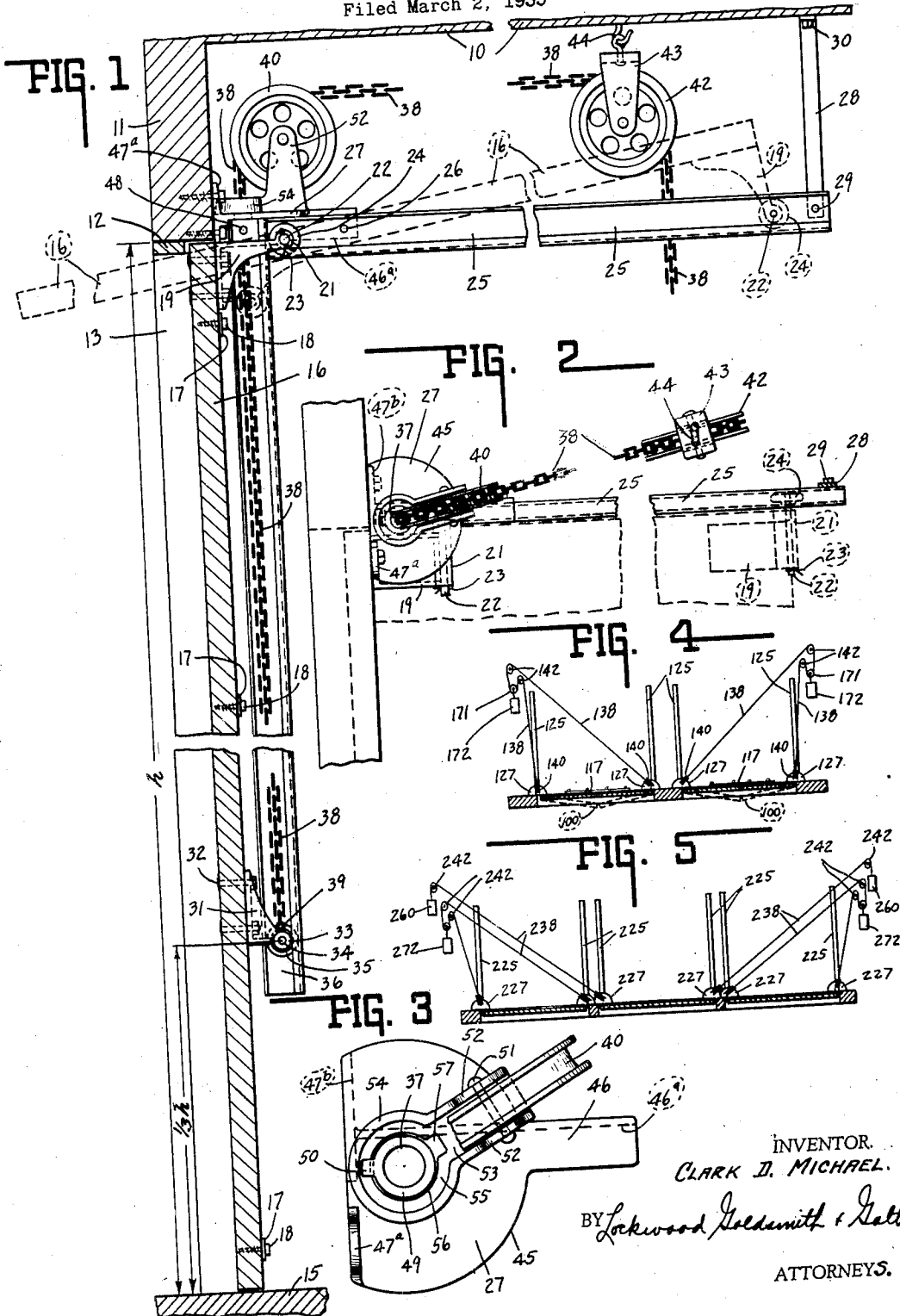


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C. D. MICHAEL
OVERHEAD DOOR CONSTRUCTION

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OVERHEAD DOOR CONSTRUCTION

Clark D. Michael, Huntington, Ind.

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3 Claims. (Cl. 16-94)

This invention relates to an overhead door structure suitable for garages, and the like, and more particularly to hardware which may be applied to present garage doors which are of the conventional, multiple opposite swinging, rolling or accordion folding type.

The chief object of the invention is to simplify the hardware structure of garage and like doors.

Another object of the invention is to provide hardware which is universally adaptable to garage doors for the operation thereof as an overhead door in association with present building structures having one or more door openings and with a minimum amount of interference or obstruction in the interior of the garage.

Another object of the invention is to provide hardware which will transform conventional multiple swinging or accordion doors that are vertically hinged or single or multiple longitudinal rolling door or doors into a single door unit which, instead of being horizontally movable, is vertically and rearwardly movable to provide entrance to and exit from the garage through the opening closed by the door.

The invention, for example purposes, is illustrated as applied to multiple horizontally swinging doors.

The full nature of the invention will be understood from the accompanying drawing and the following specification and claims:—

In the drawing,

Fig. 1 is a vertical, sectional view through a modified door, previously of the horizontal type, transformed to a single vertical and rearwardly movable door and wherein the full lines illustrate the door in the closed position and the dotted lines indicate the open position of the door, the hardware associated therewith at one side of the door being shown in elevation.

Fig. 2 is a top plan view of the hardware shown in Fig. 1.

Fig. 3 is an enlarged plan view of the swivelling pulley and supporting base.

Fig. 4 is a diagrammatic plan view of a two-door garage showing one form of counterbalance system associated therewith.

Fig. 5 is a similar view of a three-door garage showing additional modifications of the counterbalancing system.

In Fig. 1 of the drawing, there is illustrated a ceiling 10 of a garage, a front wall 11, a lintel 12, and a jamb 13. The floor of the garage and drive are indicated by the numeral 15.

The numeral 16 indicates a door which heretofore has been hingedly mounted for outward swinging upon a vertical axis. Two of these sections usually have been employed. In certain instances where an accordion type door arrangement has been employed, there are three or more sections, in which event instead of each of the sections being vertically hinged to a jamb, all of the sections are vertically hinged together and one is hinged to the jamb. This type of door structure embodying two independently hinged door sections is shown in Fig. 4.

The sections are secured together by a plurality, and herein three are shown, of connecting bars or plates 17, see Fig. 1, each secured by a plurality of lag screws, bolts or the like, 18, to the door sections to connect the same together as a unit. Of course, in the transformation, the vertical hinges are removed and discarded.

Mounted at each upper corner of the door unit thus formed, or of a single door unit if the door closure be of that character originally, is a bracket 19 suitably secured as by the bolt and nut constructions to the door. The bracket 19 projects inwardly of the door and includes an elongated tubular bearing 21 that is adapted to rotatably support an axle 22 which is secured therein by the cotter key 23 at one end and which mounts on its opposite end a guide member or roller 24.

The latter rolls in a substantially horizontal track 25, suitably secured at its forward end as at 26 to a base 27, shown clearly in Figs. 2 and 3. The rearward end of the substantially horizontal and rearwardly directed track 25, is suitably supported, in the present instance, as by a suspension member 28 secured as at 29 to said track and secured to the ceiling, or other suitable support, as at 30. If the track is positioned adjacent a side wall of the garage, it may be supported from the side wall instead of from the ceiling or the overhead support.

Approximately one-third of the height of the door from the bottom of the door is similarly secured a bracket 31 by means of the bolt and nut construction 32 and the bracket provides a tubular bearing 33 for an axle 34 which mounts at one end a guide wheel 35 that is positioned in a vertical track 36, which may be suitably secured to the jamb and which at its upper end is secured to the base 27. The base 27 includes an opening 37 through which passes a flexible element in the form of a chain 38, the lower end of which is secured as at 39 to the lower axle 34. The upper end of the chain passes over a pulley 40 suitably supported by a horn structure, hereinafter more particularly set forth. If sufficient

clearance is available, the chain, after passing over pulley 40, may be directly connected to a weight box. In the present invention—see Fig. 1—the chain passes over another pulley 42 supported by a block 43 suspended from a suitable support, such as the ceiling 10, as at 44.

The base 27 is of arcuate form, as indicated at 45, and from the same projects rearwardly a portion 46 to which the forward end of the horizontal track 25 is secured as at 26—see Fig. 1. Extending upwardly from the plate portion 45, is a vertically directed wall 47a apertured so that the same may be secured to the front wall 11. The opposite side of the bracket and partially overlapping the vertical track, is a depending wall portion 47b adapted for similar anchorage.

A web 46a extends from the portion 47b rearwardly and at right angles to the plane of the two portions 47a and 47b and the upper end of the substantially vertical track is secured as at 48 to said web. This web is offset, as shown clearly in Fig. 3 from the opening 37. The opening is defined by an upstanding collar 49 and said collar includes the radially projecting tongue 50 directed toward the plane of the portions 47a and 47b and in spaced relation to the top face of the plate portion 27 having the perimeter 45.

The pulley 40 is pivotally supported by the pin 51 mounted in the ears 52, which ears are united together as at 53 to form a horn. The ear portions 52 are extended in encircling collar relation as at 54 and said partially circular arrangement is closed by the plate portion 55 which is an extension of the portion 53. The latter provides a circular opening 56 which telescopically receives the collar 49. The portion 55—53 adjacent the connection and between the two ears 52 is provided with a notch 57, said notch being adapted to permit passage of the projection or lug 50 therethrough.

It is to be understood that the pulley yoke arrangement is axially associated with the base structure previous to mounting adjacent the door opening and is then rotated into a position similar to Fig. 3. So that, the lug 50 is nested within the partially circular portion 54 of the pulley yoke construction or horn and by bearing on the plate portion 55 prevents axial separation while permitting rotational movement.

As shown clearly in Fig. 2, the vertical tangent to the pulley and closest to the axis of the openings 56 and 37, which are concentric, is coincident therewith. So that, for any rotational position of the pulley yoke, the vertical run of the chain will always be tangential to pulley 40.

Reference will now be had to Fig. 4. In this form of the invention, each pair of the original dual swinging doors is indicated by the numeral 100 and they are herein illustrated secured together as at 117. In said figure 127, at each side of an opening, indicates the arcuate base which rotatably supports about a vertical axis the offset pulley 140. The cable or chain is indicated by the numeral 130, each being secured to the door about one-third from the base thereof and passing rearwardly overhead to a pair of overhead pulleys 142. The cable 130 after passing these two pulleys, passes beneath the floating pulley 171 from which is suspended a weight box 172.

As shown clearly in Fig. 4, the counterbalancing system for each door is positioned to one side and rearwardly of the door and includes a single cable secured at both ends to the door and with its remote run portion associated with a floating pulley counterweight construction. This leaves

the entire central portion of the garage or like, free from any counterbalancing structure.

In Fig. 5 a further counterbalancing arrangement is illustrated as applied to a three-door structure. It is quite apparent from this figure that adjacent each side of the middle door, there is insufficient room for the cable or chain to lead direct to a weight box that might move up and down immediately to the rear of and offset slightly from the jamb. In this form of the invention each end door structure is suitably counterbalanced by a counterweighting system, similar to that shown in Fig. 4, and no further reference need be made thereto. However, each side of the middle door is counterbalanced by a weight structure or counterbalance arrangement similar to that shown in Figs. 1 and 2, and it is to be noted that all of the pulleys 242 are positioned immediately adjacent each other so that two weight boxes 260 and 272 move up and down side by side, the weight box 272 providing the counterbalancing for the adjacent end door structure and the weight box 260 providing the counterbalancing for the adjacent side of the middle door structure.

The other end door and the opposite side of the middle door are similarly counterbalanced. With this arrangement all of the counterbalancing is positioned at the two sides of the garage to the rear thereof.

It is to be understood, of course, if the garage is of sufficient area that the weight boxes may be positioned adjacent the jamb at each end, the pulleys immediately adjacent each door would lie in planes but slightly offset from the plane of the door opening, although each plane would be progressively inclined relative to the door opening and each other, this being necessary for clearance.

From the foregoing, it will be clearly understood the present invention provides for the rapid and relatively inexpensive transformation of a dual hinge door into an overhead movable single door, with all of its resultant advantages, of which one is as follows: Where there is snow or where the ground is subject to freezing, or the like, an overhead, movable door is not subject to interference from the snow or the rising of the concrete outside of the garage immediately adjacent the door opening which binds against the bottom edge of the vertically hinged, horizontally swinging door section.

Furthermore, the present invention has the advantage that approximately one-third of the door extends outwardly from the door opening at the upper end thereof and forms a partial canopy and prevents falling of water, icicles, and the like, from the overhead portion of the garage adjacent thereto. It is, of course, to be understood the counterbalancing is such that when the door is released from a suitable catch construction that is associated with the lintel and the top of the door, the door will immediately rise into the open position.

The door also is provided with a suitable pull-down strap, or the like, so it may be closed and the aforesaid latch arrangement upon the door being moved into the fully closed position, automatically locks the door in that position and retains the same therein until the latch is released.

It is to be understood whenever the weight box is to move up and down adjacent the vertical guide 36, the additional pulley 42 is not required. It will be observed—see Figs. 2 and 3—that a tangent parallel to the tangent that

coincides with the axis of the registering openings, before mentioned, if offset an appreciable distance from the edge 45 of the base and that the distance of approximately the mean diameter of the pulley 46, is available for the movement of the weight box.

While the invention has been described in great detail in the foregoing specification, the same is to be considered illustrative in character and not restrictive, for it is well recognized that various modifications of this invention will readily suggest themselves to persons skilled in this overhead door art and all such modifications as well as those illustrated and described, are considered to be within the scope of this invention, reference being had to the appended claims.

The invention claimed is:

1. In a door structure having a substantially horizontal trackway, and a substantially vertical

trackway at one side of the door, the trackways having adjacent ends, the combination of a junction bracket for connecting the same together and to a door frame and including a tubular pivot with its axis in alignment with the vertical trackway, pulley, and a pulley supporting horn swivelled on the pivot and including a tubular pivot portion, the axis of the tubularity being tangential to the wheel periphery.

2. A device as defined by claim 1, characterized by the junction bracket including trackway aligning extensions to which the trackway adjacent ends are secured.

3. A device as defined by claim 1, characterized by the addition of a slot and tongue detachable connection between the horn and bracket tubular pivot.

CLARK D. MICHAEL.