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AN ASSEMBLY OF A JOINT STRUCTURE AND TWO
THERMALLY-INSULATED WINDOW UNITS

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The present invention relates to an assembly of a joint structure and two thermally-insulated window units.

Various joint structures for thermally-insulated window units have been proposed. Although, in general, the proposed joint structures have performed satisfactorily, they have not been found to be entirely suitable in applications wherein substantial accommodation for a working error in, and a relative displacement between, adjacent window units is a major requirement.

According to one aspect of the present invention, a joint structure for two juxtaposed thermally-insulated window units, includes co-operating pairs of plug and socket members disposed on and along opposite inner edges of the window units; the plug members are resiliently received in the mating socket members and movable with respect to the same to thereby take up or accommodate a relative displacement between the window units, thermal deformation and working errors created in the window units; a resilient block of thermal insulating material is disposed in a space between the opposite inner edges so as to increase the mechanical strength and the thermal insulation of a joint between the window units.

According to another aspect of the invention there is provided an assembly of a joint structure and two thermally-insulated window units disposed in

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juxtaposition with a space defined between their opposite inner edges, each window unit having a pair of spaced interior and exterior members interconnected by connectors of thermal insulating material, said joint structure

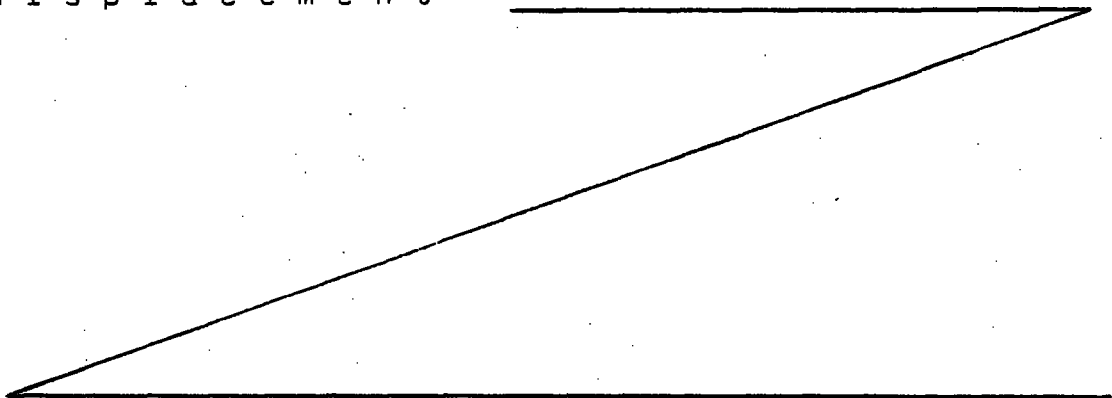
5 comprising :

(a) a first pair of plug and socket members disposed respectively on the interior members along the opposite inner edges;

(b) a second pair of plug and socket members
10 disposed respectively on the exterior members, each said plug member being resiliently received in mating one of said socket members and displaceable with respect to the same; and

(c) a resilient block of thermal insulating material
15 disposed in the space between the opposite inner edges of the window units.

It is believed possible by means of the present invention to provide a joint structure for adjacent two thermally-insulated window units wherein a relative
20 d i s p l a c e m e n t



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between the window units, thermal deformation and working errors created in the window units can be taken out or accomodated by the joint structure, such a joint structure having an increased degree of mechanical strength and thermal insulation.

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

FIG. 1 is a schematic front elevational view of an assembly of a pair of window units and a joint structure embodying the present invention;

FIG. 2 is an enlarged cross-sectional view taken along line II-II of FIG. 1; and

FIG. 3 is a cross-sectional view taken along line III-III of FIG. 2.

As shown in FIG. 1, a pair of thermally-insulated window units 10, 11 is mounted within a rectangular opening 12 provided in a building wall 13. The window units 10, 11 are connected together in juxtaposition at a joint 14 therebetween.

As shown in FIG. 2, each of the window units 10, 11 includes a pair of spaced interior and exterior frame members 15a, 15b, and 16a, 16b interconnected by a plurality (two being shown) of connectors 17 of thermal insulating material. The frame members 15a, 15b, 16a, 16b are made of metal such as an extruded aluminium. A pair of spaced glass panes G is mounted on each window unit 10, 11 substantially centrally between the interior and exterior

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frame members 15a, 16a, or 15b, 16b.

5 The window unit 10 includes a pair of socket members 18 disposed respectively on the interior and exterior frame members 15a, 16a along an inner edge 19 of the window unit 10. Each of the socket members 18 has a pair of parallel spaced inner and outer fins 20, 21 integral with the interior or exterior frame member 15a or 16a and projecting therefrom toward an inner edge 22 of the window unit 11. The inner edges 19, 22 confront with each other 10 with a space 23 defined therebetween. An elongate channel 24 is defined between each pair of the fins 20, 21 and communicated with the space 23.

15 The window unit 11 includes a pair of plug members 25 disposed respectively on the interior and exterior frame members 15b, 16b along the inner edge 22. Each of the plug members 25 includes a leg 26 integral with the interior or exterior frame member 15b, or 16b and projecting therefrom towards a corresponding one of the socket members 18. The leg 26 has at its free end an enlarged foot 27 of 20 substantially rectangular cross section loosely received in the channel 24 in each socket member 18. A pair of resilient weather strips 28 is mounted one on each side of the foot 27 and held in sealing contact with the inner and outer fins 20, 21 of each socket member 18.

25 A resilient block 29 of rigid thermal insulating material such as glass wool, rock wool, foamed rigid polystyrene or the like is compressdly disposed in the

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space 23 between the opposite inner edges 19, 22 of the window units 10, 11 so as to provide the joint 14 with an increased degree of mechanical strength and thermal insulation. The block 29 has a generally Y-shaped cross section including a bifurcate head 30 sandwiched between the legs 26 and a body 31 sandwiched between the opposite inner fins 20.

The block 29 may be bonded by an adhesive either to the legs 26 or to the fins 20, at the head 30 or the body 31 so as to further strengthen the joint 14 without hindering the relative movement of the window units 10, 11. Alternatively, the block 29 may be formed of a foamed rigid plastic filled in the space 23 by a foaming-in place method.

As shown in FIGS. 2 and 3, a pair of throating plates 32, 33 is secured at respective upper ends to the bottom portion of the interior frame members 15a, 15b of the respective window units 10, 11. The window units 10, 11 are interconnected by a connector plate 34 extending over the joint 14 between the window units 10, 11, the connector plate 34 being complementary in cross section to the throating plates 32, 33 and disposed behind the throating plates 32, 33. The throating plates 32, 33 are secured to the connector plate 34 by stud bolts 35 (FIG. 3).

FIG. 3 shows the window unit 10 as mounted within the opening 12. A thermal insulating material 36 such as glass wool is placed in a space between the bottom of the window

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unit 10 and an edge 37 defining the bottom portion of the opening 12. The interior sides of the bottom of window unit 10 and the building wall 13 are covered with an interior siding 38. A space between the connector plate 34 and the edge 37 is sealed by a suitable caulking material 39.

The joint structure thus arranged substantially takes up or accomodates for working errors created in the window units in installation of the same, a relative displacement of the window units under severe vibratory stresses, and a thermal deformation of the window units. The resilient thermal insulating block filled in the space in the joint substantially increases thermal insulation of the joint.



C L A I M S :

1. An assembly of a joint structure and two thermally-insulated window units disposed in juxtaposition with a space defined between their opposite inner edges, each window unit having a pair of spaced interior and exterior members interconnected by connectors of thermal insulating material, said joint structure comprising:

(a) a first pair of plug and socket members disposed respectively on the interior members along the opposite inner edges;

10 (b) a second pair of plug and socket members disposed respectively on the exterior members, each said plug member being resiliently received in mating one of said socket members and displaceable with respect to the same; and

15 (c) a resilient block of thermal insulating material disposed in the space between the opposite inner edges of the window units.

2. An assembly according to claim 1, said plug members being disposed respectively on the interior and exterior members of one of the window units.

3. An assembly according to claim 1 or 2, said socket member including a pair of parallel spaced fins projecting from the respective one of the interior or

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exterior members, each said plug member including a leg projecting from the other interior or exterior member respectively toward said one interior or exterior member, and having at its free end an enlarged foot and a pair
5 of resilient strips on opposite sides of said foot, said resilient strips being held in sealing contact with said fins of the corresponding one of said socket members.

4. An assembly according to claim 1, 2 or 3, said resilient, thermal insulating block being bonded to
10 either one of said plug and socket members.

5. An assembly according to any preceding claim said resilient thermal insulating block being made of glass wool, rock wool or foamed rigid polystyrene.

6. An assembly according to claim 1, 2 or 3, said
15 resilient thermal insulating block being formed of a foamed rigid plastic filled in the space between the opposite inner edges by a foaming-in place method.

7. An assembly substantially as described with reference to and as illustrated in the accompanying
20 drawings.
