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TITLE: AN ALUMINIUM FRAME ASSEMBLY

TECHNICAL FIELD: The invention relates to a metallic frame assembly, supported by a grid of interlocking members, and particularly in the configurations of french doors, windows and partitions made of aluminium material. A method of attaching a flat panel to each grid space is also related.

BACKGROUND: There are numerous types and styles of mounting means for doors, windows and partitions. In the case of aluminium french doors, windows and partitions, it is desirable to provide a mounting means which may easily and economically secure interlocking members to stiles and rails of a frame assembly and enhance the aesthetic quality of the frame assembly.

The term "frame assembly" used herein means an outer frame supported by a plurality of interlocking members, each preferably of a particular ridged profile.

In the construction of a wooden frame assembly as illustrated in Figure (1), halving joints are used. Half of the wood thickness is removed from each piece of wood and a flush joint is formed where two pieces of wood meet or cross. Each square space may be covered on one side,

or both sides, or halfway interleaved with plywood, or glass panel, or other flat sheet, to make partitions, doors, windows or cabinets. These flat sheets can be secured into position by various means such as PVC jointer, or wooden battens. The entire operation is time consuming and labour intensive.

Timber is an excellent construction material because of its ease of working. Natural texture finish will enliven any structure with rustic warmth (figuratively speaking). However, timber is subjected to environmental factors such as temperature and humidity variations, and biological decay.

For the above reasons, metal frame assemblies are gradually being favoured and they are constructed in accordance with local building regulations and acceptable building practice. Metal frame assemblies are usually fabricated from light gauge sheet metal of suitable thickness. They are either battened out with wooden battens or screwed or welded or riveted onto other metal frames. These operations are also time consuming and labour intensive. Welded and riveted operations affect the aesthetic aspect of the configurations.

Aluminium is favoured as a construction material because it is light and strong. It does not rust easily. The prior art aluminium frame assembly does not have interlocking members. A large glass sheet is interleaved and fitted into the slot provided for in the U-channels. Thus, it gives a large unobstructed view. However, because glass is not strong and can be broken easily, it becomes necessary to protect the glass sheet by installing a metallic grille structure.

It is important to note that currently the prior art aluminium outer frame is usually constructed from U-channels. The mitre joint or the corner angle joint is usually welded. Because of the U shape, all surfaces are more or less flat. Where interlocking members are inset, the joints to the stile or the rail are also welded at the straight connecting faces.

In the configurations of french doors, windows and partitions, smaller glass sheets are used to fill the resultant smaller grid spaces.

The object underlying the invention is to create an aluminium frame assembly within which is a grid of interlocking members of ridged profile allowing flat sheets, particularly glass sheets, to be secured quickly,

simply and without difficulty. Other objects of the invention are to provide an aluminium frame assembly which:-

has greater aesthetic appeal because ridged members are used;

is rugged and burglar-proof because of the particular means of mounting.

SUMMARY OF INVENTION

It is therefore new to the art to provide a rugged and sturdy aluminium frame assembly comprising a grid of ridged interlocking members. The frame assembly is economical to manufacture, and is provided with a mounting means for its installation and removal. The frame assembly uses a minimum of drilled, tapped and screwed connections linking the stiles, rails and members. The frame assembly should be of a rugged construction to render it burglar-proof.

One example of the invention with its leading features is described more closely below with the aid of the drawings, in which:

Figure (1a) is a perspective view of a wooden frame assembly, illustrating four corner halving joints, four Tee halving joints and one cross halving joint. Figure (1b) shows a corner halving joint. Figure (1c) shows a

Tee halving joint. Figure (1d) shows a cross halving joint.

Figure (2) is a front view of a prior art welded aluminium frame assembly.

Figure (3) is a front view of an aluminium frame assembly of a preferred embodiment according to the invention.

Figure (4a) shows a cross-sectional plan view of a cross joint between two horizontal interlocking members and a vertical interlocking member. This figure also shows one preferred ridged profile of an interlocking member.

Figure (4b) shows a perspective view of another cross joint between two vertical members and a horizontal member. This figure shows yet another preferred ridged profile of said member.

Figure (5) shows a mitre joint or a corner angle joint of the outer frame of the frame assembly as shown in Figure (3).

Figure (1) shows a wooden frame assembly. To render a rugged construction, both halving joints and screws are used. Figure (2) shows a prior art welded aluminium frame assembly. It is important to note that the straight

connecting faces of the members are welded. This does not give a strong connection. In comparing Figures (1) and (2) with Figure (3), it is apparent that the french door configuration has an aesthetic appeal.

As shown in Figure (3), the aesthetic look is derived from a grid of ridged interlocking members. It is important to note that the ridged interlocking member of single pass extruded cross section has been cleverly devised after many years of research and development by the inventor.

As shown in Figure (4), the horizontal member (20A, 20B) and the vertical member (20C) are preferably of the same ridged profile of single pass extrusion. It comprises a front ridged profile (21C) integrally joined to a back ridged profile (22C) by means of a connecting member (24C). The connecting member (24C) has a groove (23C) extending lengthwise its centre. A transverse hole (not shown) is drilled through the connecting member, to provide for an elongated pin member (40) to be engaged therein so that its either end interlocks with adjoining horizontal members. Each end of the pin member (40) is received in the mouth of another groove (23A, 23B) found on each adjoining horizontal member (20A, 20B). The connecting face of the horizontal member (20A, 20B) is profile-cut to correspond with the front ridged profile

(21C), and the back ridged profile (22C) of the vertical interlocking member (20C). By this clever mounting means, the cross joint holds a plurality of interlocking members (20A, 20B, 20C) firmly in a network.

As shown in Figure (4b), a cross joint holds together two vertical interlocking members (20C) and one horizontal interlocking member (20A). The principle of above said mounting means applies.

Now referring to Figure (5), a rectangular outer frame comprises two rails (10) and two stiles (30). The profile of the rail (10) or stile (30) is different from that of the interlocking members (20A, 20B, 20C). Essentially, the rail or the stile is a hollow square section (11) formed by extrusion. On one outside face of the square section (11), there is integrally extruded another slotted member (12). On the inside of the opposite face of the square section (11), there is integrally extruded another groove (13). Four mitre joints or corner angle joints are needed for a rectangular outer frame. To retain the rigidity of the outer frame, a hole is drilled through the rail section adjoining the groove (13) on the stile (30), so that the hole is in alignment with the groove (13). A retaining screw (50) passes through this passageway.

It can be seen from Figure (5) that a Tee joint can be achieved between a vertical member (20C) and a rail (10) by drilling a transverse hole right through the hollow square section (11) to align with the mouth of the groove (23C) on the interlocking member (20C).

Although other modifications and changes may be suggested by those skilled in the art, it is the intention of the inventor to embody within the patent warranted herein all changes and modifications as reasonably and properly come within the scope of his contribution to the art. For an example, the outer frame need not assume a squarish or rectangular shape. It can be circular or elliptical in shape.

CLAIMS

1. An aluminium frame assembly comprising an outer frame of a first standardised profile, arranged to receive and support inwardly a grid of interlocking members of a second standardised profile,

the first standardised profile comprising an extruded hollow section and a slotted member structure, the slotted member structure defining half the second basic standardised profile on one face of the first profile, the section including a part circular structure defining a first groove extending lengthwise along the inside of the opposite face of the first profile,

the second standardised profile comprising a front ridged profile, and a back ridged profile spaced apart by an intermediate connecting member which further includes a part circular structure that defines a second groove extending along its length,

said grid being formed by a plurality of interlocking members, first and second aligned interlocking members mating orthogonally with a third interlocking member at a cross joint,

said cross joint being formed when a transverse hole is drilled through said third interlocking member to accommodate an elongated pin member so that either end of the pin member is

received in the mouth of the second groove on first and second adjoining interlocking members, each end of the third interlocking member further being profile-cut to correspond with said slotted member as defined by half of the first standardised profile, and being fixed onto the outer frame in a Tee joint by means of threaded fasteners,

each end of the first or second interlocking member further being profile-cut to correspond with said half second standardised profile on the second interlocking members and being fixed onto the third interlocking member in a cross joint by means of pin members.

2. An aluminium frame assembly according to claim 1, in which the outer frame is circular or elliptical in shape.

3. An aluminium frame assembly according to claim 1 or claim 2, wherein a flat sheet is interleaved at each grid space.

4. Method of making an aluminium frame assembly according to claim 1, 2 or 3, comprising the steps of:

cutting to length the required pieces of the outer frames of first basic standardised profile, and the first, the second and the third interlocking

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members of the second basic standardised profile,

profile-cutting both ends of the interlocking members,

drilling holes at appropriate positions along the perimeter of the outer frame and mounting inwardly the third interlocking members,

drilling holes at appropriate positions along the length of the third interlocking members, and placing pin members through the holes to align with the grooves provided in the first and second interlocking members.

5. A frame assembly substantially as described herein with reference to the accompanying drawings.

6. A method of making an aluminium frame assembly substantially as described herein with reference to the accompanying drawings.