March 29, 1960 J. L. BROWN 2,930,480

PRE-ASSEMBLED DOOR UNITS

Filed Feb. 3, 1956 4 Sheets-Sheet 1

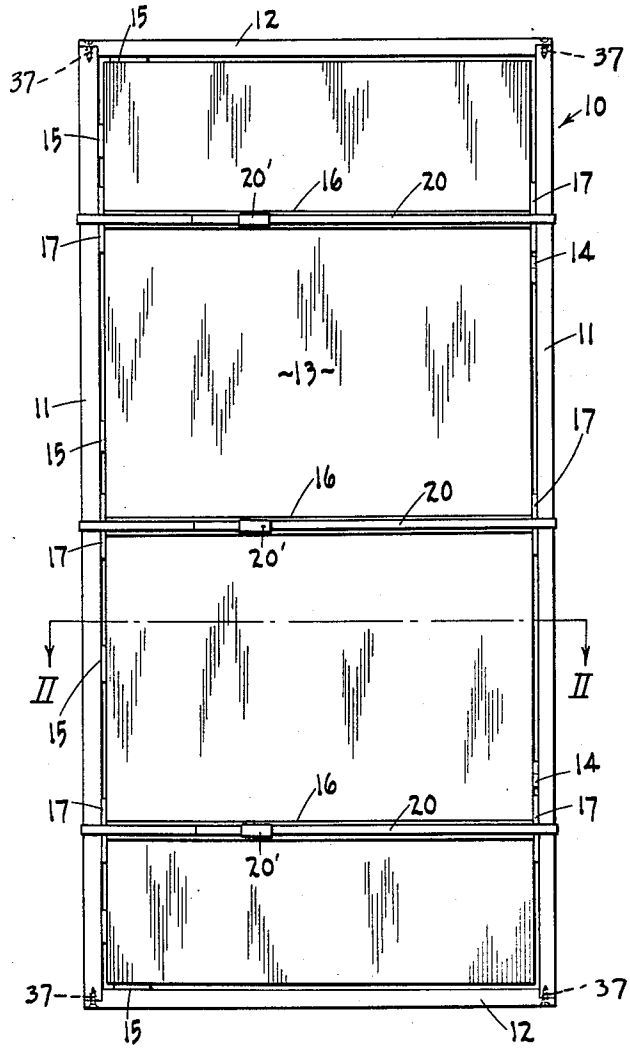


FIG. 1.

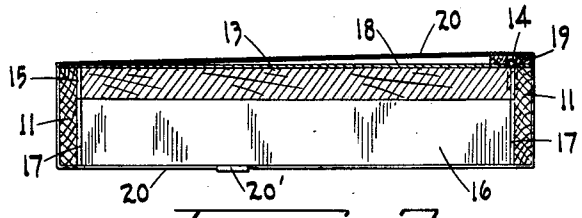


FIG. 2.

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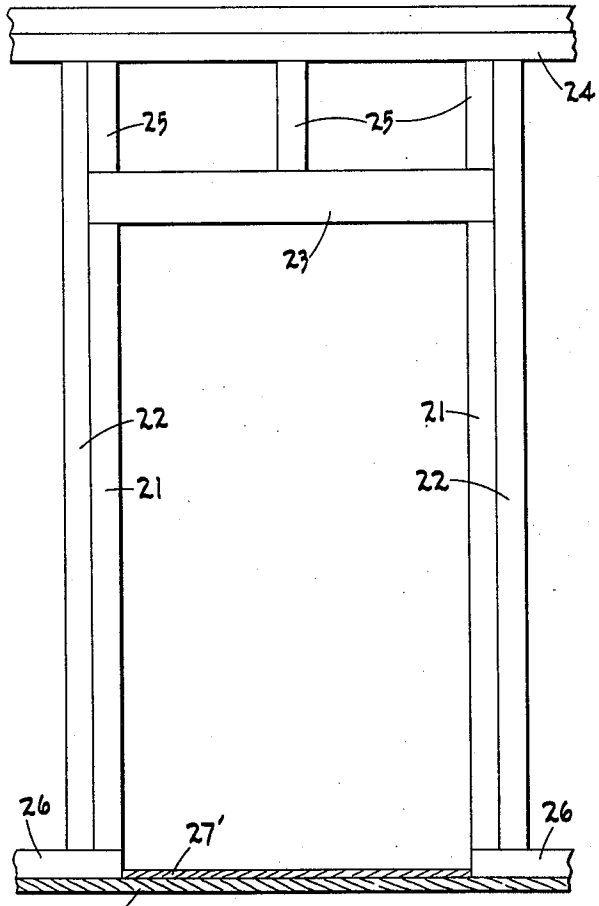


FIG. 3.

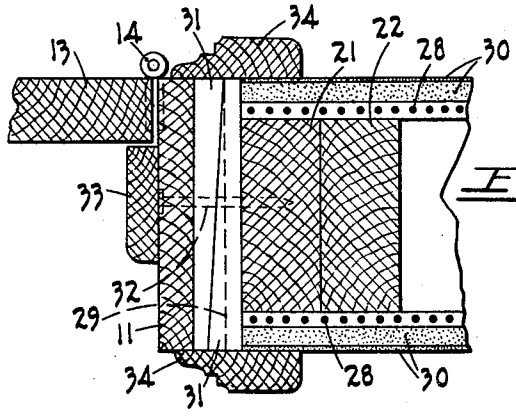


FIG. 5.

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PRE-ASSEMBLED DOOR UNITS

Filed Feb. 3, 1956 4 Sheets-Sheet 3

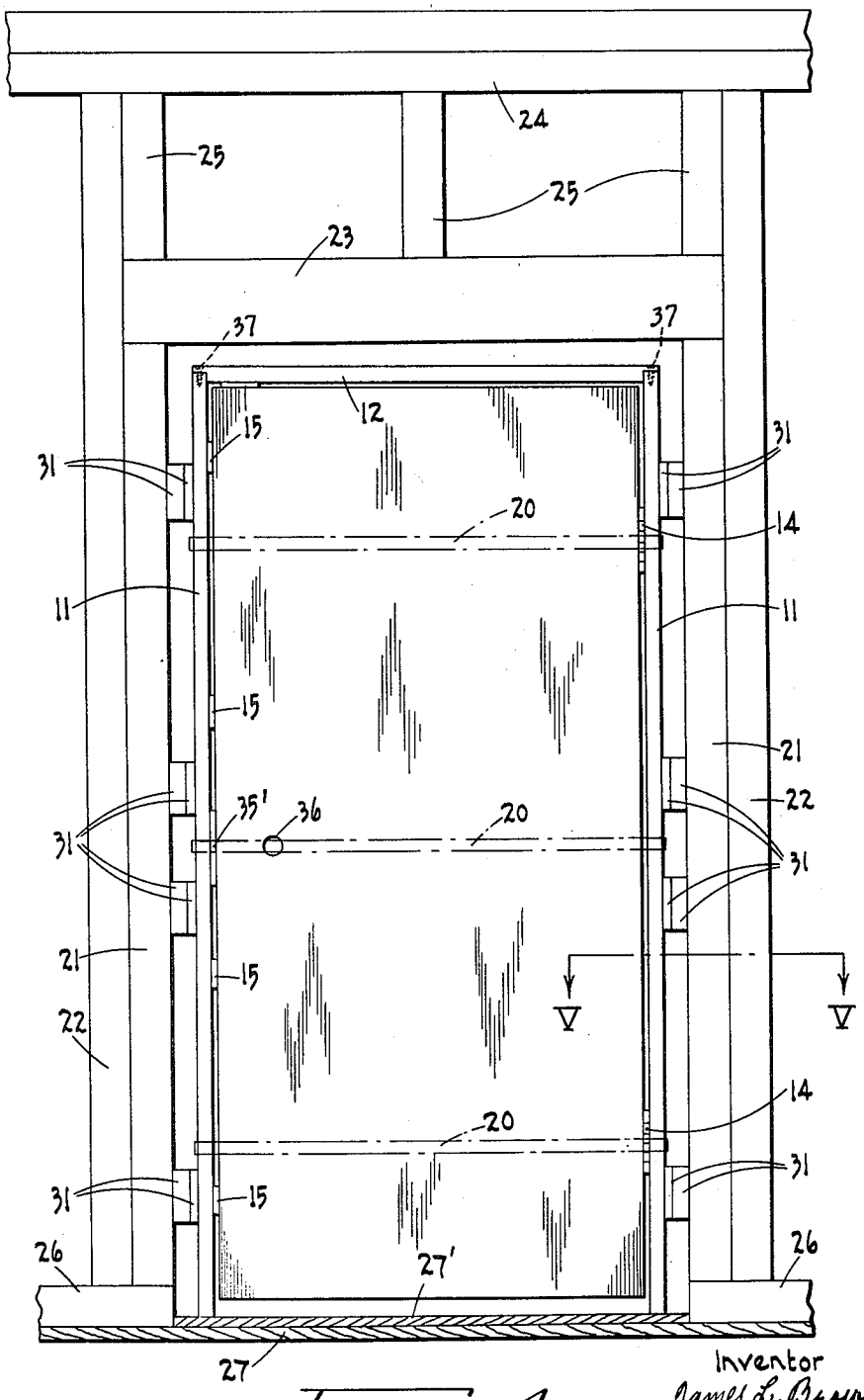


FIG. 4.

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PRE-ASSEMBLED DOOR UNITS

Filed Feb. 3, 1956 4 Sheets-Sheet 4

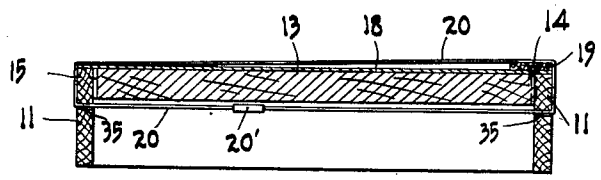


FIG. 6.

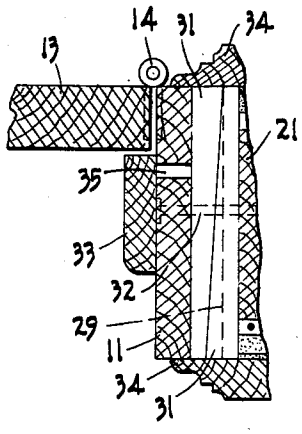


FIG. 7.

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PRE-ASSEMBLED DOOR UNITS

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5 Claims. (Cl. 206—60)

This invention relates to improvements in the construction and erection of prefabricated or pre-assembled door units for use by contractors during the building of houses, apartment blocks or other structures.

In the past the conventional method of hanging each door in a frame previously secured in a doorway in an opening in a wall, has required a highly skilled artisan working for several hours, and this expenditure of labour has appreciably affected building costs. Such method involves firstly the installation of a door frame in the rough opening, such frame being brought true and plumb by shims and blocking. Once the frame is installed the door is fitted by removing material from the door until it fits the frame opening, after which the hinge recesses are cut and hinges screwed on. This completed, the door is then hung and the latch set installed.

Factory assembled units each consisting of a normal door secured by hinges in the usual manner in a surrounding frame, have already been manufactured, but have not proved entirely satisfactory in practice. It is the intention that, by making use of a prefabricated unit, the complex fitting work can be performed by less skilled labour in a factory, with the aid of jigs and a greater variety of machine tools than would ever be available on a building site. The final erection of the unit in the doorway in the wall should then be a comparatively simple operation requiring both less time and a lower category of skill than when the conventional method is employed.

That is the theory. In practice, great difficulty has been experienced in satisfactorily erecting the unit in a doorway without allowing the unit to become distorted. The clearances between the door and its frame are small and critical, and it is important that they be closely maintained if the finished result is to be as satisfactory as an individually hung door.

It is the primary object of the present invention to provide improvements in this respect. Especially, it is desired to provide a preassembled door unit and a method of erection of the same that will avoid the tendency to revert to the use of highly skilled labour that has been the result of the practical difficulties encountered in erecting prior forms of such units satisfactorily.

To this end, the invention contemplates the provision of means for positively holding the door and door frame in the required ultimate spaced relationship, and introduces the novel step of maintaining the holding means in position until after the frame has been secured to the doorway. In the past, normal provisions have been made for holding the parts of the unit during shipment, but the means employed for this purpose have always been removed as part of the uncrating and unpacking procedure. With the present invention, the holding means are purposely formed separately from the main exterior packing that protects the units from damage in transit, and are such as to be conveniently retained in position during the erection of each unit without giving rise to interference with the means employed to secure the unit

in place. Interposed spacer members are the most satisfactory expedient for maintaining the door and its frame spaced sufficiently far apart, and tension bands of metal strip extending tightly around the unit have been found the most convenient means for holding these parts tightly against the spacers. It is possible to employ other means equivalent in function such as wires or clamps. Metal bands are much preferred since they are economical to employ and do not seriously mar the frame members and because of their comparative ease of use, particularly removal. These tension members both draw and hold the members tightly together.

A further valuable but optional feature of the invention is the arrangement of the handle assembly including a catch mechanism and/or lock in a vertical central position on the side of the door opposite the hinges. The symmetry of the frame combined with this arrangement of the handle assembly enables a single unit to be used either way up to provide a right-hand or left-hand swing as required by the builder.

The accompanying drawings illustrate an example of a manner in which the invention may be carried into practice.

Figure 1 shows a front elevation view of a pre-assembled door and frame unit in condition ready for erection in a doorway;

Figure 2 shows a section on the line II—II of Figure 1;

Figure 3 is a front elevation view of a doorway frame into which the unit of Figures 1 and 2 is to be fitted;

Figure 4 shows such unit in position in the doorway shown in Figure 3 certain parts being omitted for clarity;

Figure 5 shows a section on the line V—V in Figure 4 but with certain additional parts added;

Figure 6 shows a view similar to Figure 2, but modified in accordance with a further form of the invention; and

Figure 7 shows a section similar to a part of Figure 5, serving to demonstrate how the holes provided in the upright frame members in Figure 6 are covered over in the final mounted door.

Referring firstly to Figures 1 and 2, the pre-assembled unit will be seen to consist of a rectangular frame **10** consisting of a pair of parallel upright side members **11** (the jambs of the frame) joined at each end by horizontal end members **12** (the heads of the frame). It will be observed that the four joints between the members **11** and **12** are so constructed that the members **11** remain intact, the necessary recesses being cut in the members **12**. These members **11** and **12** are secured together by screws **37** passing vertically through the ends of the members **12** into the end surfaces of the members **11**. The screw holes formed in the members **11** are thus in the end surfaces and do not mar any of the interior vertical surfaces of such members **11** which may subsequently be exposed when the unit is in position and one of the end members **12** may have been removed. The door **13**, which has been shown as a simple panel, but may take any of the conventional door forms, is mounted within the frame **10** by means of a pair of hinges **14**. The door will contain a suitable catch mechanism **35'** (hidden in Figure 1 but visible in Figure 4) and the adjacent side member **11** will be provided with a co-operating keeper therefor. The necessary clearances between the inside surfaces of the frame **10** and the edge surfaces of the door **13** opposite the hinges and at the top and bottom are maintained by means of spacers **15** of suitable material such as thin plywood.

Once the unit has been assembled to this extent in the factory further spacing boards **16** are placed at intervals extending transversely across the frame **10** to engage the inner surfaces of the side members **11** rearwardly of

the door 13 (see Figure 2). To avoid injury to these latter surfaces, thin sheets 17 of corrugated paper, card or the like, are preferably inserted between them and the ends of such boards 16.

It is recommended that the next stage in the preparation of the unit be the placing of a sheet 18 of protective corrugated paper or card against the outer surface of the door 13. Small, preferably wooden, protecting plates 19 are then placed over each hinge 14 and a number of bands 20 of strong steel strip are drawn tightly around the assembly and secured by a conventional clasp 20'. One such band 20 should normally correspond to and be in alignment with a spacing board 16. Conveniently three such spacing boards and bands may be employed, one at each end of the door approximately in register with a hinge, and one at the centre of the door. These bands 20 are drawn tight to hold the frame firmly against spacing devices and the door and thus provide a rigid unit. Instead of passing over the hinges, the bands may be placed just above or below the hinges. The protecting plates 19 would then be unnecessary except insofar as protection against handling may be required.

These operations bring the assembly to the condition shown in Figures 1 and 2. Although further exterior wrapping may normally be applied to the unit for shipment, this requires no further explanation, since it will be of a conventional nature and will be removed on receipt of the unit at the building site where the unit will again be reduced to the condition shown in Figures 1 and 2, which is the condition necessary for erection.

Before describing this latter operation, reference will be made to Figure 3 to provide a short description of a typical doorway providing a rough opening in the wall of a building, into which the pre-assembled door unit is to be secured. This doorway consists of a pair of vertical cripples 21 and a pair of vertical studs 22 (see also Figure 5 showing a sectional view of these parts at a later stage in the operation). At the head of the door frame there is a lintel 23 joining the tops of the cripples 21. Above the lintel in the usual double top plate 24 engaging the ends of the studs 22 and header blocks 25. At the foot of the doorway there is the usual bottom plate 26, which in this case has been shown as interrupted to provide an opening extending fully down to the level of the sub-flooring 27 on which the finish flooring 27' is laid. As seen from Figure 5 a lath 28 is secured to each outer face of the cripples 21 and studs 22. During the preparation of the doorway to receive the pre-assembled door unit, a rough jamb of thin plywood or like material is placed against the surface of each of the cripples 21, the outer surface of which jamb is indicated by the broken lines 29 in Figure 5. This rough jamb then provides an edge up to which the plasterer may apply coatings of plaster 30 to each surface of the wall. For convenience of illustration these details have been omitted from Figure 4. When such plastering has been completed the rough jamb is removed and the opening is ready for the erection of the door unit.

As previously mentioned, the door unit is first stripped of any external wrapping material down to the condition shown in Figures 1 and 2. Then one or other of the end members 12 is removed, depending upon which end of the unit is to be placed against the flooring 27'. It is an important and valuable feature of the invention that the builder has a choice in this respect, and can use the same unit to provide a door with a right-hand swing or a door with a left-hand swing. Assuming that the lower end member 12, as seen in Figure 1, has been removed, the unit is then placed in position centrally of the opening formed by the cripples 21 and the lintel 23. Wedges or shims 31 are then driven at spaced intervals between the opposing surfaces of the side members 11 and the cripples 21. These wedges 31 are driven in pairs from opposite sides of the door. Nails 32, or other fixing means if preferred, are then driven into the side members 11 to extend through the wedges 31 and finally into the cripples 21. Any protruding edges of the wedges are then cut off level with the wall surface, once the wedges are tightly in place and the door unit is firmly nailed in the doorway. This final fixing permanently secures the door unit in the doorway and prevents any subsequent movement of the wedges 31. When this has been done, but not before, the steel tension bands 20 are cut so as to release the forces previously holding the side members 11 firmly against the spacers 15 and the spacing boards 16. It is an essential feature of the invention that these tension bands or some equivalently acting structure should be maintained in position until the side members 11 have been finally secured in place to the fixed structure of the doorway. If, as in the past, there were no such means provided to ensure that the members 11 cannot move together or spread apart during the erection of the unit in the doorway, there would be no guarantee of maintaining satisfactory finished clearances between the door and the frame.

Once the bands 20 have been cut, the spacing boards 16, protecting plates 19 and sheet 18 can be removed and the door 13 is then free to open outwardly on its hinges, i.e. a clockwise rotation as seen in Figures 2 and 5. Figure 4 shows the door unit at this stage of the operation although the already mounted lath 28 and plaster 30 is not shown. The spacers 15 which are conventionally secured to the door 13 rather than the frame 10 (but could be attached to the frame), are then removed and the erection of the unit is complete, except for the mounting of the handle units (not shown) in the vertically centrally disposed aperture 36 provided for this purpose, and for the superposition of any trim that it is desired to place around the edges of the door. Typical trimming strips 33 (door stop) and 34 (door casing) are shown in place in Figure 5. The door stop 33 covers the heads of the nails 32 and the door casings 34 cover the wedges 31 and the gaps between the side members 11 and the cripples 21. They also cover any chipping of the edges of the plaster 30 that may have been caused by the erection of the door unit as in conventional construction. It is a feature of the invention that the frame 10 is shipped without the addition of outwardly projecting trimming, because it has been found in the past that the pre-assembly of trimming boards with the remainder of the unit has given rise to many packing difficulties. Special shipping precautions are necessary and a split jamb construction has to be employed, which is inconvenient to install, as requiring plumbing of the jamb for satisfactory operation. Reassembly of the door stop strip is a disadvantage, because it provides no room for adjustment to compensate for a warped door, which is a common occurrence in practice. Builders prefer to have a choice of trim so as to be able to match the trim throughout the house.

It is important to note that the joints between the frame members 11 and 12 are such that, when an end member 12 is retained in position, e.g. at the top part of the door in Figure 4, there is a comparatively small clearance between the end member 12 and the upper edge of the door 13, as is normally required at the head of a door. When, however, one of the end members 12 is removed, as at the foot of Figure 4, the clearance provided by the manufacturer between such member 12 and the opposite end edge of the door 13, is extended by an amount equal to the depth of the recesses in the end members 12. This ensures desired greater clearance between the bottom edge of the door and the flooring, as necessary for proper operation and to pass over carpets.

As a modification of the assembled unit previously described, the metal bands that extend around the frame may pass through holes cut in the upright frame members so as more closely to embrace the door. In this way

it will be possible to dispense with spacing boards extending between the upright frame members, although the spacers disposed around the inside surfaces of the frame between such surfaces and the outer surfaces of the door will be retained. These spacers will then act to hold the frame and door firmly in the required ultimate spaced relationship when the metal bands are tightened around the unit.

This modification is illustrated in specific form in Figures 6 and 7 which show holes **35** formed extending horizontally through each of the side members **11** in positions aligned with the positions to be occupied by the metal bands **20**. The metal bands are passed through these holes **35** to lie closely against the inner flat surface of the door **13** as well as against the outer flat surface thereof. The spacing boards **16** shown in Figure 2 are omitted from this modified form of the invention, as are also the thin sheets **17** of corrugated paper that were previously employed to protect the side members **11** from injury by contact with the ends of the spacing boards **16**.

The remaining parts are similar to those seen in Figure 2 and the metal bands will continue to be disposed at the top, centre and bottom of the door in the manner illustrated in Figure 1. In particular, the spacers **15** disposed between the inner surfaces of the frame **10** and the outer edge surfaces of the door **13** will be retained to maintain the frame **10** spaced from the door **13** when the metal bands **20** are tightened.

Figure 7 serves to illustrate in a manner similar to Figure 5, the arrangement of the parts with the unit in position in a doorway. Figure 7 is identical with Figure 5, except that the holes **35** are seen, the section of Figure 7 having been taken through the centre of one of such holes **35** and serving to illustrate the manner in which such holes **35** are obscured in the finished assembly by the trimming strip **33** that forms the door stop. The other parts seen in Figure 7 are identical with those illustrated in Figure 5.

I claim:

1. As an assembled unit, a door frame having a pair of parallel side members, a complementary door, hinge means connecting said door to said frame, spacing members between the door and the frame, and a number of metal bands extending tightly around said frame in directions transverse to the longitudinal extent of said side members and through holes in said side members whereby to hold said side members firmly against movement away from each other and to maintain the required ultimate spaced relationship between the frame and the door.

2. A unit as claimed in claim 1, wherein each of said holes is positioned such that the span of the metal band extending therethrough will lie closely adjacent a flat surface of the door.

3. As an assembled unit, a door frame having a pair of parallel side members, a complementary door, hinge means connecting said door to said frame, spacing members between the door and the frame, and at least one tension element engaged with the side frame members to hold said side members firmly against movement away from each other and to maintain the required ultimate spaced relationship between the frame and the door, said tension element extending tightly around and through holes in said side frame members in a direction transverse to the longitudinal extent of said side frame members.

4. As an assembled unit, a door frame having a pair of parallel side members and a pair of end members removably secured thereto, a complementary door, hinge means connecting said door to one of said side members, wherein each end of each of said side members projects beyond the respective neighbouring end surface of the door by a distance equal to the required clearance between the bottom of the door and the floor after erection of the unit, and each of said end members extends between the ends of said side members with its surface adjacent the neighbouring end surface of the door at a distance from such door surface equal to the required clearance between the top of the door and the frame after erection of the unit.

5. A unit as claimed in claim 4 wherein each end of each said end members is formed with a recess to receive an end of a side member, and including fastening means each extending through an end of one of said end members towards the end edge surface of a side member to project longitudinally into the end of said side member.

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