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OVERHEAD DOOR CONSTRUCTION

Filed July 25, 1939

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UNITED STATES PATENT OFFICE

OVERHEAD DOOR CONSTRUCTION

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Application July 25, 1939, Serial No. 286,429

4 Claims. (Cl. 16—84)

This invention relates generally to overhead door constructions, and particularly to overhead door constructions wherein hingedly connected panels are shifted along track sections between vertical door closing position and substantially horizontal door open position.

Overhead door constructions of conventional design, with which I am familiar, employ a plurality of hingedly connected door panels which are adapted to be shifted upwardly along a vertical track section, thence over a curved track section, and finally along a substantially horizontal track section which is formed integral with the curved track section at its forward extremities.

The present invention contemplates improvements in the door guiding structure whereby the door panels may be more efficiently shifted between vertical and open overhead positions.

More specifically, the invention contemplates an overhead door construction wherein an improved guide track arrangement is provided, to-wit, a guide track structure, wherein three separate track sections are employed to facilitate installation, and to make for rigidity and stability in guiding the hingedly connected door panels.

It is a further object of the present invention to provide the above mentioned improved track structure in combination with a rigidly mounted sheaves for guiding the counterbalancing spring chain in such a manner as to insure convenient attachment and detachment of said sheave.

Another object of the present invention is to provide in combination with the improvements set forth above, a counterbalancing spring guiding means or rod, which will serve to prevent inadvertent displacement of the spring convolutions, and thus insure efficiently operable counterbalancing mechanism for the hingedly connected panels.

The foregoing and numerous other objects and advantages will be more apparent from the following detailed description, wherein—

Figure 1 discloses an elevational view of a door structure embodying features of the present invention, the hingedly connected door panels thereof being shown in their vertical door closing position, said view being taken substantially along the line 1—1 of Figure 3;

Figure 2 is an enlarged transverse sectional view taken along the line 2—2 of Figure 1, disclosing the disposition of the vertical track, door jamb, and associated door panel.

Figure 3 is a side elevational view of the door structure, said view being a vertical section adjacent one of the track structures;

Figure 4 is an enlarged view similar to Figure 3 disclosing the structure in the vicinity of the curved track section;

Figure 5 is an enlarged vertical sectional view taken substantially along the line 5—5 of Figure 4;

Figure 6 is a plan sectional view of the upper portion of the track in the vicinity of the curved section, said view being taken substantially along the line 6—6 of Figure 3;

Figure 7 is a plan view of the curved track section and parts connected therewith as a unit, said structure being shown detached from the vertical and horizontal track sections, said view being taken substantially along the line 1—1 of Figure 3;

Figure 8 is an elevational view of the front side of the structure shown in Figure 7;

Figure 9 is an elevational view of the rear side of the structure shown in Figure 7; and

Figure 10 is a perspective view of the sheave supporting bracket detached from the curved track supporting structure.

Referring now to the drawings more in detail wherein like numerals have been employed to designate similar parts throughout the various views, it will be observed that my invention contemplates an overhead door construction, which includes a plurality of hingedly connected panels 12, 14, 16, and 18. These panels are connected by side hinge devices 20 (Figures 1 and 2), and central hinge devices 22. Each hinge device 20 includes a roller 24 carried by a pin 26. The rollers 24 are adapted to be vertically shifted within an upright or vertical track section 28, one of said sections being positioned adjacent each vertical margin of the door panels when said panels occupy said door closing position shown in Figure 1. These vertical track sections 28 are secured in a fixed position by means of suitable brackets 30, said brackets being fastened by lag screws or other suitable fastening elements to the jamb 32 of the door frame structure.

The upper extremity of each vertical track section 28 abuts and registers with a curved track section 34, and the opposite or upper extremity of this curved section 34 abuts and registers with a substantially horizontal track section 36. Thus it will be apparent that the door panels 12—18 are adapted to be shifted between the vertical door closing position shown in Figure 1 and an open overhead position by shifting the guide rollers 24 along the track sections 28, 34, and 36.
One of the important features of the present invention resides in the structural arrangement of the curved track section 34 and the elements associated therewith. As will be apparent from the foregoing description, the invention comprises an overhead door construction wherein each guide track is comprised of three separate or detachable parts, namely, a vertical section, a curved section, and a horizontal section. Therefore, the elements which serve to unite the curved track section 34 with the vertical and horizontal sections constitute an important phase of the present invention. It will be noted that the lower extremity of the curved track section 34 is secured by welds 35 (Figures 8 and 9) to a gusset member 40. The lower extremity of this gusset member is apertured at 42, and these apertures register with companion apertures provided in the upper extremity of the track section 28 to enable these parts to be secured together by suitable bolts 44 (Figure 4). The forward edge of the gusset member 40 is provided with a flange 45 which is adapted to be secured by lag screw 48 to the jamb 32. The upper end of the gusset member 40 is secured by welds 50 to a horizontal gusset member 52. The right extremity of this gusset member 52 (Figure 6) is secured to the upper extremity of the curved track section 34 by welds 54, and includes an extending portion 55, which is adapted to be secured to the forward extremity of the horizontal track 36 by means of bolts or rivets 56 (Figures 4, 5, and 6).

It will be noted that the gusset member 52 is provided with a flange 60 which is apertured to receive a lag screw 62 (Figure 4) for securing the gusset member 52 to the door jamb 32. In this connection it will be observed that an aperturing 64 is provided in the gusset member 52 by striking out an ear 66. This ear is also apertured to receive a lag screw 68 (Figure 6) anchored to the door jamb 32. The upper margin of the gusset member 52 is provided with a flange 70 which continues out to the end of the extension 56. Thus the extension 56 serves to rigidly connect the forward extremity of the horizontal guide track 36 in abutting registration with the upper extremity of the curved track section 34.

In instances where the weight of the door panels exceed 500 pounds, I find it desirable to provide an additional supporting strip or member 72 which is adapted to superimpose the upper portion of the flange 70 provided with apertures 74 and 76. It will be noted in this connection that I prefer to employ an angle iron 78 which is interposed between the inside surface of the projecting portion 56 of the gusset 52 and the complementary side surface of the horizontal track section 36 and also between the flange 70 and the strip member 72 (Figures 4 and 5). The right extremity of the supporting member 72 is secured to the upper flange portion of the angle iron 78 by a bolt 80, whereas the left end of said support is secured to the angle iron and to the flange 70 by bolts 82, 84, and 86.

Attention is now directed to a sheave mechanism designated generally by the numeral 88 (Figures 4 and 5, inclusive), one such sheave mechanism being provided at each side of the door construction and serving as a guide means for the rolling sliding door sections 89. The chain 90 is anchored at its upper end to an anchor hook 92 and is secured at its lower end to the door panel 18 in any suitable manner, as may be best seen in Figure 1. In accordance with the invention, I associate the sheave mechanism directly with the curved track section 34 (Figures 8 and 9). To this end each sheave comprises a pulley wheel 94 and a supporting bracket 96, the bracket being adapted to be removably mounted directly upon the gusset member 53 associated with the curved track section.

As best shown in Figure 10, the bracket 96 is provided at one end with a hook projection 98 and at its other end with a pair of hook projections 100, the gusset member 52 being provided with corresponding openings 102 and 104 by means of which the hook projections may be removably mounted upon the gusset member. The bracket 96 is provided with an opening 106, and the gusset member 52 is provided with a slotted opening 108, so that the axle 110 of the pulley wheel may be supported at both ends thereof to impart maximum guiding support to the movements of the pulley wheel. An auxiliary bracket 112 is welded to the bracket 96 as indicated at 114, the auxiliary bracket being adapted to be secured to the flange 70 of the gusset member by means of a bolt 116. The bracket 96, together with the auxiliary bracket 112, form a rigid and substantial support for the pulley wheel. It will be noted, however, that the brackets may be readily removed or disconnected from the gusset member merely by the removal of the bolt 116 and then the release of the hook projections 98 and 100 from the associated openings in the gusset member. By this means the sheave mechanism may be readily removed so as to permit access to the lag screw 62. It will also be noted that the auxiliary bracket 112 is provided with a flange 118 adapted to grip the edge of the gusset member flange 70, further adding to the rigidity of the support structure. The flange 118 will be moved clear of the flange 70 during removal of the bracket as the hook projections 98 and 100 are removed from the openings in the gusset member.

I now direct attention to means provided by the invention for insuring that the user of the door construction will not be injured in the event of breakage of the counterbalancing springs. As best shown in Figures 3 and 4, a counterbalancing spring 120 is provided adjacent each horizontal track section 36, one end of the spring being secured to a bracket 122 anchored to the track section, and the other end of the spring being connected to the floating bracket 124 comprising a sheave or pulley wheel 126 forming a part of the guiding assembly for the chain 90. In accordance with the invention, a safety guide rod 128 passes through the convolutions of each of the springs 120, the guide rod being secured at one end to the bracket 122, and at its other end to a lug 130 struck out from the bracket member 96 (Figures 4 and 10). An intermediate section of the guide rod is adapted to be slidably mounted within a bearing lug 132 carried by the floating bracket 124. It will be seen that, in the event that the counterbalancing spring 120 should break, each and every convolution thereof will be prevented from flying or falling away from the overhead track structure by the guide rod 128. The guide rod thus constitutes an effective means for preventing injury to the user of the door construction, or other damage which might result from sudden swinging out of the gusset sections in the event of spring breakage. It will be seen that each and every convolution of the spring is supported. At the same time the guide rods in no way interfere with the proper operation of the counterbalancing springs.

Changes may be made in the form, construc-
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3. In an overhead door construction including a plurality of hingedly connected door panels, guide tracks for said panels and a flexible element for lifting said door panels, the combination wherein said guide tracks comprise an upright section, a substantially horizontal section, and a separable intermediate curved section connected to the upright and substantially horizontal sections, a gusset plate for supporting said curved track section and connecting it with the other sections, a sheave wheel mounted on an axle for guiding said flexible lifting element in its movements, means journaling one end of said axle in said gusset plate, a bracket member in which the other end of said axle is journaled, and means for removably securing the bracket member to the gusset plate comprising gusset plate interengaging means on said bracket member and complementary interengaging means formed on said gusset plate for receiving said bracket member against accidental dislodgement in the plane of said gusset plate.

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