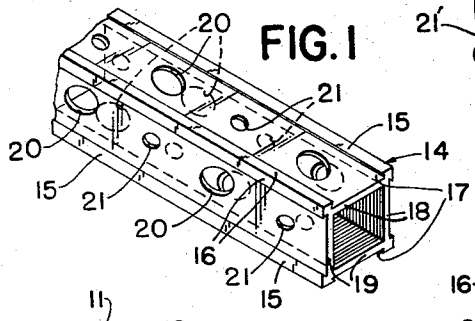
Dec. 20, 1966 L. F. HAGAN 3,292,323

EXTRUDED AND APERTURED CONSTRUCTION MEMBERS

Filed Oct. 23, 1965

FIG. 1



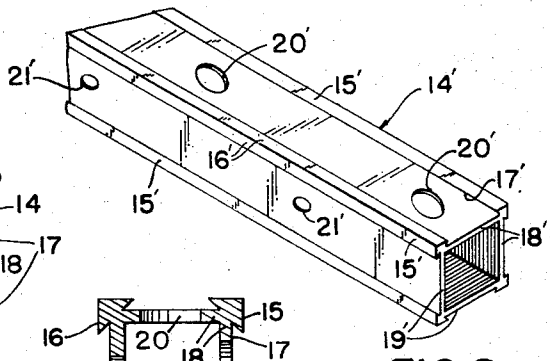


FIG. 8

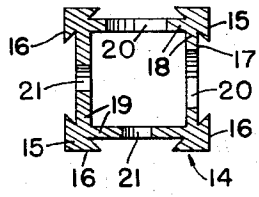


FIG. 2

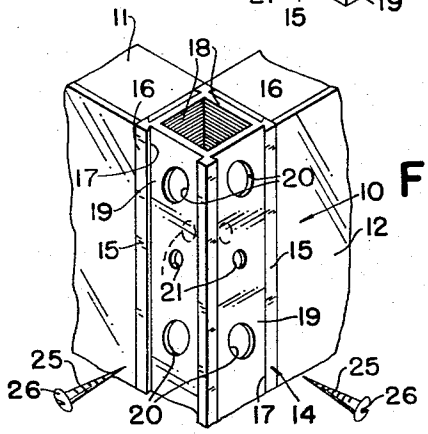


FIG. 3

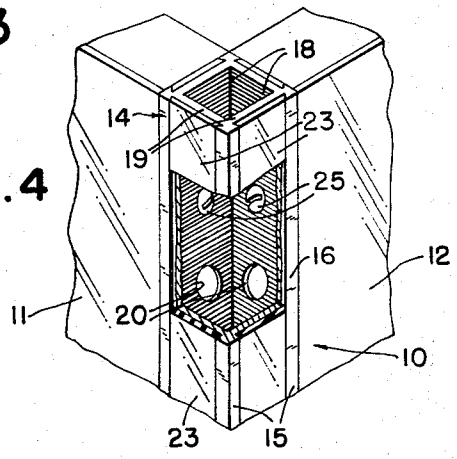


FIG. 4

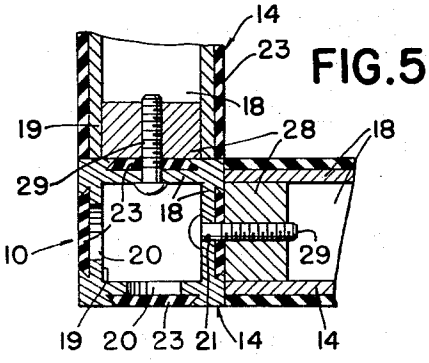


FIG. 5

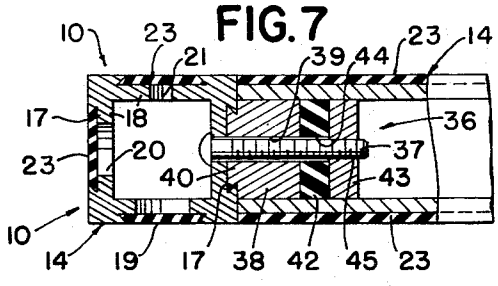


FIG. 7

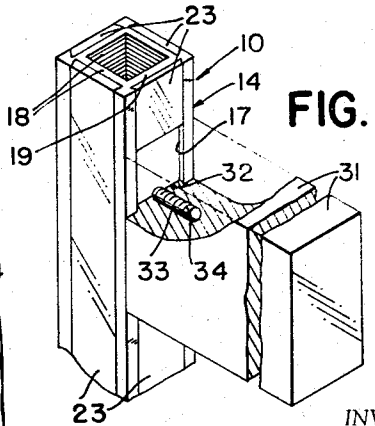


FIG. 6

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EXTRUDED AND APERTURED CONSTRUCTION MEMBERS

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15 Claims. (Cl. 52—127)

The present application is a continuation-in-part of my copending application, Serial No. 156,912, filed December 4, 1961 and now abandoned.

The invention relates to improvements in low cost extruded construction members such as may be employed in the production of a wide variety of furniture and related items requiring a rigid frame and/or partition structure and, in most instances, one which is also attractive in appearance.

It is an object of the invention to provide an improved construction member for this type of use which is basically constituted by a simple extruded hollow length of square of other polygonal, preferably balanced cross section and of any suitable metal lending itself to the extrusion process, which member has novel and improved securing provisions for readily and quickly fastening the same to other rigid panel or like components of a fabricated structure, furniture or otherwise. The construction member is completed by the dovetailing of finish strips, preferably flexible in nature, in place between exposed corners of the extrusion, which strips then effectively conceal the securing means of the member. However, in some applications such strips may be partially or wholly omitted, as in instances in which it is desired to make a direct dovetail tongue and groove connection between two parts, one of which is an extrusion.

A further object is to provide a construction member of this sort which is characterized by a hollow and rectangular, preferably square, cross section transversely of its length, with the walls thereof specially apertured for the purpose of securing such construction member to a coacting panel, or in some instances to another similar construction member disposed, for example, at a right angle to it. Specifically in accordance with the present improvement, the securing means will take the form of headed wood or machine screws; and for the purpose of receiving these screws, assuming that the hollow extrusion is square or rectangular in cross section, each pair of opposed walls thereof are provided with a number or series of circular apertures, with the apertures on one wall of said pair of larger size or diameter than aligned apertures on the opposite wall. Thus the larger size apertures or holes will freely receive the head of a bolt or screw inserted from the exterior, and the smaller size opposite hole will receive the shank of the securing element, with the head of the latter engaging the wall in question to secure the parts together.

More particularly in accordance with the invention, the series of holes in each of the opposed pairs of walls is such that the larger size and smaller size apertures alternate with one another along the length of the progression. Thus, the extrusion may be applied and secured to a panel or like part in a random manner, and without need for consideration as to which side shall be presented to an edge of a panel or the like; and the screws or fastening elements may be passed through the interior thereof from one exposed side or another, whether a 90° intersecting side or an opposed, parallel side, at random, inasmuch as both larger size and smaller size holes are exposed on either of such sides.

In an alternative embodiment, as disclosed in my application identified above the larger apertures are exclusively in one pair of 90° intersecting walls and the smaller apertures exclusively in the other pair of 90° intersecting walls and, more particularly, with the larger and smaller alternating at equal spacings along the length of the extrusion.

Further in accordance with the invention, in one adaptation thereof, it is contemplated that an extrusion of the character described may be mounted endwise, in 90° meeting relation to another extrusion, by the provision of a lead or other soft metal slug poured into and filling the engaging end of the first named extrusion. The metal bonds to the inner surface of the latter, and is then bored for a self-threading engagement by a headed machine screw, thus to clamp the extrusions fixedly in intersecting relation to one another.

In yet another aspect, the invention contemplates a direct dovetail union of two parts in side-by-side relation to one another, with securing elements applied through one thereof and into the body of another, which may be other than the extrusion of the invention.

A still further object is to provide a composite extrusion and finish strip type of construction member of the sort referred to, along with a second type of means to quickly and easily assemble the same directly to another similar member, for example a member disposed at 90°, such securing means taking the form of a plural-piece, expansion type of connector adapted to be expansively engaged with the interior of the 90° engaging member, and being manipulated from the exterior of the member which it engages.

Generally, it is an object of the invention to provide an extremely simple and inexpensive construction member or unit which enables its quick and easy utilization as a corner, partition, or like component of a wide variety of furniture or free-standing structural items; in which such furniture and like items can be readily assembled and dismantled for inexpensive packaging and shipment; and in which the provisions for assembly and dismantling involve the use of entirely standard screws, bolts, or the like which are fully concealed by outer finish strips which snap or slide readily into place to complete the construction member.

Another general object is to provide a construction unit as described which is extremely versatile as to its usage. For instance, it may be utilized in the production of modern equipment of high aesthetic quality by combining the unit with numerous types of wood and wood finishes, with which the unit may be matched or contrasted in appearance. The usage applies to numerous types of furniture having interior partitioning, and the like. Thus, the improved construction unit is well adapted, usually but not necessarily in association with exposed finish panels, for the production of domestic and office tables, desks, chests or wardrobes of various design, free-standing partitions, planters, partition-type or otherwise, and the like; and other possible applications will readily suggest themselves, for example, shelving.

The foregoing as well as other objects will become more apparent as this description proceeds, especially when considered in connection with the accompanying drawings illustrating the invention, wherein:

FIG. 1 is a fragmentary perspective view showing a portion of an elongated metal base extrusion of the improved construction member or unit;

FIG. 2 is a view in transverse section through such member or unit at 90° to the direction of its length, the section being at the transverse plane or level of a set of openings in the sides or walls of the extrusion;

FIG. 3 is a perspective view, exploded in nature, showing the mode of attachment of the unit to act as a corner or like component in association with wooden or like paneling engaged therewith;

FIG. 4 is a fragmentary perspective view, similar to FIG. 3 and partially broken away, illustrating another step in the completion of the unit as thus secured to the panels;

FIG. 5 is a fragmentary view in horizontal cross section through a completed assembly of a different type, showing one embodiment of means to secure a pair of the construction units together in 90° abutting relation to one another;

FIG. 6 is a fragmentary perspective view of another type of 90° abutting arrangement, in which one of the assembled parts is not a tubular extrusion and has a direct dovetail and screw connection to an extrusion unit;

FIG. 7 is a fragmentary view in horizontal section showing another type of assembly of similar extruded finish components relative to one another at a 90° angle, and not necessarily associated with coacting structural panel means; and

FIG. 8 is a fragmentary perspective view similar to FIG. 1, showing an alternative embodiment of the extrusion, as disclosed in my copending application identified above.

Referring to FIGS. 1 through 4, the improved construction unit is shown in FIGS. 3 and 4, being generally designated by the reference numeral **10**, as performing the function of a decorative corner post or frame part to which upright wooden panels **11**, **12** are secured in a 90° relationship to one another. The unit **10** essentially comprises a base extrusion **14** (FIGS. 1 and 2), preferably of aluminum, steel, or other extrudable material adapted to present an attractive finished appearance at exposed zones along its four corners.

The extrusion **14** is formed in a hollow cross section, preferably square for versatility, standardization of production and ready applicability to various functions and modes of connection including those suggested in FIGS. 1 through 4, and the three illustrative modifications depicted in FIGS. 5, 6 and 7, respectively. The section is such as to provide four corner zones **15** externally bordered by flat longitudinal surfaces **16** which intersect at a right angle; and the basic extrusion **14** is formed between each pair of corner formations **15** to provide elongated dovetail grooves or recesses **17** coextensive in length with the extruded part. The grooves **17** are of substantial transverse width, leaving the corner formations **15** to expose elongated metallic corner zones of only restricted transverse width, but equal in width at the intersecting surfaces **16**.

In accordance with the invention, and for a purpose to be described, respective opposed and parallel pairs of walls **18**, **19** of the thus formed extrusion length are pierced by punching, drilling or otherwise at spaced points along the length thereof to provide apertures therethrough. Of these, the series or succession includes, in each of the walls **18** which are in 90° relation to one another, a number of apertures or holes **20** which are of a relatively large diameter or area, whereas the opposed walls **19** are provided with holes **21** of smaller diameter or area, i.e., of a bore sufficient to receive the threaded shank only of a securing screw, bolt or the like, the larger size apertures **20** permitting the passage of the head of such securing member. The respective larger and smaller apertures **20** and **21** of a given set in a transverse plane are aligned with one another across the extrusion and these respective apertures alternate in equal spacing with one another along the longitudinal center line of each dovetail recess **17** (FIG. 1).

It will be seen that the alternating arrangement described enables interference of securing screws, as applied in a manner to be described, to be avoided; and it also significantly enables the extruded units to be applied to panels, connecting cross parts, etc., in a wide variety of relationships of the latter to one another, without exercising particular care as to the presentation and

orientation of the unit, as to its holes, in relation to such panels or parts.

The second component of the construction member or unit **10** takes the form of a plurality of finish strips **23** which are assembled to the base extrusion **14**. In some structures two of these strips will be finish-mounted on two 90° walls **18**, **19** of the extrusion prior to completion of the fabrication of the intended structure, and this is the case in regard to the structures of FIGS. 3, 4 and 5, in which these wall zones may at least in part be hidden. The strips **23** are preferably of a somewhat soft material having a readily flexible or elastic quality, such as polyethylene or various other available plastic materials; and are intended to be snapped or slid into place in the respective dovetail grooves **17** of the extrusion. They are of a finish surface appearance and textural quality, if other than perfectly smooth surfaced, to match or contrast with the surface quality of either or both of the panels **11**, **12** associated with the unit **10**.

The invention permits the sound and secure attachment of such unit to the panels **11**, **12** in a very expeditious and easy manner. Thus, with the strips **23** not yet assembled to the exposed walls of member **10**, the securing wood screws **25** (FIGS. 3 and 4) are passed through some if not all of the respective staggered larger-sized apertures **20**, these being disposed outwardly, and the screw shank is inserted through the respective aligned smaller apertures **21**, the screws being then taken up to engage the heads **26** thereof with the respective inner walls **18**. With the parts thus rigidly locked together, the strips **23** are then progressively snapped or slid into place along the dovetail grooves **17** to hold them in final assembly. The strips completely cover the screw holes, leaving the attractive appearance shown in FIG. 4 of the drawings.

The units **10** lend themselves well to the production, if desired, of a panelized furniture structure or item, and also to the fabrication of a skeleton-type, non-panelized structure.

FIG. 5 illustrates a simple and effective means for securing to a corner extrusion unit **10** a pair of similar units arranged in endwise abutting, 90° relation to the corner unit. For this purpose, the endwise abutting units are provided at the abutting ends thereof with a slug **28** of lead or other soft metal, which has been poured in molten form therein with the units **14** supported upright on an appropriate bottom surface. The slug bonds to the walls **18**, **19** of extrusion **14**, and is then centrally drilled to provide a pilot opening, into which an appropriate self-threading type of headed bolt or screw **29** is applied. In thus threading itself into the slug **28**, the screw, which is applied through the wall opening **20** in the manner described above, draws the abutting unit **14** tightly against the adjacent surface of the corner unit. While the plastic insert strips **23** may be omitted in an arrangement of this sort, it is preferable that they be employed, since they tend to furnish a resilient, compressible surface exerting a frictional retaining effect which enhances the connection at bolt **29** and slug **28**.

FIG. 6 of the drawings illustrates another alternative type of union of a structural unit **10** according to the invention with a transverse bar or the like, designated **31**, which differs in character. In this case, the bar **31** is formed at an end thereof to provide an integral, dovetail-shaped projecting tongue **32** which mates slidingly with the dovetail recess **17** of the extrusion **14** of unit **10**. The end of the piece **31** is drilled and tapped at **33** to threadedly receive one or more machine screws or bolts **34**; and when the part **31** (shown as being of solid cross section) is properly located along the extrusion recess, the screw **34** is inserted into extrusion **14** and tightly taken up to hold the extrusion and part in rigid connection with one another.

In an embodiment of this type, the finish strip material **23** will, of course, be omitted above and below the part

31, separate strips 23 being applied above and below to complete the finish of the structure. The part or piece 31 may be employed, for example, as a cantilever-type suspending manner, as a quite elongated weight supporting beam member, etc.

In the embodiment of FIG. 7, as an alternative to that of FIG. 5, a securing sub-assembly, generally designated 36, is employed as a completely hidden lock (like that of FIG. 5) to secure one unit 10 in rigid end-abutting engagement with another, through the agency of a single machine bolt 37. The sub-assembly 36 comprises a first block or piece 38 in the general form of a cube, the lateral dimensions being of a width such as to enable block 38 to be slidingly received within the interior of the abutting unit 10 with a fairly close hand fit. Block 38 is provided with a central hole 39 extending end-to-end therethrough; and is further provided at one end thereof with an integral, dovetail-shaped tongue 40 on its end which has slidable mating reception (like the tongue 32 of FIG. 6) within the dovetail groove 17 of the unit 10 to be abutted. Block 38 may be of any rigid material, such as metal or wood.

The second component of the lock sub-assembly 36 is an elastically deformable friction locking member 42, of cross section similar to that of block 38, but of lesser axial thickness; while the final member of the assembly is a nut member 43 of outline similar to that of the elastically deformable intermediate member 42.

Member 42 has a hole 44 therethrough of a bore similar to the block bore 39, and the nut member 43 is drilled and tapped at 45 to threadedly receive the end of the securing bolt 37.

In use, the three-part locking assembly 36 is slipped onto the end of the bolt 37 projecting through a small size aperture 21 of the extrusion 14, with the nut member 43 taken up a turn or two on the bolt thread to hold the parts preliminarily in place. The assembly 36 is then slipped into the interior of the abutting unit 10, whereupon the bolt 37 is fully taken up to compress the friction locking member 42 axially, thus to expand it laterally into internal frictional engagement with the walls 18, 19 of said abutting unit. This tightly clamps the parts together in the desired 90° abutting relationship. The insert strips 23 are then applied to conceal the bolt holes, as in the first described forms, completing the assembly. As in the embodiment of FIG. 6, the strip material is necessarily omitted in the area occupied by the dovetail tongue 40.

FIG. 8 of the drawings illustrates an alternative embodiment of the extrusion, shown and described in my copending application identified above, which is generally similar in nature to the extrusion 14 as thus far described herein; so that corresponding reference numerals, primed, are employed to designate corresponding features, permitting further description in detail to be dispensed with.

In this form, as in the earlier, one pair of 90° intersecting walls 18′ meet at one corner of the extrusion, and the other opposed, 90° intersecting pair of walls 19′ similarly meet at the diagonally opposite corner of the extrusion 14′. However, in this instance, the larger size apertures or openings 20′ are formed exclusively in the walls 18′ and the smaller size apertures 21′ are formed exclusively in the walls 19′. As before, the respective apertures 20′, 21′ are in transverse alignment with one another across the section of the extrusion; and as thus paired, the sets of apertures 20′, 21′ alternate in staggered relation to one another along the length of the extrusion. Extrusion 14′ is obviously capable of utilization in any of the ways illustrated in FIGS. 4 through 7.

The invention provides an improved ornamental construction member or unit for furniture and other pieces of a wide variety, as referred to above. A highly aesthetic appearance, of a more or less modernistic and streamlined nature, is had, using standardized parts which are capable of being related to one another and/or associated paneling in various ways, and by extremely simple and expeditious procedures capable of being efficiently performed by unskilled persons.

What I claim as my invention is:

1. A construction member for the fabrication of assembled furniture and like structural items, comprising a hollow elongated extrusion of closed, generally square cross section defined by walls at least some of which have external dovetail type recesses extending along lengthwise zones thereof, one of said recessed walls having a number of apertures through the recessed zone thereof, including longitudinally spaced apertures of predetermined size, an opposed wall also having a number of apertures therethrough, including longitudinally spaced apertures of smaller size than and in alignment respectively with the larger sized apertures of said one wall for the reception of headed securing elements through said walls, with the heads of said elements in securing relation to the inner surface of said opposed wall, and an elongated finish strip having a width substantially equaling that of said dovetail recess and secured in dovetail fashion in the latter to extend therealong and cover the apertures thereof.

2. A construction component comprising a hollow elongated extrusion of closed polygonal cross section defined at least in part by an opposed pair of walls, one of which has a number of longitudinally spaced apertures of predetermined size opening therethrough, the other wall of said pair having a number of longitudinally spaced apertures of smaller size than said first named apertures, with the respective apertures of the respective opposed walls in transverse alignment with one another for the reception of headed securing elements through said walls and with the heads of said elements in engagement with the wall having the smaller apertures, said one wall having an elongated dovetail type external recess along the zone of said predetermined size apertures, and a finish strip disposed in said recess to conceal at least some of the apertures in said zone.

3. In a furniture or like structural item, a pair of adjacent, angularly disposed panels, and a member extending along and against adjacent edges of said panels to secure the same together at a connecting zone of the item, said member comprising a hollow elongated extrusion of closed, generally square cross section defined by opposed pairs of first and second walls, which walls each have external dovetail type recesses extending along lengthwise zones thereof, one pair of said walls intersecting at one corner of the member, the other pair intersecting at a diagonally opposite corner, said first walls of each pair each having longitudinally spaced apertures of predetermined size opening through the recessed zone thereof, said second walls of each pair each having longitudinally spaced apertures of smaller size in transverse alignment respectively with the first named apertures for the reception of headed securing elements to secure said member to the panel edges, with the heads of said elements in securing relation to the inner surface of the second walls and with the first walls in non-facing relation to said panel edges, and elongated finish strips having a width substantially equaling that of the recesses of the first walls and secured in dovetail fashion in the latter to extend therealong and cover the apertures thereof.

4. A construction member for the fabrication of assembled furniture and like structural items, comprising a hollow elongated extrusion of closed, generally square cross section defined by walls at least some of which have external dove-tail type recesses extending along lengthwise zones thereof, one of said recessed walls having a series of longitudinally spaced apertures of predetermined size opening through the recessed zone thereof, an opposed parallel wall having a longitudinal spaced series of apertures of smaller size opening therethrough in alignment respectively with the first named apertures for the reception of headed securing elements through said walls, with the heads of said elements in securing rela-

tion to the inner surface of said opposed wall, and an elongated finish strip having a width substantially equaling that of said dovetail recess and secured in dovetail fashion in the latter to extend therealong and cover the apertures thereof.

5. A construction member for the fabrication of assembled structural items, comprising an elongated extruded or like one-piece member of hollow rectangular cross section, the walls of at least one opposing wall pair of said section each being provided in a longitudinal zone thereof with a number of longitudinally spaced apertures which are respectively in transverse alignment with one another across the section, the apertures in one wall of said pair including apertures larger than the respective aligned apertures of the opposed wall of the pair, and thus being adapted to receive therein an enlarged head of a securing element which extends through the opposite, smaller aperture, with the wall of the smaller aperture engaged from within by said head, said one wall having an elongated dovetail type external recess along said apertured zone thereof, and a finish strip disposed in said recess to conceal at least some of the apertures in said zone.

6. A construction member in accordance with claim 5, in which both pairs of walls are provided with larger and smaller apertures in the relationship described.

7. A construction member in accordance with claim 5, in which both pairs of walls are provided with larger and smaller apertures in the relationship described, the apertures in all walls lying in sets in a number of cross sectional planes 90° transverse of the length of the member.

8. A structural arrangement comprising the combination of a construction member in accordance with claim 5, and a panel member secured in edge abutment with a wall of said construction member by a headed fastening screw, the head of which internally engages said wall at one of the smaller apertures.

9. A structural arrangement comprising the combination of a construction member in accordance with claim 5, and a similar construction member secured in end abutment with a wall of said construction member by a headed fastening screw, the head of which internally engages said wall at one of the smaller apertures, said similar construction member having means within an end thereof engaged by said screw to effect the securement.

10. A structural arrangement comprising the combination of a construction member in accordance with claim 5, and a similar construction member secured in end abutment with a wall of said construction member by a headed fastening screw, the head of which internally engages said wall at one of the smaller apertures, said similar construction member having means in the form of a soft metal insert within an end thereof engaged by said screw to effect the securement.

11. A structural arrangement comprising the combination of a construction member in accordance with claim 5, and a similar construction member secured in end abutment with a wall of said construction member by a headed fastening screw, the head of which internally engages said wall at one of the smaller apertures, said similar construction member having a nut within an end thereof threadingly engaged by said screw to effect the securement.

12. A construction member in accordance with claim 5, in which the apertures in said one wall of said pair are exclusively the larger sized.

13. A construction member in accordance with claim 5, in which said one wall and said other wall of said pair are each provided in said longitudinal zone thereof with further apertures alternating with said respective larger and smaller apertures, said further apertures being respectively smaller and larger in relation to one another.

14. A construction member in accordance with claim 13, in which both pairs of walls are provided with larger and smaller apertures in the relationship described.

15. A structural arrangement comprising the combination of an elongated extruded or like one-piece member of hollow rectangular cross section, the walls of at least one opposing wall pair of said section each being provided in a longitudinal zone thereof with a number of longitudinally spaced apertures which are respectively in transverse alignment with one another across the section, the apertures in one wall of said pair including apertures larger than the respective aligned apertures of the opposed wall of the pair, and thus being adapted to receive therein an enlarged head of a securing element which extends through the opposite, smaller aperture, with the wall of the smaller aperture engaged from within by said head, and a dissimilar member secured in abutment with said last-named wall by said securing element, said last-named wall also having an elongated dovetail type external recess along the apertured zone thereof, said dissimilar member having a tongue slidably received in said last-named recess.

References Cited by the Examiner

UNITED STATES PATENTS

2,030,730	2/1936	Wilson	52—624
3,082,850	3/1963	Weening	52—127
3,131,792	5/1964	Groneman et al.	52—72 X
3,177,988	4/1965	Costantini et al.	287—189.36

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