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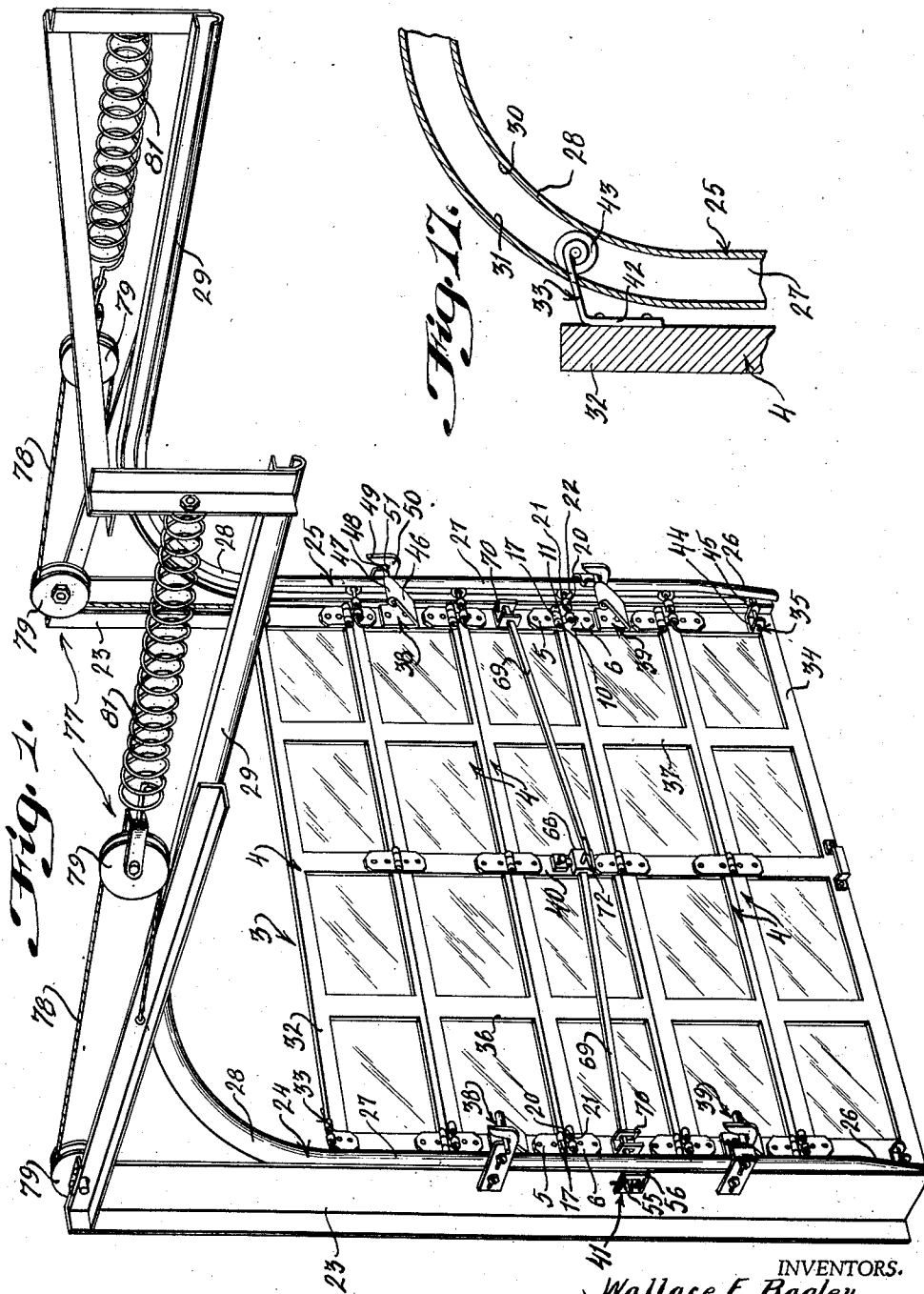
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2,124,969

OVERHEAD GARAGE DOOR CONSTRUCTION

Filed March 25, 1936

4 Sheets-Sheet 1



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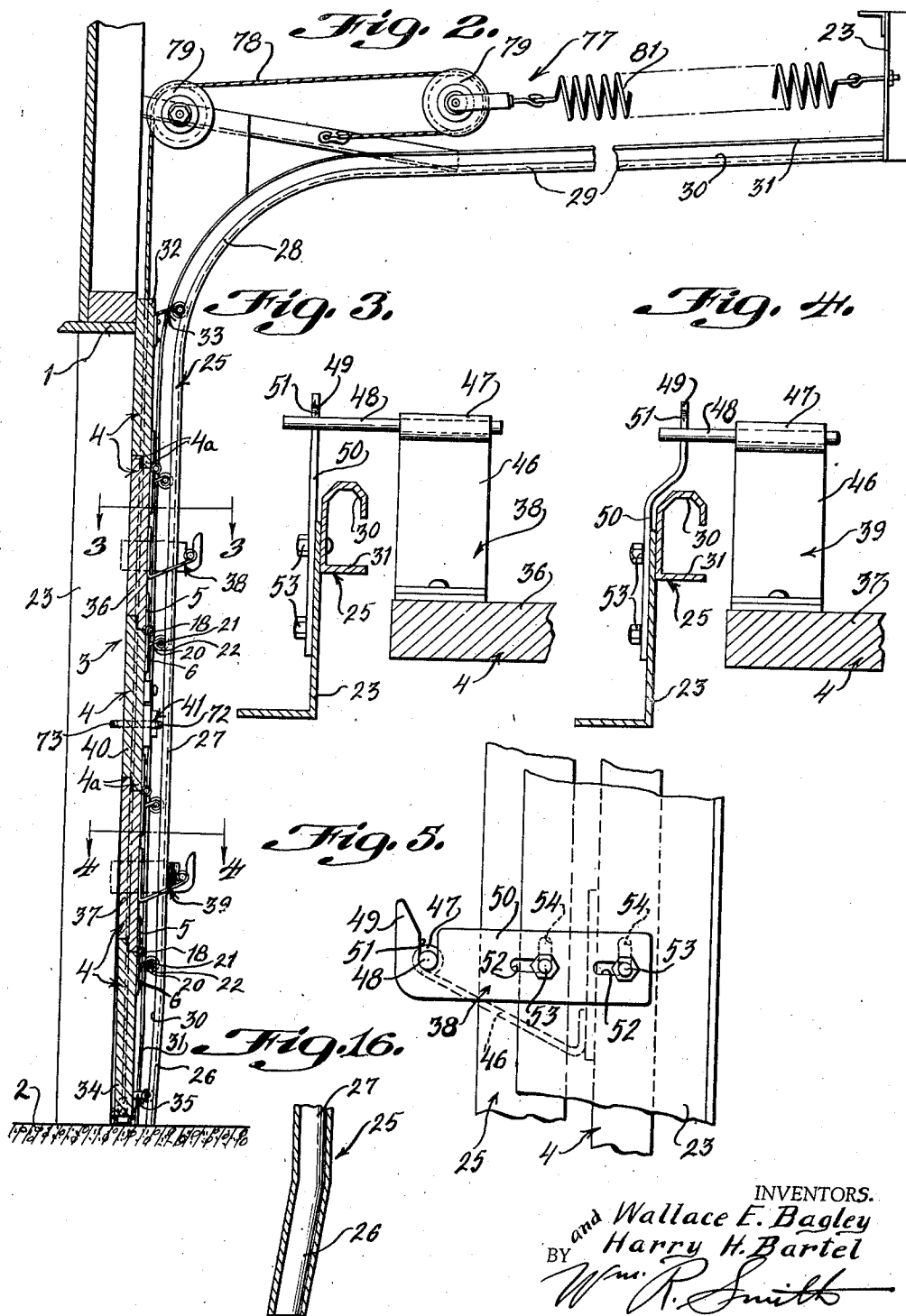
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

Fig. 6.

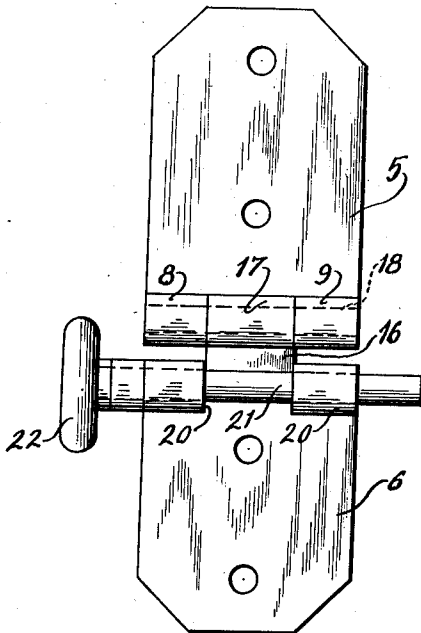


Fig. 7.

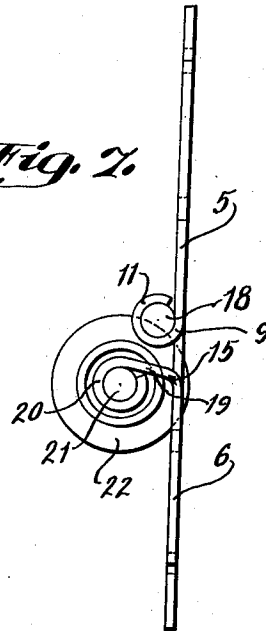
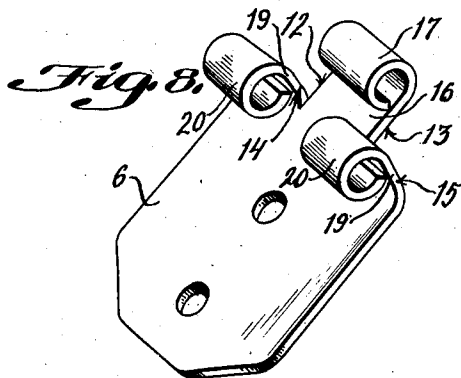


Fig. 9.

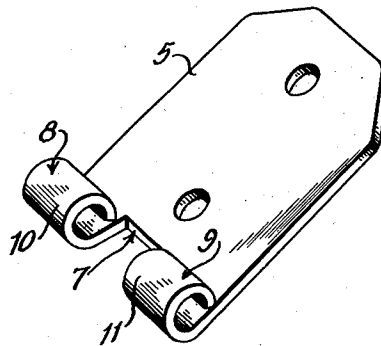
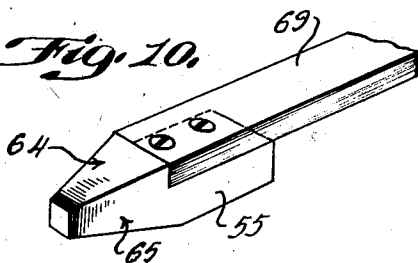


Fig. 10.



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Fig. 11.

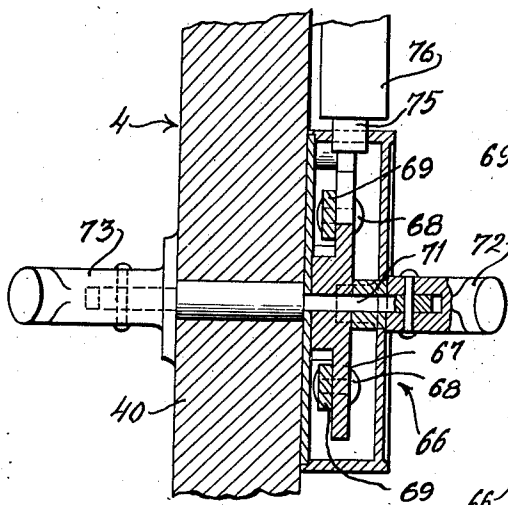


Fig. 12.

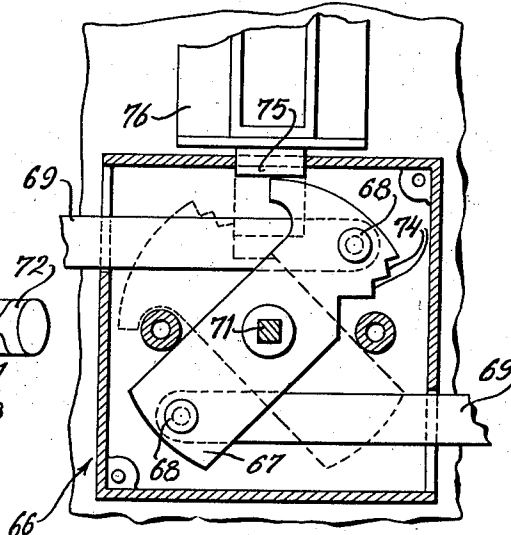


Fig. 13.

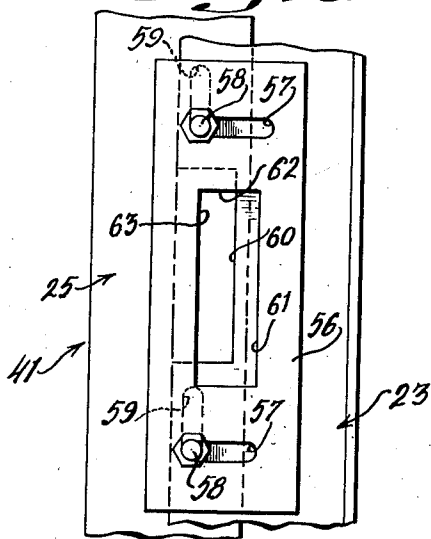


Fig. 14.

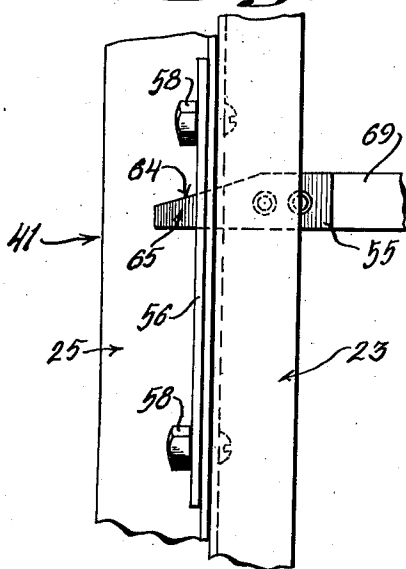
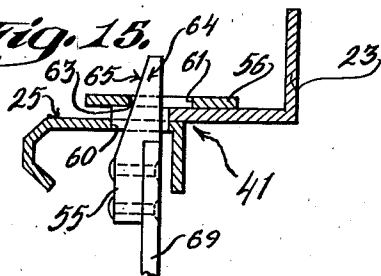


Fig. 15.



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UNITED STATES PATENT OFFICE

2,124,969

OVERHEAD GARAGE DOOR CONSTRUCTION

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Application March 25, 1936, Serial No. 70,736

2 Claims. (Cl. 20—20)

This invention relates to a door construction, more particularly to a door construction of the overhead garage type, and has for its primary object the incorporation in said structure of a plurality of types of closing devices whereby the door may be more effectively and positively moved into closed position with the door frame, and locked in such position.

An object of the invention resides in the use of a combination of types of closing devices, all of which cooperate in a new and effective manner to give the required movement to the door panels towards the door frame, when the door reaches its closed position, one of said closing devices being capable of being locked for holding all the closing devices in closed position.

Another object of the invention resides in the combination and arrangement of a manually operated closing device with automatic closing devices, whereby a more effective closing action is accomplished between the door panels and the door frame.

A feature of the invention resides in a design of closing device that will assure full effective movement of the panels into closing position with the door frame but will readily compensate for any irregularities in construction or irregularities in the closing movements of the door panels when in use.

Another feature of the invention resides in the use of closing devices that will move the door panels horizontally towards the door frame and capable of coaction with other types of closing devices that are capable of giving horizontal and vertical movements to the door panels to assure tight closing of the panels against the door frame, and tight closing of the panels against the ground or base of the door frame.

Besides the above, the invention is distinguished in the specific details of construction of the various parts of the door structure, whereby the cost of manufacture is materially reduced while at the same time adding to the efficiency of the door construction as a unit.

With these and other objects in view, the invention will be better understood from the following detailed description, taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a perspective view of the overhead door construction.

Figure 2 is a vertical sectional view.

Figure 3 is a detail sectional view taken on line 3—3 of Figure 2.

Figure 4 is a detail sectional view taken on line 4—4 of Figure 2.

Figure 5 is a side elevation of one of the cam plates.

Figure 6 is a front elevation of the hinge construction.

Figure 7 is a side elevation of the hinge construction.

Figure 8 is a perspective view of one of the hinge plates.

Figure 9 is a perspective view of the other hinge plate.

Figure 10 is a perspective view of one of the locking bolts.

Figure 11 is a vertical sectional view through the manually operated closing device.

Figure 12 is a cross sectional view of a part of the manually operated closing device.

Figure 13 is a front elevation of the keeper plate.

Figure 14 is an edge elevation of the keeper plate and associated elements.

Figure 15 is a detail sectional view through the keeper plate and associated elements.

Figure 16 is a detail sectional view of the inclined portion of the track.

Figure 17 is a detail view of the closing device of the upper panel of the door.

Again referring to the drawings, illustrating one of the many constructions of the invention, the numeral 1 designates a door frame of a garage, or any other suitable enclosure, and this frame 1 rests upon a ground base 2.

Associated with the door frame 1 is the improved door construction, including a door 3, which consists of a plurality of hingedly connected panels 4, the number of panels depending upon the area of the opening formed by the door frame 1. These panels are provided with overlapping flanges 4a at their abutting edges and, further, the abutting edges of the panels are hingedly connected together by the improved type of hinge illustrated in Figures 6 to 9 inclusive.

The hinge is so constructed as to perform the dual function of a hinge and a guide device for the door panels. To accomplish this dual result, the hinge consists of a pair of metal plates 5 and 6, the former hereinafter identified as the upper plate, and the latter as the lower plate, although it is to be understood that this relation of the plates may be reversed.

The plate 5 is stamped to provide a slot 7 defining a pair of side strips 8 and 9 which are rolled back upon themselves to form ears 10 and 11. The plate 6 is stamped and cut along the lines 12 and 13 to provide the end strips 14 and 15 and the intermediate strip 16. The intermediate strip is rolled back upon itself to form a cylindrical ear 17 which is adapted to be arranged in the slot 7 of plate 5 and aligned with ears 10 and 11 to receive the pintle 18 of the hinge, thereby forming a hinge connection between the upper plate and the lower plate.

The end strips 15 and 14 are bent at an angle to the plate 6 to provide the yoke 19 for the purpose of spacing the bearings 20 thereof from the

body of the plate 6. The bearings 20 are formed by rolling back the extreme end portions of the strips 14 and 15. These bearings or tubular members 20 have relatively smooth interior surfaces so as to allow the free rotation of the shaft 21 journaled therein, which shaft is capable of longitudinal shiftable movement in the bearings. Mounted upon one end of the shaft 21 is a roller 22 adapted to travel in the trackway hereinafter described.

The improved hinge device is connected to a pair of adjacent panels so that the panels may swing relative to each other for the purpose hereinafter set forth.

Secured to the door frame 1 is a supporting frame 23 which, in turn, supports a pair of tracks 24 and 25, each shaped and constructed to have a lower vertically inclined portion 26; a vertical straight portion 27, a continuation of the portion 26; an intermediate curved portion 28, a continuation of the straight portion 27; and a horizontal portion 29, a continuation of the curved portion 28. These tracks are further provided with flanges 30 and 31 having a guiding engagement with the rollers 22 of the various hinges.

Associated with the upper panel 32 of the set of panels is an automatic closing device 33 and associated with the bottom panel 34 is an automatic closing device 35. The intermediate panels 36 and 37 are associated with automatic closing devices 38 and 39 while the intermediate panel 40 is associated with a manually operated closing device 41.

The automatic closing device 33 consists of a clip 42 directly bolted or secured to the panel 32 and this clip supports a roller 43 guided by the flanges 31 and 30. Due to the length of the clip 42, and the position of the roller 43, the roller 43 will have a cam action with the curved portion 28 of the track when the panel 32 approaches its closed position. As a result, the panel 32 is wedged towards the frame 1 for assuring the effective closing of the upper portion of the door.

The automatic closing device 35 also consists of a clip 44 carrying a roller 45 that is positioned to have a wedging action with the inclined portion 26 of the track when the bottom panel 34 reaches its closed position and, as a result, this panel 34 is forced towards the frame 1.

Each of the automatic closing devices 38 and 39 consists of a bracket 46 secured to an intermediate panel, the bracket terminating in a sleeve 47 in which is mounted a pin 48 adapted to have cam action with a cam finger 49 projecting from the cam plate 50 secured to the vertical portion of the track. Contiguous to the cam finger 49, the plate is provided with a recess 51 in which the pin 48 is adapted to be lodged after it has been guided into the recess by the cam action of the cam finger 49. It will be noted from the drawings that the brackets 46 extend upwardly at a slanted angle from the door, and it will be understood that due to the length of said brackets, the pins 48 are yieldably carried with respect to the cooperating cam plates 50 so that each pin 48 resiliently coacts with the cam finger 49 and contiguous recess 51 of the corresponding cam plate to urge the associated door panel towards the door frame with a yieldable force. This coaction between the pin and the cam finger properly forces the door panels towards the door frame and when this is accomplished, the panels are locked in such position due to the coaction of the walls of the recess 51 with the pin 48. To assure proper coaction be-

tween the cam finger 49, the pin 48, and the walls of the recess 51, the plate is provided with slots 52 in which are mounted bolts 53 that are also mounted in slots 54 in the supporting frame 23. Attention is called to the fact that the slots 52 are horizontally disposed, whereas the slots 54 are vertically disposed, thereby enabling the plate to have horizontal and vertical adjustments.

The manually operated locking device 41 consists of a pair of locking bolts 55, one for each vertical edge of the door and each having a double cam action with the tracks so that the set of door panels may be given horizontal and vertical movements in the actuation of the locking device 41. Each bolt 55 directly coacts with a keeper plate 56 provided with horizontally disposed slots 57 in which are mounted clamping bolts 58 that are in turn mounted in vertical slots 59 formed in the supporting frame 23.

Each track is provided with an opening 60 registering with the opening 61 in the keeper plate. The horizontal wall 62, and the vertical wall 63 of the keeper plate opening 61 are so disposed when the bolts 58 are properly adjusted in the slots 57 and 59, that they will have the desired cam action with the horizontal cam face 64 and the vertical cam face 65 of the bolts.

The coaction between the walls 62 and 63 and the cam faces 64 and 65 is such that the door panels are simultaneously given movements in two directions, that is, horizontally and vertically, to bring about a tight fitting action between the panels and the door frame and between the lower edge of the bottom panel 34 and the ground base 2.

For the purpose of giving the desired sliding movements to the bolts 55, there is provided an actuator 66 consisting of a link 67 having pivotal connections 68 with rods 69 that are connected to the bolts, the rods being slidably mounted in the guide bearings 70 arranged contiguous to the keeper plates 56. The link 67 is mounted upon a shaft 71 that, in turn, has secured thereto an interior handle 72 and an exterior handle 73 for the manual operation thereof. The link 67 is further provided with notches 74 adjustably related with the latch 75 of any suitable form of lock 76. Due to the arrangement and construction of the notches and their coaction with the latch 75, the bolts may be effectively locked in any of their adjusted positions, thereby compensating for any irregularities in construction or sliding movements of the door in the use thereof.

To complete the invention, there is provided a lifting mechanism 77 consisting of cables 78 secured to the door panels and travelling over pulleys 79 with one of the pulleys connected to one end of a coil spring 81, the other end of which is secured to a portion of the supporting frame 23. In the installation of the door, the rollers 23 are arranged to travel between the flanges 30 and 31 of the pair of tracks so that the panels may be flexed relative to each other and caused to travel vertically and horizontally. In the movement of the door panels towards closing position, the wedging action between the closing devices 35 and the inclined portion of the tracks 26 will force the door panel 34, or the lower portion of the door, into tight engagement with the door frame. As this action is taking place, the pins 48 are being subjected to a cam action due to their engagement with the cam fingers 49 which also forces the door or door panels towards the door frame 1 and conjointly with this action, the

closing devices 33 are having a cam action with the curved portion of the tracks for forcing the upper panel 32 or upper portion of the door towards the frame 1. Thus it will be appreciated that the panels are automatically moved into engagement with the door frame.

As a final operation and, further, to assure the tight engagement of the panels with the frame through the action of the automatic closing devices, the manually operated closing device 41 is actuated, which gives a further movement of the panels towards the door frame and, further, gives a movement of the panels downwardly to assure tight engagement of the lower edge of the door with the ground base and a final engagement of the panels with the door frame 1.

This manual actuation of the closing device 41 draws the pins 48 into final tight engagement with the walls of the recess 51 and, further, draws the rollers of the closing devices 33 and 35 into tight wedging action with the cam surfaces of the tracks. As the manually operated device 41 is capable of being locked, it will be appreciated that the locking device 51 performs the triple function of giving horizontal and vertical movements to the door and locking the door panels in vertical and horizontal adjusted positions.

To facilitate proper coaction between the panels in the operation of the various types of closing devices, there is provided an overlapping arrangement of the flanges 4a of the door panels.

In concluding, attention is called to the fact that by the adjustment of the clips 42 and 44 upon their respective panels, and through proper adjustment of the cam plates due to their adjustable connections with the tracks, the door panels can be made to move simultaneously into engagement with the door frame, or to move progressively into engagement therewith, that is to say, the uppermost panel moving into closing contact with the door frame; immediately thereafter, the intermediate panels moving into closing contact with the door frame; and finally, the lower panel moving into closing contact with the door frame; or, this action may be reversed, with the lower panel first contacting with the door frame, then the intermediate panels, and finally the uppermost panel.

Of course, it is to be understood that the details of construction of the various parts may be changed without departing from the spirit of the invention and, therefore, we do not wish to be limited in protection except as set forth in the following claims:

What we claim is:

1. A door structure of the character described comprising in combination: a door frame extending vertically from the ground; an overhead door movable to an initial closing position and then to a final closing position towards the door frame and towards the ground, said door consisting of a central panel, intermediate panels, a lower panel, and an upper panel respectively hinged together; guide tracks for the door panels each including a lower inclined portion converging towards the door frame, an intermediate straight vertical portion extending in paralleling spaced relation to the door frame, and an upper curved portion directed away from the door frame; rollers connected to the panels and disposed for riding engagement with said

tracks to guide the door to its initial closing position, certain of said rollers being disposed at the bottom section of the lower panel for contact with the inclined portion of the tracks, and others of said rollers being arranged at the top section of the upper panel for contact with the curved portion of the tracks when the door reaches its initial closing position; cam plates arranged in spaced relation along the vertical portion of the tracks; closing elements yieldably carried by the intermediate panels and adapted to engage said cam plates when the door reaches its initial closing position; and a device mounted on the central panel and having a double cam action with said tracks whereby to force said central panel against the door frame and, at the same time, urge the door as a whole towards the ground, thereby drawing the mentioned rollers into wedging engagement with the inclined and curved portions of the tracks for forcing the door and upper panels against the door frame and simultaneously drawing the closing elements into wedging engagement with said cam plates for forcing the intermediate panels against the door frame, thus moving the door to its final closing position.

2. A door structure of the character described comprising in combination: a door frame extending vertically from the ground; an overhead door movable to an initial closing position and then to a final closing position towards the door frame and towards the ground, said door consisting of a central panel, intermediate panels, a lower panel, and an upper panel respectively hinged together; guide tracks for the door panels including a lower inclined portion converging towards the door frame, an intermediate straight vertical portion extending in paralleling relation to the door frame, and an upper curved portion directed away from the door frame; rollers fixed to the panels and disposed for riding engagement with said tracks to guide the door to its initial closing position, certain of said rollers being disposed at the bottom section of the lower panel for contact with the inclined portion of the tracks, and others of said rollers being arranged at the top section of the upper panel for contact with the curved portion of the tracks when the door reaches its initial closing position; cam plates arranged in spaced relation along a vertical portion of the tracks and mounted for vertical and horizontal adjustment thereon; closing elements yieldably affixed to the intermediate panels and adapted to engage said cam plates when the door reaches its initial closing position; and a device mounted on the central panel and having an adjustable double cam action with said tracks, whereby to force said central panel against the door frame and, at the same time, urge the door as a whole towards the ground, thereby drawing the mentioned rollers into wedging engagement with the inclined and curved portions of the tracks for forcing the door and upper panels against the door frame and simultaneously drawing the closing elements into wedging engagement with said cam plates for forcing the intermediate panels against the door frame, thus moving the door to its final closing position.

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