United States Patent

[11] **3,608,613**

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[33] **Australia**
[31] **37857/68**

[54] **SLIDING DOOR**
6 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **160/229,** 160/201, 160/232
[51] **Int. Cl.** **E06b 3/14,** E06b 3/22
[50] **Field of Search** 160/201, 209, 229, 232

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Primary Examiner—Peter M. Caun
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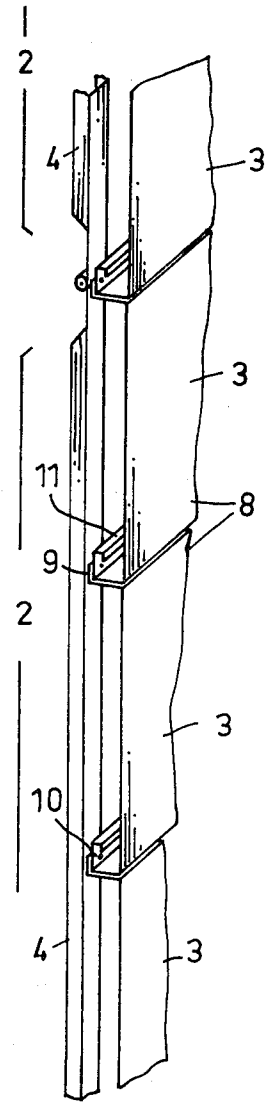
ABSTRACT: A sliding door formed from a plurality of panels hingedly connected transversely to the direction of sliding.



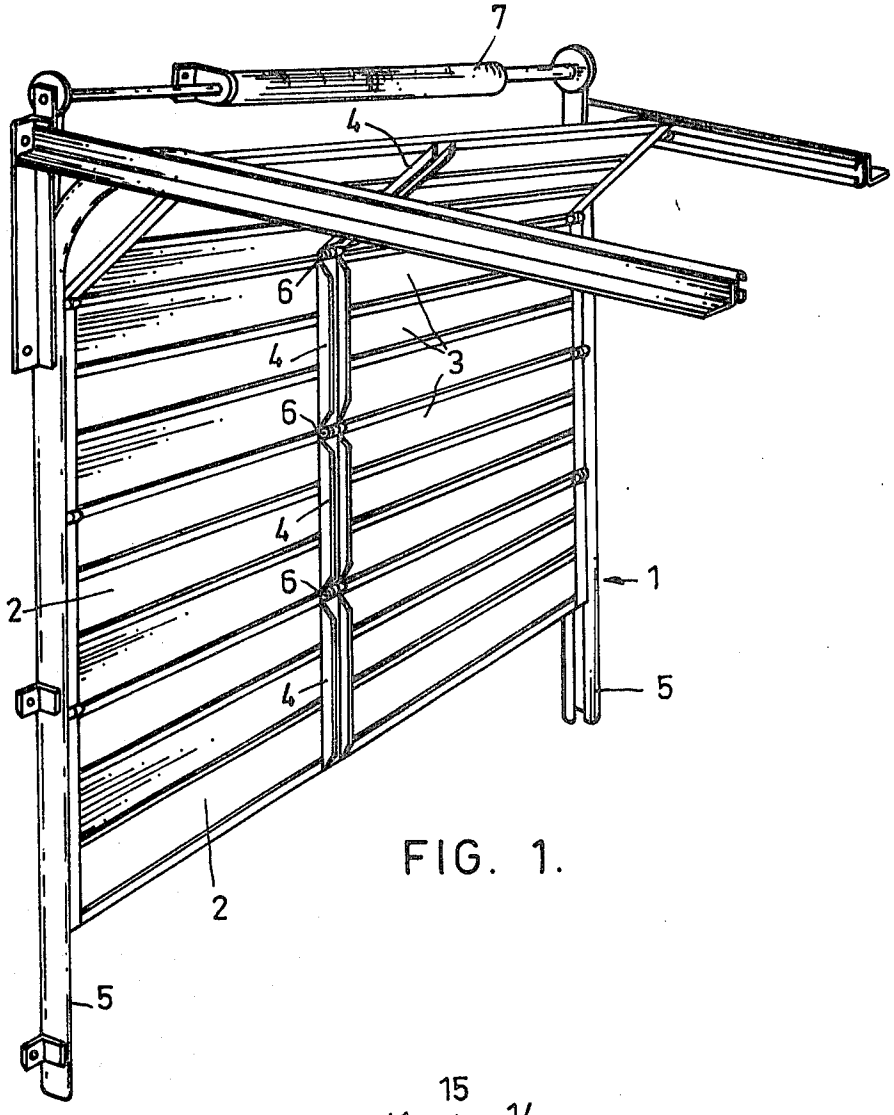


FIG. 1.

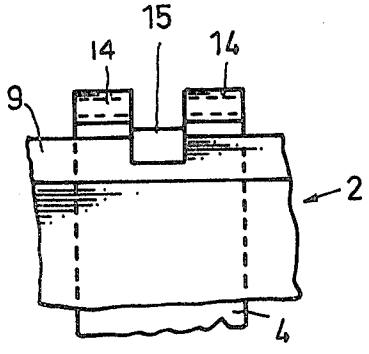


FIG. 4.

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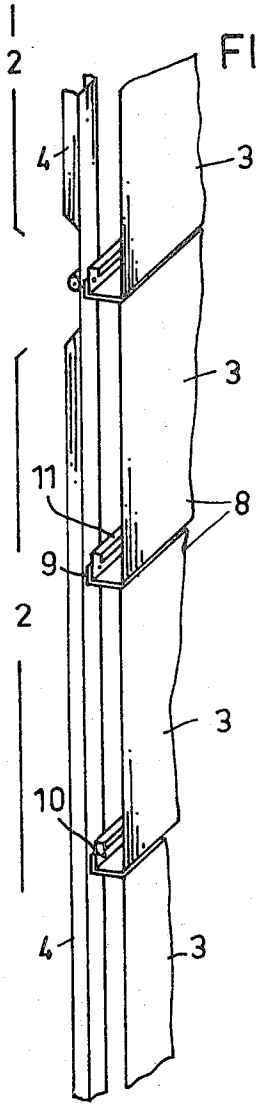
FIG. 2.



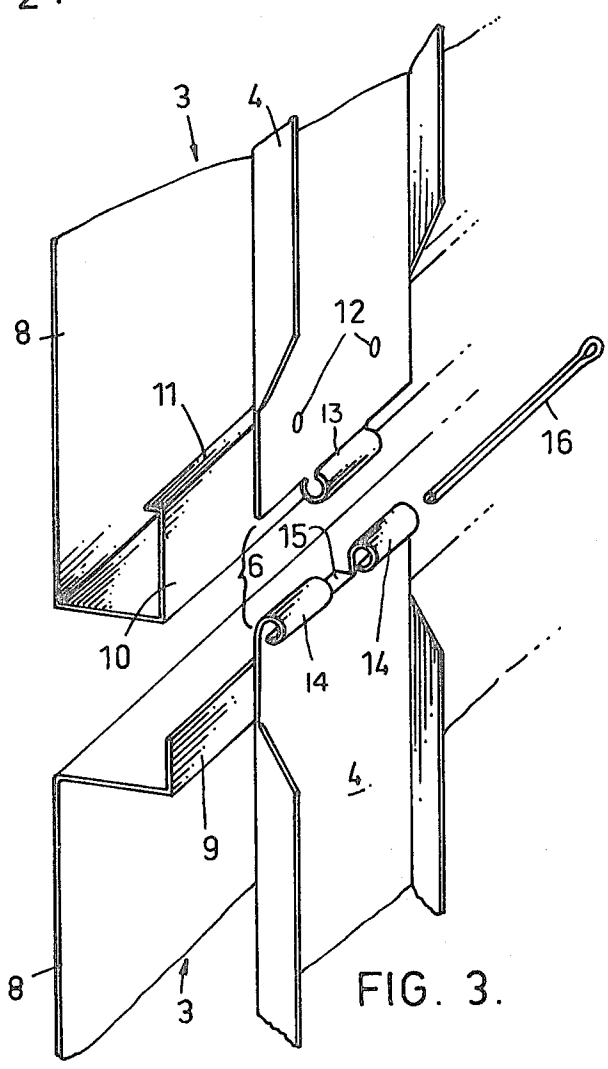


FIG. 3.

FIG. 5.

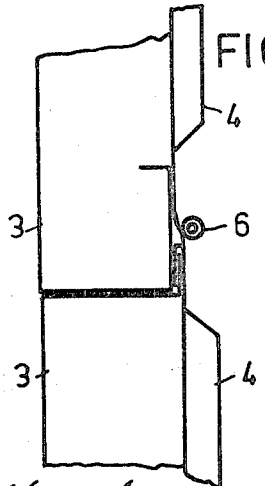
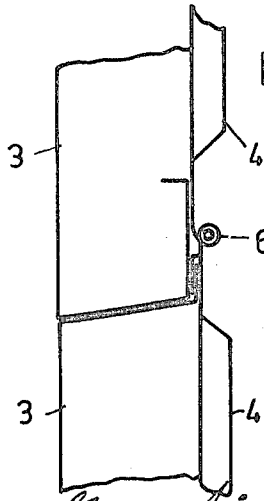


FIG. 6.



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SLIDING DOOR

The invention relates to sliding doors and more specifically to doors for garages, factories and the like which are flexible being formed of horizontal door sections and are slidable upwardly.

Many different forms of such doors are known in which door sections of suitable width are hinged together each section carrying its own rollers guided in rails extending vertically along the door opening and being curved at the top of the opening to extend horizontally into the garage or the like to guide the door when opened from the vertical into a horizontal position.

It has also been proposed when using metal as door material to form each door section from a number of narrower panels which are interlocked by a folded-over edge of one panel receiving the straight edge of a neighboring panel. This construction has, however, certain disadvantages. The connection between the panels is not completely watertight and requires additional sealing means and in addition it is difficult to connect muntins to each door section in a simple manner to give the required stiffness to each door section. It is also difficult and costly to attach hinges directly to the edges of the door sections in such a way that in the closed position of the door the door sections are so close together that not only has the door a uniform appearance but that adjoining door section do not allow ingress of water between them.

All the above disadvantages are overcome according to the invention by an upwardly sliding door assembled from a plurality of door sections hinged to each other along their horizontal edges, each section being composed of one or more panels extending across the full width of the door, each panel having a U-shaped cross section to form a channel, the exterior surface of the base of said channel forming the effective panel surface, and one edge of said channel being bent outwardly to form a first flange in a plane parallel to the plane of said panel surface, and the opposite edge of said channel being bent inwardly to form a second flange in substantially the same plane as said first flange, said first flange on one panel overlapping at least part of said second flange on an adjacent panel, when the effective surfaces of said adjacent panels are in a common plane, and the sections formed by said panels being assembled so that said flanges are pointing upwardly.

In one form of the invention several panels forming a section are held together by one or more channel-type muntins extending across the rear of the panels and being fixed by rivets or other suitable means to the inwardly bent flanges of the panels forming a rigid door section. By hinging a number of these sections together a door of any required size can be built up. As the outwardly bent flange of the uppermost panel of one door section overlaps in the manner as described above the inwardly bent flange of the adjoining section a good weather seal is provided between the individual door sections in the same manner as between the individual panels.

As the bent-over flanges of the panels are generally not wide enough to allow the mounting of hinges for the connection of individual door sections the hinges can be incorporated in the ends of the muntins.

One embodiment of the invention with a minor modification thereof will be described hereinafter in connection with the drawings, in which:

FIG. 1 shows schematically an assembled door incorporating the invention,

FIG. 2 is a side perspective view partly cut away of the panels forming the door sections,

FIG. 3 and 4 show details of the hinge parts formed on the muntins for connection between panels of adjacent door sections,

FIG. 5 shows schematically the connection between the panels of adjacent sections when the door is closed, and

FIG. 6 shows a modification of the arrangement shown in FIG. 5.

FIG. 1 shows a door 1 partly opened which is assembled from four sections 2 each section being composed of three individual panels 3 extending over the full width of the door 1 and being rigidly connected with each other by a muntin 4. The door 1 is mounted in known manner between guide rails 5, so that it can be moved upwardly and slides on horizontal rails into the garage or the like. To give the door flexibility the sections 2 are connected by hinges 6 which form part of the muntins 4 as will be described hereinafter. The door 1 can be counterweighted in known manner by means of a spring assembly 7.

As can be seen, for example in FIG. 2, the panels 3 are shaped in such a manner that not only the panels forming a section 2, but also the outer panels of adjacent sections form a waterproof connection between each other, without obstructing the movement between sections provided by the hinges 6 of the muntins 4.

Each panel 3 has a substantially U-shaped cross section to form a channel, having a base 8 and parallel legs extending therefrom. The exterior surface of the base 8 forms the effective panel surface. As can be seen from FIGS. 2 and 3 one leg of the channel is bent outwardly to form a flange 9 which extends in a plane parallel to the plane of the base 8 and the opposite leg of the channel is bent inwardly to form a flange 10 which can be stiffened by forming thereon a rib 11.

The flange 9 is narrower than the flange 10 and in the assembled position partly overlaps the flange 10 of the neighboring panel. Thus any rain water entering between the panels is prevented by flange 9 from penetrating the inside of the door. The beforementioned shape of the panels 3 does not obstruct the movement between the door sections 2 which are assembled from a plurality of panels 3 by means of muntins 4.

The muntins 4 are of U-shaped cross section to give them additional stiffness and one or more muntins, depending on the width of the door, extend across each section 2 made up, for example, of three panels 3. Each muntin 4 is fixed, for example by rivets 12 to the wider flanges 10 of the panels 3 forming each section 2. The flanges 9 of the adjacent panels are clamped between the muntins 4 and the flanges 10 and are thus also held in position.

As the flanges 9 are not wide enough to secure hinges thereto, hinges are formed at the ends of each muntin 4 at the edges of each section 2, as shown in FIG. 3. The end of the muntin 4 which is secured to the flange 10 has a rolled-in tongue 13 forming the center part of the hinge 6. The other end of the muntin has two spaced rolled-in tongues 14, 14 which can receive between them the hinge part 13 of the adjacent section. The part of the muntin 4 between the hinge parts 14, 14 forming a lug 15, is bent backwards over the flange 9 (see FIG. 4) to provide a connection between the muntin 4 and the flange 9 of the panel at the edge of a section.

The sections 2 can easily be assembled or separated by using as a hinge pin a split pin 16 (FIG. 3), but any other type of hinge pin can be used instead.

FIG. 5 shows schematically the panels 3, the muntins 4 and the hinges 6 of the two adjacent sections 2 whereby the channel sides of the panels are at right angles to the base 8. A modification thereof is shown in FIG. 6 in which the parallel sides of the channel forming each panel form an obtuse and an acute angle respectively with the base 8 so that the sides slope outwardly and downwardly to facilitate the runoff of any water that may have been driven between adjacent panels.

The above-described door construction provides a door built up of a plurality of door sections, each formed by a plurality of panels giving a uniform appearance from the outside and being weatherproof not only between individual panels but also between the various door sections without necessitating any special sealing means. The construction furthermore lends itself to mass production as all parts can be assembled in a simple manner.

I claim:

1. In an upwardly sliding door,

a plurality of door sections hinged to each other along their horizontal edges,

each door section comprising a series of connected interengaging parallel panels disposed one above the other when the door is in a vertically extending closed position,

each panel being generally U-shaped in cross section and having a base and parallel legs extending from said base,

the exterior surface of said base forming a flat uniplanar surface, one of said legs having a free end portion bent to extend parallel to said base in a direction away from said legs and forming a first flange,

the opposite of said legs having an end portion bent to extend along and parallel to said base to form a second flange,

said second flange being lapped by said first flange of a next adjacent downwardly extending panel when said panels are connected together to form a door section and the outer surfaces of said bases of said panels are in a common plane, and

hinge members secured to said second flanges of said panels and extending above and below each door section and connecting said panels together with all of said flanges extending upwardly, said second flanges retaining said first flanges to said hinge members by clamping engagement of said second flanges with said first flanges.

2. The upwardly sliding door of claim 1,

wherein the second flange is wider than the first flange and has an inwardly bent edge to form a stiffening rib.

3. The upwardly sliding door of claim 1,

wherein the two parallel legs of the channel are at obtuse and acute angles respectively with respect to said base, to slope downwardly and outwardly when the door is assembled.

4. The upwardly sliding door of claim 1,

wherein the hinge members secured to said second flanges and connecting said panels together include a plurality of parallel spaced muntins extending vertically and secured to said second flanges and each having a backwardly and downwardly bent portion formed to extend downwardly along the first flange of the top panel to clip said first flange of the associated top panel of the series of panels to the associated muntin.

5. The upwardly sliding door of claim 4,

wherein the end of each muntin bearing against the first flange at the top of the door section, has two spaced apart rolled-in tongues on opposite sides of said means formed to clip said first flange to said muntin,

wherein the bottom of the next upwardly spaced muntin has a part extending between said rolled-in tongues and bent outwardly to fit between said first mentioned rolled-in tongues to accommodate a hinge pin to pass through said tongues and hingedly connect said muntins together, and

wherein the means formed to clip said first flange to said muntin is integral with said muntin and extends from the space between said first mentioned rolled-in tongues and is bent backwardly from said muntin over the first flange.

6. The upwardly slidable door of claim 5,

wherein the two parallel legs of the channel form an obtuse angle and and an acute angle respectively with the channel base and slope outwardly and downwardly when the panels are in assembled relation with respect to each other.