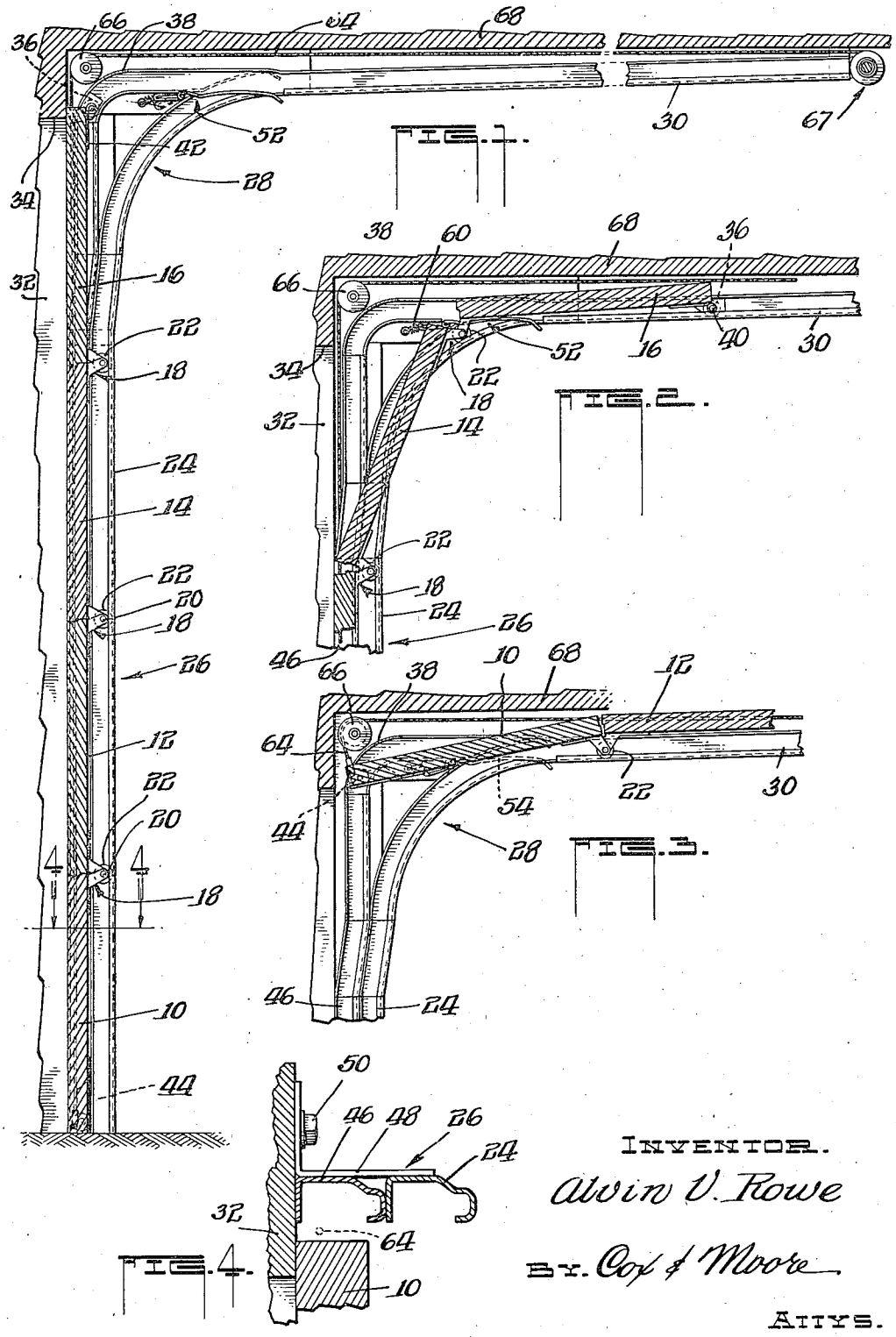
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OVERHEAD DOOR CONSTRUCTION

Filed May 27, 1940 2 Sheets-Sheet 1



INVENTOR.

Alvin V. Rowe

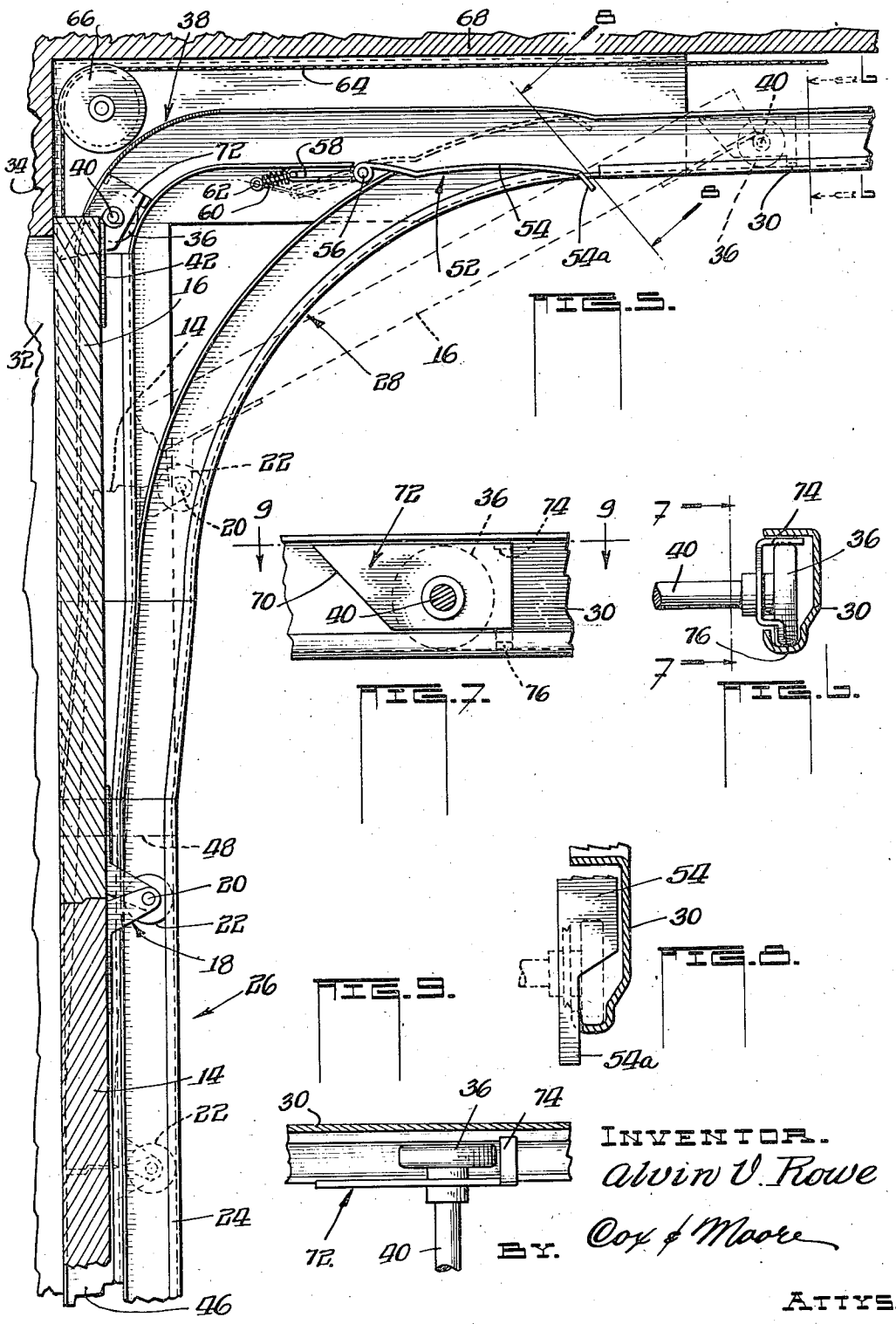
BY. Cox & Moore

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OVERHEAD DOOR CONSTRUCTION

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8 Claims. (Cl. 20—20)

This invention relates generally to overhead door constructions and more particularly to overhead door structures capable of installation in instances where a minimum amount of head room is available.

Conventional overhead door structures are not designed nor adapted for use where the available head room is relatively small. The head room to which I refer is the amount of space present above the lower edge of the header in the door opening. As a practical matter, the lower margin or edge of the shiftable door must occupy a position no lower than the bottom edge of the header when the door is in its open or overhead position. Due to the fact that it has been found necessary in conventional installations to employ a track curvature having a radius of approximately fifteen inches in order to direct the door between vertical closed position and open overhead position, the degree to which the trailing or bottom edge of the door can be shifted upwardly is somewhat limited. That is to say, this trailing or lower edge of the door panel comes to rest at the lower extremity of said track curvature, it being held there by a flexible lifting element or cable extending upwardly to a sheave or other suitable guiding element. Thus, the radius of track curvature has an important bearing upon the ultimate height to which the bottom edge of a lower door panel may be elevated.

The present invention has for its general object the provision of an overhead door structure, as for example, a plurality of hingedly connected door panels shiftable along tracks or guide-ways, which is so constructed as to permit the final positioning of the door panel or panels in their open overhead position immediately adjacent the ceiling of the room or garage with the margin of the door panel adjacent the opening positioned well above the point normally occupied by conventional door panels.

More specifically, the invention contemplates a construction wherein a double track or guide-way is provided for directing the door panels to a position adjacent the ceiling, thus requiring very small head room for installation purposes. The invention further contemplates shiftable means or switch mechanisms for guiding track rollers along predetermined paths to thereby greatly facilitate directing the door panels between substantially vertical open position and substantially horizontal overhead position.

Still more specifically, the invention proposes the installation of an overhead door structure in which a substantially vertical double guide-way or track arrangement is provided, one of said guide-ways accommodating certain guide rollers and the other guide-way accommodating the remaining guide rollers.

The invention not only has for an object the presentation of a door structure which may be installed within a very small space above the door header, but also to provide an arrangement whereby such a structure will insure tight sealing engagement of the door panels against the door jamb when they occupy their vertical closed position.

The foregoing and numerous other objects and advantages will be more apparent from the following detailed description when considered in connection with the accompanying drawings, wherein—

Fig. 1 is a vertical sectional view of a door structure embodying features of the present invention;

Fig. 2 is an enlarged sectional view showing the upper left-end portion of the door structure of Fig. 1 with the panels partially shifted upwardly from the substantially vertical closed position of Fig. 1;

Fig. 3 is a sectional view similar to Fig. 2 showing the position finally occupied by the lowermost door panel and particularly the position occupied by the trailing or lower edge thereof with respect to the header of the door frame;

Fig. 4 is an enlarged transverse sectional view taken substantially along the line 4—4 of Fig. 1 disclosing the double guide-way or track arrangement;

Fig. 5 is an enlarged sectional view similar to Fig. 1 which discloses more in detail the structural arrangement of the constituent elements, dotted lines indicating the position occupied by the uppermost door panel when the upper roller thereof is positioned in the horizontal track portion and the lower roller thereof is positioned in the vicinity of the lower extremity of the curved track section;

Fig. 6 is a transverse sectional view taken along the line 6—6 of Fig. 5 to more clearly illustrate the structural arrangement of the switch controlling element associated with each upper guide roller;

Fig. 7 is a side elevational view taken substantially along the line 7—7 of Fig. 6 to more clearly illustrate the structural arrangement of the aforesaid switch controlling element;

Fig. 8 is a transverse sectional view taken substantially along the line 8—8 of Fig. 5 to more

clearly illustrate the structural arrangement of the shiftable control or switch member which directs the guide rollers along one of two predetermined paths or guide-ways; and

Fig. 9 is a transverse sectional view taken substantially along the line 9—9 of Fig. 7 to more clearly illustrate the detailed construction of the above mentioned switch operating or controlling element.

Referring now to the drawings more in detail wherein like numerals have been employed to designate similar parts throughout the various figures, it will be seen that one embodiment of my improved overhead door construction contemplates a plurality of shiftable door panels 10, 12, 14 and 16. The adjacent margins or edges of these door panels are connected by suitable hinges 18 which extend rearwardly and carry a pintle 20 upon which suitable guide rollers 22 are mounted. As shown in Figs. 1 to 3, inclusive, these rollers 22 are guided within an inner vertical guide-way or track section 24 which forms a part of a vertical guide-way or double track portion designated generally by the numeral 26. As the door panels shift upwardly from their normal closed position, as shown in Fig. 1, the rollers 22 are guided by a curved track section 28 and thence by a substantially horizontal track section 30. Obviously, each installation requires a hinge 18 at each side of the panels and a track structure in the vicinity of each of said margins for guiding the rollers 22.

When the door panels 10—16 occupy their normal door closing position, as illustrated in Figs. 1 and 5, the front marginal faces of the door panels are sealed against the complementary surface of the door jambs 32, and the upper front marginal surface of the door panel 16 sealingly bears against the inner surface of the door header 34. In this connection, particular attention is directed to the position of a guide roller 36 which is associated with the upper margin or edge of the door panel 16. One of these rollers is positioned at each side of said door panel and is positioned within a curved track section 38 which is of much smaller radius than the radius of the curved track section 28; in fact, the radius of the curved track section 28 may conform substantially with the fifteen inch radius of conventional track structures and I have found it practical in some instances to employ a radius of approximately four inches for the curved track section 38. Each roller 36 is carried by a pintle 40 and each pintle is mounted within a suitable bracket or strap 42, Figs. 1 and 5. It will be apparent that the rollers 36 cooperate with their companion curved track sections 38 in securing the uppermost panel tightly sealed against the door frame when the panels occupy their lower or vertical door closing position.

Attention is now directed to a guide roller 44, Figs. 1 and 3, carried along the outer margin of the door panel 10 in the vicinity of the lower edge thereof. One of these rollers is carried at each side of the door panel 10. These rollers 44 are vertically directed within a substantially vertical track section 46 which extends in substantial parallelism with the track section 24. As previously pointed out, these vertical track sections 24 and 46 combine to form a substantially vertical track portion designated generally by the numeral 26. Suitable brackets 48, Figs. 4 and 5, serve to secure the track structure or portion 26 to the door frame by suitable bolts or lag screws 50.

Attention is now directed to a direction controlling device or switch mechanism designated generally by the numeral 52, Figs. 1, 2 and 5. This switch mechanism 52 comprises a shiftable element or member 54 which is pivotally supported at 56. The member 54 may be made of suitable flat stock which includes a U-shaped portion 58 extending to the left of the pivotal point 56, Fig. 5. When the element 54 occupies the solid line position shown in Fig. 5, it permits the rollers 36 to be directed into association with the curved track section 38. When the element 54 occupies its upper position as indicated by the dotted lines in Fig. 5, the rollers 22 are guided from the horizontal track section 30 on to the curved track section 28. A coiled spring 60, Fig. 5, which is constantly under compression and encircles a link extending between the free extremity of the U-shaped portion 58 and a pivotal point 62, operates to hold the switch member 54 in one of the two positions illustrated in Fig. 5. The force of the spring acts along a line slightly inclined to a plane common to both pivotal points 56 and 62 and thus serves to urge the member 54 either into its solid line position or its dotted line position, depending upon which side of the aforesaid plane the spring functions.

Assume that the door panels 10—16 are shifted from their normal vertical door closing position, shown in Figs. 1 and 5, toward their open overhead position, shown in Fig. 3. The rollers 36 move along the curved track section 38 and then on to the horizontal track section 30, as indicated by the dotted line disclosure in Fig. 5. Simultaneously, the rollers 22 move upwardly within the vertical track section 24 and then along the curved track section 28. The shiftable control member or switch element 54 is engaged by the uppermost roller 22 and this causes the member 54 to be shifted to the dotted line position indicated in Fig. 5, thereby connecting the horizontal track section 30 with the curved section 28.

During this movement the rollers 44 shift upwardly in the vertical track section 46 and finally reach the position illustrated in Fig. 3. Conventional flexible lifting elements or cables 64 are pivotally coupled with the lower side edge of the panel 10 and extend over guide pulleys or sheaves 66 and then rearwardly to suitable counterbalancing mechanism 67, Fig. 1. It will thus be observed that due to the relatively small curvature of the track section 38, the flexible lifting element or cable 64 is capable of holding the trailing or lower margin of the lowermost door panel 10 well above the position normally occupied by similar edges of panels in conventional door structures. In other words, the trailing edge of the lowermost panel 10 is positioned well above the point which would normally be occupied by a door panel in which the rollers corresponding to the rollers 44 were guided by a curved track section of greater radius, such as the curved track section 28. In this manner all of the door panels 10—16 are retained in a position closely adjacent the ceiling 68, thereby requiring a minimum amount of head room for satisfactory installation and operation.

Assume now that the door panels begin to shift from their open overhead position, shown in Fig. 3, toward their vertical door closing position, shown in Figs. 1 and 5. The rollers 44 move downwardly into vertical track section 46, and

the rollers 22 are successively guided or directed from the horizontal track section 30 into the curved track section 28 and thence into the vertical track section 24. As the rollers 36 approach their complementary switch elements 54, an inclined surface 70 of a switch shifting element 72 engages a downwardly flexed extremity 54a of the member 54, thereby causing the downward shifting of the member 54 from the dotted to the solid line position as shown in Fig. 5. This member 72 is pivotally supported upon the pintle 40 which carries a roller 36 and is preferably formed from a single piece of flat stock. The trailing or rear portion of the member 72 is bent inwardly to provide guide members 74 and 76 which cooperate with companion tread portions of the track in maintaining the proper position of the member 72 as it is shifted within said track. As the control member 72 moves along the curved track section 38 toward the position shown in Fig. 5, the free pointed extremity of the member 72 projects forwardly and therefore the tread portion of the track in this vicinity is removed to provide clearance for said free extremity. As previously pointed out, with the rollers 36 in the position shown in Fig. 5, the upper portion of the door panel 16 is tightly sealed against the door frame.

From the foregoing it will be apparent that the present invention contemplates a distinct improvement in overload door constructions, particularly with respect to facilitating installations where only small head room is available. By employing the duplicate track arrangement as heretofore described, the shifting of the trailing or lower edge of the lowermost door panel to a point of relatively high elevation is assured, thereby enabling installation in instances where only a short space is available between the lower edge of the header and the ceiling. The constituent parts essential for practical application of the invention are relatively few in number and yet these parts cooperate most efficiently in producing the results referred to above. Thus, the invention may be practiced with economy and yet without sacrificing durability or efficiency in operation. While for purposes of illustration certain specific embodiments have been shown and described, it should be understood that the invention is not restricted to these particular structural features but is capable of other modifications and changes without departing from the spirit and scope of the appended claims.

The invention is hereby claimed as follows:

1. An overhead door construction including a door comprising a plurality of hingedly connected door panels for traversing a door opening and adapted to be shifted between vertical door closing position and open overhead position, track follower members disposed along opposite side margins of the door panels and including track followers intermediate the extremities of each side margin and a track follower adjacent an extremity of each side margin, and track structures for guiding said door panels, each track structure including a horizontal track portion, a substantially vertical track portion, an intermediate curved portion for accommodating said intermediate track followers, a further track portion communicating with said horizontal track portion for accommodating said follower adjacent the extremity of the margin, said horizontal track portion providing a guideway selectively connectible with said curved track portion and with said further track portion, and means connected to the door and operable by movement of the door to closed position for connecting said further track portion to the horizontal portion to accommodate said last named track follower when the track follower approaches closed position.

2. An overhead door construction including a door comprising a plurality of hingedly connected door panels for traversing a door opening and adapted to be shifted between vertical door closing position and open overhead position, track follower members disposed along opposite side margins of the door panels and including track followers intermediate the extremities of each side margin and a track follower adjacent the top extremity of each side margin, and track structures for guiding said door panels, each track structure including a horizontal track portion, a substantially vertical track portion, an intermediate curved portion for accommodating said intermediate track followers, a further track portion communicating with said horizontal track portion for accommodating said follower adjacent the extremity of the margin, said horizontal track portion providing a guideway selectively connectible with said curved track portion and with said further track portion, and means connected to the door and operable by movement of the door to closed position for connecting said further track portion to the horizontal portion to accommodate said last named track follower when the track follower approaches closed position.

3. An overhead door construction including a door comprising a plurality of hingedly connected door panels for traversing a door opening and adapted to be shifted between vertical door closing position and open overhead position, track follower members disposed along opposite side margins of the door panels and including track followers intermediate the extremities of each side margin and a track follower adjacent the top extremity of each side margin, and track structures for guiding said door panels, each track structure including a horizontal track portion, a substantially vertical track portion, an intermediate curved portion for accommodating said intermediate track followers, a further track portion communicating with said horizontal track portion for accommodating said follower adjacent the extremity of the margin, said horizontal track portion providing a guideway selectively connectible with said curved track portion and with said further track portion, and means connected to the door and operable by movement of the door to closed position for connecting said further track portion to the horizontal portion to accommodate said last named track follower when the track follower approaches closed position, the said further track portion extending toward the door beyond said curved track portion and extending downwardly in a radius of curvature less than the radius of curvature of said curved track portion.

4. An overhead door construction as defined in claim 1 wherein said track portion connecting means comprises a switching member normally maintaining communication between said horizontal and said vertical track portions for passage of the intermediate followers, said switching member being shiftable by movement of the door to direct the track follower adjacent the extremity of the side margin into the said further track portion.

5. An overhead door construction as defined in claim 1 wherein said track portion connecting means comprises a switching member normally maintaining communication between said hori-

zontal and said vertical track portions for passage of the intermediate followers, said switching member being shiftable by movement of the door to direct the track follower adjacent the extremity of the side margin into the said further track portion, said intermediate track followers being operable upon movement of the door to open position to shift said switching member for connecting the curved track portion with the horizontal track portion.

6. An overhead door construction including a door for traversing a door opening and adapted to be shifted between vertical door closing position and open overhead position, track follower members disposed along opposite side margins of the door and including track followers intermediate the extremities of each side margin and a track follower adjacent an extremity of each side margin, and track structures for guiding said door, each track structure including a horizontal track portion, a substantially vertical track portion, an intermediate curved portion for accommodating said intermediate track followers, a further track portion communicating with said horizontal track portion for accommodating said follower adjacent the extremity of the margin, said horizontal track portion providing a guideway selectively connectible with said curved track portion and with said further track portion, and means connected to the door and operable by movement of the door to closed position for connecting said further track portion to the horizontal portion to accommodate said last named track follower when the track follower approaches closed position.

7. An overhead door construction including a door comprising a plurality of hingedly connected door panels for traversing a door opening and adapted to be shifted between vertical door closing position and open overhead position, track follower members disposed along opposite side margins of the door panels and including track followers intermediate the extremities of each side margin and track followers adjacent the top and bottom extremities of each side margin, and track structures for guiding said door panels, each track structure including a horizontal track portion, a substantially vertical track portion, an intermediate curved portion for accommodating said intermediate track followers, a further track portion communicating with said horizontal track portion for accommodating the followers located adjacent the extremities of the margin and extending forwardly from said horizontal track portion and generally vertically downwardly adjacent said substantially vertical track portion, said horizontal track portion providing a guideway selectively connectible with said curved track portion and with said further track portion, and means connected to the door and operable by movement of the door to closed position for connecting said further track portion to the horizontal portion to accommodate the track follower adjacent the top extremity of said margin when the track follower approaches closed position.

8. An overhead door construction including a door comprising a plurality of hingedly connected door panels for traversing a door opening and adapted to be shifted between vertical door closing position and open overhead position, track follower members disposed along opposite side margins of the door panels and including track follower members intermediate the extremities of each side margin and a track follower adjacent the lower extremity of each side margin, and track structures for guiding said door panels, each track structure consisting of a single horizontal guideway, a substantially vertical double guideway in which one guideway is positioned forwardly of the other and both are secured in a fixed position, an intermediate curved guideway for accommodating said intermediate track followers and communicating with the rearward of said double guideways and with the single horizontal guideway, and a further guideway positioned forwardly of the curved guideway and extending upwardly from and communicating with the forward vertical guideway for accommodating said follower adjacent the extremity of the margin, said further guideway being secured in a fixed position and being inclined inwardly adjacent the top of the door opening.

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