

LOCKABLE FRAMES FORMED FROM METAL EXTRUSIONS

The present invention relates to frames for doors and windows formed from lengths of metal extrusion, the frames incorporating a locking device.

For many years window and door frames have been manufactured from lengths of metal extrusion. Frames formed from metal extrusions are very popular as they are easy to maintain and are extremely durable. In particular, aluminium extrusions are used extensively as they are long lasting, easy to mould and attractive to look at.

Conventionally, in forming a corner joint in such frames the cut lengths are joined by a mitre joint in which the metal extrusions are cut diagonally at a 45° angle. The diagonally cut faces are then brought together to form each corner joint, a flat, L-shaped piece of metal usually being placed on the inside of the extrusions, one arm of the L-shaped piece of metal being received by a cavity defined within each of the lengths of extrusion, the joint being secured by driving rivets or screws through the lengths of extrusion being joined into the L-shaped piece of metal.

More recently, in our co-pending British Application a frame is described which is formed from lengths of metal extrusion prepared from longer lengths of extrusion by cutting in a plane perpendicular to the long axes thereof, at least one cavity being defined in each of the lengths of extrusion so formed, the lengths of extrusion being joined to form the frame by means of connecting pieces having at least one tongue so configured as to form a snug fit with at least one cavity in a length of extrusion, the connecting pieces also being securable to at least one other length of extrusion.

It is generally desirable to provide a locking means within the frame to enable the door or window frame to be restrained. Conventionally, this typically takes the form of a "latch and bolt" mechanism. The bolt is housed within one of the lengths of extrusion. At some point along the length of the bolt there is attached some form of latch mechanism, part of which protrudes through one of the sides of the length of extrusion in which the bolt is housed, enabling the user to operate the latch mechanism so as to extend the bolt beyond one of the sides of the extrusion and to retract it back inside the length of extrusion. A hole is formed in one of the lengths of extrusion forming the frame at the point where the bolt is to emerge, so allowing the bolt to be extended beyond the frame. The

bolt is extended into a recess, the recess being aligned with the point of exit of the end of the bolt so as to receive the bolt securely, thus restraining the door or window. In the case of a window frame, the recess may be formed in the outer frame supporting the window, while in the case of a door frame the recess may alternatively be formed in the floor.

In conventional door and window frames incorporating locking means, where the lengths of extrusion are joined by means of a mitre joint, the longitudinal axis of the bolt is substantially parallel to the long axis of the extrusion in which it is housed, such that the bolt passes through the area of one of the corner joints formed with the length of extrusion housing the bolt and emerges through a hole in an outer edge face of the other length of extrusion forming the corner joint.

However, the present method of forming these corner joints and guiding the bolt through the length of metal extrusion in which the receiving hole is formed is unsatisfactory. As described earlier, the diagonally-cut lengths of extrusion are joined together by means of a flat, L-shaped piece of metal to which the lengths of extrusion are secured by means of screws or rivets. When a bolt is incorporated within the frame, the part of the aluminium frame through which the hole has to be bored (and hence through the fixing L-piece

inside) is frequently prone to splitting. Furthermore, it is extremely difficult to form the corner joint while at the same time forming the bore hole for receiving the bolt, so that in many cases the hole is found to be out of alignment vis-a-vis the bolt once the joint has been formed.

Thus it can be seen that there are severe difficulties experienced in incorporating latch and bolt locking mechanisms into frames formed from lengths of metal extrusion using the existing methods of forming joints between the lengths of extrusion. Not only is the incorporation of the locking mechanism into the frame extremely time consuming because of the skilled nature of the work involved, but furthermore there is a considerable degree of waste because of the prevalence of faulty locking mechanisms due to the misalignment of the bolt and the receiving hole. It is these problems that the present invention addresses.

According to the present invention there is provided a frame comprising lengths of extrusion, each length of extrusion defining at least one internal cavity, and a restraining bolt, the lengths of extrusion being connected by means of a connecting pieces having tongues, each tongue being so configured as to fit snugly into a cavity of an extrusion, characterised in that one of the connecting pieces is configured to receive and guide the bolt.

The connecting pieces may be formed from a durable plastic such as acetal, ABS (acrylonitrile-butadiene-styrene copolymers) or uPVC (unplasticised polyvinylchloride). It should be appreciated that the tongue may be unitary or comprised of two or more elements. The lengths of metal extrusion will typically be lengths of aluminium extrusion. The bolt may, for example, be guided vertically within the frame into a recess formed below or above the frame, or it may be guided within a horizontal length of extrusion into a recess formed at the side of the frame.

In one embodiment of the invention, there is provided a frame in which the connecting piece is so configured as to be completely hidden from view by the lengths of extrusion forming the frame. Thus, there is provided a frame in which the lengths of extrusion are joined by mitre joints, the frame incorporating a locking device comprising a bolt and a latch means to enable extension and retraction of the bolt, the longitudinal axis of the bolt being substantially parallel to the long axis of a length of extrusion in which it is housed, the bolt being extendable so as to restrain the frame through a hole in a length of extension to which the length of extension housing the bolt is joined, the connecting piece for securing the length of extrusion housing the bolt to the length of extrusion in which the hole is

formed being substantially L-shaped, the arms of the connecting piece being so configured as to form a snug fit with the cavities in the lengths of extrusion that are joined, the connecting piece further incorporating a guiding means so configured as to enable the bolt to be readily guided through the hole in the length of extrusion being secured. Typically the guiding means will take the form of a suitably configured bore in the arm of the connecting piece that is received by the cavity in the length of extrusion housing the bolt.

In the frames of the invention, the connecting piece used to connect the lengths of extrusion can be easily manouevered within the lengths of extrusion so as to allow easy formation of the joint while at the same time allowing the bolt to be readily aligned with the hole in the frame through which it is to be extended. Thus, the frames of the invention may be readily assembled without the need for specialist skills and equipment.

Furthermore, the guiding means within the connecting piece enables ready alignment of the bolt with the hole in the frame, thus cutting down on the wastage caused by the misalignment commonly encountered using the conventional techniques of joint formation.

In another embodiment of the invention, there is provided a frame in which lengths of extrusion are cut from longer lengths of extrusion in a plane

perpendicular to the long axes thereof, the connecting pieces joining the lengths of extrusion to form the corner joints having tongues which are received by the cavities in the extrusions so as to form the joints, the connecting pieces being so configured as to convey a continuous appearance between the lengths of extrusion connected by them, the connecting pieces further incorporating a guiding means and a hole such that the guiding means may receive the bolt and guide it through the hole. Typically, the guiding means and the hole are continuous, usually taking the form of a bore passing through the tongue received by the length of extrusion housing the bolt and the central body of the connecting piece, the end of the bore away from the point at which the bolt is first received constituting the hole.

In a further aspect of the invention, connecting pieces for use in manufacture of the frames of the invention are provided.

The invention may be further understood by reference to the accompanying drawing which shows a front view of a door frame according to the invention shown in part cut away so as to show the connecting piece and bolt.

In the embodiment of the invention in the drawing, there is shown a door 1 constructed from four lengths of metal extrusion 2, each adjoining pair of lengths of extrusion

being joined together by means of a mitre joint 3. In the cut away portion of the door there is shown a substantially L-shaped connecting piece 4 having two arms 5, each arm being received by a cavity within the length of extrusion being joined so as to secure the joint. A bore 6 passes through the length of one of the arms 5 and through the central body of the connecting piece 4. Within the frame 1 there is incorporated a locking means comprising a bolt 7, at the end of which there is a stop 8, and a latch 9 attached to the side of the bolt 7, the end of the latch protruding through an opening 10 in a side of the door frame 1. The bolt 7 is received and guided by the bore 6. Directly below the bolt there is formed a hole 11 in the length of extrusion 2 forming the bottom length of the frame 1, a recess 12 being formed in the floor 13 directly below the hole 11.

In use, the bolt 7 may be extended and retracted by the user from outside the frame 1 using the latch 9. When the frame 1 is not locked, the bolt 7 is retracted into the frame. When it is desired that the frame be locked, however, the bolt 7 is extended by means of the latch 9, the bolt passing through the bore 6 in the connecting piece 5 and through the hole 11 in the frame, the stop 8 at the end of the bolt 7 being received by the recess 12 in the floor 13, thus securing the frame in position. The bore 6 acts to receive the bolt and to guide it through the hole 11 into the recess 12.

Claims

1. A frame comprising lengths of metal extrusion, each length of extrusion defining at least one internal cavity, and a restraining bolt, the lengths of extrusion being connected by means of a connecting pieces having tongues, each tongue being so configured as to fit snugly into a cavity of an extrusion, characterised in that one of the connecting pieces is configured to receive and guide the bolt.
2. A frame according to Claim 1, wherein the tongue is unitary or comprised of two or more elements.
3. A frame according to Claim 1 or Claim 2, wherein the connecting pieces are formed from a durable plastic.
4. A frame according to Claim 3, wherein the connecting pieces are formed from acetal, ABS or uPVC.
5. A frame according to any of Claims 1 to 4, wherein the connecting piece is completely enclosed by the lengths of extrusion so as to be hidden from external view.
6. A frame according to Claim 5, wherein the lengths of extrusion are joined by mitre joints, the frame incorporating a locking device comprising a bolt and a



latch means, the longitudinal axis of the bolt being substantially parallel to the long axis of a length of extrusion in which it is housed, the bolt being extendable so as to restrain the frame through a hole in a length of extension to which the length of extension housing the bolt is joined, the connecting piece for securing the length of extrusion housing the bolt to the length of extrusion in which the hole is formed being substantially L-shaped, guiding means being incorporated in said connecting means configured so as to receive the bolt and guide it through the hole in the length of extrusion secured.

7. A frame according to any of Claims 1 to 4, wherein the lengths of extrusion are cut from longer lengths of extrusion in a plane perpendicular to the long axes thereof, the connecting pieces joining the lengths of extrusion to form the corner joints having tongues which are received by the cavities in the extrusions so as to form the joints, the connecting pieces being so configured as to convey a continuous appearance between the lengths of extrusion connected by them, the connecting pieces further incorporating a guiding means and a hole such that the guiding means may receive the bolt and guide it through the hole.

8. A frame according to Claim 7 in which the guiding means and hole are continuous.



9. A frame according to any of Claims 1 to 6 substantially as described herein with reference to the accompanying drawing.

10. A connecting piece configured to receive and guide a bolt for use in frames formed from lengths of metal extrusion, as defined in any preceding Claim.