A. L. CRESCI.

DOOR.

APPLICATION FILED OCT. 6, 1919.

1,429,063.

Patented Sept. 12, 1922.

4 SHEETS—SHEET 1.

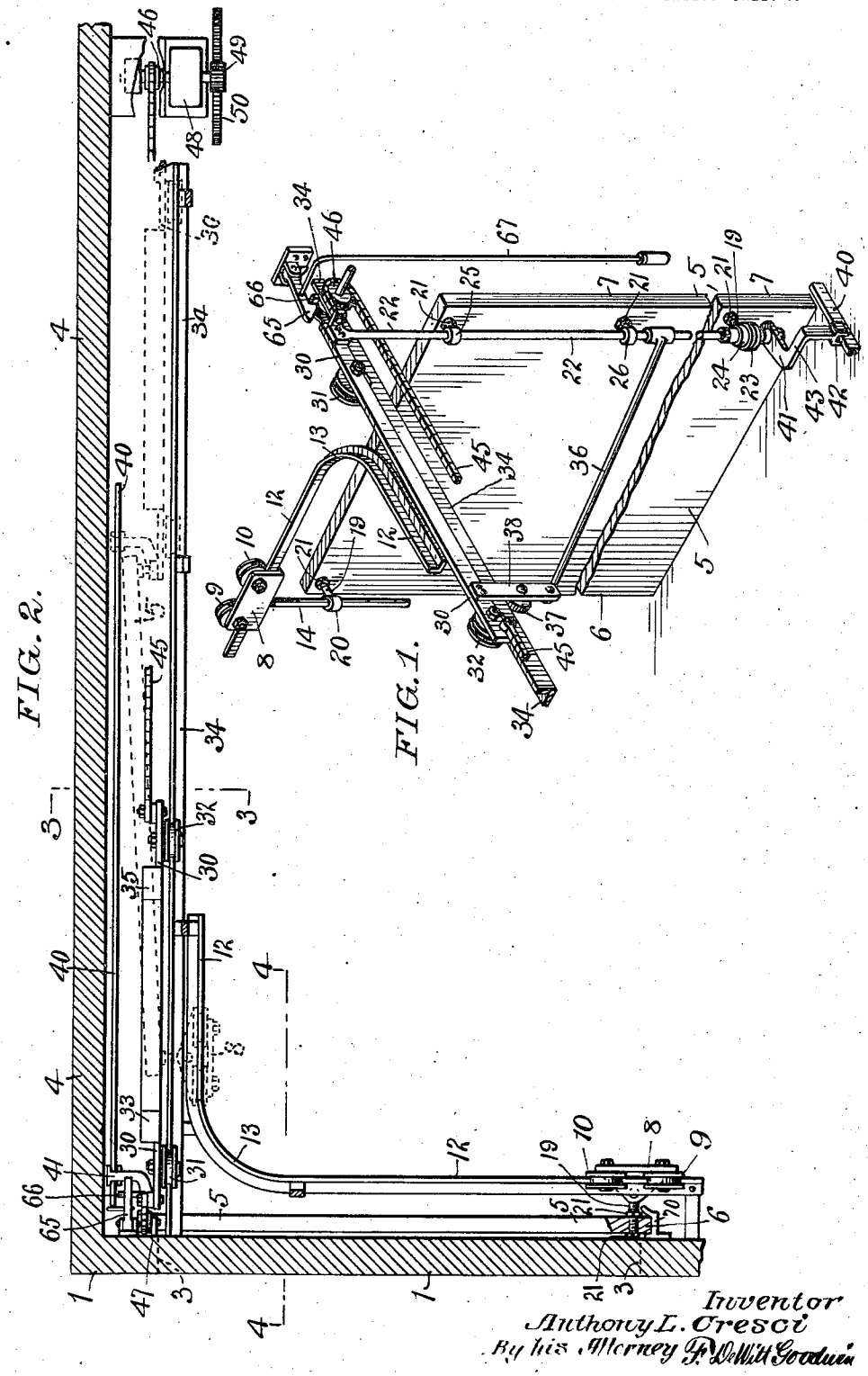


FIG. 2.

FIG. 1.

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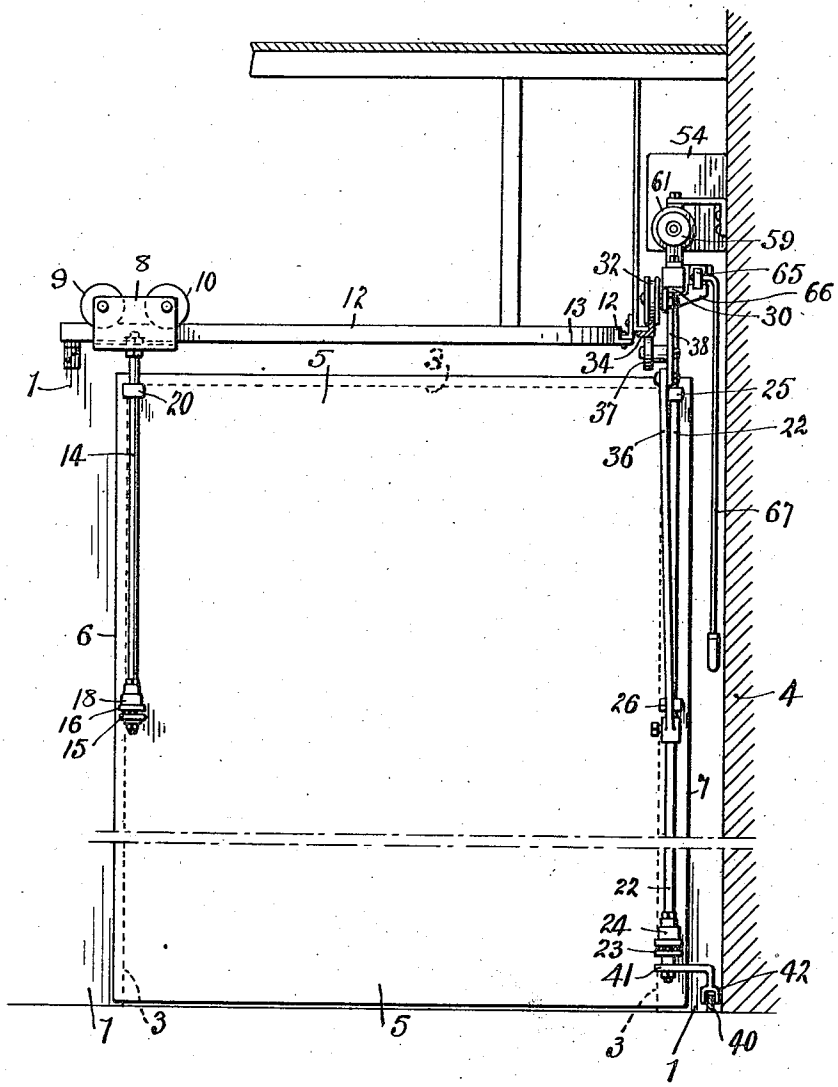
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4 SHEETS—SHEET 2.

FIG. 3.



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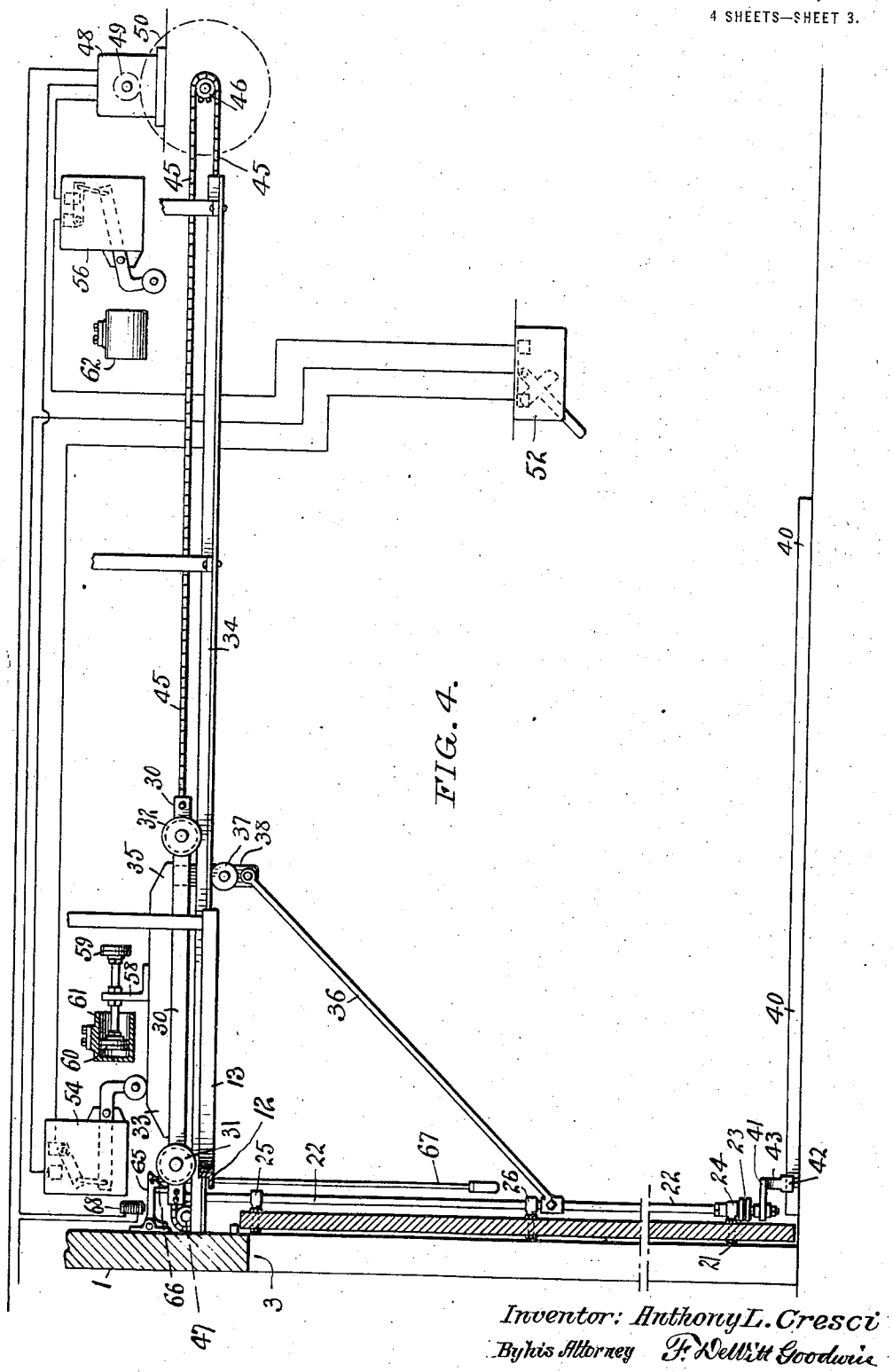


FIG. 4.

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4 SHEETS—SHEET 4.

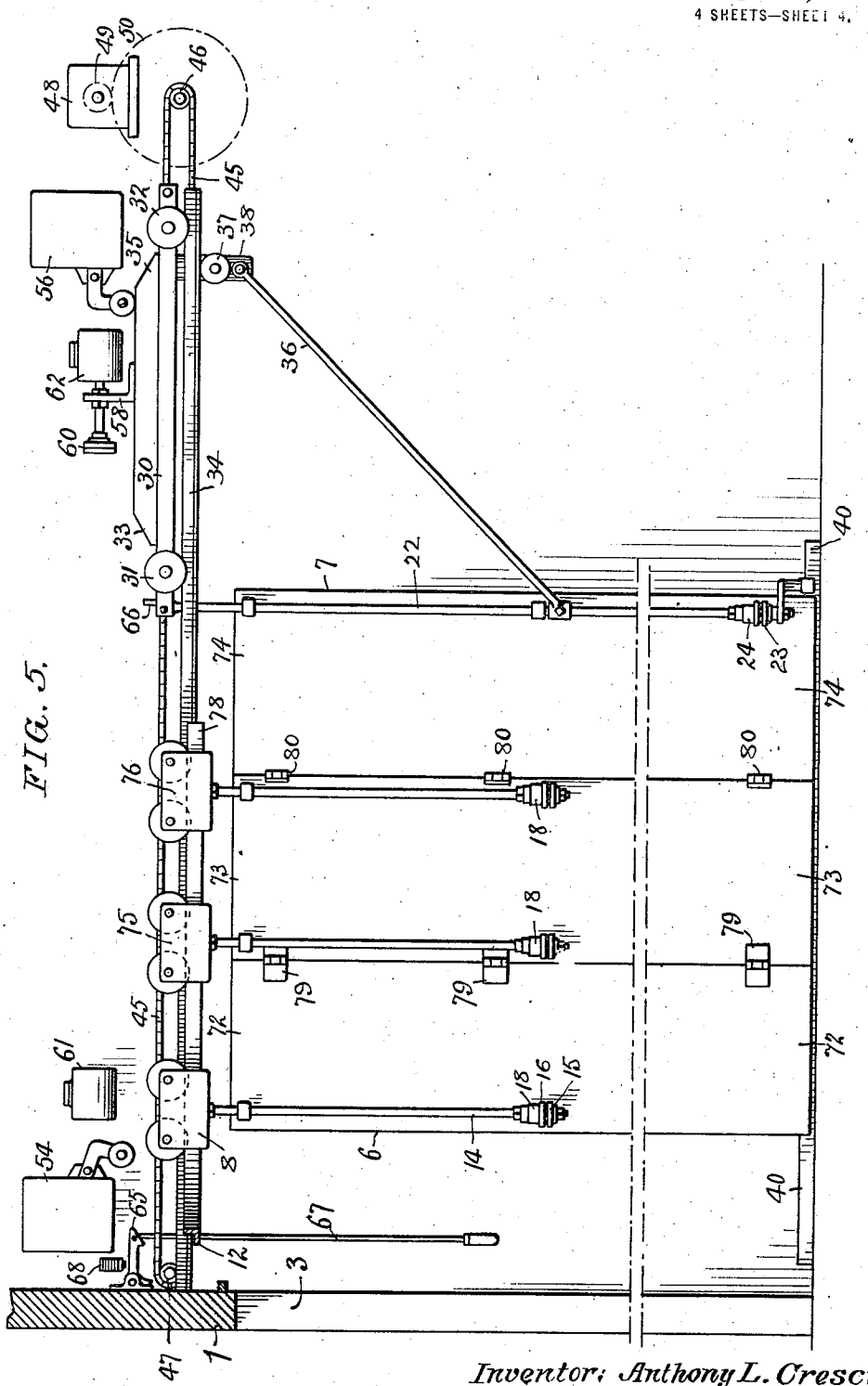


FIG. 5.

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Patented Sept. 12, 1922. 1,429,063

UNITED STATES PATENT OFFICE.

ANTHONY L. CRESCI, OF VINELAND, NEW JERSEY.

DOOR.

Application filed October 6, 1919. Serial No. 328,709.

To all whom it may concern:

Be it known that I, ANTHONY L. CRESCI, a citizen of the United States, residing at Vineland, in the county of Cumberland and State of New Jersey, have invented certain new and useful Improvements in a Door, of which the following is a specification.

My invention relates to improvements in sliding doors for buildings requiring large doorways, such as garages, and my invention particularly relates to a door adapted to be used on a wall having a doorway located therein adjacent to a side wall extending at right angles to the doorway wall and where the door, when in the open position, extends parallel with the side wall.

The object of my invention is to provide means for supporting the door by which the rear edge of the door will move in a line parallel with the side wall and the forward edge of the door will move parallel with the doorway wall throughout a portion of the distance and through an arc of a circle into the open position; a further object of my invention is to provide two separate tracks, one a straight track carrying the rear edge of the door and the other track having a curved portion carrying the front edge of the door or the forward sections of the door if made in sections. The said curved portion of the track having sufficient radius to allow the door to move freely in either direction and thus permitting the door to be used in a space where there is no room for the door to have any movement parallel with the doorway wall; a still further object of my invention is to construct a door which may be operated by power and to provide suitable operating mechanism therefor; a still further object of my invention is to provide a rigid brace for holding the rear edge of the door vertically and for holding the bottom of the door closed against a pressure from without the building, and to provide an extension hanger or carriage for carrying the rear edge of the door and the said brace and also having various other parts of the operating mechanism attached thereto; and a still further object is to provide various other novel features of construction and arrangement of the several parts which will be more fully hereinafter described and claimed.

Heretofore two separate straight tracks have been used for supporting a door, the tracks positioned at right angles, also a single track having a right angle bend has been used, but these forms require force to be applied at both edges of the door to fully open or close the door.

Referring to the accompanying drawings; Fig. 1, is a perspective view of the inside of a door embodying my invention and showing the door in the closed position; Fig. 2, is a horizontal section of a portion of a building showing the door in full lines in the closed position and in dotted lines in the open position; Fig. 3, is a transverse section on line 3—3 Fig. 2, showing the inside of the door when closed; Fig., 4 is a longitudinal vertical section on line 4—4 Fig. 2, showing the door in the closed position; and Fig. 5, is a view similar to Fig. 4, showing the door in the open position and showing a modified construction of the door.

In the accompanying drawings in which like reference characters refer to like parts; 1 represents the doorway wall having a doorway 3 formed therein, and 4 represents a side wall extending at right angles to the wall 1 and located adjacent to the said doorway 3. The sliding door 5 is arranged to close the doorway 3 and when in the open position the door will occupy a space parallel with the side wall 4.

The front, or forward edge 6 of the door 5, is supported by a trolley hanger 8 having wheels 9 and 10 which run upon the track 12. The hanger 8 has secured thereto a vertical rod 14, on the lower end of which is secured a collar 15, forming one part of a ball-bearing. The other part of the ball-bearing consists of a rotatable plate 16 upon which rests the head of an eye-bolt 18, having a threaded shank 19, which passes through the door to which it is adjustably secured by nuts 21. The eye-bolt 18 forms a bearing which supports the door upon the rod 14. The rod 14 turns freely in the eye-bolt 18 and also in the eye-bolt 20, which latter guides the rod 14 but does not support the door; the door is thus free to turn upon the rod.

The rear edge 7 of the door is supported in a similar manner upon a vertical rod 22 also carrying a ball-bearing 23 upon which rests an eye-bolt 24, secured to the door and the eye-bolts 25 and 26 are pro-

vided to guide the upper portion of the door upon the rod 22 and permit the door to turn upon the rod.

The vertical rod 22 supporting the rear edge 7 of the door is carried by and is secured to a trolley hanger, or carriage 30, having rollers 31 and 32, which run upon the straight track 34 extending parallel with the side wall 4.

The track 12, on which the hanger 8, carrying the forward edge 6 of the door, runs, is a separate track from the track 34 on which the carriage 30, carrying the rear edge 7 of the door, runs. The track 12 extends parallel with the doorway wall 1 for a portion of the width of the doorway and then curves rearwardly, with a long sweeping curve 13. Said track 12 terminates adjacent to the straight track 34, at a sufficient distance from the doorway wall to accommodate the front trolley hanger 8 when the door is in the open position, as shown in dotted lines Fig. 2. The curved portion 13, of the track 12, is formed with a curve having a long radius which insures the front hanger 8 running freely upon the curved track without binding.

The rear edge 7 of the door does not require any movement parallel with the doorway wall 1, to permit the door to open and close, as the hanger or carriage 30, carrying the rear edge of the door runs upon the straight track extending at right angles to the wall 1. The door can therefore be operated in either direction to open or close it by applying force to the rear edge of the door only and the front edge of the door will move freely and will be guided by the trolley 8 around the curved track 12.

My improved arrangement of the tracks and door, as above described makes the door particularly adapted for operation by power actuated means, in which only a pushing and pulling force in the same plane is practicable.

The hanger or carriage 30 is of sufficient length to allow a brace rod 36 to be secured to the rear end thereof, with its opposite end secured to the vertical rod 22 at a point low enough upon the door to form a rigid triangular brace for holding the bottom of the door in the closed position against the doorway wall. A roller 37 mounted upon a bracket 38 secured to the rear end of the carriage 30 bears against the under side of the track 34, on which the carriage 30 is mounted and the roller 37 will prevent the rear end of the carriage from being lifted off the track due to a pressure from without when the door is closed and the rigid brace construction will prevent the bottom of the door from being swung inwardly by wind pressure from without when the door is being opened or closed.

The brace 36 and the carriage 30 are hinged to the door by the vertical rod 22, the door is thus permitted to swing upon the vertical axis in relation to the carriage and brace. When power is applied to the carriage to move the door the power is distributed through the rigid triangular brace to the lower portion of the door, thus insuring the free movement of the door upon the tracks. And by locking the carriage against rearward movement, when the door is closed, the brace 36 will hold both the top and bottom of the rear edge of the door against the doorway wall.

When the door is open it is desirable to hold the bottom of the door from swinging away from the side wall. A guide or track 40 is provided which is engaged by an arm 41 upon the door. The arm 41 is rigidly secured on the lower end of the rod 22, secured on the lower end of the rod 22, which extends nearly to the bottom of the door. The arm 41 has an angular extension 43, having jaws 42 which embrace the guide 40.

The guide or track 40 is secured upon the floor, or upon the side wall 4 adjacent to the floor, and extends parallel with the side wall. As the arm 41 is rigidly secured to the rod 22 and the rod 22, at its upper end, is rigidly secured to the carriage 30, the arm will therefore not turn in relation to the guide 40 when the door turns upon the vertical rod 22, thus the arm 41 is prevented from binding upon the guide or track 40.

The arm 41 and the guide 40 are so positioned as to allow the door to turn freely upon the vertical rod 22 and the arm will hold the bottom of the door from swinging away from the guide 40, and away from the side wall 4, when the door is in the open position or when the door is being opened or closed. By providing the arm 41 with an angular extension 43, the guide or track 40 may be located close to the side wall 4, and occupy a position between the door when the door is open, and the wall 4, thus saving floor space.

The power operating means consists of a flexible member 45, formed into a loop, extending over pulleys 46 and 47 at opposite ends of the loop. The ends of the member 45 are secured to opposite ends of the carriage 30. Power is supplied by an electric motor 48 which will rotate the wheel 46 in either direction, through the gear wheels 49 and 50.

The motor 48 is started by a hand switch 52, shown, in Fig. 4, in a position to operate the motor and move the door into the closed position, in which position the electric circuit is broken by a switch 54, automatically opened by a cam 33 on the carriage 30. By reversing the hand switch 52 the circuit will be completed through the closed switch 56 and operate the motor in a direction to open the door. When the door reaches the open

position, see Fig. 5, the cam 35, upon the carriage 30, engages the arm of the switch 56 and breaks the circuit and stops the door.

Upon the carriage 30 is mounted a bracket 58 carrying pistons 59 and 60 adapted to enter open ends of cylinders 61 and 62, secured in fixed positions, at either end of the distance traveled by the carriage, so that air cushions will be formed in said cylinders for stopping the door in either position without shock.

The door may be locked in the closed position by a latch 65, which automatically engages a projection 66 upon the carriage 30, when the door reaches the closed position, as shown in Figs. 1 to 4. The said latch 65 may be released by a handle 67, or by a magnet 68, connected in the circuit operating the motor. The latch may be located so as to engage the rear edge of the door instead of the carriage. The object being to hold the rear edge of the door against movement at right angles to the doorway wall, so that the rear edge of the door cannot be forced away from said wall by a pressure from without. The front edge of the door is held against the wall by the usual form of stop plate 70.

The door may be made in several vertical sections 72, 73 and 74, as shown in Fig. 5, which are supported by additional trolley hangers 75 and 76, located upon the door adjacent to the points where the sections are hinged together. The intermediate hangers 75 and 76 are similar to the hanger 8, carrying the front edge of the door, as above described, and said hangers run upon the same track 12 as the forward hanger 8. The rear edge of the rear section 74 of the door is carried by the trolley hanger or carriage 30, as above described, which runs on the straight track 34. The rear section 74 is held in a vertical position by the brace rod 36 extending from the rear end of the carriage 30 in the same manner as the one piece door.

The track 12 having the curved portion 13 has an extension 78, extending parallel with the track 34, a sufficient distance to accommodate the trolley hangers 75 and 76, when the door is in the open position, as shown in Fig. 5. The several sections of the door are hinged together by hinges 79 and 80, the latter being double acting hinges to allow the rear section to be carried by the trolley hanger on the straight track and the forward hangers upon the curved track when the door is being opened or closed.

Having thus described my invention I claim and desire to secure by Letters Patent;

1. A sliding door mounted adjacent to a doorway wall and adapted to open along a side wall, a track extending along the side wall, a trolley hanger mounted on said track and hingedly connected with the door, a guide located in a fixed position between the side wall and the door when in the open position, an arm having an angular extension adapted to extend around the edge of the door into engagement with the said guide, and means for securing the said arm in a fixed position upon said hanger.

2. A sliding door mounted adjacent to a doorway wall and adapted to open at right angles to said wall, a track extending at right angles to said wall, a trolley hanger mounted upon said track and hingedly connected with the top rear edge of the door, means for locking the said hanger in a fixed position upon said track, to hold the top of the door against the doorway wall, said hanger comprising an extension carriage, a brace rigidly attached to said carriage and to a part upon the lower portion of the door, and means upon the rear end of the carriage for engaging the track to rigidly hold the bottom of the door against the doorway wall, when the hanger is locked in said fixed position.

3. A sliding door having in combination a track extending at right angles to the door when closed, an extension carriage slidably mounted upon said track, said carriage having one end pivotally connected with the rear edge of the door whereby the door may swing in a vertical plane to a position at right angles to said track, a bracket upon the rear end of said carriage having a part positioned below said track, a brace rod rigidly connected to the said bracket, and said brace rod having its opposite end hinged to a part upon the lower portion of the door to hold the door in a vertical position against pressure from without, a locking device for automatically locking the door in the closed position, power driven mechanism for sliding the door upon the track, and releasing mechanism adapted to disengage the said locking device when power is applied to the driving mechanism to open the door.

In testimony whereof I affix my signature.

ANTHONY L. CRESCI.