MULTI-SECTION DOOR HINGE AND MOUNTING

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Application February 21, 1957, Serial No. 641,538

5 Claims. (Cl. 160—201)

This invention relates to sectional upward acting doors adapted to move between upright formed tracks, and more particularly to a novel hinge construction between door sections and a novel adjustable roller mounting for said door sections.

It is the object of the present invention to provide a novel hinge construction for a series of sections making up a sectional upward acting door and including a novel means for pivotally connecting registering flanges of adjacent door sections.

It is the further object of the present invention to provide in a sectional upward acting door a series of hinged sections together with an unique adjustable roller mounting means on each section.

It is also an object of my invention to provide an improved sectional overhead door which may be conveniently constructed of various types of face covering materials.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawings, in which:

Fig. 1 is a fragmentary rear elevational view of the present door, partially broken away for illustration.

Fig. 2 is a fragmentary section taken on line 2—2 of Fig. 1.

Fig. 3 is a fragmentary section taken on line 3—3 of Fig. 1, but on an enlarged scale, showing hinge pivot means between sections.

Fig. 4 is a fragmentary section taken on line 4—4 of Fig. 1, but on an enlarged scale.

Fig. 5 is a fragmentary section taken on line 5—5 of Fig. 1, but on an enlarged scale.

Fig. 6 is a fragmentary section taken on line 6—6 of Fig. 1, but on an enlarged scale.

Fig. 7 is a fragmentary perspective view corresponding to the dotted line relation of parts in Fig. 3.

Fig. 8 is a fragmentary perspective view corresponding to Figs. 3 and 4.

It will be understood that the above drawings illustrate merely one embodiment of the invention and that the other embodiments are contemplated within the scope of the claims hereinafter set forth.

Referring to Fig. 2 there is fragmentarily shown a pair of walls 11 with a cross beam 12 defining with the ground surface 76, Fig. 5, the rectangular opening 13 bound at its interior upon its sides and across the top by the upright jams 14 and header 14'.

Mounted upon rear portions of said jams, shown in Fig. 1, and arranged rearwardly thereof are a pair of inclined but substantially upright tracks 16, secured thereto by the brackets 19, which are retained on the tracks by bolts 18. Each of the said tracks include the curved track element 17 and spaced forwardly thereof the co-operating flange 17' between which are slidably and movably mounted the graduated guide rollers 62 mounted upon the respective door sections in the manner hereinafter described.

The upper ends of said tracks have intermediate rearwardly curved track elements 21, Fig. 2, which terminate in the horizontal tracks 22 of the same construction guidedly and retainingly receiving rollers 62. The rear ends of the respective tracks 22 are secured at 23 to the lower ends of hangers 24, whose upper ends are suitably secured to the cross beam 25. Forward angle extensions 26 of tracks 22 are anchored by the brackets 27 which are bolted or otherwise secured at 28 to rear portions of jams 14, as shown in Fig. 1.

Brackets 27 also support shafts 29 which journal the sheaves 30 over which move cables 31, the lower ends of which are secured at 32 to spaced bottom portions of the lowermost door section 39, as in Fig. 1.

The cables 31, Fig. 2, extends around the counterbalance sheave 34 and is anchored at 33 to a portion of angle extension 26. Yoke 35 journals sheave 34 and is suspended from the hanger 24 by the intermediate coiled spring 36 which is anchored to said hanger at 37 to complete the spring counterbalance for the sectional door 38. While only one is shown in Fig. 2, there is a pair of such counterbalances corresponding to the two sheaves 30 in Fig. 1.

The sectional upward acting door 38 includes a series of equal size rectangular door sections 39 adapted when the door is closed, as in Fig. 1, to be in vertical alignment. The sections 39 which make up the door are symmetrical to provide for ready interchangeability if desired.

Each of the door sections includes a hollow continuous angle frame, which consists of the top and bottom angles 40, which are of L-shape in cross section for illustration, and the upright end angles 41 of similar cross section. Each frame includes a pair of spaced intermediate upright reinforcing angles 42 of similar cross section.

The frame is provided as a rigid unit with the elements thereof made of steel or aluminum and suitably secured together by welding, for illustration, though the frame elements could be riveted together or secured by screws or bolts. The respective frames are of equal height and are interchangeable. While four such frames or sections are shown in Fig. 1, any number of sections may be employed in accordance with present invention.

The symmetry of the door section frames provides for easy application of equal sizes of insulation throughout when required.

A series of reinforcing angle members 43 are secured as by welding to the internal corners of the frames to increase its rigidity. Each of the respective door sections is completed by the application to the outside plane surface of the frame elements 40, 41, and 42 of a face covering 44 of any suitable material such as Masonite, plywood, plastic, sheet steel or aluminum. Said facings 44 are individually secured to the respective frames by adhesive or any other suitable means, such as welding or by screws and bolts.

The specific faces for the door sections are adapted for vertical alignment as shown in Figs. 1, 3 and 4, with the registering horizontal edges of adjacent facing sheets in engaging relation along a line which is vertically displaced from the horizontal line of contact between a pair of adjacent frame flanges, as indicated in Figs. 3.
3. and 4. This overlapping structure provides a weather seal between door sections in the fully closed position. As shown in Figs. 1 and 4, the end frame members 41 include the right angularly related flanges 45, which lie in a common plane with corresponding flanges of frame members 42 as well as the top and bottom frame elements 40 against which the respective facings 44 bear and to which they are suitably secured.

The horizontal frame elements 40 include between adjacent sections 49 corresponding horizontally disposed flanges 46 which are arranged in overlapped engaging relation throughout the length of the corresponding sections as shown in Figs. 3 and 4.

While in the preferred embodiment the frame is constructed of flanges of L-shape and cross section, it is contemplated that other cross sectional shapes may be employed provided the engaging horizontal frame element register in the manner shown in Figs. 3 and 4, because the respective door sections are hinged together where the said horizontally disposed flanges engage each other.

A series of horizontally spaced hinge means generally indicated at 47 are provided for pivotally connecting adjacent flanges 46. Each of said hinge means consists of a formed plate of substantial C-shape in cross section. This includes a flat top central portion 47 which overlies the outer portion of the upper of the horizontal flanges 46, and is secured thereto by the sheet metal screw 49, which extends loosely through a registering aperture 50 formed in the lower flange 46, as shown in Fig. 3.

The central portion 47 of the hinge means terminates in the acute angularly related rear flange 48 which extends past the outer edge to upper flange 46 and angularly downward and inward and loosely and retainingly engages the corresponding rear edge of lower flange 46 with respect to which said hinge means is pivotally, as indicated by the dotted lines in Fig. 3. Said hinge means also includes the arcuate downwardly extending front flange 51 which extends through an aperture formed in upper flange 46 and loosely and guidingly through a corresponding slot 52 formed in the lower flange 46.

Front flange 51 extends toward rear flange 48 to thereby complete the construction of the hinge means, of which a plurality are employed between adjacent door sections. Fig. 3 also indicates by dotted lines the relative angular position which may be attained between door sections as provided for by the above described hinge means. Note this on an enlarged scale in Fig. 7.

Each of the respective door sections 39 at their upper opposite ends is provided with a roller 62 by which the said frame are slidably and adjustably mounted with respect to the upright door tracks 16.

The mounting for each of said rollers includes the elongated rearwardly extending plate 53 which has transverse elongated slots 54 formed there through to provide for securing and adjustment of said plate directly below the respective bottom flange 46 between said registering frame flanges.

For this purpose a suitable fastener such as the bolt 55 is employed. Its head is nested within a corresponding aperture 56 in corner reinforcement 43 and aperture angularly related 46 and borewise of bottom flange 46. Said bolt extends through corresponding apertures in said bottom flange and the reinforcing angle 43 and is secured by nut 58 with a suitable lock washer 59 interposed.

The roller mounting plates 53 are actually secured to the undersurface of the bottom flange only, with respect to Figs. 3 and 4, and merely purposes does the head of said bolt lie within corresponding apertures in member 43 and the top flange 46.

Said roller mounting plates 53 are mounted upon the undersurface of the uppermost horizontal frame element 40 of each of the door sections. By virtue of the elongated slots 54 the said plates 53 may be adjusted inwardly and outwardly in order to provide proper weathering fit and adapt rollers 62 to the tracks 16.

The roller mounting construction is completed by the circular formation 60 of cylindrical shape at the outer end of plate 53 within which is retained the stud shaft 61 upon which roller 62 is journaled and retained.

As viewed in Fig. 2 the roller mounting for the top section is slightly different from the roller mountings of the other sections. Extension brackets 63 are suitably secured to upper portions of the uppermost frame and have adjustably secured thereto corresponding plates 64 slotted similarly to plate 53 whose rear portions are circularly curved as at 60 for retaining roller mounting studs 61, whereby top rollers 62 are guidably retained within upper portions of the curved tracks as at 21.

The bottom frame element 40 for the lowermost door section includes the rearwardly extending horizontal flange 66 upon which are mounted at opposite ends the bracket plates 67 adjustably secured thereto through a similar slotted opening by the bolts 68.

Plates 67 due to their location at the bottom of the door have upright extensions terminating in the circularly formed cylindrical portions 69 which retain said studs 61 for mounting the lower rollers 62.

A suitably horizontally elongated preferably rubber astragal 70 is located along the undersurface of the bottom flange 66 by the series of elongated retaining plates 70, which extend across the bottom section.

The upper portion of retainer plates 70 overlie bottom flange 66 and are reversed turn over its undersurface as at 71 and are secured to said bottom flange by the bolts and nuts 77. Retainers 70—71 terminate in the arcuate elongated strips 72 which retainingly engage the elongated body 73 which forms a part of the rubber seal. Said seal includes a central body portion 74 and the elongated tapered flap 75.

Fig. 5 fragmentally illustrates the position of this flap with respect to the ground surface 76 when the door section is in closed position. When the door is elevated, said flap will assume the arcuate dotted line position 75 shown. This provides an effective seal between the bottom edge of the lowermost door section and ground surface 76.

A resilient stop moulding 78, in the form of a weatherstrip is suitably secured to inner surface portions of the door jams 14 and header 14' as indicated in Fig. 6 and is adapted to engage the outer marginal edge portions of the door facings 44 when it is in the closed position shown in Fig. 2 to thus complete a weather stripping between said door jams and header.

Having described my invention, reference should now be had to the claims which follow:

1. In a door comprising a plurality of sections adapted to slidably move between upright formed tracks in a building opening; a pair of vertically aligned door sections, each section including a frame comprising angle frame members, each frame having horizontal flanges at the upper and lower edges, with the upper horizontal flange on one frame in overlapped engaging relation with the lower horizontal flange on the frame immediately above, the lower horizontal flange on the top surface and the top horizontal flange on the lower surface, each frame means interconnecting said flanges, each hinge means consisting of a formed plate of substantial C-shape in cross section including a flat top central portion secured to the upper of said engaging flanges, an acute angularly related rear flange extending past the edge of the upper flange and loosely and retainingly engaging the rear flange, and an arcuate front flange extending through said upper flange and loosely and guidingly through a corresponding slot in the lower flange and in a direction toward said rear flange.

2. In the door of claim 1, the frame members of said sections being L-shape in cross section.

3. In the door of claim 1, a rectangular facing sheet...
for each section secured to the respective frame, with said sheets adapted for vertical alignment, and with registering horizontal edges of said sheets in engaging relation along a line displaced vertically from the horizontal line of contact between adjacent frame flanges.

4. In the door of claim 1, the securing of said hinge means including screw means extending therethrough retainingly engaging the top flange of said frames and received loosely within a corresponding aperture formed in the adjacent bottom flange.

5. In the door of claim 1, roller mounting plates adjacent opposite ends of said registering frame flanges adjustably secured to the undersurface of the lower of said flanges and extending rearwardly of the plane of said sections, and fastening means connecting said plates to said lower flange with portions of said fastening means loosely nested within corresponding clearance apertures formed through said upper flange.

References Cited in the file of this patent

UNITED STATES PATENTS

1,328,918 Fulda --------------- Jan. 27, 1920
1,337,689 Calvelage --------------- Apr. 20, 1920
1,395,766 Phillips --------------- Nov. 1, 1921
1,857,756 Headley --------------- May 10, 1923
1,989,511 Ginder --------------- Jan. 29, 1935