 are mounted in the first large mounting recesses 18, 18 through the spacer members 51, 51.

Further, a lower horizontal batten 61 for the upper curtain wall unit is mounted by means of a screw bolt 62 and the end wall 15<sub>b</sub> of the mounting piece 15 of the section body 14 forming the lower horizontal frame member 2<sub>c</sub> of the upper curtain wall unit by the interposition of a connecting body 60 made of a heat insulating material similarly as previously described. The horizontal batten 61 has an outer end wall 61<sub>a</sub> and a bent or angled wall 61<sub>b</sub> integrally connected to and

inwardly projected from the outer end wall 61a. In the bent wall 61b are formed sixth and seventh small mounting recesses 64 and 65 so as to be opposite to the second and the third small mounting recesses 19 and 20, respectively. An upper connecting plate 66 is fitted into and connected between the second and the third small mounting recesses 19 and 20 and the seventh small mounting recess 65.

An upper horizontal batten for the lower curtain wall unit is similarly mounted (upside down relative to batten 61) to the section body 14 forming the upper horizontal frame member 2a of the lower curtain wall unit, with a connecting plate 67 fitted into and connected between the second small mounting recess 19 and the sixth small mounting recess 64. The hook 58 at the top of the sill member 50 is fitted into the sixth small mounting recess 64 of the bent wall 61b of the horizontal frame member 2c. The end portion of the panel 34 is mounted and held by the interposition of two packings 69, 69, which are mounted one in an overhung groove 68 formed in the horizontal batten 61, the other between a pair of ribs 23 and 24 integrally formed on the outside of the short side wall 12 of the section body 14.

In such a construction as described above, in case of

connecting the horizontal batten 61 to the section body 14 by the interposition of the connecting body 60, it is favourable to be able to make the positioning of curtain wall units precise so that the respective curtain wall units can be precisely mounted in position. Further, a hollow space which is closed independently of the outside such as, for example, atmosphere is formed between the connecting body 60 and the connecting plate 66. Therefore, the prevention of air convection in the thus formed hollow space brings an excellent heat insulating effect for the curtain wall units each of which includes sections in accordance with the present invention as the vertical and the horizontal frame members thereof.

It should be understood that as shown in Fig. 5, recesses 19, 20, 20a, 36, 37, 37a can be formed above and below the connecting body 31 in the mounting piece 15 and the batten 32 so that the connecting plates 38, 38a may be mounted above and below the connecting body 31, and that as shown in Fig. 6, three recesses 19, 20, 20a, 36, 37, 37a can be formed in the mounting piece 15 and the batten 32 so that a plate-like connecting plate 38 and an H-shaped connecting plate 38b may be mounted.

**Claims:-**

1. A section for building used as vertical and horizontal members and mounted around a panel in the form of a rectangular frame, the section comprising: a frame body; a batten disposed across from a mounting piece integrally formed on the outside facing side wall of said frame body and fixedly secured through a screw bolt to the mounting piece so as to leave a predetermined space between the batten and the mounting piece; a relatively large connecting body formed of heat insulating material disposed in said space; and at least one connecting plate substantially smaller than said connecting body disposed in said space between the batten and the mounting piece and fitted in small mounting recesses formed in an outside wall of said mounting piece and in an inside wall of said batten opposite to the outside wall of the mounting piece, said connecting plate being separated from said connecting body to block a hollow space fully between said connecting plate and said connecting body to prevent air convection within the layer of air adjacent said connecting body in said hollow space; said panel being mounted at one side of said space between the batten and the mounting piece and said connecting plate being mounted at the other side of said space relative to the interposition of said connecting body.



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5 2. A section for building according to claim 1 wherein a plurality of said connecting plates are used, said connecting plates being inserted into a plurality of small recessed grooves formed in an external end surface of said mounting piece and into a plurality of small recessed grooves formed in an internal end surface of said batten, respectively.

10 3. A section for building according to claim 2 wherein said plurality of connecting plates are provided on only one side of said connecting body.

4. A section for building according to claim 2 wherein said plurality of connecting plates are provided on both sides of said connecting body.

15 5. A section for building according to claim 2 wherein at least two of said plurality of connecting plates are connected integral with each other.

6. A section for building according to any preceding claim wherein said connecting plates and said connecting body are formed of a heat insulating material.

20 7. A curtain wall comprising two mutually adjacent  
[curtain wall units each comprising a respective]



curtain wall units each comprising a respective rectangular frame and a respective panel, with one side of one frame next to one side of the other frame, said one side of each frame comprising a generally

5 rectangular section having two relatively long sides and two relatively short sides, with one of the short sides facing the exterior of the curtain wall and joined integrally to a mounting piece which projects outwardly of said one short side, a respective one of two battens

10 being connected to the mounting piece by connecting means passing through a body of thermally insulating material which spaces the batten away from the mounting means, an edge of each panel being received between said one short side of the section and the batten said one

15 side of each frame also being provided with at least one connecting plate of thermally insulating material which interconnects the batten and the mounting piece and is spaced from the body so as to form an enclosed thermally insulating space between the block and the connecting

20 plate(s), the connecting plate(s) of one frame also being spaced apart from the connecting plate(s) of the other frame, with space therebetween.

8. A curtain wall as claimed in claim 7 wherein the or each said connecting plate is received in respective

25 grooves in the batten and the mounting piece.



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9. A curtain wall as claimed in claim 7 or 8 wherein each mounting piece is formed with a groove open towards the corresponding groove of the other mounting piece.

5 10. A curtain wall as claimed in claim 9 wherein a packing band extends between the two mounting pieces and is received in the said open grooves thereof, the two curtain wall units being side-by-side.

10 11. A curtain wall as claimed in claim 9 wherein a sill member extends between the two mounting pieces and has portions received in the said open grooves thereof, the sill member projecting outwardly of the battens, the two curtain wall units being one above the other.

15 12. A curtain wall substantially as described with reference to and as illustrated in the accompanying drawings.

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