

June 14, 1932.

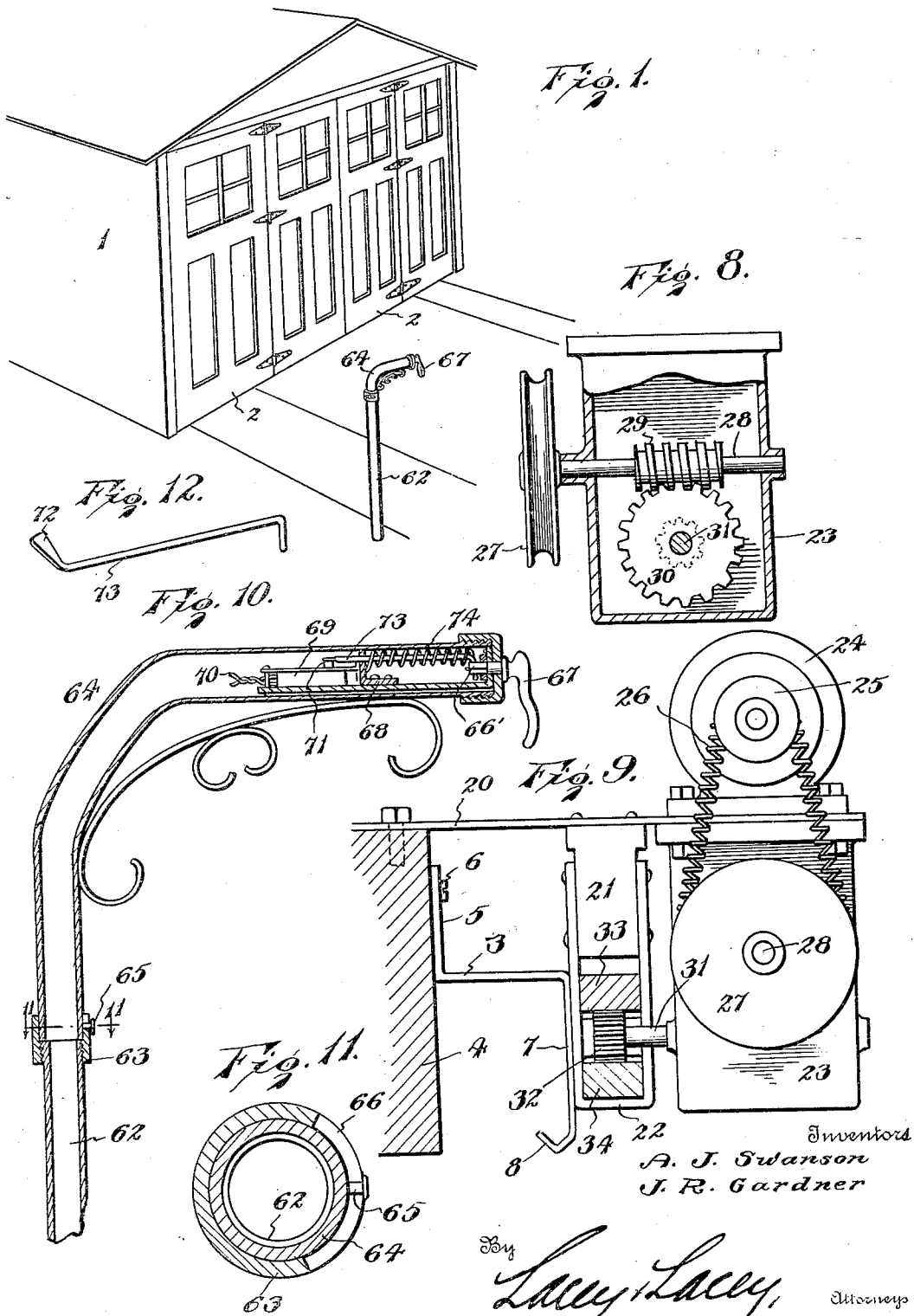
A. J. SWANSON ET AL

1,863,509

GARAGE DOOR

Filed March 18, 1930

4 Sheets-Sheet 1



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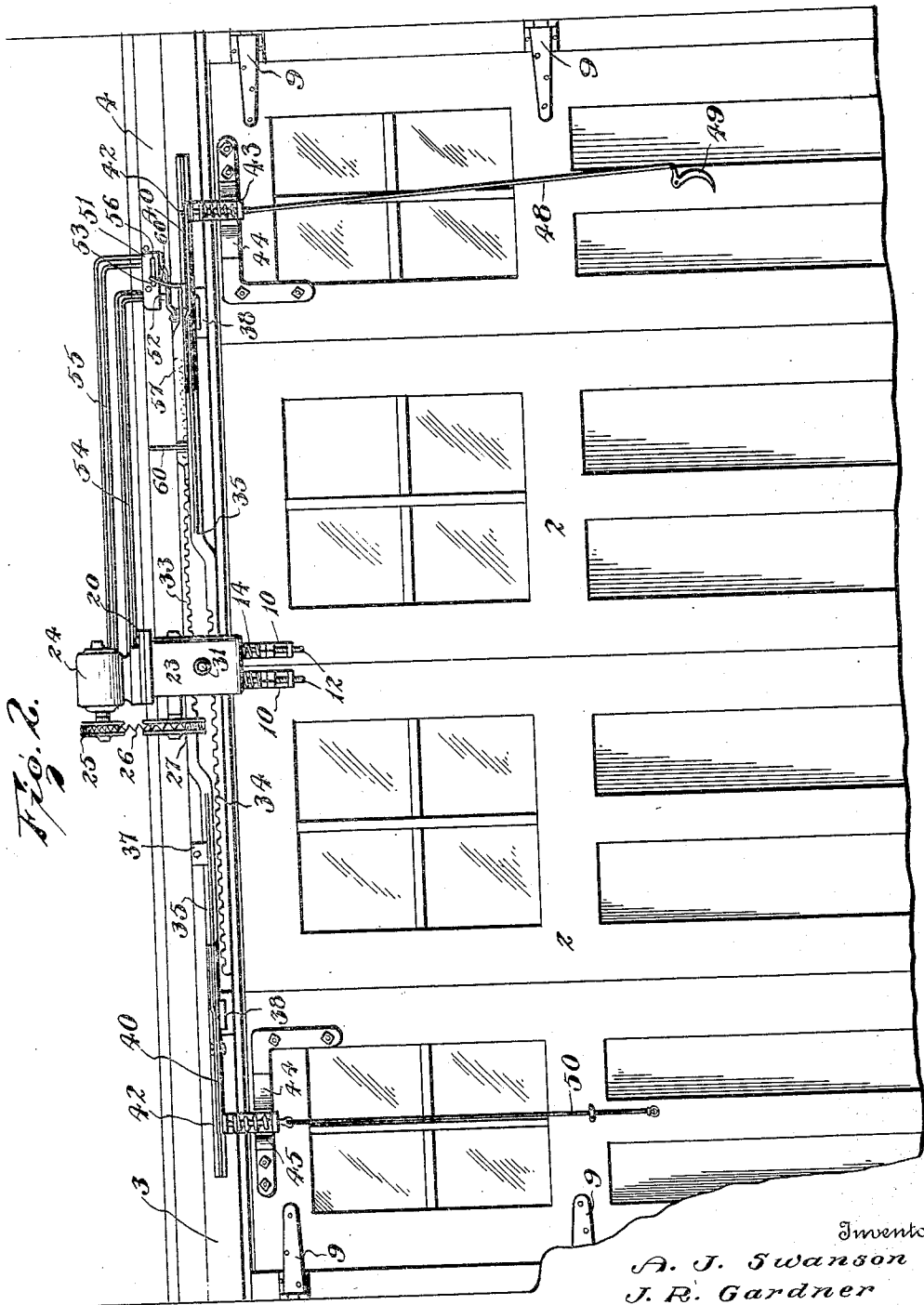
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GARAGE DOOR

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By *Lacey Lacey* Attorneys

June 14, 1932.

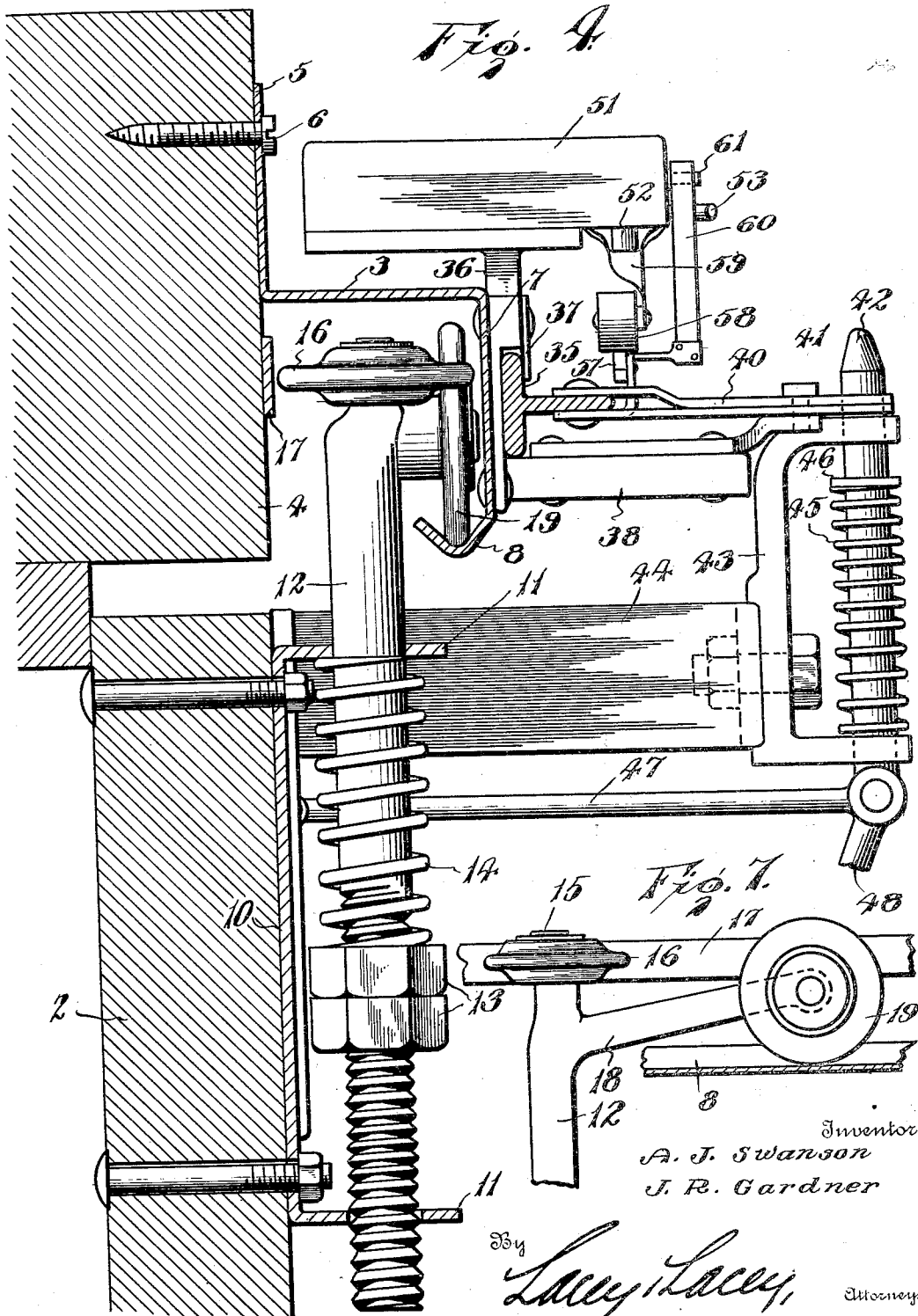
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UNITED STATES PATENT OFFICE

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GARAGE DOOR

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The object of this invention is to provide a door which will be opened or closed by the operation of an electric motor and which may be started from a distant point. The invention provides means whereby closed garage doors may be opened from the outside to permit the entrance of a motor car without requiring the chauffeur to alight from the car and to manually operate the doors. The invention also provides means whereby the doors may be operated manually when desired, and also provides novel features of construction and arrangement whereby the doors will be firmly supported in such a manner that they may yield somewhat to chance blows and obstructions without causing any breakage or binding of any of the working elements. Incidental objects of the invention will appear in the course of the following description, and the invention resides in certain novel features which will be particularly pointed out in the appended claims.

In the accompanying drawings which illustrate one embodiment of the invention.

Figure 1 is a perspective view of a portion of a garage showing the doors in closed position,

Fig. 2 is an enlarged elevation of the inner sides of the doors,

Fig. 3 is a detail view partly in top plan and partly in horizontal section,

Fig. 4 is an enlarged vertical section showing the track and the hangers whereby the door is supported,

Fig. 5 is a plan view of a reversing switch which is employed as a part of the apparatus,

Fig. 6 is an elevation of the casing of the reversing switch and more particularly showing the means for operating the switch,

Fig. 7 is a detail side elevation of a portion of the door hanger,

Fig. 8 is a section through a portion of the gearing whereby travel of the door hanger is effected,

Fig. 9 is a sectional elevation through the track for the door hanger and the means for operating the hanger,

Fig. 10 is a vertical section of a post which is provided at the front of the garage to per-

mit opening of the doors from the outside, Fig. 11 is an enlarged detail section on the line 11—11 of Fig. 10, and

Fig. 12 is a detail perspective view of a switch closing rod which forms a part of the mechanism shown in Fig. 10.

The reference numeral 1 indicates a garage which may be of any approved design and the numerals 2, 2 indicate the garage doors which in the present instance are shown duplicated and consisting of two pair of doors hingedly supported at the sides of the garage and each having its members hinged together so that when the doors are opened the members of each pair will fold together and at the same time will swing inwardly. Within the garage, a track 3 is rigidly secured to the lintel 4 which is rigidly secured in place above the doors, the track consisting of a metal bar having one edge portion disposed vertically, as shown at 5, and rigidly secured to the lintel by bolts or screws 6. An intermediate portion of the track extends horizontally inwardly from the lower edge of the upstanding portion 5 and from the rear edge of this intermediate portion there depends a lower portion 7 which extends longitudinally of the lintel and parallel therewith and has its lower edge terminating in an inwardly turned flange 8 of V or U shaped formation whereby it forms a depressed trough or rail upon which the supporting roller of the door hanger may run, the trough formation of the rail serving to guide the roller and resist lateral oscillation of the same.

The outer member of each pair of doors is supported by hinges 9 from a post set in the garage at a side of the door opening and at the upper inner corner of the inner door section or member is secured a bracket 10 provided with rearwardly projecting terminals 11 having openings therethrough to receive the shank 12 of the door hanger. Said shank 12 has a threaded lower extremity upon which are mounted lock nuts 13 and around the shank, above said nuts and bearing against the same at its lower end and against the upper terminal 11 at its upper end, is an expansion spring 14 which takes

the weight of the door and supports the same so that it will be firmly carried but will not be apt to be damaged by chance blows, the spring serving as a buffer or cushion to absorb vibrations and shocks. The shank 12 has an upstanding terminal 15 upon which is mounted a horizontally disposed roller 16 which, during the opening or closing movement of the door, is adapted to ride upon a flat bar 17 which is secured upon the lintel 4 below the intermediate horizontal web of the track 3, as shown most clearly in Fig. 4, the side thrust of the door being thus received by said roller 16 so that oscillation of the door as it opens or closes will be nullified. Near the upper terminal of the shank 12, an arm 18 extends therefrom in a direction longitudinally of the rail 8 and at the end of this arm is mounted a vertically disposed roller 19 which seats in and runs on the rail 8, as shown in Figs. 4 and 7, the door being thus supported and its corner held to movement in a path parallel with the rail. It will be noted that the shank 12 is fitted loosely in the ends of the bracket 10 so that there may be free relative movement between the bracket and the hanger, thereby permitting the door to fold while its free end will be held to a rectilinear path.

Secured upon the lintel 4 midway the ends thereof is a plate or bracket 20 which projects rearwardly therefrom into the garage and secured to this bracket or supporting plate and depending therefrom is a block 21 to which is secured a pendent hanger or bracket 22 which is substantially U-shaped and bears against the outer side of the lower portion 7 of the track, as shown most clearly in Fig. 9. The plate or bracket 20 projects beyond the block 21 and a gear casing 23 is secured to and depends therefrom. Upon the upper side of the supporting plate or bracket 20 immediately over the gear casing 23 is mounted a small electric motor 24 of any approved form and which is illustrated in a conventional manner. Upon the motor shaft is secured a pulley 25 and an elastic belt 26 is trained around said pulley and around a pulley 27 which is secured on the outer end of a shaft 28 journaled in the sides of the gear case 23 and extending through said case, as shown in Fig. 8. Within the gear case 23, a worm 29 is secured on the shaft 28 and said worm meshes with a worm gear 30 on a cross shaft 31 journaled in the front and rear walls of the case and projecting through the front wall, as shown in Fig. 9. Upon the projecting end of the shaft 31 is a pinion 32 which meshes with upper and lower racks 33 and 34 which are disposed within the hanger 22 and guided by the same. The racks 33 and 34 are connected to the respective doors so as to operate the same and they obviously will move simultaneously in opposite directions when the motor is driven. The elastic belt 26 will effectually transmit motion from the motor to the pulley 27 and the members associated therewith while at the same time it will provide means whereby breakage of the doors when they meet an obstruction will be avoided. As long as the doors are moving freely, the belt will actuate the driven pulley 27 but if the door meets an obstruction the belt will then slip upon the pulley without imparting motion to the door so that no breakage will occur and as soon as the obstruction has been removed the opening or closing operation of the doors will proceed. The racks 33 and 34 are formed on the opposed edges or sides of long bars 35 disposed above the doors and at the rear side of the track 3, the end portions of these bars being T-shaped in cross section with the head of the T set on edge and the shank of the T extending rearwardly, as shown clearly in Fig. 4. The head of the T-shaped portion of the bar bears against the track or against a bracket 36 secured thereto and it is held to the track or said bracket by a keeper 37 secured on the rear side of the bracket or on the track and engaging over the edge of the T head, as will be understood. Near one end of the track is secured a bracket plate 38 projecting within the garage and having its rear end turned toward the hinge edge of the door and formed with a notch 39, as shown in Fig. 3. Pivoted to the adjacent bar 35 is a lever 40 which extends across the bracket 38 toward the hinge end of the door and carries a pin 41 which is adapted to engage in the notch 39, as shown in Fig. 3, the end of the lever having an opening therethrough which normally receives the upper end of a bolt 42. The bolt 42 is mounted slidably through a vertically disposed guide bracket 43 which is rigidly secured upon the outer end of a bracket or arm 44 rigidly secured to the inner side of the door adjacent the upper end edge of the same, as shown in Figs. 2 and 4. The bolt is normally held upwardly in engagement with the lever 40 by an expansion spring 45 which is coiled around the bolt between the lower end of the guide bracket 43 and an abutment 46 on the bolt, and the lower end of the bolt is pivoted below the guide 43 to a lever arm 47 pivotally mounted upon the door below the arm 44 and having a depending branch 48 which extends downwardly to a point where it may be conveniently manipulated by a person standing within the garage. The lower end of the branch 48 may be pivoted to a crank handle 49 pivotally mounted upon the door section and so formed that it may be comfortably gripped by the hand of an operator and rocked so as to exert a downward pull upon the bolt and also transmit a rearward pull to the door so that the door may be opened manually if desired from the inside. It

will be understood that this bolt mechanism is duplicated at the two ends of the door and instead of the rod 48 a short cable or chain, indicated at 50, may be employed. When the door is mechanically operated, the bars 35 will be moved toward the hinge sides of the doors to open the same and this movement will carry the levers 40 which are engaged with the respective bolts 42 outwardly and will transmit movement to the doors through the bolts. The levers, it will be noted, extend rearwardly as well as toward the hinge sides of the door and, consequently, the door sections having the bolts mounted thereon will be caused to swing about their hinge supports. The door sections which are hinged to the moved sections will be held at their upper free corners to the tracks by the hangers and, consequently, the doors will be caused to fold at the same time that they swing about their hinge supports, this action being indicated by dotted lines in Fig. 3. When the doors are closed, the stud 41 will move into the notch 39. When the bolts 42 are withdrawn from the cooperating levers 40 to open the doors manually, the levers will be supported by the brackets or arms 38 upon which they rest and, by reason of the engagement of the studs 41 in the notches 39, they will always be in operative position and after the doors have been manually closed the bolts may be reengaged with the respective levers by merely releasing the bolts, the springs 45 pushing the bolts into the locking position.

The bracket 36 is located adjacent one end of the track 3 and upon said bracket is mounted a switch casing 51 in which is mounted a push button switch 52 and a reversing switch 53. The switch 52 is an ordinary well known push button device, the wires 54 from which are connected with a source of current supply, and is arranged in parallel relation with push buttons, which may be located on the side wall of the garage or in the adjacent dwelling at various points so that the garage doors may be opened before the garage is entered, thus providing for effectual ventilation and escape of any accumulated obnoxious gases. The push button switch 52 is connected in series with the terminals of the reversing switch and said terminals are connected by wires 55 with the winding of the motor so that the motor will be caused to rotate in one or the other direction according to the position of the reversing switch. As shown most clearly in Fig. 5, the reversing switch comprises a switch arm or lever which is fulcrumed within the casing 51 between its ends and has one end projecting through a slot 56 in the rear side of said casing. The lower rack, 34, has one end portion extending under the switch casing 51 and upon its upper edge under said casing is provided with a cam projection 57 which is arranged to

ride under a roller 58 carried by the free end of a lever arm 59 supported in any convenient manner on the under side of the switch casing 51 and passing under the button of the switch 52, as shown clearly in Fig. 6. If the motor circuit be closed through any of the push button switches, the motor will at once start to operate and the parts are so disposed that the initial movement of the motor will carry the cam projection 57 immediately against the roller 58 to lift the same and cause the lever 59 to press upon the button 52 and close the switch. The extent of the cam 57 is such that the switch 52 will be held closed during the entire opening or closing movement of the door and when the door has been closed the end of the cam will pass from the roller 58 so that the switch will immediately be opened.

The bar 35 also carries upstanding strikers 60 which are spaced apart longitudinally of the bar and arranged in proximity to the ends of the cam projection 57. These strikers are designed to cooperate with retarding rollers 61 upon the switch casing 51 and they are resilient so that as either striker impinges against the proper roller it will be held back slightly until it may clear the roller, whereupon it will forcibly strike upon the projecting end of the switch lever 53 and swing the latter about its fulcrum so as to set the lever to reverse the motor. This action, however, does not occur until just as the switch 52 is opened. It will thus be seen that if the circuit through the motor be momentarily closed at any point the motor will be set in action and will immediately effect closing of the switch 52 so that the motor circuit will remain active until the door has been opened or closed at which time the switch 52 will be opened and the reversing switch 53 will be reversed so that when the motor circuit is again closed the doors will be operated in the reverse direction.

In order that the doors may be opened from the outside without requiring a chauffeur to alight from the vehicle, we provide a switch which may be easily reached and closed from the chauffeur's seat. This switch is mounted at the upper end of a hollow post 62 which is set in the ground at some distance from the garage doors and may be ornamented as desired. The post is preferably circular in cross section and a collar 63 is secured upon its upper end while an upper handle section 64 is fitted within the collar and rests upon the upper end of the lower section and upon an internal shoulder formed in the collar so that a swiveled connection is provided and the handle member may be turned to any convenient position. To limit the turning movement of the handle, a stop pin or stud 65 is carried thereby and plays in a slot 66 formed in the collar. At the upper end of the handle section, there is mounted a short rock shaft 120

66' having a handle 67 which may well be of the form commonly employed in the doors of automobiles. Disposed within the upper end section 64 of the post adjacent the terminal thereof is a bracket 68 and a switch box 69 from which wires 70 may extend through the post and underground to the motor 24. The switch within the box 69 is of the push button type and the button 71 projects through the top of the box in position to be engaged by the crank 72 at the inner end of a rock shaft 73 which is disposed longitudinally of the post and is secured at its front end in the shank 66 of the handle 67, a torsion spring 74 being disposed about the shaft 73 and secured at one end to the bracket 68 and at its opposite end to the shank 66 so that it will tend constantly to hold the crank 72 on the button 71 but without exerting pressure on the button. Rocking of the handle 67, however, will apply pressure to the button so that it will be depressed and the switch closed to start the opening operation of the doors. The shank 66 may be equipped with a cylinder lock such as now commonly provided upon automobile doors so that unauthorized opening of the garage doors may be prevented.

From the foregoing description, taken in connection with the accompanying drawings, it will be seen that we have provided an exceedingly simple, compact and easily operated mechanism whereby the doors of a garage or other enclosure may be very easily opened or closed while at the same time they will be locked securely against tampering by unauthorized persons.

Having thus described the invention, we claim:

1. The combination with a swinging door, of an electric motor mounted above the door, means for starting the motor, operative connections between the motor and the door, a normally open stopping switch mounted above the door and including a depending button, an arm disposed below and extending under the button, and a cam element movable with the door and engageable with said arm to raise the same for pushing the button and closing said switch and holding it closed during movement of the door.

2. The combination with a swinging door, of a sliding member mounted above the door, a lever pivoted at one end to said member and projecting laterally therefrom over the door, a vertically slidable bolt on the door to detachably engage the free end of the lever and transmit movement of the lever to the door, a fixed bracket below the lever having a laterally extending notch in its free end edge, the lever resting on said bracket, and a stud on the lever near the free end thereof arranged to enter said notch when the door is closed whereby the lever will be supported in proper position to be engaged by the bolt and the

bolt may be withdrawn to permit operation of the door by human effort.

3. The combination of a swinging door, a motor mounted above said door, operative connections between the motor and the door, means for starting and stopping the motor, a switch casing above the door, a reversing switch lever mounted in the casing and projecting through the side thereof, a slide above the door constituting a part of the connections between the door and the motor, spaced resilient strikers carried by and rising from the slide to impinge upon the free projecting end of the reversing switch lever, and retarders on the switch casing in the path of the strikers at opposite sides of the reversing switch lever.

4. The combination of a door, a motor above the door, operative connections between the motor and the door including a sliding bar mounted above the door, a normally open switch above said bar having a depending button, an arm held at one end at one side of said switch and having its free end projecting under the button, said button and switch being in the motor circuit, a roller on the free end of said arm, and a cam member on the upper side of the sliding bar to pass under said roller for raising the button to close the switch and hold the switch closed during movement of the door.

In testimony whereof we affix our signatures.

ALBERT J. SWANSON. [L. S.]
JOHN R. GARDNER. [L. S.]

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