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Ottosson

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[54] **CORNER JOINT FOR FRAME STRUCTURES**

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[52] **U.S. Cl.** ..... **52/758 H,** 52/656, 403/231, 52/400, 52/753 D, 52/753 F

[51] **Int. Cl.** **F16b 7/18**

[58] **Field of Search** 287/20.92 F, 20.92 D, 20.92 C; 52/399, 400, 402, 403, 656, 758 H, 397, 455, 456; 403/231, 254, 255, 257, 258, 260, 264, 382

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[57] **ABSTRACT**

A window or door construction having a rectangular frame constructed of frame members of identical cross sectional shape. Each of the frame members has a central bar portion sandwiched between two side bar portions. The side bar portions extend inwardly of the frame beyond the central opening channel bounded by the inner surface of the central bar portion and opposed inner surfaces of the side bar portions. The frame members are joined at right angles to one another at the corner of the frame. One of the joining members has end portions of the side bar portions recessed from the end of said central bar portion a distance equal to the central bar portion of the first member thereby projects beyond the ends of the recessed side bar portions as a tongue which is received with a close fit in the channel of the second of the two joining members. The end surfaces of the central bar portion and the side bar portions of the second member are flush with outer surfaces of the respective bar portions of the first member and the end surfaces of the side bar portions of the first member abut the inner edges of the respective side bar portions of the second member. The tongue portion of the first member has a longitudinally extending hole therein and an end portion of the central bar portion of said second portion has a transverse hole aligned therewith. A panel having marginal edge portions is received in the channels of the frame members fastening means in the aligned holes releasably secure the frame members together at the corners of the frame and thereby removably hold the panel in the frame.

7 Claims, 3 Drawing Figures

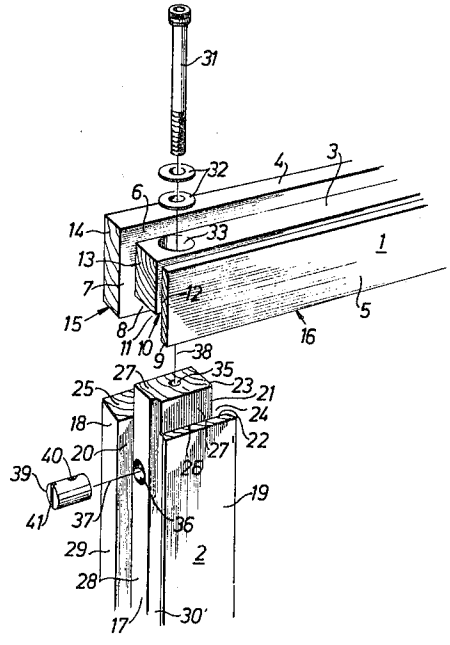

Fig.1

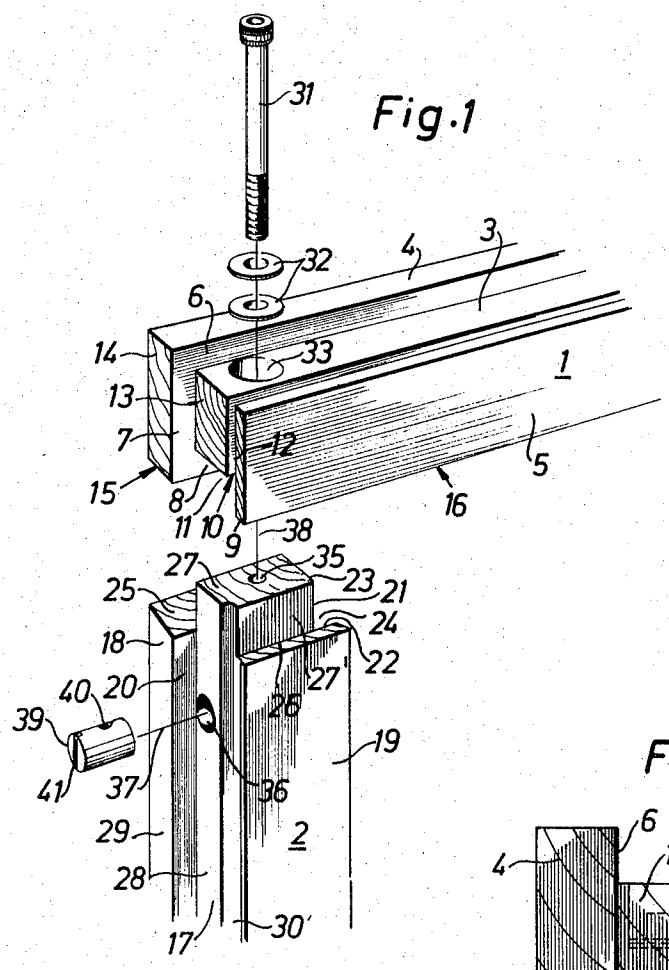
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Fig.2

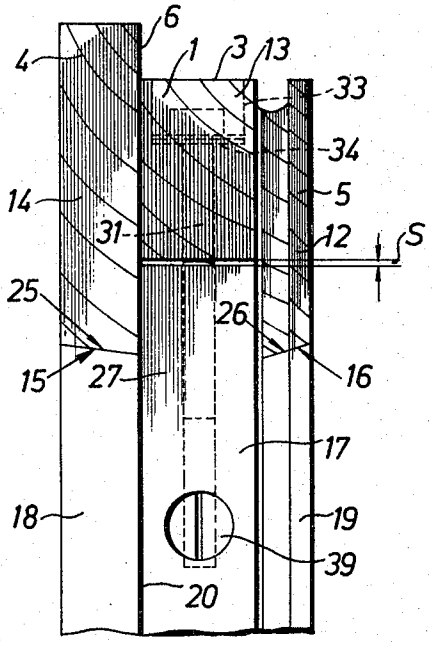
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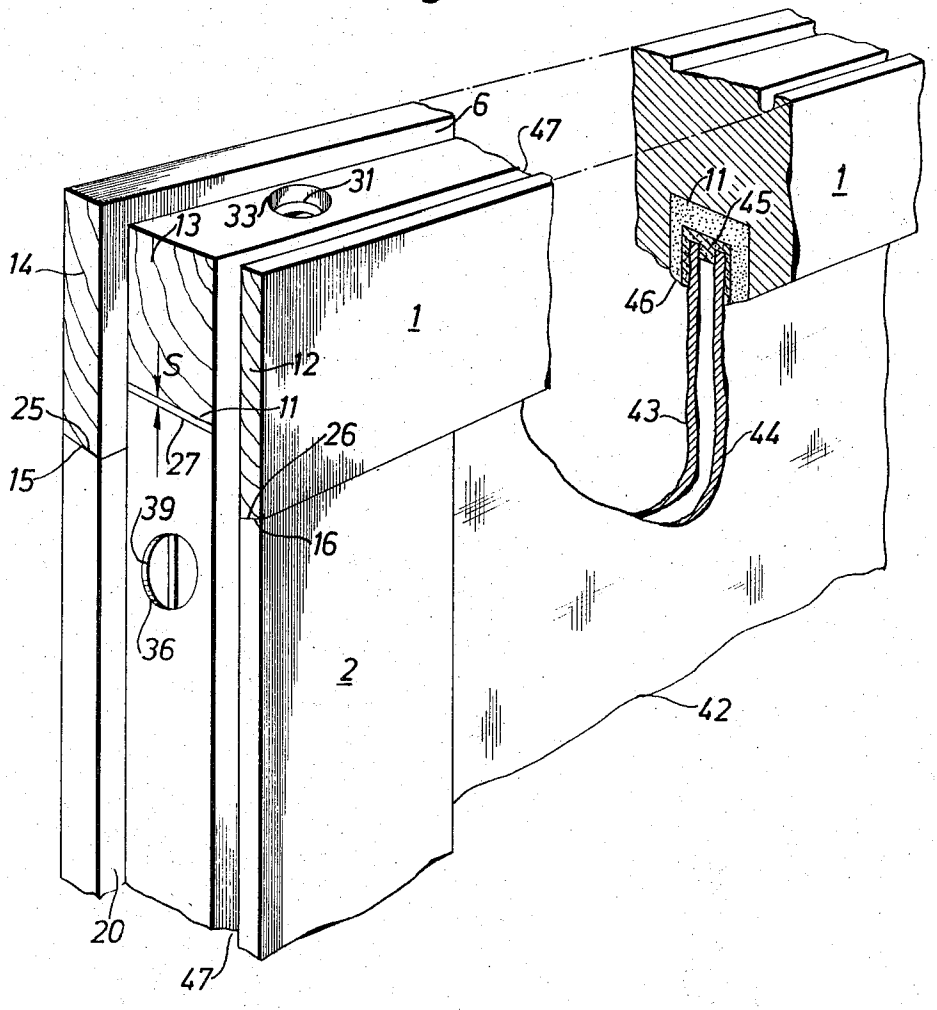
Fig. 3



CORNER JOINT FOR FRAME STRUCTURES

The present invention refers to a corner joint for frame structures.

A large number of different corner joints for frame structures in general, e.g. for windows, casements, sashes and the like are known to the art. With the most common of these frame structures, the frame members are provided with tightly fitting pegs and recesses and are intended to be brought together in a manner such that the pegs fit firmly into their respective recesses, whereafter the joint is secured by nailing or by driving wooden plugs into specially prepared holes or the like. In the case of frame structures for casements, sashes, etc., it is also usual to strengthen the joint still further by means of an angular fitting normally made of iron, which is screwed securely to one side of the joint.

Owing to the manner in which they are made, joints of this type cannot be taken apart. Neither has it been particularly necessary in earlier cases to dismantle a joint once it has been made. The profiled bars, for example, for a window frame, have been provided with longitudinally extending recesses for receiving the panes of glass, which have been secured in position by pins and thereafter tightened and sealed with putty, the term window frame being used here to define the frame structure of the casement or the sash window. With such an arrangement, it is a relatively simple task to remove a pane of glass without dismantling the window frame or disturbing it in any way. A corresponding method of assembly has been applied with glass doors, with which when used in domestic dwellings, etc., the putty has been normally replaced with a strip of material.

In recent times so-called insulating glass has become increasingly popular for window panes and outer doors. This type of window glass comprises a laminate construction with two or three panes which are held at a suitable distance apart by means of special metal edge frames, for example made from aluminium. The distance between the panes of glass may, for example, be 10 mm and the edge frames are provided with grooves in which the glass panes are inserted in a manner such that the interspace between the panes of glass is hermetically sealed. This means that a seal must be made along the edges of the panes against the edge frame. A window of this type has substantially improved heat insulating properties and dust or dirt is unable to penetrate between the glass. The construction has therefore become widely used.

With the arrival of this type of window glass problems associated with the construction of the frames have arisen. As a result of its design, the insulating glass window is unavoidably dependent on careful handling. The seal between the edges of the glass panes and the edge strip must not be damaged and the construction must be considered a fragile one. Consequently, great importance must be placed on the construction of the frame. Frame structures which are particularly adapted for insulating glass windows are not commercially available but that frames and corner joints for such windows are produced in the conventional manner.

This means that the frames cannot be dismantled and when it is necessary to replace an insulating glass window extra work and additional costs are required, which would otherwise be unnecessary if the frame could be dismantled in a relatively simple manner to

enable the old pane of glass or remains thereof to be removed and a replacement inserted.

The object of the present invention is to obviate the aforementioned difficulties and to provide a corner joint which is particularly suited for window frames intended for insulation glass.

Thus, the present invention relates to a corner joint for frame structures intended, for example, for window frames, glass door frames and the like, including a first frame member having a recess provided therein and a second frame member provided with a peg located on said member to coincide with the recess on the first frame member in a manner such that when assembling the frame members the pin can be inserted into the recess, the invention being characterized by the fact that the first frame member and the second frame member are produced from the same blank profiled in a manner such that a longitudinally extending channel and two long edges are produced on the side of the frame members directed inwardly of the frame to be produced, the channel at the joint end forming the recess in the first frame member, and that the peg of the second frame member is produced by removing material on both sides of and up to a centre bar the width of the centre bar being equal to the width of the channel and in that a screw or clamp joint is provided for holding the frame members into a joint.

The invention will now be described with reference to an embodiment thereof illustrated in the accompanying drawings, in which

FIG. 1 is an exploded perspective view of a corner joint according to the invention,

FIG. 2 is an end view of the corner joint of FIG. 1 shown in assembled condition, and

FIG. 3 illustrates in perspective and enlarged scale the corner joint of FIG. 1, the Figure also showing an upper frame member and how a window pane provided with a sealing strip is fitted.

The examplary corner joint comprises a horizontal frame member **1** and a vertical frame member **2**, both of which may be made from profiled wood or metal, for example aluminium. In the latter case the frame members may suitably be made of extruded aluminium sections or suitably profiled sheet metal bars or welded constructions. The choice of material is not important to the application of the concept of the present invention.

Each frame member has an identical profile. Thus, the frame member **1** is provided with a centre bar **3** which defines on either side thereof ribs **4** or **5**. The rib **4** is formed so that it projects beyond the centre bar **3** on all sides thereof and forms flank surfaces **6, 7** and **8**. The rib **5** is also formed to provide an inwardly projecting flank surface **9**. The flank surfaces **8** and **9** together with a surface **10** of the centre bar **3** form a channel **11**. The end surface **12** of the rib **5** lies in plane with the end surface **13** of the centre bar **3** while the end surface **14** of the rib **4** lies beyond the plane of the surfaces **12** and **13**. The long edges **15, 16** of the edge ribs **4, 5** resp. defining the channel are chamfered outwardly.

The frame member **2** is constructed in a manner similar to that of the frame member **1**, i.e., is provided with a centre bar **17** provided on both sides thereof with ribs **18, 19**. As with the rib **4**, the rib **18** is wider than the centre bar **17** and forms flank surfaces **20** and **21** on either side of the centre bar. The rib **19** is provided with

a flank surface 22 and the flank surfaces 22 and 21 together with the surface 23 of the centre bar form a channel 24, similiar to the channel 13 in the frame member 1. The end surfaces 25, 26 of the ribs 18, 19 resp. are located slightly within the end surface 27 of the centre bar 17. The end surfaces 25 and 26 are chamfered for connection to the chamfered surfaces 15 and 16 on the frame member 1. As a result of the afore described arrangement with respect to the frame member 2, a tongue 27' is formed by the outwardly projecting end of the centre bar 17.

When assembling the frame members, the tongue 27' is inserted between the surfaces 8 and 9 of the ribs 4 and 5, i.e., in the channel 11. In this way, the end surface 13 is brought into plane with the outer surface 28 of the centre bar 17 and the chamfered surfaces 15, 16 and 25, 26 abut each other. Naturally, the rib 4 is adapted so that the end surface 14 comes in plane with the outer surface 29 of the rib 18 and the outer surface 12 of the rib 5 comes in plane with the outer surface 30 on the rib 19. The extension of the tongue 27' is adjusted to leave a small clearance between the surface 10 of the centre bar 3 and the end surface 27 of the centre bar 17. As will be seen from the drawing, when assembling four of frame members to form a complete frame structure, a circumferentially extending channel is obtained, formed by the channels 11 and 24, in which channel the insulating glass can be inserted with an appropriating agent, such as rubber, foam plastic or the like. It should be noted that when assembling the frame members 1 and 2 automatic alignment is obtained of the frame members at a 90° angle in relation to each other by means of the configuration of the chamfered surfaces 15, 16 and 25, 26.

For the purpose of securing the joint there is arranged a screw 31 having two washers 32. A countersunk hole 33 is drilled in the centre bar 3 in a manner such that the washers 32 and the head of the screw are accommodated in the countersink. Thus, the washers 32 will rest against an abutment surface 34 in the countersunk hole. As aforementioned the countersink should have a depth which will permit the head of the screw 31 to be completely accommodated therein.

A hole 35 is also provided in the upper surface 27 of the tongue 27' for the screw 31. The position of the hole 35 in the tongue 27' is such that when the tongue is in position in the channel 11 the hole 35 is in register with the hole 33.

A third hole 36 of larger diameter than the holes 33 and 35 is drilled transversally of the longitudinal direction of the centre bar 17 preferably perpendicular to the hole 35 at a certain distance from the upper surface 27 of the tongue 27' and in a position such that a centre axis 37 of the hole 36 intersects a centre axis 38, common to the holes 33 and 35. Arranged in the hole 36 is a preferably cylindrical member 39 which is provided with a threaded hole 40 extending diametrically through the member 39, the thread of the hole being adapted to the thread on the screw 31. The member 39 is also provided with a driver slot 41 to facilitate alignment of the screw threaded hole 40 relative to the screw 31.

The frame structure is assembled in the following manner.

The two frame members 1 and 2 are brought into a position relative to each other such that the edges on the tongue 27' enter the edge surfaces of the channel 11. The tongue 27' is then inserted into the channel 11. The measurements of the tongue 27' and the channel 11 are so adapted with respect to each other that the tongue can be inserted in the channel with a push fit or a light force fit. The screw 31 with the washers 32 is then inserted in position in the hole 33 and the hole 35 and pushed partially down into the hole 35. The threaded member 39 is then inserted into the hole 36, the depth of which is adjusted so that the threaded hole 40 will lie coaxially with the centre line 38 of the holes 33 and 35. By using a suitable tool inserted in the slot 41 the member 39 can then be readily turned until the threaded hole 40 is able to engage the thread of the screw 31 correctly. The screw 31 is then moved down the hole 35 until its threaded portion is picked up by the threaded hole 40 whereafter the screw is tightened. As previously mentioned, the tightening force applied by the screw will act on the surfaces 15 and 25 and 16 and 26 in a manner to provide a strong and stable joint.

When dismantling the frame, it is only necessary to unscrew the screw 31 in order to release the joint. The member 39 may remain in the hole 36 ready for reassembling of the frame.

FIG. 3 further illustrates, in perspective and partially in section, the corner joint of the present invention, mainly for the purpose of illustrating one of its applications, namely a window frame. The same reference numerals as those used in FIGS. 1 and 2 are used with the embodiment illustrated in FIG. 3. The frame members 1 and 2 form a portion of the frame of a window holding a panel shown as a window pane 42. The window pane 42 of the exemplary embodiment has two panes of glass 43, 44 and a profiled strip 45 extending circumferentially around the edges of the panes to hold them together. The pane 42 with the profiled strip 45 is fitted in the channel 11 on the frame member 1 and in the channel 24 (not shown in FIG. 2) in the frame member 2, and in corresponding channels on two other frame members (not shown), which frame members may be arranged parallel with the frame member 1 and 2 resp. As an intermediate portion between the profiled strip 45 on the pane 42 is arranged a sealing strip 46 of rubber, plastic or similar elastic material for example. The strip 46 surrounds the profiled strip 45 in a manner to prevent it coming into direct contact with the sides of the channel 11. In this way deformations which the completed frame structure with window glass mounted therein may be subjected to are not directly transferred to the window pane 42, but instead are elastically equalized, and a satisfactory and reliable seal is obtained between the window pane 42 and resp. frame members.

An outer channel 47 shown in FIG. 3 but not previously described is arranged in the frame members 1 and 2. The channel 47 is intended to receive a further sealing strip (not shown) located between the structure of holding the window glass and the window frame located in the window opening and intended for the said frame structure.

As previously mentioned, it is suitable in practice to insert into the channels 11 and 24 insulating material, such as rubber, plastics, foam plastic and the like, prior to mounting the insulating glass. The insulating glass cannot be placed in position in the frame or removed therefrom unless the frame is dismantled at, at least two corners. It will be understood from the aforegoing that

the frame structure of the present invention can be dismantled relatively easily.

As previously mentioned, the two frame members 1 and 2 have the same cross sectional configuration. This means that all frame members can be produced from one and the same profiled strip or rod material. Thus, it is only necessary to cut the material into correct lengths and work the ends of the cut portions. This in turn opens the possibilities for a particularly expedient and inexpensive manufacturing process.

Since the frame members can be assembled into complete frame structures in an extremely simple manner at the place where they are to be used by means of a simple tool, the frame members and necessary appurtenances can be delivered as readily packed and readily transport substantially standardised parts, which also contributes towards lowering the cost thereof.

What I claim is:

1. A window or door construction comprising a rectangular frame defined by frame members of identical cross sectional shape, each of said frame members comprising a central bar portion sandwiched between two side bar portions, said side bar portions extending inwardly of said frame beyond said central bar portion so as to form a longitudinally extending inwardly opening channel defined by the inner surface of said central bar portion and the opposed inner surfaces of said side bar portions, at least two said frame members being joined at right angles to one another at the corner of said frame, a first one of said joining members having end portions of said side bar portions recessed from the end of said central bar portion a distance equal to the depth of said channel, the end portion of said central bar portion of said first member thereby projecting beyond the ends of said recessed side bar portions as a tongue which is received with a close fit in said channel of the second of said two joining members, end surfaces of said central bar portion and side bar portions of said second member being flush with outer surfaces of the respective bar portions of said first member and end surfaces of said side bar portions of said first member abutting inner edges of respective side bar portions of said second member, said tongue portion of said first member having a longitudinally extending hole therein and an end portion of said central bar portion of said second portion having a transverse hole aligned therewith, a panel having marginal edge portions received in said channels of said frame members, and fastening means in said aligned holes releasably securing said frame members together at the corners of said frame and thereby removably holding said panel in said frame.

2. A construction according to claim 1, in which one said side bar portion of each of said frame members projects outwardly of said frame beyond the respective central bar portion so as to form an outwardly projecting peripheral flange.

3. A construction according to claim 1, in which, the edges of said side bar portions inwardly of said frame of each of said frame members are bevelled and in which end surfaces of respective side bar portions of said first members at said corner joint are correspondingly bevelled to abut and fit end portions of side bar portions of said second member.

4. A construction according to claim 1, in which elastic material of U-shaped cross section is received in said channel of the frame and the margined edge portion of said panel is received in said elastic material, whereby said panel is cushioned against any flexing of said frame.

5. A construction according to claim 1, in which said central bar portion of said first member at said corner joint has a cylindrical recess intersecting said hole in said tongue and of larger diameter than said hole, and in which said fastening means comprises a cylindrical member received in said recess and having a threaded hole aligned with said aligned holes and a bolt extending through said aligned holes and screwed into said threaded hole.

6. A construction according to claim 5, in which said cylindrical member has a screwdriver slot in its outer end for rotating said cylindrical member to align said threaded hole with said aligned holes.

7. A construction according to claim 5, in which said recess extends inwardly from the outer surface of the central bar portion of said first member and has a depth equal to the length of said cylindrical member.

* * * * *