

Nov. 8, 1960

V. E. CLAPSADDLE, JR

2,959,221

SECTIONAL SLIDING DOOR

Filed June 11, 1957

3 Sheets-Sheet 1

Fig. 1.

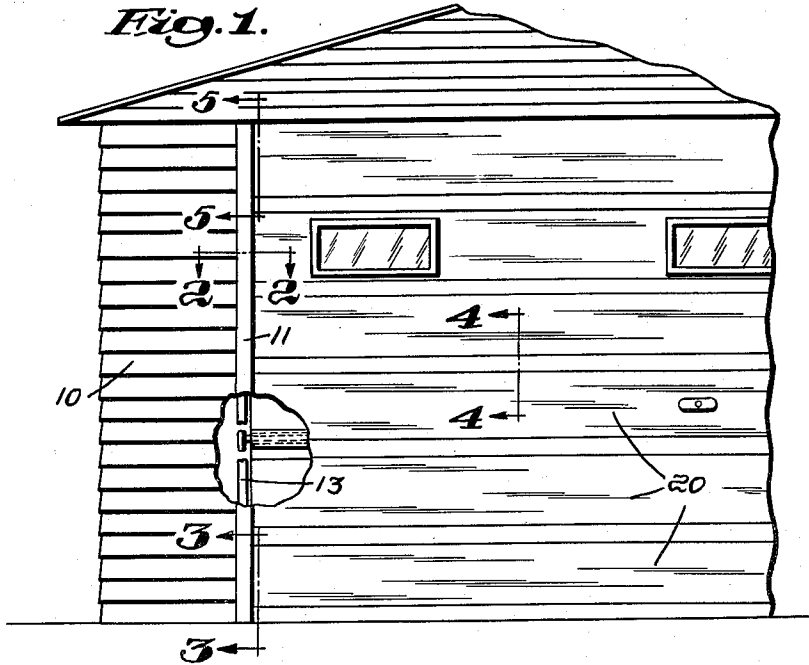


Fig. 2.

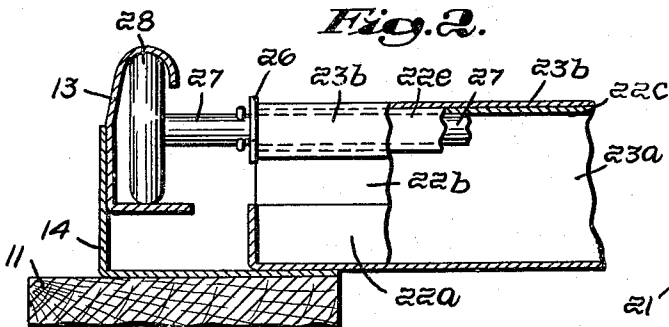


Fig. 3.

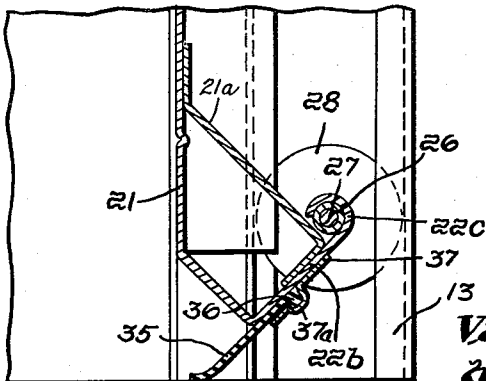
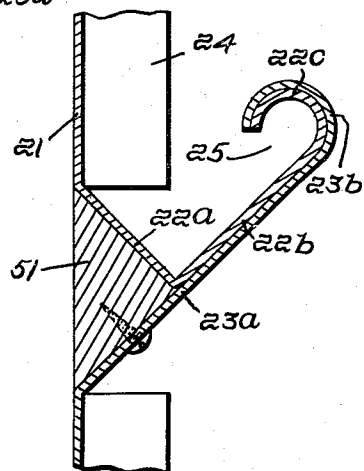


Fig. 4.



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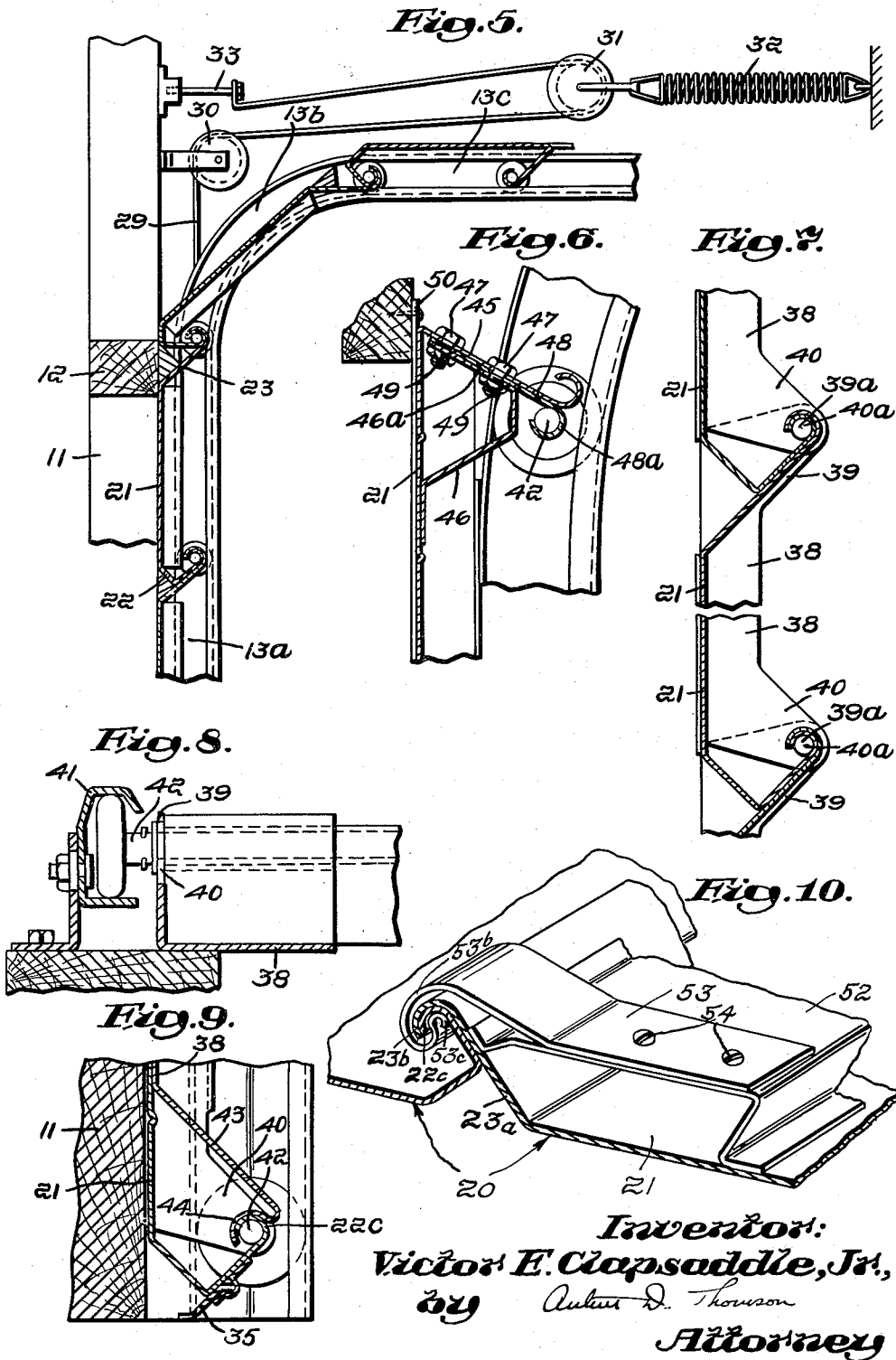
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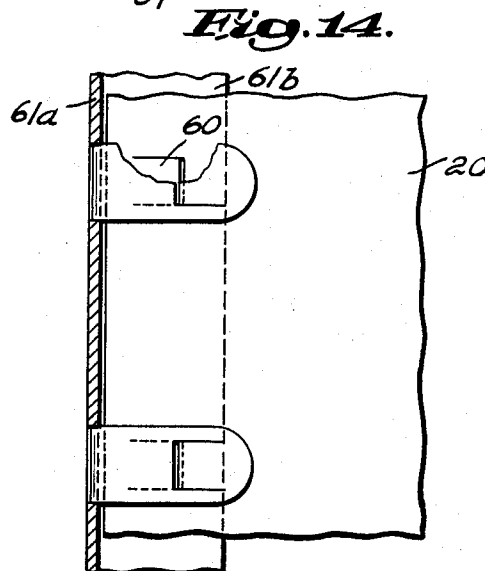
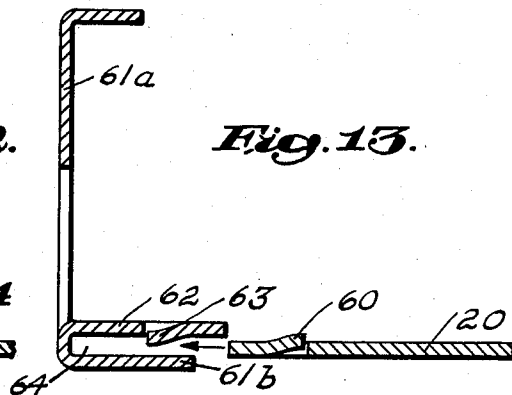
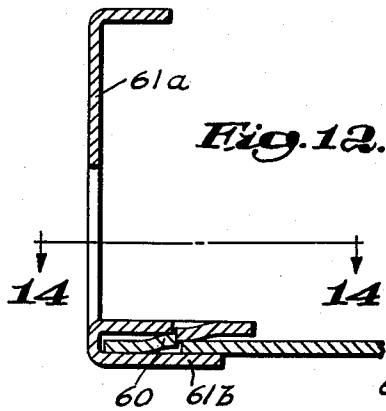
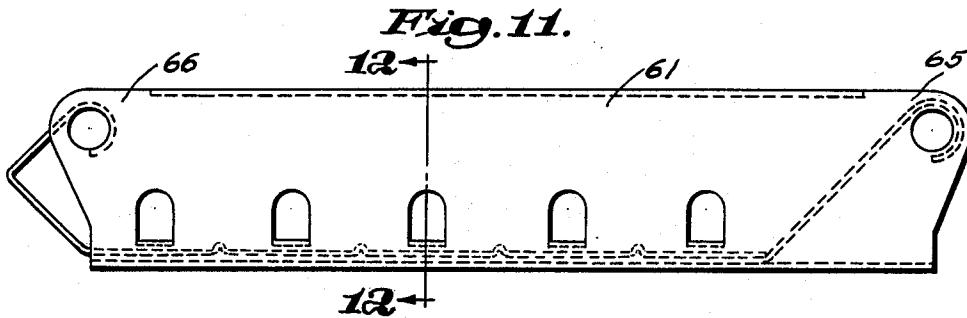
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2,959,221

SECTIONAL SLIDING DOOR

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Filed June 11, 1957, Ser. No. 665,025

6 Claims. (Cl. 160—201)

This invention relates in general to sliding doors, and more particularly to doors of the overhead type commonly used in garages, the present application being a continuation-in-part of my copending applications Serial No. 456,531, filed September 16, 1954 and Serial No. 588,384, filed May 31, 1956, both now abandoned.

A typical overhead sliding door consists of a number of panels hinged together and provided at the sides with rollers which run in tracks on the door jamb. The tracks ordinarily have curved portions at the top leading to horizontal portions which extend back into the building, so that the door can be rolled from a vertical position to a horizontal, overhead position. Such doors are ordinarily assembled at the factory and shipped as complete units. Doors for openings of other than standard size must be custom made and are quite costly. Furthermore, the door panels are usually connected by separate hinges which are expensive to manufacture and attach, and which require the use of heavy panels in order to make a door which is sufficiently rigid. In order to insure a tight fit when the door is closed, the track is tapered from top to bottom, so that the rollers will fit tightly in the track when the door is in closed position. The door is thus likely to stick in closed position and may require considerable force to open.

The general object of this invention is to provide an overhead sliding door which may be manufactured less expensively than doors previously on the market, without sacrificing any rigidity or durability, which can be readily adapted to openings of different sizes, which can be shipped in compact form and assembled on the job by an unskilled laborer, and which, when assembled, fits tightly against the jamb but can be raised with a minimum of effort.

The door consists in general of a number of horizontal panels identical in construction formed from sheet metal and having integral flanges consisting of flat sloping portions and open tubular portions along their upper and lower edges, the upper flange of each panel interlocking with the lower flange of the panel above. The interlocking tubular portions of the flanges form seats for roller assemblies which are mounted at the ends of the panels and engage the tracks on either side of the door opening. The sloping portion of the lower flange of each panel rests on the sloping portion of the upper flange of the panel below. Preferably the panels have stiffeners attached to their side edges with overlapping lugs through which tubular sleeves, which support the roller shafts, are inserted. The bottom panel has a rubber strip attached along its lower edge for sealing the bottom of the opening.

In the drawings illustrating the invention:

Fig. 1 is a front elevation, partly broken away, of a garage on which is installed a door constructed according to the invention;

Fig. 2 is an enlarged fragmentary cross-section taken along line 2—2 of Fig. 1;

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Fig. 3 is an enlarged fragmentary cross-section taken along line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary cross-section exemplifying the interlocking connection of a pair of panels taken, for example, along line 4—4 of Fig. 1;

Fig. 5 is an enlarged fragmentary cross-section taken along line 5—5 of Fig. 1;

Fig. 6 is an enlarged fragmentary vertical cross-section in the region of the top of the door showing the top panel in process of installation;

Fig. 7 is an enlarged fragmentary cross-section taken in the same region as Fig. 4, showing a modification of the end stiffeners of the panels;

Fig. 8 is a view similar to Fig. 2 showing the modification shown in Fig. 7;

Fig. 9 is a view similar to Fig. 3 showing the modification of Fig. 7;

Fig. 10 is an enlarged fragmentary perspective view of a modification of the connection between the panels;

Fig. 11 is an end view of a panel with a modified stiffener construction;

Fig. 12 is an enlarged fragmentary cross-section taken along line 12—12 of Fig. 11;

Fig. 13 is a section similar to Fig. 12 showing the stiffener and panel prior to assembly; and

Fig. 14 is a fragmentary cross-section taken along line 14—14 of Fig. 12.

The door is intended to be mounted in a garage or similar building, generally indicated by the numeral 10, having a door opening bounded by the usual jamb 11 and header 12. A track, generally indicated by the numeral 13, is mounted on the rear of the jamb on either side of the door. As shown in Fig. 5, each track 13 has a vertical part 13a, a curved part 13b, and an overhead horizontal part 13c. The track may be secured to the jamb in any suitable manner, for example by means of angle bars 14 welded to the track and screwed to the jamb. The curved portions 13b of the track are disposed inside the building above the door opening and merge with the horizontal overhead portions 13c which extend back into the building and on which the door rests when it is open.

The door is made of a number of generally rectangular panels 20, all of which are substantially the same in construction. A typical panel is formed from sheet metal and consists of a flat rectangular body portion 21, a flange 22 along the lower edge having a downwardly and rearwardly sloping flat portion 22a (Fig. 4), an upwardly and rearwardly sloping flat portion 22b, and a tubular portion 22c, and an upper flange 23 consisting of an upwardly and rearwardly sloping flat portion 23a and a tubular portion 23b. Each panel may be provided with stiffener plates 24 at each end. These plates may be integrally formed with the panel or may be made separately and attached to the panel. The tubular portion 23b of the upper flange is of an internal diameter suitable for providing a sliding fit with the outer diameter of tubular portion 22c, and these portions of adjoining panels interlock, as shown by Fig. 4, and serve as a continuous hinge between the two panels across their entire width. The tubular portion 23b is formed approximately as three-quarters of a circle, leaving an opening 25 between the edge of portion 23b and the flat portion 23a. Tubular portion 22c may be similarly formed. The panels can be initially connected together by holding the lower panel slightly above and sloping to the rear of its final position and snapping portion 23b around portion 22c of the upper panel with a rolling motion.

It will be noted that the panel portions 22c and 23b are not true tubes, but are more accurately tubular segments, because of the provision of the opening 25 and the corresponding opening between the portion 22c and

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the flat portion 22b. However, for brevity and convenience, the portions 22c and 23b have been referred to herein as tubular portions.

The roller assemblies which are mounted in either end of tubular portion 22c of each panel flange, consist of a sleeve 26 (Fig. 2) in which is mounted a shaft 27 carrying on its outer end a roller 28. These rollers engage in the track 12 on either side of the doorway. On either side of the doorway a cable 29 is connected to the bottom roller of the door and passes around a fixed pulley 30 and a movable pulley 31 attached to a spring 32; and then is anchored to the wall of the garage, for example by a bolt 33. This spring and cable arrangement assists in raising the door and sliding it into the overhead position.

As shown in Fig. 3, the bottom panel has a brace plate 21a attached to its body portion 21 and to sloping portion 22b of the bottom flange. A rubber sealing strip 35, having a bead 36, is attached to the under side of portion 22b, by means of a retainer strip 37 having a rib 37a which engages around bead 36. Strip 35 extends downward at a slant and engages the floor of the garage when the door is closed. This strip is fairly thin and flexible and, being disposed on a slant, bends readily to conform to irregularities in the floor, thus forming an effective weather seal at the bottom of the door.

In the modification shown in Figs. 7 and 8, the panels are shown as having end stiffeners 38, each of which carries an upwardly and rearwardly extending lug 39 at its upper end, and a downwardly and rearwardly extending lug 40 at its lower end. The upper lug 39 of each panel stiffener, and the lower lug 40 of the stiffener on the panel above, overlap and have registering openings 39a, 40a which align with the ends of tubular portions 22c and 23b. The roller assemblies may consist merely of a roller 41 mounted on ball bearings on the outer end of a shaft 42 which passes through openings 39a, 40a into tubular portion 22c. Alternatively, the sleeve 26 of the roller assembly shown in Fig. 2 may be fitted through these openings into portion 22c in a similar manner. The mounting of the rubber strip 35, as illustrated in Fig. 9, is the same as in Fig. 3, but a different kind of bottom stiffener plate 43 may be employed. This plate has a curved portion 44 which fits around tubular portion 22c.

In the form shown in Figs. 7-9, the shear stress of the roller shafts is borne by the side stiffener lugs 39 and 40. In case of an obstruction in the track, any extra force on the roller will not be transmitted to the tubular portions 22c and 23b. The latter are thus protected against being bent out of shape, and will maintain a free hinging action. The overlapping stiffener lugs 39 and 40 also add rigidity to the structure.

The top panel, as illustrated in Fig. 6, has a straight downwardly and rearwardly sloping extension 45 along its upper edge. A bracket 46 is attached to the body 21 of the panel and has a sloping portion 46a which is connected to extension 45 by bolts 47. Between portion 46a and extension 45 is mounted a roller bracket 48 having a curved end 48a which receives the roller shaft 42. Bracket 48 has elongated slots 49 which permit adjustment of the position of the top roller. The side stiffener 38 of the upper panel has an extension 50 provided with a hole for nailing.

In hanging the door, the top panel is first placed in the desired position at the top of the doorway and secured temporarily by nailing extension 50 to the header. This panel can be readily levelled in mounting so that the door will hang straight. Tubular portion 23b of the next to the top panel is then snapped around tubular portion 22c of the top panel, and the rest of the panels are hung, one below the other, in the same manner. The rollers are then inserted in the ends of the tubular portions 22c of the interlocked panels, and finally the tracks are set in position and secured to the jamb, and

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the cable and spring assemblies mounted and adjusted. When the installation is complete, the nails are removed from extensions 50.

For very wide doors, the panel connection shown in Fig. 10 may be used. A stiffening strut 52 is connected along the upper part of each panel 20, for example by spot-welding to the body portion 21 and flange portion 23a. An auxiliary hinge strip 53 is attached to strut 52, for example by self-tapping screws 54. This strap has a curved portion 53b, which passes around tubular portion 23b of the upper panel and a curved reentrant end portion 53c, which fits inside tubular portion 22c of the lower panel. The strap may be applied when the door is assembled by snapping the curved portions into position around the interlocking tubular portions of the panels and then securing the strap to strut 52 by means of screws 54. Depending on the width of the door, a single strap, disposed near the center of each panel may be used, or several straps may be applied at spaced intervals across the door.

The form of side stiffener connection shown in Figs. 11 through 14 is particularly suitable for doors made of aluminum as it eliminates the expensive operations of welding or riveting. The panel 20 is the same in contour, but has a series of rectangular tabs 60 punched out near its side edges. These tabs are offset slightly out of the plane of the panel toward the inside and face away from the adjacent side edge. The side stiffener 61 is similar in overall shape to stiffener 38 but has a number of lugs 62 which are punched out of the side wall 61a and bent over parallel to the front flange 61b. A rectangular tab 63 is punched out of each lug and offset slightly toward flange 61b. These tabs face toward wall 61a.

Lugs 62 and flange 61b form between them a recess 64 in which the side margin of panel 20 is received. The panel and stiffener are assembled by pushing the side of the panel into grooves 64 with tabs 63 in register with tabs 60. The tabs have enough spring to snap past one another, and the ends of the tabs engage, when the parts are completely assembled, as shown in Fig. 12 to lock the stiffener on to the panel. The stiffener has lugs 65 and 66, corresponding to lugs 39 and 40 in Fig. 7, which overlap on successive panels and reinforce the hinge connection when the rollers are inserted.

The assembly of the door requires no particular skill or special tools, and the door may be hung by the garage owner himself, if he desires to keep the cost to a minimum. Another advantage arising from the fact that the door can be readily assembled on the job, is that the parts for a door installation can be shipped and stored in a compact package of the length and width of a single panel, thus effecting a considerable saving in the floor space required by the manufacturers for storage, and in shipping charges, as well as being more convenient to handle than an assembled door.

All the panels, except for the top and bottom panel, are interchangeable, so that the owner can vary the position of a panel provided with windows or locks, for example, to suit his needs. A damaged panel can be easily replaced without taking down the door.

All the panels are basically formed from a single rolled shape so that the same forming tools can be used for doors of all sizes. The manufacturer need not keep a number of doors of different sizes in stock, as the basic rolled lengths can be readily cut to size and the end stiffeners applied on receipt of an order. Any appropriate number of panels can be assembled together to accommodate door openings of various heights.

The continuous interlock of tubular portions 22c and 23b along the edges of the panels eliminates the expense of making and installing separate hinges and roller brackets, and also stiffens the structure so that relatively light sheet metal panels can be used. It will be noted also that the sloping portion 22b of each lower panel

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flange seats firmly on portion 23a of the panel below, when the door is closed, thus further stiffening the door in closed position. The upward slope of these portions prevents the entry of snow and rain. If desired, however, a triangular strip of rubber 51 (see Fig. 4) can be attached all along the lower part of portion 23a of each panel for a weather seal. Portion 22a of the panel above will then seat on this strip when the door is closed, portion 22a being substantially at right angles to portions 22b and 23a. The front face of strip 51 is aligned with the front faces of the panels so as to provide a flush surface when the door is closed.

The upward and rearward slope of portions 22b and 23a of the panels also serves another purpose. When the door is closed, the weight of each panel causes it to tend to slide forward on the panel below. The panels will thus tend to rest tightly against the jamb, and it is unnecessary to taper the track to provide a tighter fit for the rollers at the bottom, as in the conventional door. This makes the door easy to open. When the door is lifted, for example, by handles on one of the upper panels, the panels will tend to slide back on each other, minimizing friction against the jamb.

What is claimed is:

1. A sectional door of the type intended to roll along tracks from an upright closed position to an overhead open position, comprising a number of panels, disposed one above the other, each panel having a generally rectangular body portion with upper and lower edges and side edges, a continuous top flange disposed along the upper edge, a continuous bottom flange disposed along the bottom edge, and a pair of stiffening members, one disposed along and connected to each side edge, the flanges having tubular segment portions and the tubular segment portion of the top flange of one panel interfitting with the tubular segment portion of the bottom flange of the panel above, each of said stiffeners having an upper lug and a lower lug, the upper lugs of the stiffeners on one panel overlapping the lower lugs of the stiffeners on the panel above and each overlapping pair of lugs having registering openings disposed alongside the interfitting tubular segment portions, and a number of roller assemblies, each having a supporting member passing through the openings of one of the overlapping pairs of lugs and being frictionally secured in the adjacent interfitting tubular segment portions.

2. A sectional door comprising a number of panels, including a pair of panels disposed one above the other, the upper of said pair having a continuous lower flange provided with a tubular segment portion, and the lower of said pair having a continuous upper flange provided with a tubular segment portion, said tubular segment portions being disposed one within the other to form a continuous interfitting hinge, and at least one strap member connected to one of said pair of panels, said strap member having a first curved portion disposed around said tubular portions and a second reentrantly curved portion disposed within the inner of said tubular portions.

3. A sectional door as described in claim 2, the panel to which said strap is connected having an attached stiffening member on which said strap is mounted.

4. In a sectional door, of the type adapted to be moved from an upright closed position to an open position and composed of a number of interchangeable similar panels formed of sheet material; a first panel having a generally rectangular body portion with top, bottom and side edges and a front face, a top flange disposed along said top edge, and a bottom flange disposed along said bottom edge, each of said flanges running substantially the full width of the panel and having a rearwardly extending flat portion and a generally tubular portion, and a pair of stiffening members, one disposed along each of said side edges and extending rearwardly, said stiffening members running substantially the full height of said body portion; a second panel disposed below the first panel and

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having a body portion, flanges, and stiffening members of the same construction and arrangement as those of the first panel, the generally tubular portion of the top flange of the second panel being engaged with the generally tubular portion of the bottom flange of the first panel to form a continuous hinge, and the flat portions of said flanges converging to form a groove between the body portions of the two panels, each of said stiffening members having an upper portion projecting across an end of the adjacent top flange tubular portion and a lower portion projecting across an end of the adjacent bottom flange tubular portion, the upper portions of the stiffening members of the second panel overlapping the lower portions of the stiffening members of the first panel; and a pair of roller assemblies, each including a supporting member frictionally received in one end of said engaged tubular portions, the overlapping stiffening member portions having registering circular openings substantially coaxial with said engaged tubular portions, the respective supporting members passing through said openings.

5. A sectional door comprising a number of panels including a pair of panels disposed one above the other, and each having a substantially flat, rectangular body portion with a side edge, the upper of said pair having a continuous lower flange provided with a tubular segment portion, and the lower of said pair having a continuous upper flange provided with a tubular segment portion, said tubular segment portions being disposed one within the other to form a continuous interlocking hinge, each of said body portions having tabs offset from the plane thereof adjacent said side edge, and a stiffener member along its side edge with a front flange disposed parallel to the body portion and tabs engaged with the tabs of the panel to connect the stiffener to the panel, the stiffener connected to the upper panel having a lower lug, and the stiffener connected to the lower panel having an upper lug overlapping said lower lug, said lugs having openings aligned with said tubular segment portion, and a roller assembly having a supporting member passing through said openings and frictionally engaged in said tubular segment portions.

6. A panel assembly for a sectional door of the type intended to move between an upright closed position and an overhead open position, comprising, in combination, a pair of panels having substantially flat rectangular body portions with top, bottom and opposite side edges, a lower flange extending along the bottom edge of one of said panels and defining a continuous tubular segment, an upper flange extending along the top edge of the other of said panels and defining a continuous tubular segment, said tubular segments being disposed one within the other, each of said panels having a side stiffener disposed along each of the panel's side edges, said side stiffeners on one panel overlapping the side stiffeners on the other panel adjacent the ends of said tubular segments, said side stiffeners having registering openings in their overlapping portions disposed in alinement with the ends of said tubular segments, and a pair of roller assemblies each having a supporting member, said assemblies being mounted at opposite sides of said panels by having their supporting members fitted through said side stiffener openings and into the opposite ends of said tubular segments.

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