

PATENT SPECIFICATION

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(54) PANEL CONNECTOR

(71) We, YOSHIDA KOGYO K. K., a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to connectors, and more particularly to a connector assembly for connecting adjacent curtain wall units or panels edge to edge to assemble a curtain wall, a partition or the like.

The present invention seeks to provide a connector assembly which facilitates easy assemblage of a curtain wall or a partition construction.

The invention also seeks to provide a connector assembly which, as attached between curtain wall components or panels, has sufficient structural strength to transmit forces, from either jointed part to the other, either edgewise or facewise.

The invention further seeks to provide a connector assembly which is constructed to allow for removal of any wall component or panel for replacement without the necessity of disturbing a number of adjacent wall components or panels.

The invention further seeks to provide a connector assembly which permits wide latitude in the order of arrangement or installation of wall components or panels.

The invention further seeks to provide a connector assembly including sealing means which, in addition to its ordinary purposes such as airtight and/or sound insulating, serves as an absorber for dimensional errors of factory-made wall components or panels, thereby requiring no high degree of dimensional precision of these wall units to be jointed.

According to the invention there is provided a panel connector comprising a pair of

first elongate members each having elongate plug means extending therefrom for securement in edge grooves of panels to be connected and a pair of elongate flanges oppositely extending laterally of the direction of the plug means at one end thereof, a pair of elongate second members each having a face for engagement with adjacent faces of panels to be connected and means for retentive engagement with oppositely disposed flanges of the first elongate members, so as to secure the first elongate members together and a pair of elongate sealing means disposed between the oppositely disposed flanges of the first members and carried by one flange of the oppositely disposed flanges.

In order that the invention and its various other preferred features may be understood more easily, embodiments thereof will now be described, by way of example only, with reference to the drawings in which:-

Figure 1 is a front elevational view of a partition assembled by a plurality of connector assemblies each embodying the present invention;

Figure 2 is a fragmentary, enlarged horizontal cross-sectional view taken along line II-II of Figure 1 showing one of the connector assemblies; and

Figure 3 is a fragmentary cross-sectional view similar to Figure 2, but showing another embodiment of the connector assembly constructed in accordance with the invention.

In the accompanying drawing, Figure 1 illustrates a partition 10 in which partition components or panels 11A, 11B, 11C and 11D are connected edge to edge by attaching connector assemblies, each designated by 12, between adjacent panels. The panels are made of a substantially rigid material, such as wood, metal, synthetic resin and the like.

Referring to Figure 2, the two adjacent

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panels 11A, 11B are arranged edge to edge with a space or joint opening therebetween, and each have a groove 13,14 extending longitudinally along and centrally of a jointing panel edge 15, 16.

Oppositely disposed within the joint opening between the adjacent panels 11A, 11B are a pair of elongate first and second members 17, 18, which are made of a relatively rigid and slightly resilient material, such as extruded aluminium. The first and second members 17, 18 are provided with a pair of first and second plug projections 19, 20, respectively. Each of the first and second plug projections 19, 20 has a substantially U-shaped transverse cross section defined by a pair of spaced side walls 21, 22 projecting perpendicularly from one side of one of the first and second members 17, 18 and terminating in a top wall 23 extending between the side walls 21, 22, such two U-shaped portions opening toward each other.

Each of such two top walls 23, 23 has a plurality of through holes 24, 25 (only one of which is illustrated on each side for clarity) through which a corresponding number of fastening screws 26, 27 (only one of which is also illustrated on each side for clarity) extend into one of the panels 11A, 11B. Thus, the first and second members 17,18 are secured to the respective panels, the first and second plug projections 19, 20 being received in the respective panel grooves 13, 14.

Disposed adjacent to one face of the joint opening are a pair of first and second front arm projections 28, 29 spaced apart from each other and carried by the first and second members 17, 18 along their respective front longitudinal edges. In turn, disposed adjacent to the opposite face of the joint opening are a pair of first and second rear arm projections 30, 31 spaced apart from each other and carried by the first and second members 17, 18 along their respective rear longitudinal edges. Each of such four arm projections 28, 29, 30, 31 has a substantially C-shaped transverse cross section so as to provide a flanged recess 32, 33, 34, 35.

For airtight and sound insulating purposes, a pair of elongated front and rear sealing means 37, 38 are mounted between the opposed front arm projections 28, 29 and between the opposed rear arm projections 30, 31, respectively. These sealing means 37, 38 are carried by the front and rear arm projections 29, 31 on the second member 18, respectively, part of each sealing means being received in one of the recesses 33, 35. The recesses 32, 34 on the first member 17 open toward the recesses 33, 35 on the second member 18, respectively. The sealing means 37, 38 serve as, in

addition to the aforementioned purposes, an absorber for dimensional errors of factory-made wall components or panels upon installation.

Also shown in Figure 2 is a pair of elongate front and rear third members 39, 40. Each of these third members 39, 40 has a generally II-shaped transverse cross section defined by a base 41, 42 covering the joint opening on its one face and a pair of spaced legs 43, 44 and 45, 46 projecting perpendicularly from one side of the base and terminating in inwardly directed snap-locking flanges or lips 47, 47 and 48, 48, respectively. The legs 43, 44 hold the opposed front arm projections 28, 29 and the sealing means 37 therebetween, the snap-locking flanges 47, 47 being in locking engagement with such front arm projections 28, 29 on their respective inner ends, as viewed in transverse cross section. Thus, the front arm projections 28, 29 are secured to each other through the sealing means 37. In the same manner, the rear arm projections 30, 31 are secured to each other through the sealing means 38. The front and rear third members 39, 40 are also made of a relatively rigid and slightly resilient material, such as extruded aluminium. The sealing means 37, 38 are made of a flexible and resilient material, such as rubber, synthetic resin or the like.

For assembly, the two panels 11A, 11B are first provided to which the first and second members 17, 18 are applied, respectively, the first and second plug projections 19, 20 being fitted in and along the respective panel grooves 13, 14. Then, the first and second members 17, 18 are secured to the respective panels 11A, 11B by the fastening screws 26, 27. The panels are then positioned edge to edge in alignment with each other, the front and rear third members 39, 40 are applied to the joint opening on and along opposite faces, and move toward each other, in the directions perpendicular to the panel faces, with a relatively great force, until the snap-locking flanges 47, 47 and 48, 48 come into locking engagement with the arm projections 28, 29 and 30, 31 on their respective inner ends, as viewed in transverse cross section. The two sealing means 37, 38 have been mounted along one of the recesses 33, 35 and one of the recesses 32, 34, respectively, at anytime before the panels have been positioned edge to edge. Thus, the pair of opposed front arm projections 28, 29 and the sealing means 37 are held together by the front third member 39 between the pair of legs 43, 44; the pair of opposed rear arm projections 30, 31 and the sealing means 38 are held together by the rear third member 40 between the pair of legs 45, 46. As a result, the two panels 11A, 11B are securely connected to each other.

If the panels 11A, 11B thus jointed are

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5 moved toward each other, with a relatively great force, against resilient forces of the sealing means 37, 38, both front and rear first members 39, 40 can be removed from the first and second members 17, 18 in the directions perpendicular to the panel faces, thereby permitting either one or both panels to be removed for replacement.

10 Figure 3 illustrates a modification of the connector assembly 12 described above with reference to Figure 2. This modified connector assembly is designated by 12' as a whole, and has a construction similar to that of Figure 2 except for the first and second plug projections 19, 20. A pair of modified first and second members are designated by 17' and 18', respectively. Accordingly, the description of the other parts made with reference to Figure 2 will be applied here, and for this purpose, like reference numerals refer to like parts throughout Figures 2 and 3.

25 In substitution for each of the first and second plug projections 18, 19 of Figure 2, there are provided a pair of modified first and second plug means 49, 50. Each of the modified first and second plug means 49, 50 has a substantially U-shaped transverse cross section defined by a base portion 51, 52 constituting a part of one of the modified first and second members 17', 18' and a pair of spaced arcuate side walls 53, 53 and 54, 54 projecting substantially perpendicularly from one side of the base portion 51, 52 into one of the panel grooves 13, 14. Each of such four arcuate side walls 53, 53 and 54, 54 has a corrugation 55, 55 and 56, 56 extending longitudinally on and along its contacting exterior surfaces, such two pairs of corrugations 55, 55 and 56, 56 engaging interior side walls of the panel grooves 13, 14, respectively, thereby causing the modified first and second plug means 19', 20' to be firmly fitted in the respective panel grooves 13, 14. Thus, the two adjacent panels 11A, 11B are secured to each other.

45 For securing the modified first and second members 17', 18' to the respective panels 11A, 11B, it is sufficient if each of the modified first and second members 17', 18' is applied to one of the panels and moved toward the same, in the direction parallel to the panel faces, with a relatively great force, so that each pair of the opposed arcuate side walls 53, 53 and 54, 54 are fitted into one of the panel grooves 13, 14.

WHAT WE CLAIM IS:-

60 1. A panel connector comprising a pair of first elongate members each having elongate plug means extending therefrom for securement in edge grooves of panels to be connected and a pair of elongate flanges oppositely extending laterally of the direction of the plug means at one end thereof, a pair of elongate second members each

having a face for engagement with adjacent faces of panels to be connected and means for retentive engagement with oppositely disposed flanges of the first elongate members, so as to secure the first elongate members together and a pair of elongate sealing means disposed between the oppositely disposed flanges of the first members and carried by one flange of the oppositely disposed flanges.

2. A connector according to Claim 1 wherein each flange of the oppositely disposed flanges has a recess extending longitudinally on and along one side thereof.

3. A connector according to Claim 1 or 2 wherein each of the second members having a generally II-shaped transverse cross section defined by a base covering the joint opening on its one face and a pair of spaced legs projecting perpendicularly from one side of said base and terminating in inwardly directed snap-locking flanges, each pair of oppositely disposed flanges of the first members being disposed between the pair of legs of one of the second members.

4. A connector according to any preceding claim, wherein each of the plug means has a substantially U-shaped transverse cross section defined by a pair of spaced side walls projecting perpendicularly from one side of the associated first member and terminating in a top wall extending between side walls, each of such two top walls having at least one through hole through which at least one fastening screw extends into one of the panels.

5. A connector assembly according to any one of Claims 1 to 3, wherein each of the plug means includes a pair of spaced arcuate walls projecting substantially perpendicularly from one side of the associated first member, each of the arcuate walls having a corrugation extending longitudinally on and along its contacting exterior surface to retain the plug means firmly in the respective panel grooves.

6. A connector assembly substantially as herein described with reference to the drawings.

For the Applicants,
J.F. WILLIAMS & CO,
Chartered Patent Agents,
34 Tavistock Street,
London WC2A 1 AY.

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75 2. A connector according to Claim 1 wherein each flange of the oppositely disposed flanges has a recess extending longitudinally on and along one side thereof.

80 3. A connector according to Claim 1 or 2 wherein each of the second members having a generally II-shaped transverse cross section defined by a base covering the joint opening on its one face and a pair of spaced legs projecting perpendicularly from one side of said base and terminating in inwardly directed snap-locking flanges, each pair of oppositely disposed flanges of the first members being disposed between the pair of legs of one of the second members.

85 4. A connector according to any preceding claim, wherein each of the plug means has a substantially U-shaped transverse cross section defined by a pair of spaced side walls projecting perpendicularly from one side of the associated first member and terminating in a top wall extending between side walls, each of such two top walls having at least one through hole through which at least one fastening screw extends into one of the panels.

90 5. A connector assembly according to any one of Claims 1 to 3, wherein each of the plug means includes a pair of spaced arcuate walls projecting substantially perpendicularly from one side of the associated first member, each of the arcuate walls having a corrugation extending longitudinally on and along its contacting exterior surface to retain the plug means firmly in the respective panel grooves.

95 6. A connector assembly substantially as herein described with reference to the drawings.

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For the Applicants,
J.F. WILLIAMS & CO.
Chartered Patent Agents,
34 Tavistock Street,
London WC2A 1 AY.