

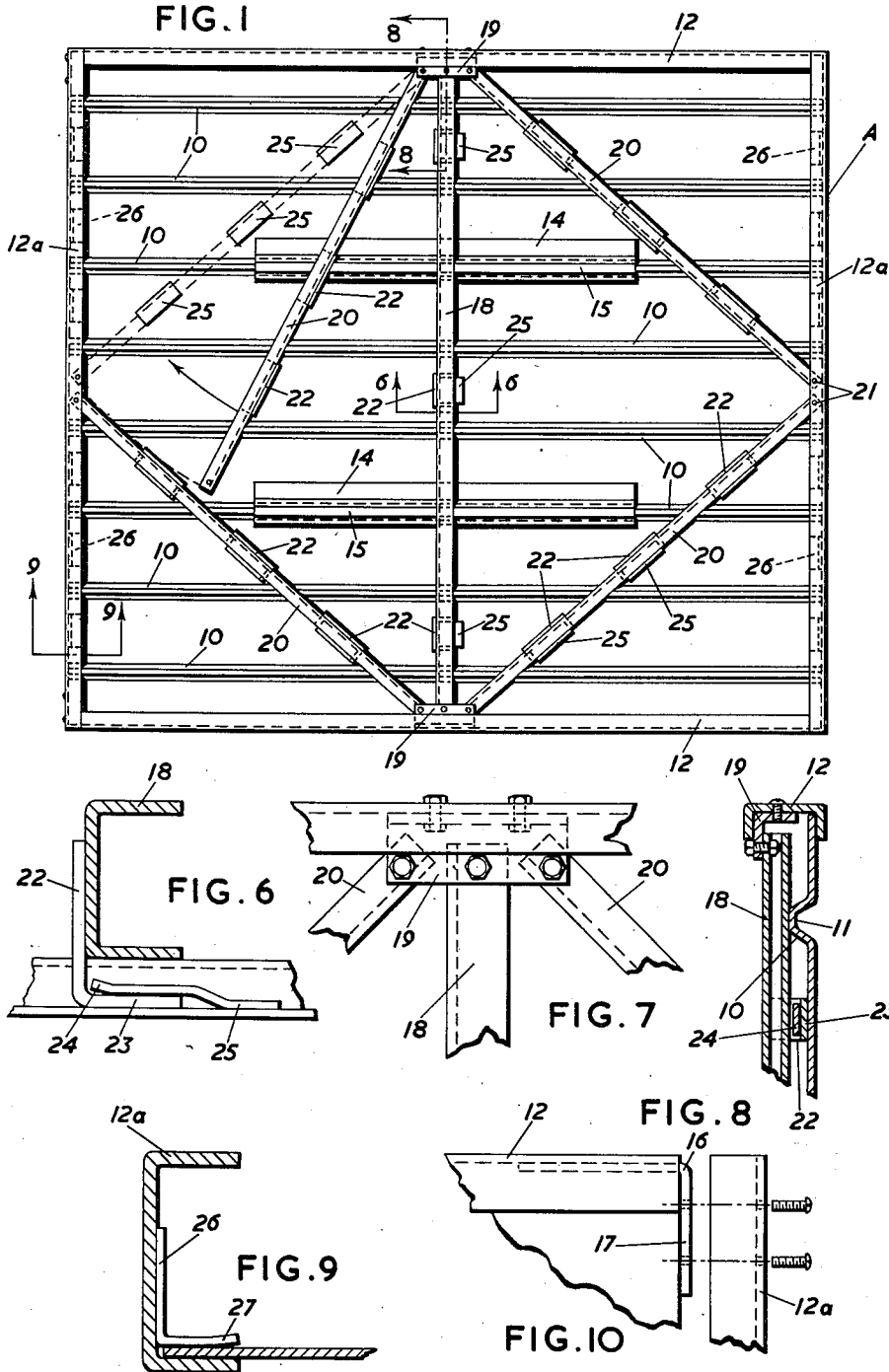
Sept. 3, 1957

A. M. BUEHLER
SECTIONAL METAL DOORS

2,804,953

Filed Dec. 5, 1955

2 Sheets-Sheet 1



Inventor
ALLAN M. BUEHLER
By *Fetherstonhaugh & Co.*
Attys

Sept. 3, 1957

A. M. BUEHLER
SECTIONAL METAL DOORS

2,804,953

Filed Dec. 5, 1955

2 Sheets-Sheet 2

FIG. 2

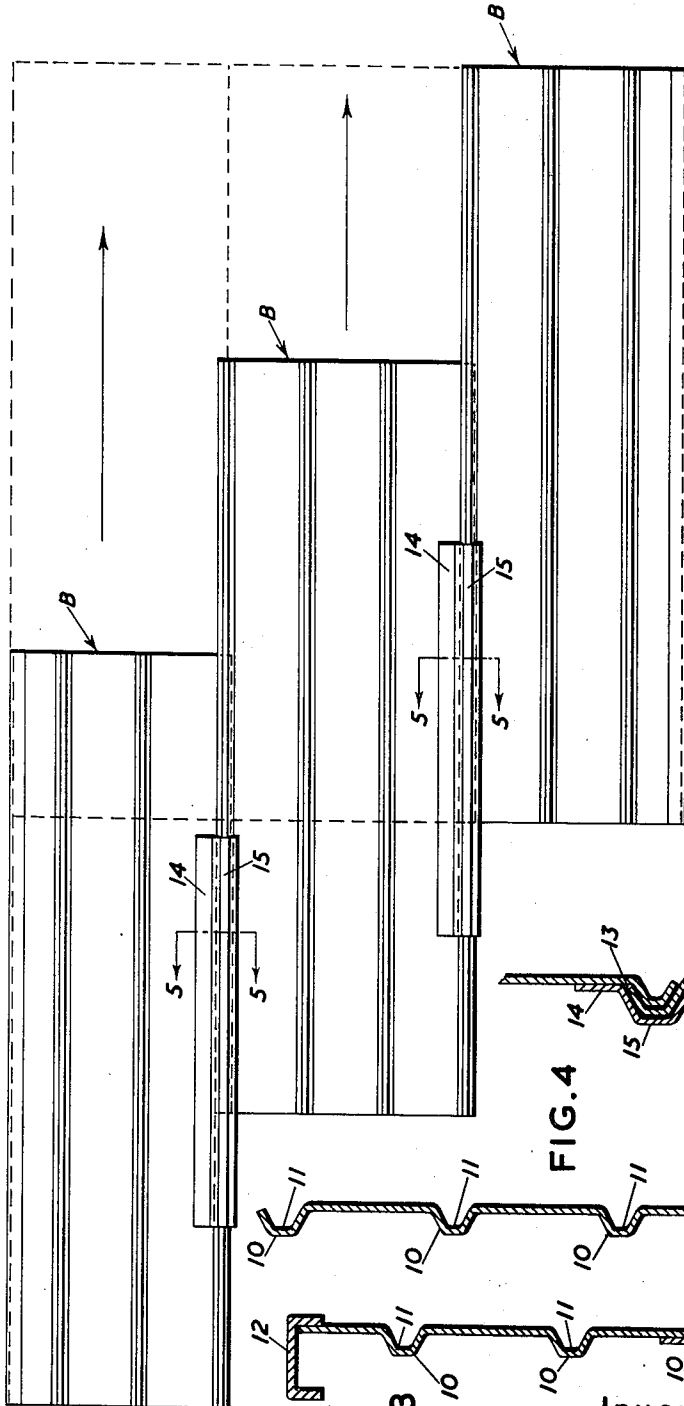


FIG. 4

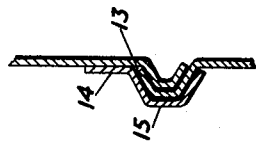
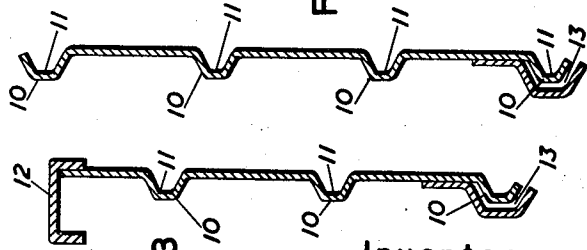


FIG. 5

FIG. 3



Inventor
ALLAN M. BUEHLER
By *Felton Torhaugh & Co.*
Attys

1

2,804,953

SECTIONAL METAL DOORS

Allan M. Buehler, Preston, Ontario, Canada

Application December 5, 1955, Serial No. 551,158

7 Claims. (Cl. 189—46)

This invention relates to sectional metal garage doors or the like.

It has been previously proposed to make sectional metal doors, such as garage doors. In the general type of construction proposed they are made up of a plurality of metal sections formed with longitudinal marginal flanges which are butted with one another using a number of sections sufficient to give the necessary size of door, the flanges being secured together by means of bolts or the like. The flanges may run horizontally or vertically as desired, except that when they run vertically the length of the sections determines the height of the door, and when they run horizontally the length of the sections determines the width of the door.

Such a construction requires a large number of bolts or other securing means, since the sections are secured together along the length of the flanges, while, moreover, it is necessary also to bolt on bracing means. In some such structures as many as 142 bolts are required with the result that it takes a great deal of time to assemble a door.

The present invention relates to a sectional door which can be manufactured readily and which is very easy to assemble, requiring on the average not more than approximately 16 bolts or metal screws, and which can be easily assembled within half an hour.

The invention generally comprises a door for garages and the like, embodying a plurality of channeled sections preferably of greater longitudinal than lateral dimension, each having receiving means adjacent to one edge, the latter being capable of receiving the opposite edge of an adjacent section, said sections being connected together preferably by slidably engaging the edge of one section with the receiving means of an adjacent section, and bracing means engaging said sections to retain the latter firmly as a complete door unit. Substantially rigid marginal members are secured to the marginal edges of a door unit to form finished margins therefor, and which in some instances may also constitute a bracing means therefor. However, it is preferred that special bracing means be employed in addition to marginal channel units for producing an extremely rigid strong unit. Preferably the bracing means takes the form of a composite unit to brace the door vertically as well as angularly, wherein the angular bracing elements are pivotally attached to the bracing unit and swing to position engaging the sections of the door at predetermined points.

The invention will be clearly understood by reference to the following detailed specification taken in conjunction with the accompanying drawings.

In the drawings:

Figure 1 is a front elevation of a complete door unit according to the present invention, with one of the bracing members yet to be secured.

Figure 2 is a miniature view of three door sections in the process of being assembled.

Figure 3 is a cross-section taken through an outer door section of preferred type.

2

Figure 4 is a cross-section taken through an inner door section of preferred type.

Figure 5 is an enlarged section taken on the line 5—5 of Figure 2.

Figure 6 is an enlarged section taken on the line 6—6 of Figure 1.

Figure 7 is a fragmentary detail of the manner of attachment of the bracing means.

Figure 8 is a section taken on the line 8—8 of Figure 1.

Figure 9 is a section taken on the line 9—9 of Figure 1; and

Figure 10 is a fragmentary detail of the manner of securing marginal channels.

Referring to the drawings, A indicates a sectional door as a whole, constructed in accordance with the present invention, which primarily is composed of a plurality of sections B of greater length than width, and preferably three in number, to provide, when connected, a door unit of suitable width or length depending upon whether the longitudinal direction of the sections is vertical or horizontal. The length and width of the sections is chosen to provide for the appropriate dimensions of the ultimate door unit, in both direction. Each section is provided with longitudinally extending substantially V-shaped ribs 10 which are pressed therefrom to provide for required strength, such ribs forming a channel 11 on the opposite surface. In other words, the sections are suitably channeled to provide rib reinforcement.

It is preferred to employ two types of sections B for each door unit, namely, outer sections such as shown in Figure 3, and an inner section or sections as shown in Figure 4. In this instance, the outer sections terminate along their inner edge in a channeled rib 10 and along their outer edges in a flat free edge which, as shown in Figure 3, may be provided with or subsequently have applied thereto a substantially rigid marginal element 12 which preferably takes the form of a channel element as shown, and which is preferably spot welded thereto. This will form a finished marginal edge for the door unit, either upper or lower or a side edge, depending upon whether the sections B in their longitudinal dimension are disposed vertically or horizontally. Alternatively, of course, the marginal element or channel member 12 might be left as an accessory to be assembled at the time that the sections are put together, and it could be bolted or screwed to the outer free edge of the section. For convenience of reference hereinafter, the marginal elements 12 (and 12a later referred to) are given the specific designation "channel members."

The inner sections, as shown in Figure 4, terminate at both ends in a channeled rib 10. Moreover, by reference to Figure 5 and also to Figure 1, it will be noted that the inner edge of one of the outer sections and one edge of the inner sections is provided with a receiving recess 13 by applying to the section a channel plate 14 having a channeled rib 15 of larger dimension than that of the marginal channeled rib 10 of the section, so that when the channeled rib 15 of plate 14 is disposed to overlies the channeled rib 10, the receiving recess 13 is provided. Therefore, as clearly shown in Figure 2, the sections B making up a door are joined by sliding a marginal channeled rib 10 of a section into the receiving recess 13 of the adjacent section, so that this structure forms receiving means on each section for receiving and securing adjacent sections, against lateral displacement.

When the necessary number of sections have been united in this manner to form the basic element for a complete door unit, the marginal channel members 12 being already attached, it is then necessary to apply marginal channel members 12a to the other two free edges of the door unit. These are applied, as shown in Figure

3

1, and to secure them, the marginal channel members 12 may be formed as shown in Figure 10 with an angle bracket 16 applied thereto which may be done by spot welding, riveting, or the like, as part of prefabrication. One arm 17 of the bracket 16 is left to depend at right angles to the channel member 12 and is orificed to receive a pair of bolts, metal screws, or the like. Thus the marginal channels 12a may be applied to the unbound edges of the doors by fastening ends of these channels to the arm 17 of bracket 16.

It will be noted by reference to Figure 3 and also to Figure 8, that the depth of the channeled ribs 10 is substantially less than the cross-sectional width of the channels 12, and incidentally also in respect of channels 12a. This leaves the necessary space for securing and mounting bracing means to give the door unit the maximum rigidity desired, although it will be understood that the marginal channel members 12 and 12a can constitute bracing means and could be made of a width substantially the same as the channeled ribs 10 of the sections B, since, depending upon the gauge of the metal used, and the purposes for which the door is designed, a practical unit might be provided in this way without additional bracing. Particularly, however, for light metal sections, it is desired to employ wider channel members 12 and 12a than the depth of the ribs 10, and an intervening bracing structure of suitable kind, which will bear upon the crest of the ribs and fit beneath a flange, of the marginal or channel members, which is disposed in spaced parallel relation to the sections B and their ribs 10.

A preferred form of bracing structure is illustrated in Figure 1 with details in Figures 6, 7 and 8. This bracing structure takes the form of a central brace element 18 preferably of channel cross-section which extends over the width or length of the door unit as the case may be. This element has pivotally attached thereto at each end an angle plate 19 (see Figures 7 and 8). Preferably also attached to each such angle plate in a pivotal manner are the subsidiary bracing elements 20 preferably of channel section and shorter than bracing element 18. This bracing structure may be made up as a complete unit and, with the door assembled as previously described, it is only necessary to slide the angle plates 19 at each end of brace 18 into position underlying a flange of the channel members 12 as shown in Figures 1 and 8 and to secure the angle plate to the channel members 12 by means of two securing elements such as bolts or metal screws.

The subsidiary bracing elements are swung outwardly and secured beneath the adjacent flange of the channel members 12a by a similar pair of securing elements which pass through the flange of these channels, the securing element being as at 21 in Figure 1. The bracing elements 18 and 20, therefore, bear against the crest of the channeled ribs 10 and are disposed between these ribs and the spaced flange of the channel members 12 and 12a, such as shown in Figure 8, and suitable spacers may be used between the channel members 12a and elements 18 and 20 if necessary to correspond with the thickness of the plate 19 to which they are pivoted.

Preferably, I provide a means of assuring a tight bearing engagement between the crest of channeled ribs 10 and one side of the bracing elements 18 and 20. In this connection, reference is made to Figure 6 wherein the brace 18 has secured to it an angle plate 22 in such a manner as to provide a locking element or tongue 23 in parallel spaced relationship to its inner flange, and spaced therefrom substantially to the depth of the channeled ribs 10. This structure is provided at spaced apart points along the length of the brace 18 as shown in Figure 1, and on each section B making up the door unit a preferably flexible securing element or lip 24 is provided by suitably securing a plate 25 to the inner surface of the section at points substantially as indicated in Figure

4

1. The lips 24 form a receiving element for the tongues 23 of the bracing member 18, so that when the latter is slid into position, engagement takes place between these lips and tongues so that the bracing member 18 is held firmly in bearing engagement against the crest of the channeled ribs 10, when this bracing member is secured in position.

In a similar manner, the subsidiary braces 20 are provided with securing elements or tongues 23, such as shown in Figure 6, and the sections are provided with lips 24 disposed along an inclined line as shown in Figure 1, so that the subsidiary braces 20 are secured to each section in a similar manner. Thus, a very rigidly braced door unit is provided. Moreover, it is preferred to apply also to the channel members 12a angle elements 25 which provide the flexible fingers 27 (see Figure 9) in spaced relation to the flange of channel member 12a normally engaged by each section, so that the element 27 together with this flange forms a clip to receive the free edges of each section as the channel members 12a are disposed in position as margins of the door unit. Therefore, the door sections are very rigidly secured in the manner described.

The simplicity of this rigidly constructed unit, both as a final product and its assembly, will be apparent by describing the preferred form as supplied and constructed. The door unit may be supplied as a complete packaged knocked-down unit, comprised of two outer channeled sections B having the marginal channel members 12 secured to their outer edges; one or more inner sections as required, the channel members 12a and the bracing unit, including the braces 18 and 20 pivotally secured to the angle plates 19. The door sections are first of all secured together by slidably connecting the sections at their appropriate edges as described. The channel members 12a are then applied and secured by two securing elements at each end which thus requires in all only eight securing elements. The brace 18 is secured in position by two screws or other securing elements at each end and the subsidiary braces 20 are swung to position and secured to the channel members 12a by two securing elements in each case, making a total of sixteen securing elements, and such door can be assembled and completed in approximately twenty minutes to half an hour. This is in contrast to prior structures requiring a very large number of securing elements and a substantial period of erecting time.

As indicated, modifications may be made in structure, since a suitable door might be provided without the use of bracing elements as described, and employing only the channel members secured in a manner to function as bracing elements as well as door margins. Moreover, it will be appreciated also that angle members might be employed instead of the channel members, whereas some modification might be made in the securing features without departing from the principle of the invention. It is, therefore, intended that the foregoing description be considered in the light of a preferred embodiment of my invention.

I claim:

1. In a door having a rectangular marginal frame and a body of sheet material secured thereto; bracing means therefor, comprising a mounting member and a plurality of substantially rigid bracing elements, having one end of each pivotally connected to said mounting member, the latter being attachable to an element of said rectangular frame and to dispose said bracing elements in contact with said body; said bracing elements being swingable on said mounting member to engage, for connection, the free ends of said bracing elements with another part of said frame.

2. In and for a door having a rectangular marginal frame and a body of sheet material secured thereto; bracing means therefor, comprising a substantially rigid primary bracing element a pair of mounting members, one

5

attached to each end of said primary element, a plurality of auxiliary bracing elements pivotally connected to said mounting members, each of the latter being securable to one of a pair of elements of said frame which are opposed to one another to dispose said bracing elements in contact with said body, said auxiliary bracing elements being swingable on said mounting members to engage, for connection of their free ends, other elements of said frame.

3. A sectional door, comprising a plurality of similar rib sections, means for securing said sections together to form a basic door unit having ribs projecting from one face thereof; substantially rigid marginal members secured to the edges of said door unit having elements thereof projecting beyond said face of the door unit to a greater degree than the projection of said ribs; and bracing means connected to said projecting elements of said marginal members and held in bearing engagement with said ribs to form a substantially rigid door; said substantially rigid marginal members being formed with flanges to engage a surface of the door unit adjacent marginal edges thereof, and means in connection with at least certain of the marginal members for slidably receiving the marginal edges of said door unit, said means retaining said edges of the door unit against movement at right angles to the plane of said flange.

4. A sectional door, comprising a plurality of similar rib sections, means for securing said sections together to form a basic door unit having ribs projecting from one face thereof; substantially rigid marginal members secured to the edges of said door unit having elements thereof projecting beyond said face of the door unit to a greater degree than the projection of said ribs; and bracing means connected to said projecting elements of said marginal members and held in bearing engagement with said ribs to form a substantially rigid door; said bracing means comprising at least one substantially rigid member connected between substantially rigid marginal members, and means that is engaged and disengaged as the bracing member is moved over the upper edges of the said ribs on the face of the door unit, that co-operates between said bracing member and sections of said door unit to secure said sections to the bracing member when said member is connected to said marginal members.

5. A sectional door, comprising a plurality of similar rib sections; means for securing said sections together to form a basic door unit having ribs projecting from one face thereof; substantially rigid, flanged, marginal members secured to the edges of said door unit having said flanges projecting inwardly of the edges of said door unit and in spaced relation to said face of the door unit to a greater degree than the projection of said ribs; and bracing means connected to said flanges and held in pressure bearing engagement with said ribs to form a substantially rigid door; said door sections being provided with securing elements between ribs thereof for slidably receiving co-

6

operating securing means on said bracing means, said securing means maintaining pressure bearing engagement between said bracing means and said ribs intermediate the points of securement of said bracing means with the marginal members.

6. A sectional door, comprising a plurality of similar rib sections; means for securing said sections together to form a basic door unit having ribs projecting from one face thereof; substantially rigid marginal channel members secured to the edges of said door unit having one flange overlapping and engaging the other face of said door unit and the other flange projecting beyond the first mentioned face to a greater degree than the projection of said ribs; and bracing means connecting between marginal members and disposed between the said projecting flange thereof and the ribs of said sections, said bracing means being of a width to engage said ribs in pressure engagement when connected to said marginal members and form a substantially rigid door; two opposed marginal members being secured to the remaining two complementary marginal members, and means being provided co-operating between said first mentioned marginal members and the adjacent marginal edges of said door unit for slidably receiving and securing the said first mentioned marginal members along said adjacent edges of the door unit.

7. A sectional door, comprising a plurality of similar rib sections; means for securing said sections together to form a basic door unit having ribs projecting from one face thereof; substantially rigid marginal channel members secured to the edges of said door unit having one flange overlapping and engaging the other face of said door unit and the other flange projecting beyond the first mentioned face to a greater degree than the projection of said ribs; and bracing means connecting between marginal members and disposed between the said projecting flange thereof and the ribs of said sections, said bracing means being of a width to engage said ribs in pressure engagement when connected to said marginal members and form a substantially rigid door; said bracing means comprising a main bracing member extending between two diametrically opposed marginal members and connected to the latter, and a plurality of angular bracing members extending between adjacent marginal members and connected to the latter, and means co-operating between said bracing members and said first mentioned face of the door unit for receiving and securing said sections to said bracing means between ribs of said sections when said bracing members are disposed in mounted position between said marginal members.

References Cited in the file of this patent

UNITED STATES PATENTS

2,597,786 Fontaine May 20, 1952