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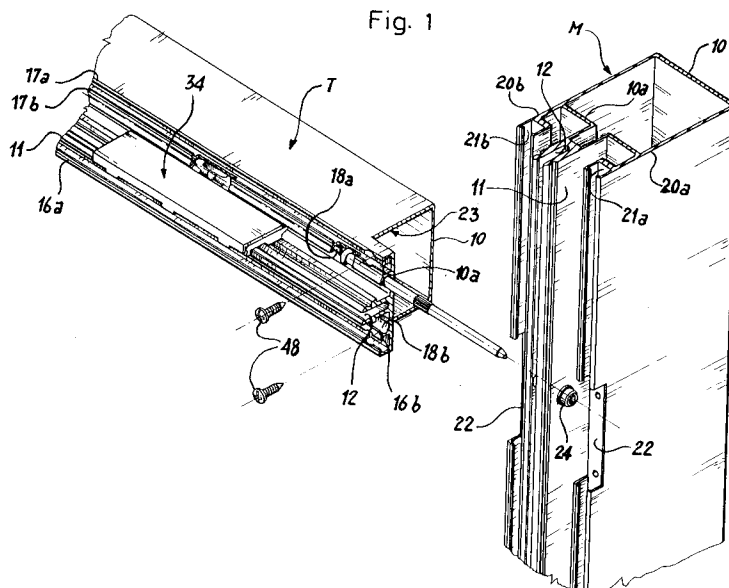
A sectional structure for erecting roof and wall frames.

The post (M) and rail (t) sections of a sectional structure for erecting frames have at least one longitudinal groove (18a) pre-arranged to receive slidably and retain therein in mating engagement either or both of the following accessory items:

a fastening pin (29) provided with an enlarged diameter (30) adapted to be force fitted through a

bush (24) driven into the corresponding post section (M) whereto the rail section (T) carrying the pin (29) is coupled; and

a bead (35) whereby a bracket member (34), arranged to support curtain walls (P) on said sections, is bonded in a loss-preventing fashion to the corresponding section.



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This invention relates to a sectional structure for erecting roof and wall frames according to the preamble of the main claim.

As is known, the installation of roofs and faces of the so-called "flush" type involves the erection of a latticework which is usually comprised of aluminum alloy sections and intended to provide support for curtain walls mainly composed of glazed panels.

An example of such a structure is disclosed in European Patent No. 162227.

A prerequisite of the design, manufacture, and assembly of structures of this type, is that the various components of the structure be delivered to the job site as much as possible in a pre-assembled condition complete with all the accessory items needed both to connect the post and rail sections together and to implace the glazed curtain walls.

Extensive pre-fabrication and pre-assembly techniques can lower the structure erection times as well as many of the problems which typify the installation process, while improving the quality of the end product.

For instance, it has been known to fit, at the workshop stage, the ends of the rail sections with special quick-connect couplers for attachment to the post sections. A typical example of this technology is disclosed in European Patent No. 334080. Such couplers, while serving their function at the assembly stage, still have a disadvantage in their comparatively complicated, and hence expensive, construction. A simpler design juncture is disclosed in published French Patent Application No. 2,517,730. This document shows the use of dowels which are received in slots of the rail sections. However, no directions are given as to how such dowels can be secured on the post sections to form the desired juncture. Even in the assumption that the dowels are to be driven through corresponding holes in the post sections, there are no provisions for securing the junctures, e.g. preventing the dowels from coming out of the holes or the slots after the assembly has been completed.

Assembly problems also arise in the arrangement of the bracket members intended to support the glazed panels on the latticework at their designed positions. It is found that these members are connected to the latticework sections by the installer in a general way, and then positioned at specific distances according to specifications. Frequently, a resilient lining is also provided between the bracket member and the glazed panel resting on it for cushioning, purposes, in order to avoid chipping the glazed panel during the installation.

This known technology is the cause of a number of problems. For instance errors may occur in the bracket member positioning whereby the dis-

tance between two supports and/or the distance of the supports from the latticework sections would depart from its designed value.

Further, some of the bracket members may incidentally come loose during application and be dropped to ground; the occurrence, always annoying, may cause delay where the installer has forgotten to carry along, up the latticework, some spare bracket members, just in case. And it may happen that, for a similar reason or by oversight, the resilient lining be omitted. In this case the installed panel may show out of plane and/or be chipped.

The underlying technical problem of this invention is to provide a sectional structure designed to admit extensive pre-assembly of its components at the workshop and to overcome the drawbacks with which the cited prior art is beset.

This problem is solved according to the invention by a sectional structure as claimed in Claim 1.

The subclaims cover preferred embodiments of the invention, to be described in detail with reference to an exemplary embodiment thereof, shown by way of example and not of limitation in the accompanying drawings, in which:

Figure 1 is an exploded perspective view of a junction node between a rail section and a post section in a sectional structure according to the invention;

Figure 2 is a sectional detail view, taken through a rail section, of this structure as incorporating glazed panels;

Figure 3 is an exploded perspective view of a detail of the structure shown in the preceding Figures;

Figure 4 is a longitudinal section view of an assembled junction node in the structure of this invention; and

Figure 5 is an enlarged sectional view of a detail of Figure 4.

With reference to the drawing views, a sectional structure for erecting roof and face skeletons, according to the invention, comprises post sections M and rail sections T, both conventional in construction, which are pre-arranged for mutual connection at junction nodes substantially at right angles into a skeleton to which curtain walls P, e.g. glazed panels of the so-called "chamber pane" type, are then mounted.

The post sections M and the rail sections T, also referred to as posts and rails hereinafter for simplicity, include each a tubular body 10 having a wall 10a provided with a central rib 11 apertured lengthwise as at 12. The slot 12 forms a seat for threading in a screw 13 to clamp the panel P between the corresponding section M, T and a covering profile 14 on which a cap 14a is snap fitted. A spacer 15 is placed between the rib 11

and the profile 14.

From the wall 10a of the rail sections T there extend two parallel wing pairs 16a,b and 17a,b which lie along either sides of the central rib 11 and define corresponding channel-shaped sockets for respective seals 18. Formed along the wings 16b, 17b to face the rib 11 is a respective longitudinal groove 18a,b having a cylindrical skirt and being formed with an axial slot 19 whose circumferential extent is smaller than the groove diameter. Thus, a cylindrical object slid into the groove 18a,b and having an outside diameter that matches the groove inside diameter, but for the necessary clearance to afford a sliding fit, is retained in a radial direction but allowed to slide in the groove along an axial direction.

From the wall 10a of the post sections M there extend two more parallel wings 20a,b, each having, at the remote end thereof from said wall 10a, a respective channel-shaped formation 21a,b which constitutes a socket for a seal (not shown). The side walls of this channel-shaped formation are removed at the location of a junction node of a rail section T to leave a cutout 22 adapted to receive a corresponding butt 23 on the rail section T. At the location of said junction node, an adapter bush 24 is set in a transverse hole 25 through the central rib 11 of the post section 18a. The bush 24 is formed with a shoulder 26 on its exterior through which it abuts against the rib 11, and has a part of its outer skirt knurled as at 27 for easier driving into the hole 25.

On its interior, it has a slightly reduced diameter at a middle location which defines an annular ridge 28.

This bush 24 co-operates with a pin 29 being a sliding fit in the groove 19a of a rail T to secure said rail on the post section M. Should the pin 29 be fitted into the groove 18b by assembly mistake, the required positioning can still be achieved by a 180° turn of the section T. Likewise, said bush enables two rails T, aligned to the same axis and extending from opposite sides of a post section M as shown in Figure 4, to be fastened to each other and to said post section.

The pin 29 has an enlarged diameter 30 at a middle location thereon, which is formed by local deformation through knurl impressions in its skirt, and has at an axial end thereof a groove 31 accommodating an elastically shrinkable ring 32, such as a rubber ring having a diameter dimension selected to interfere elastically with the groove 18a, adapted to function as a loss-preventing means by holding the pin 29 to the rail section T while the latter is being handled.

The structure of this invention also comprises bracket members, generally designated 34, each provided with a bead 35 whereby they are engaged

in the same groove 18a which receives the pins 29. The diameter of the bead 35 is greater than the circumferential length of the slot 19 and such as to be caught and retained in said groove for an axial sliding movement.

Each member 34 comprises a metal alloy support 36 defining a generally rectangular bearing surface 37 with two portions 35a,b of the bead 35, separated by a passage 39, being attached to one of its long sides by respective linking arms 38. On the remote side from the surface 37, the support 36 has two raised formations 39a,b through which it can bear, when in the working position of Figure 2, on the central rib 11 and the spacer 15. A lip 40 is formed along the long side of the support 36 remote from the bead 35 at the location of the raised formation 39b.

Each bracket member 34 is completed by a lining 41 of a resilient plastics which includes a plate-like portion 42 overlying in use the bearing surface 37. First and second wings 43a,b extend in the same direction at the long sides of the plate-like portion 42. The wing 43b has a plurality of teeth 43c or other snap fastening means to the lip 40 of the support 36. The wing 43a locates at the passage 39 and is received between the arms 38 of the bead portions 35a,b. The lining 41 further comprises, located at the wing 43a, a respective third portion 44 of the bead 35. With the lining 41 mounted to its respective support, the third portion 44 fits interlockingly in the passage 39 to re-establish the bead 35 continuity and hold the lining 41 securely to the support. This bond, being further enhanced by the snap engagement of the teeth 43c and the mating engagement of the wing 43a in the passage 39, prevents incidental separation of the resilient lining from the support and further ensures, therefore, that the lining be properly fitted at the structure erecting stage.

Notice that the third portion of the bead 44 is made elastically shrinkable in a radial direction at its middle portion by the provision of a radially throughgoing aperture 45 in the form of an elongate slot in the axial direction. This portion 44 also has a radial enlargement 46 at the middle portion of the slot 45. By these expedients, a limited interference of the radial enlargement 46 in the groove 18a can be provided, whereby detachment and loss of the bracket member from its rail section T can be effectively prevented.

With the sectional structure of this invention, a skeleton for roofing and facing is erected as follows.

The post sections M are prepared at the workshop by providing it with the cutouts 22 at the designed locations and with the bushes 24 duly driven through the corresponding holes 25.

Likewise, the rail sections T are machined with suitable butts 23 and the bracket elements 34 fitted in the groove 18a as specified. Limitation to the sliding movement of such members 34 in the grooves 18a prevents them from being incidentally released during subsequent handling of the sections. This pre-assembly at the workshop is completed by inserting the pins 29 into the grooves 18a, where provided. The pins 29 are also held securely to the rail sections T.

These items are then taken to the job site where the skeleton will be erected. To this aim, the rail sections are associated as described with the post sections such that the pins 29 are aligned to their corresponding bushes 24. On completion of the desired positioning, the pin 29 is approached, on the side where it is received in the corresponding groove 18a, by its adjacent bracket member, and by hammering in the latter on the remote side from the pin, the latter is driven home to first engage the bush 24 and the corresponding groove 18a in the further rail section T to be fastened to the post section M, and then set in its eventual position with the knurled portion 30 force fitted in the annular ridge 28. The fastening of the rail sections to the post ones is improved by means of screws 48.

Notice that the pin 29, once driven through the bush 24, forms a spacer for proper positioning of the bracket members 34, it being sufficient that the latter be made to abut on the ends of the pin 29 jutting out of the bush 24.

Claims

1. A sectional structure for erecting roof and wall frames, comprising post sections (M) and rail sections (T) adapted to interfit, wherein the post sections and/or the rail sections have at least one longitudinal groove (18a), characterized in that said longitudinal groove (18a) is pre-arranged to slidably receive and retain in mating engagement relationship either or both of the following accessory items:
 - a fastening pin (29) having an enlarged diameter (30) to allow of force fit in a bush (24), said pin being inserted into the groove (18a) of a rail, or respectively post, section and said bush being driven through the corresponding post, respectively rail, section coupled thereto; and
 - a bead (35) whereby a bracket member (34) arranged to support curtain walls (P) on said sections is bonded in a loss-preventing fashion to the corresponding section.
2. A sectional structure according to Claim 1, wherein said enlarged diameter (30) is pro-

vided at a middle location on said fastening pin (29) such that said pin, when driven forcibly through said bush (24), will jut bilaterally out from said bush in readiness for engagement in the corresponding longitudinal grooves (18a) of two rail (T), respectively post (M), sections along a common axis.

3. A sectional structure according to either Claim 1 or 2, wherein said groove has a cylindrical skirt with a predetermined inside diameter and is formed with an axial slot (19) whose circumferential dimension is smaller than said inside diameter.
4. A sectional structure according to one or more of the preceding claims, wherein said pin carries knurl impressions at said enlarged diameter.
5. A sectional structure according to one or more of the preceding claims, wherein said pin is provided with a loss-preventing means (31,32) co-operating with the corresponding groove (18a) and through which it is retained axially in said groove.
6. A sectional structure according to Claim 5, wherein said loss-preventing means is an elastically shrinkable ring (32) fitted over said pin at the portion thereof inserted into the groove and interfering with the latter.
7. A sectional structure according to one or more of the preceding claims, wherein said bead (35) is provided with a loss-preventing means (44-46) co-operating with the corresponding groove and through which it is retained axially in said groove.
8. A sectional structure according to Claim 7, wherein said loss-preventing means comprises a portion (44) of said bead which is shrinkable radially and elastically from a position of interference with said groove.
9. A sectional structure according to one or more of the preceding claims, wherein said bracket member comprises a support (36) swivel and slidably connected to said section by having the bead (35) engaged in the groove (18a), a bearing surface (37) defined on the support, and a lining (41) applied to the support at least at the bearing surface, the radially and elastically shrinkable bead portion (44) being unitary with said lining and the remaining bead portion (35a,b) being unitary with the support.

10. A sectional structure according to Claim 9, wherein the bead portion made unitary with the support has a passage (39) at a middle location and the bead portion (44) made unitary with said lining is received in said passage to restore the bead (35) continuity. 5
11. A sectional structure according to Claim 10, wherein said bead portion made unitary with the lining interfits with said passage to retain said lining axially on said support. 10
12. A sectional structure according to one or more of Claims 8 to 11, wherein the bead portion made unitary with the lining is made shrinkable radially and elastically by the provision therein of a throughgoing radial slot (45) with an axially elongate shape. 15
13. A sectional structure according to Claim 12, wherein said bead portion made unitary with the lining has at least one radial enlargement (46) at the location of said slot (45). 20

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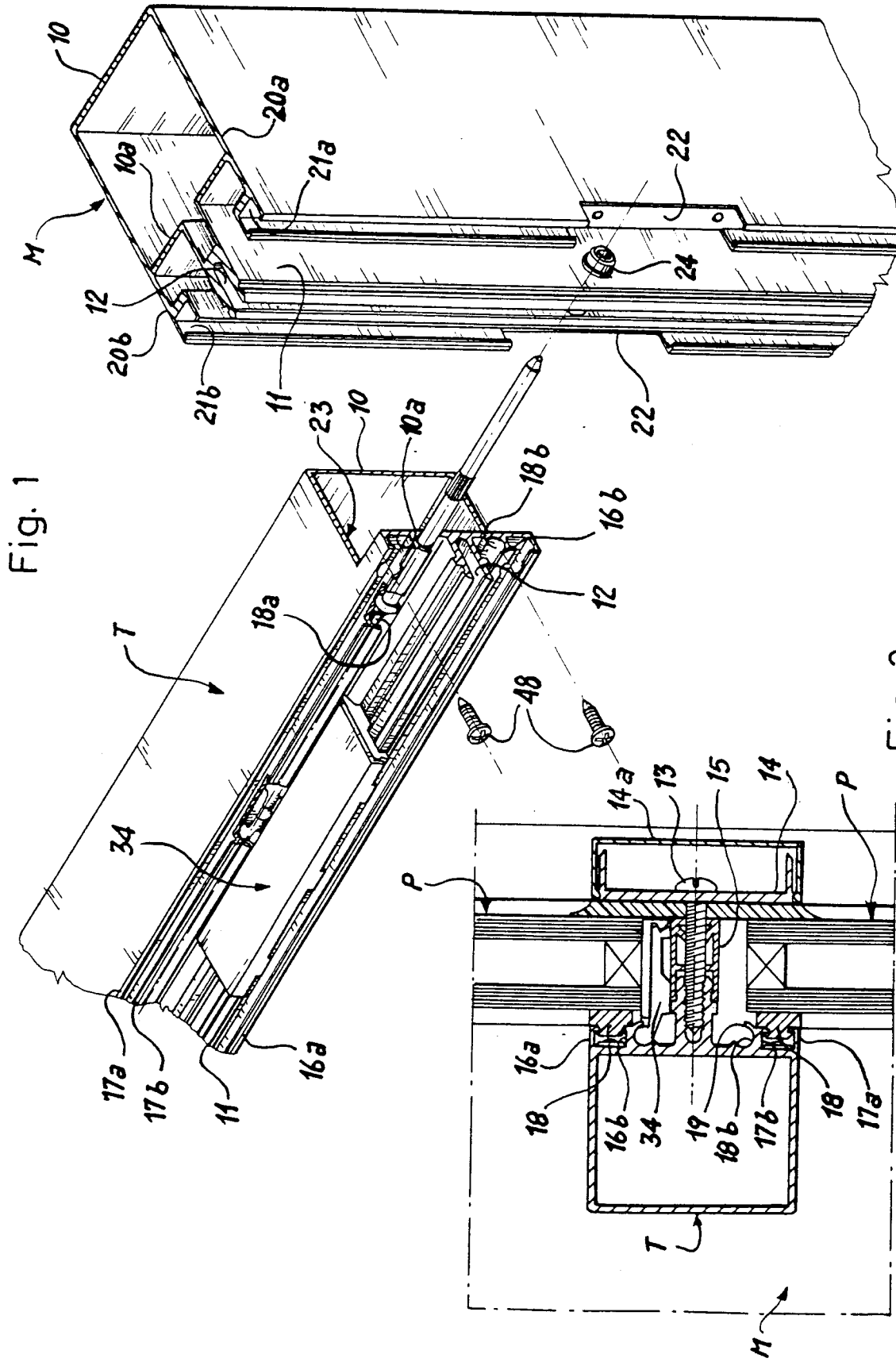


Fig. 1

Fig. 2



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	DE-A-3 419 104 (MÜHLE) * page 7, paragraph 2 - page 8, paragraph 1; figures * ---	1-4	E04B2/96 E06B3/54 E04D3/06
Y	DE-A-2 745 846 (B.V.KONINKLIJKE MAATSCHAPPIJ) * page 10, last paragraph - page 11, paragraph 1; figures * ---	1-4	
D,A	FR-A-2 517 730 (STRUCTAL TOURS) * page 1, line 21; figures * ---	1,3	
A	EP-A-0 221 480 (ELTREVA AG) * column 4, line 18 - line 47 * * column 5, line 14 - line 30; figures * ---	1,5	
A	DE-U-8 603 790 (MÜHLE) * page 4, last paragraph - page 5, paragraph 1 * * page 5, last paragraph - page 6, line 3; figures * ---	1,5	
A	GB-A-2 247 713 (REDDIPLX LTD.) * page 4, line 23 - line 26; figures * ---	1	
A	WO-A-9 112 390 (CONSTRUCTION UTILITIES GROUP LTD.) * page 4, paragraph 4 * * page 7, paragraph 2; figures 1-4,6 * -----	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 APRIL 1993	Examiner FORDHAM A.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	