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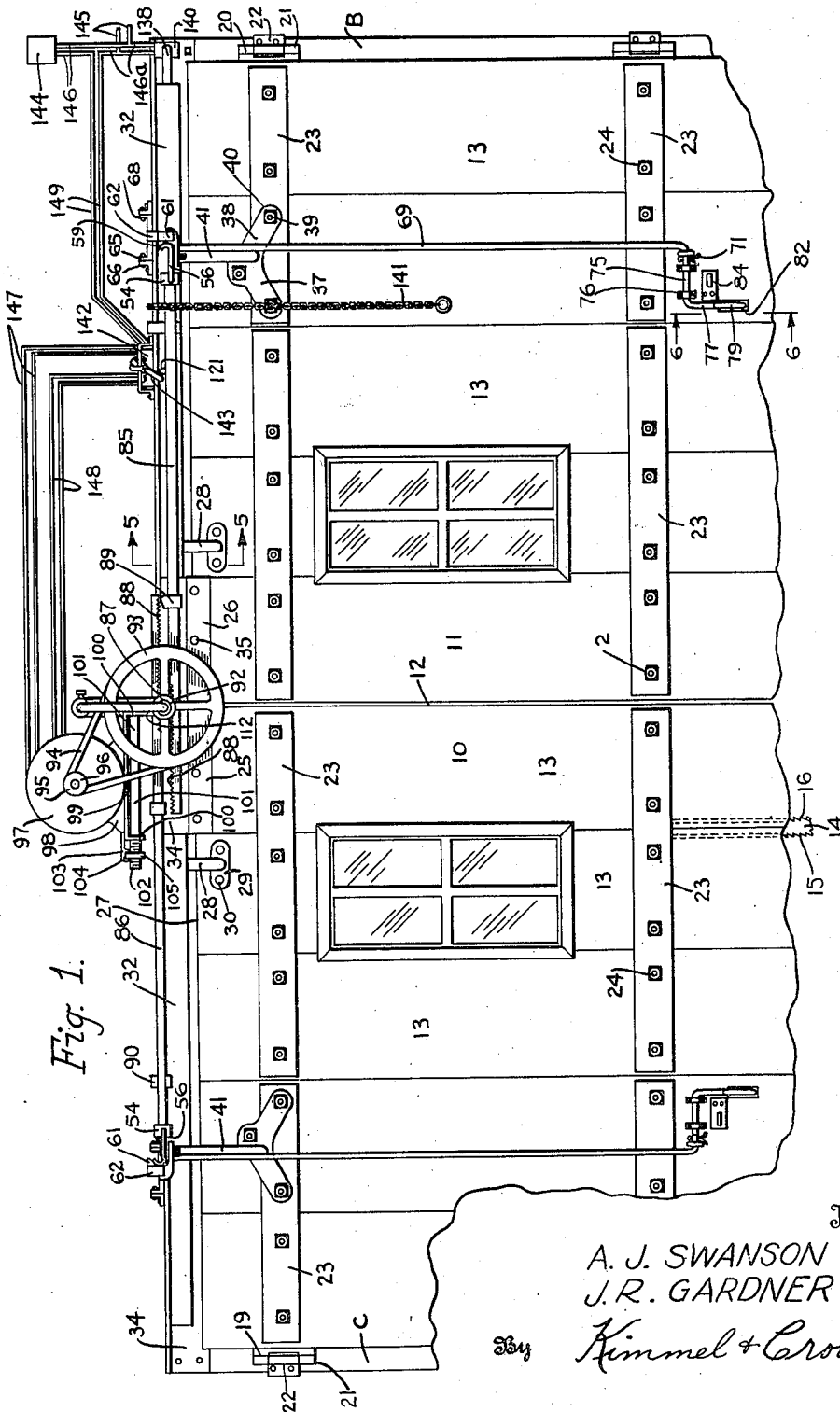
A. J. SWANSON ET AL

2,452,501

GARAGE DOOR OPERATION

Filed April 29, 1946

4 Sheets-Sheet 1



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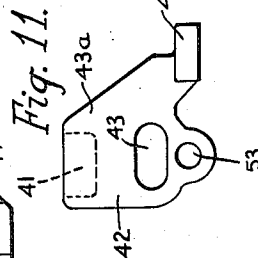
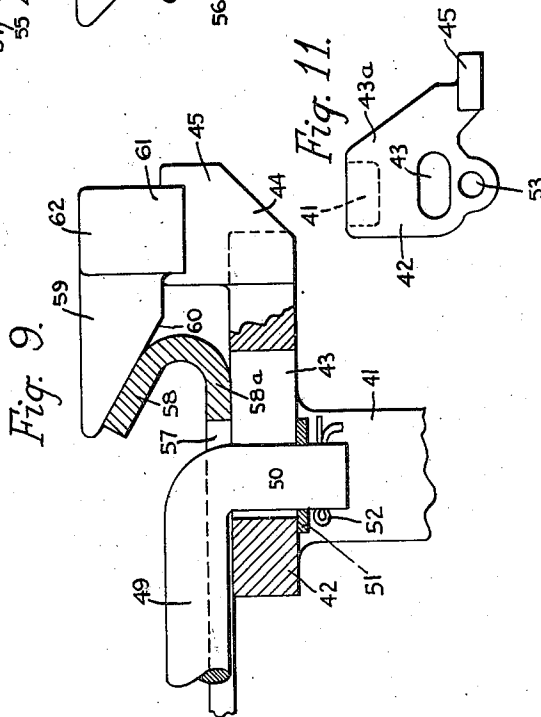
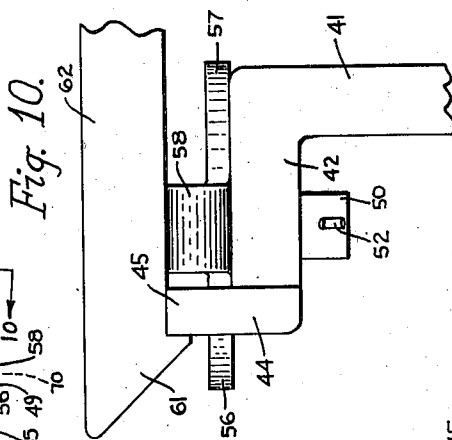
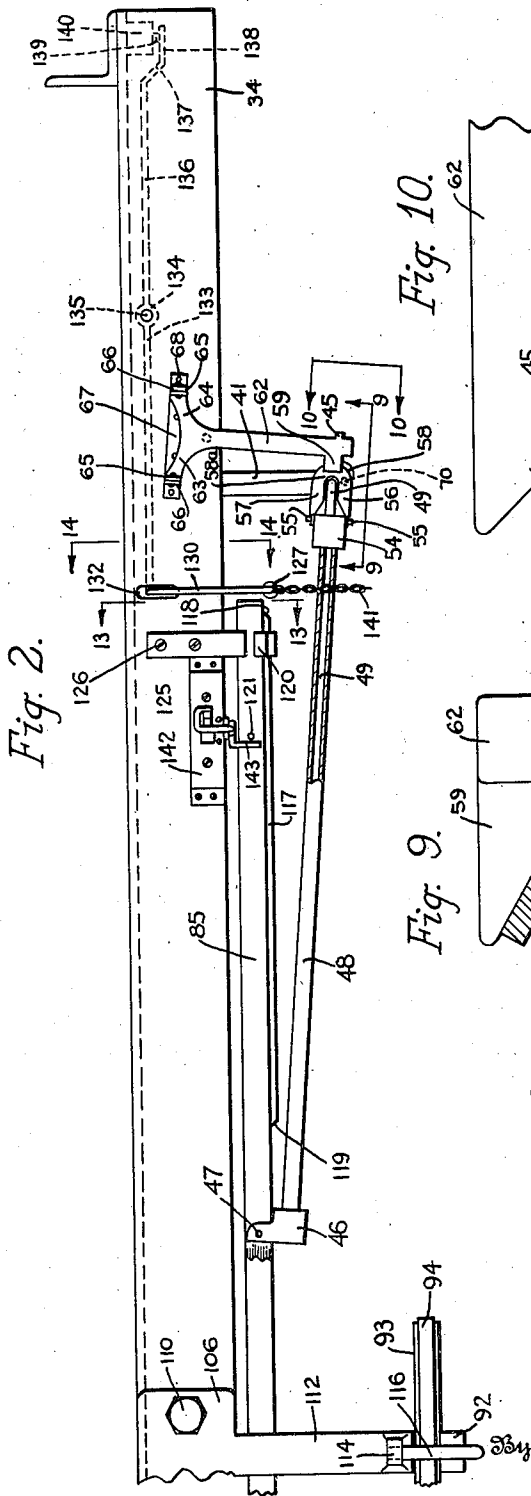
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GARAGE DOOR OPERATION

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4 Sheets-Sheet 2



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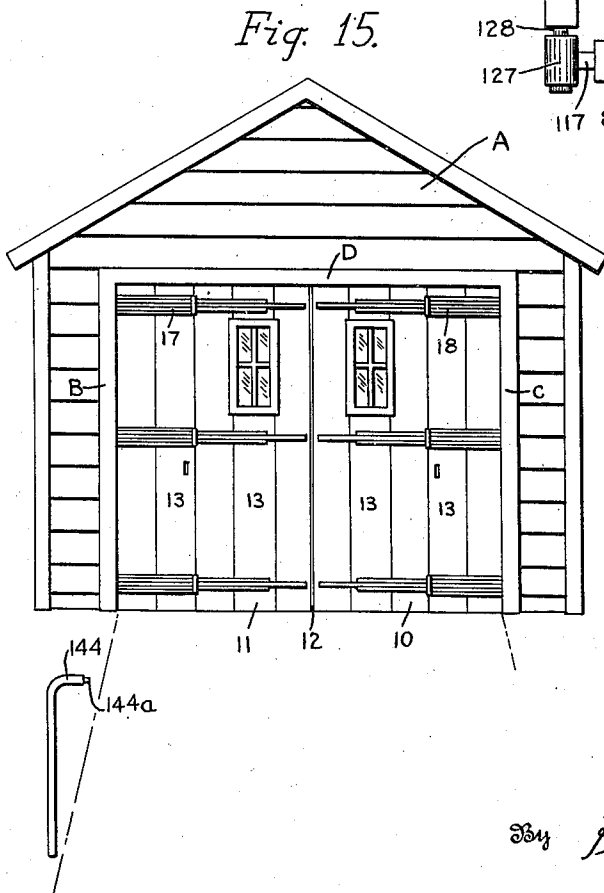
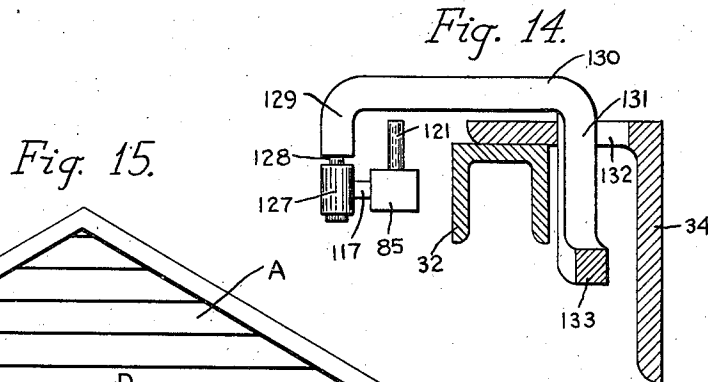
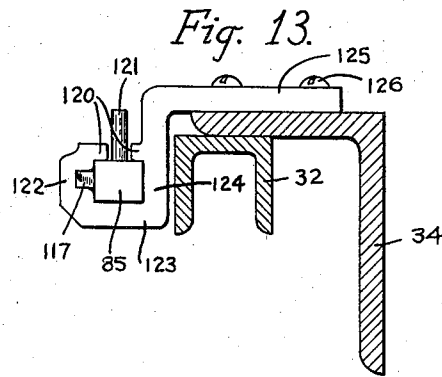
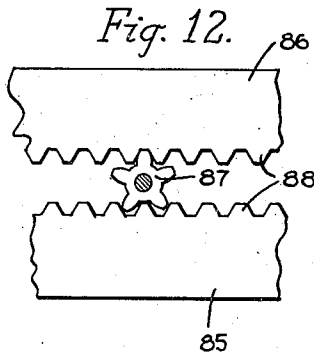
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2,452,501

GARAGE DOOR OPERATION

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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GARAGE DOOR OPERATION

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Application April 29, 1946, Serial No. 665,747

12 Claims. (Cl. 268—63)

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The present invention relates to improvements in garage doors and more particularly to mechanism for moving the doors to open and closed position by switch-operated means.

One of the main objects thereof is to provide a simple, efficient, and inexpensive device for the purpose of effecting the swinging movement of the doors to either open or closed positions in the door frame, in a manner that requires the least amount of attention or labor on the part of the attendant.

Another object thereof is to provide improved means for facilitating the operations of opening and closing the doors so far as is concerned with effecting the movements thereof electrically, and allowing the movements thereof unlatchedly.

A further object thereof is to provide, in a device of the kind described, improved means for automatically unlatching the doors just prior to starting their movement to open position.

Another object thereof is to provide, in a device of the kind described, improved means for automatically keeping the motor circuit closed while the doors are being swung to open position, as well as for resetting automatically the motor circuit for another operation upon reversal of movement of the doors to closing position.

A still further object thereof is to provide, in a device of the kind described, improved means for enabling the movement of the doors to begin to open position by aid of the instrumentalities herein set forth from either of the opposite sides of the doors manually.

Another object thereof is to provide, in a device of the kind described, improved means for manually unlatching the doors when it is desired to automatically start the movement of the door to open position.

Another object thereof is to provide, in a device of the kind described, improved means for so mounting the motor and its drive belt connections to the mechanism for operating the movement of the doors that it will have a floating support where, under influence of its gravity, mounting it will respond to vibrations, jars and other causes of ordinary unbalance due to irregular functioning of any parts of the mechanism, by shifting itself bodily without interfering with its proper operation of said mechanism.

A further object thereof is to provide, in a device of the kind described, improved means for mounting the drive motor for the door operating mechanism whereby it is easily adapted automatically to take up slack in the belt that is driven from the motor.

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Another object thereof is to provide, in a device of the kind described, improved means for reinforcing and bracing the adjoined wooden planks making up the garage doors of the present invention, in such a manner that they will withstand rough usage and resist separation.

A further object thereof is to provide door operating mechanism for doors that admits of being set in motion in various ways and from various positions. It is proposed to start the working of the mechanism from a remote point outside of the garage, by hand inside of the garage, by hand outside of the garage, and automatically reset the mechanism for refunctoning as well.

Another object thereof is to provide garage door operating mechanism so shaped, arranged and functioning that only manual starting of the motor is required to start the mechanism in motion, so that once the mechanism starts to function the door is successively unlatched, the motor kept running only so long as the doors are still undergoing movement, the motor circuit reset for a restarting operation, and stoppage of the movement of the doors accomplished.

With the above and other objects in view our invention consists in the combination, arrangement and details of construction disclosed in the drawings and specification and then more particularly pointed out in the appended claims.

In the drawings wherein similar reference characters designate similar parts throughout the respective views,

Figure 1 is a rear elevation of the invention showing all parts of the door operating mechanism in position when the doors are closed,

Figure 2 is a top plan view of one of the doors, being the door to the right of the door frame,

Figure 3 is a fragmental and elevation, partly in section, of the mechanism,

Figure 4 is a fragmental detail sectional view of a weather strip mounting for the upper ends of the doors,

Figure 5 is a vertical section taken on line 5—5 of Figure 1,

Figure 6 is a cross section taken on line 6—6 of Figure 1,

Figure 7 is a fragmental sectional view showing two planks of a door connected by a serrated steel spline,

Figure 8 is a fragmental detail view in plan of the serrated steel spline,

Figure 9 is a section taken on line 9—9 of Figure 2,

Figure 10 is a section taken on line 10—10 of Figure 2,

Figure 11 is a detail plan view of a bearing portion mounted upon a door bracket herein-after described,

Figure 12 is a fragmental detail view of rack bars and operating pinions,

Figure 13 is a vertical section taken on line 13—13 of Figure 2,

Figure 14 is a vertical sectional view taken on line 14—14 of Figure 2, and

Figure 15 is a front elevation of the garage.

In the drawings which are merely illustrative of our invention, the various parts are disclosed.

The garage building of approved design is broadly designated A and the door frame therein is shown to consist of the top part D and opposite side parts B and C respectively.

The doors will be rigidly constructed for special use in a garage and made to withstand severe usage and rough punishment incidental to bodily movements as they swing to open or closed positions. The door is composed of two sections 10 and 11. Each door section is composed of a series of adjoined wooden planks 13. Interposed between the adjoining edges of these planks, making up each door 10, 11, are steel spline strips which are formed upon opposite longitudinal edges with serrations. Thus, one spline strip 14 will have one longitudinal serrated edge 16 inserted into the plank as shown in Figure 7 so it is bridged across the slit intervening between the planks. In this manner the planks are reinforced and also held with a close interfitt and against accidental separation.

Strapped transversely across each door 10 and 11 centrally as well as the top and bottom thereof, are main door hinge bars 17 on door 11, and 18 on door 10. They materially reinforce and brace these doors and will assure that the doors do not buckle under temperature variations. These bars, as well as bars 23 shown in Figure 3, are formed with a series of points 37a along its effective area which take into the wooden planks. At the ends of the bars 17 and 18 are movable hinge knuckles 19 for door 11, and 20 for door 10. The stationary hinge plates 22 of these door hinges are countersunk in the rectangular recesses 21 formed in the door frame. The rigid bracing bars 23 are secured to the planks by bolts and nuts 24. The main door hinge bars are on one side of the doors, the outer side, while the reinforcing bars 23 are on the inner side of the doors.

An angle iron metal sill 34 extends longitudinally along the upper part of the door way upon the inner side of the doors. Extending centrally upon the upper edges of the doors 10 and 11 are depending weather strips 26 against which the doors abut. These weather strips are secured by fasteners 35 (Figure 4) directly through a spacer 36 to the angle iron sill 34. The top edges of the doors are denoted at 27.

Also provided for easy frictionless movement of the garage doors 10 and 11 are roller guides 28, which are roller carrying arms, the lower face plates 29 of which are attached (Figure 5) by suitable screws 30 to the door 10 or 11. On vertical pins 31a secured upon arms 28 on the doors are rollers 31 which engage the opposing flange walls 32 of an inverted channel shaped body attached by fasteners 33 to the top of angle iron sill 34.

It will be seen that 32 provides a track for the

rollers 31 carried by the doors and that these rollers 31 also serve as pivots upon which the doors may swing to open and closed position when operated by the mechanism about to be described.

The doors 10 and 11 have secured rigidly in overlying contact therewith brackets having opposing arms 37, 38 thereof attached to the doors by fasteners 39, being bolts to which nuts 40 are threaded operatively. These brackets are formed with outwardly spaced and curved upstanding rigid arms 41 formed at their upper planes with horizontally disposed bearing portions or plates 42.

Reference being made to Figures 9 and 10 of the drawings, the details of the connections between the doors and the door operating mechanism will best appear. In Figure 11 the bearing portions 42 of the bracket arms 41 appear in top plan. It will be seen that they are each formed with an elongated slot 43, and behind the slots 43 with holes 53. Upon laterally extending parts 43a of these bearing portions 42 are formed upstanding lugs 45 arranged parallel to the arms 41. The bearing portions are beveled as at 44.

Upon oppositely movable door operating members 85 and 86 soon to be described, are pivoted at suitable points, swivel castings 46 into which are arranged for pivotal connection to these members 85, 86, elongated tubular rods 48 in which are telescopically arranged rods 49, as shown in Figure 9, are bent back downwardly to form pins 50 which project swivellably down into slots 43 of bearing portions 42 of the brackets 37, 38. These pins 50 also extend into wear plates 51 abutting the bearing portions 42, being held in contact therewith by the cotter pins 52.

Just prior to being bent into the formation of the pins 50, tubes 48 are provided with heads 54 which project beyond opposite sides of the rods. A pair of horseshoe-shaped levers or latches have their parallel arms 56, 57 straddling the rods 49, and have their inner narrowing ends pivoted at 55 to opposite sides of the heads 54 of the rods 48. The bight portion 58a of this latch lever curves around the pin 50 of the rod 49 and is raisable at this point relatively to the bearing portion 42 of the bracket 37, 38 upon which it normally rests as shown in Figures 9 and 10. It will be seen that the latch lever along its bight portion is formed with a bent back hook bill 58 disposed obliquely of the plane of the lever as shown in Figure 9.

The inclined bill 58 of the latch lever bears against the correspondingly inclined beveled surface 60 of the toe 59 formed laterally at right angles upon the latch arm 62 which, at its outer end, is formed with a beveled latching terminal 61 hooked against the abutment 45 formed upon the bearing portion 42. There are two latch arms 62, one operating in conjunction with each door 10 or 11. Each latching arm 62 projects forwardly of the door frame angle iron sill 34 at an angle thereto, preferably as shown in Figure 2. At their inner ends each latching arm is formed with divergent arms 63, 64, which at their ends are formed with upstanding lugs 65, 66, which abut against adjacent upstanding lugs 66 formed upon the ends of a bracket member 67, which is secured by fasteners 68 upon the sill 34.

As shown in Figures 1 and 6, a vertically disposed push up rod 69 is mounted upon the inner side of the doors 10 and 11. The top end of each rod is designated 70. It passes through the holes 53 of the bearing portion 42 of the brackets 37,

38, and bears directly under the bight portion 58a of each latch lever for the purpose of raising same upon its pivot pins 55 at the proper time when the push rods are lifted for this purpose.

The lower end of the push rod 69 is formed with a right angular pin 71 which projects through an eye 72 formed terminally upon a crank arm 73. The pin 71 is held against displacement from this eye by means of a cotter pin 74.

The crank arm 73 is formed upon a spindle 75, which, as shown in Figure 1, extends horizontally along each door 10, 11, being mounted for rotation in keepers 76 secured to these doors. Vertical shanks are formed integrally with the spindles 75 and overlie the doors as shown in Figure 6. At their lower ends these spindles 77 are formed with outwardly projecting offsets 78 which are bent downwardly at 79 to provide a handle which is seen to project laterally of the inner side of the doors. This handle portion 79 is formed with a horizontally extending right angular portion 81 which projects movably and swivellably into a vertical slot 82 formed in each door 10, 11. The connection rods 81 of the handles 79 terminate in spaced relation from the outer side of the doors, in upstanding handles 80 which are disposed parallel to handles 79. There is normally space 83 intervening between the bottom of each slot 82 and the connecting rods 81 of the spindles 77. Any approved design of a lock 84 may be employed to extend with its bolt across and behind the spindles 77 of the push rod actuating means such as is shown in Figure 6.

The oppositely movable members 85, 86, to which the tubular rods 48 are pivotally mounted are rack bars, of which 85 is the lower one and 86 the upper one. Interposed for meshing engagement with the rack bars 85 and 86 is a pinion 87, which engages the rack teeth 88 of these rack bars. Suitable rack bar guides 120, 121, are employed which are operatively secured upon the sill 34. The pinion shaft is designated 91, Figure 3. Number 92 is a hub upon a large pulley 93 which is mounted for rotation with pinion shaft 91. A belt 94 is trained over and around pulley 93, and also over and around a smaller pulley 95 made fast upon the motor shaft 96 of an electric motor 97 whose bottom portion is designated 98.

The motor under supporting is intended to impart to the motor a floating disposition with respect to the movable parts of the mechanism for operating the doors including the rack bars 85 and 86, and also for the purpose of bodily tensioning the belt 94 to tighten the same automatically. For this purpose the motor bottom 98 is mounted flat upon a base portion or platform or bracket 99. The cross section of the motor equals that of the width of the platform 99. Reference will also be made to Figure 1 for an observation of the mounting of the motor 97. Here it is seen that the bracket mounting for the motor is provided with depending lugs at the opposite ends thereof as at 100, these lugs being disposed in marginal alignment upon the base plate or platform 99. The lugs 100 of the platform are trunnioned upon a screw rod 101 which is operatively and rigidly secured at its inner end upon the web 113 of a suitable standard secured upon the sill 34 in a manner soon to be described.

The rod 101 is formed with screw threads 102 at its outer end as shown in Figure 1. A laterally disposed casting 103 upon the base 98 of the motor 97 has a depending fork 104 into which

extends a nut 105 threaded upon the screw threaded end 102 of the screw rod 101.

The means for fastening the web 112 upon the sill 34 will now be set forth. It consists of the innermost bracket arm 106 which overlies the top flange of the sill 34. Bolts 110 pass through the bracket arm 106 and the flange of the sill, the heads of which bear against the flange while nuts 111 are threaded upon the bolts for clamping the bracket arm rigidly upon the sill 34. Formed integrally upon the web 112 is a rack bar guide 113. Also formed upon this web 114 at its outer plane is the upstanding part or standard 114. Pinion shaft 91 is a rod-like part which has an upright connector arm 115 disposed parallel to pulley 93. The top of this arm 115 is denoted at 116 which extends horizontally and has its end received in the standard 114.

In Figure 2 it is seen that rack bar 85 is formed upon its outer face with a longitudinally extending cam bar 117 which has its opposite ends beveled as at 118, 119. Reference being made to Figure 13, it is seen that horizontally aligned cheeks 120 are formed upon a bracket member. They provide a recess in which an upstanding pin 121 on rack bar 85, secured to its upper face, may pass. Cheek 120 is formed upon the offset 122 of the bracket member, which is formed as a part of the arm 123 of this member upon which rack bar 85 rides as upon a guide. The bracket member has a depending shank 124 which carries arm 123, and which shank is shaped into a right angular arm 125 overlying the sill 34, being secured to the latter by means of the bolts 126.

Reference being made to Figures 14 and 2, it is seen that the actuating part of a switch member is disclosed here. As rack bar 85 advances in movement to effect opening of the proper door 10 or 11, its cam bar 117 will ride against a vertically disposed roller 127 operatively journaled upon a vertical pin 128 carried by the depending arm 129 formed upon the overhanging horizontally disposed shank 130 of a rock lever shown in dotted lines to the right of Figure 2. Shank 130 forms a part of the vertical stem 131 of this rock lever. Stem 131 of the rock lever projects into the slot 132 formed in the top flange of longitudinal sill 34, being formed upon the arm 133 of rock lever, the other arm of which is denoted at 136. Rock lever has a central hub 134 which is fulcrumed upon a pivot pin 135 secured upon the sill 34.

Rock lever has its arm 136 formed terminally with an offset 137 upon which is formed the laterally disposed feeler 138 that engages pressingly the motor circuit starting switch 140 mounted upon the door frame. The feeler 138 engages the push button 139 of this switch 140. A pull cord or chain 141 has its upper end attached to the trip arm 130 of the rock lever. This trip arm projects forwardly of the sill 34 so that its vertical roller 127 will project in the path of movement of the cam bar 117 of rack bar 85. The lower end of chain 141 extends downwardly of the doors at a convenient point where same may be reached by an attendant.

Number 142 designates a switch having provision for reversing the direction of rotation of the motor 97 by means of circuit parts and connections. This switch 142 is operatively secured upon the sill 34 as shown in Figure 2. Centrally of this switch it has an irregularly shaped contact arm 143 which projects beyond sill 34 so as to project into the path of movement of the pin 121 on rack bar 85 when the latter is moving in

one direction. In Figure 15 illustrating the outside of the garage and doors thereof, we have generally denoted at 144 a remote control switch having a push button 144a designed to be manually operated by the operator of an automobile who has brought his car thereadjacent. This remote control switch may be actuated electronically by approved means not shown.

The circuit wire connections to the switches will now be detailed. This is shown diagrammatically in Figure 1. Number 145 denotes the plug-in wires. These wires 145 are connected to wires 146a which are connected to the motor starting switch 140 operatively and are also connected to the remote control switch 144 by aid of wires, 146. Wires 146 are connected by wires 149 to the switch member 142 operatively to feed current thereinto. From switch member 142 run wires 147 connected to wires 149, and are also connected to the motor 97 for starting the rotation of the motor when the circuit is closed thereto. Another pair of wires 148 connect at one end with switch member 142 and at the other ends are connected also to the motor 97 for the purpose of effecting the reversal of rotation of this motor 97. Number 150 designates the leverage of the platform 99 of the motor with respect to the pivotal point 101 of the platform and motor.

The use and operation of this invention will now be set forth.

It is apparent that, when the doors swing from open to closed position in the door frame, as they assume their final closing positions therein abutments 45 of brackets 37, 38 of the doors will ride over against the beveled surfaces 61 of the latching members 62 and snap under the latching hooks thereof. The doors will now be effectively latched in closed position. The latching members or arms 62 have to be disengaged from the abutments 45 before the doors can be moved into opening position by the mechanism described. The attendant who happens to be inside of the garage building A can take hold of handle 79, Figure 6, and pull it away from and outwardly of the inner side of the door 10 or 11, to thereby swing spindle 77 and operate crank arm 73 to move upwardly, whereby push rod 69 is caused also to move upwardly of the door. As push rod moves upwardly, its upper end 70 pushes up on latch levers 56, 57, which raises so that (Figure 9) the inclined lips 58 of this latch lever pushes upwardly upon the beveled surface 60 of the lateral offset 59 of the latching arm 62, thereby disengaging the hook 61 of the latch arm from the abutment 45 carried by bracket 37, 38 of the door.

If the attendant happens to be on the outside of the garage building A, he can take hold of the handle 80 of this same push rod operating means and accomplish the same result thus described—disengage the latching member 62 from abutment 45.

If the attendant is coming into the drive way of the garage in his automobile, and desires to open the garage doors 10 and 11 without leaving his machine, he extends his arm outside of the car and engages the push button 144a of the remote control switch 144, and in doing so he closes the circuit to the electric motor as follows: Current will flow to the battery (not shown) to plug-in wires 145, switch 140. Switch 140 has wires 146a and 149 run to switch 142, and thence current flows through such wires and by wires 147 leading from switch 142 current flows directly to

the electrical motor 97, thus closing the circuit to this motor so it starts running.

Rotation of the motor shaft 96 sets pulley 95 in motion, which sets in motion the belt 94, trained over pulley 93, so pulley 93 begins to rotate. This rotates pinion shaft 91 and the pinion meshing with rack bars 85 and 86 causes the rack bars to move in opposing directions to the right and left for effecting the opening of the doors 11 and 10 to the left and right accordingly. As rack bar 85 moves to the right it induces longitudinal movement in the link arms 48, 49, which have a telescopic relation adjustably. The angular projecting disposition of the link arms 48, 49 with respect to the plane of the rack bar results in these link arms pushing the bearing portion 42 of the doors away from the door frame and radially of the pivotal point of attachment 47 of these link arms. The moment the rack bar 85 and 86 start moving to open the doors, beveled end 118 of cam bar 117 on rack bar 85, and on rack bar 86 begin to ride over the roller 127 of the trip arm 130 of the rock lever 133, 136 of starting switch 140. As each door operates in the same way we will describe how one door is caused to open and close.

When the cam bar 117 of rack bar 85 rides against roller 127, it pushes the trip arm 130 outwardly. This action rocks the switch lever arm 133 so it moves outwardly of the sill 34, while the arm 136 of the lever moves inwardly of the sill. This makes the feeler 138 at the outer end of lever arm 136 so engage the push button 139 of the switch 140 that the motor circuit already closed remains closed as long as cam bar 117 is riding against roller 127.

As the cam bar is thus riding over roller 127, rod 49 of the link arm by aid of its crank pin 50 is pulling the door gradually open. The initial movement, however, of the rod 49 forwardly imparted to it by rack bar 85 forces the horseshoe-shaped latch lever 56, 57 forwardly also so it is forced and pushed against the toe 59 of latching bar 62. As this is done, inclined hook 58 of the latch lever wedges home against and under the beveled surface 60 of this latching arm 62 and pushes the same upwardly with the result that latching arm 62 is lifted off from engagement with the abutment 45. This unlatches the door instantly, so that it may be moved to fully open position by the link arms 48, 49. The pin 121 is moving away from the trip arm 143 of the reversing switch member 142 as this takes place.

When the cam bar 117 rides off from engagement with the roller 127 of the trip arm 130 of the motor circuit starting switch, the circuit to the motor 97 may be automatically disrupted, if so desired, and the motor will stop running. However, the motor may, by its switch and circuit hook up, still continue to run.

When the starting switch is closed, the motor either opens or closes the doors, depending on which way the reversing switch 142 has been set. The motor is of the type in which the starting field is used for reversing thus making it possible to reverse without affecting the motor while it is running at full speed. This permits the motor to keep running not only while the doors are opened, and while the doors remain open for a given interval, but also when the closing of the doors is to be accomplished automatically. It is only when, during the continued reversal of rotation of the motor, beveled end 119 of the cam arm on rack bar 85 engages roller 127 of switch trip arm 130, that means has been started and put into operation for

automatically reversing the motor so that, upon completion of its reversal for closing the doors, the motor may be stopped running but started running the next time the other beveled end 118 of the cam bar of rack bar 85 engages roller 127. During the back movement of rack bar 85, pin 121 thereof engages trip arm 143 of the reversing switch 142 to reset the motor circuit. The moment cam bar 117 runs off roller 127, during the closing movement of the doors, that moment will the motor 97 stop rotating automatically, because then trip arm 130 will be released, and feeler 138 of the switch operating rock lever 133; 136 will be disengaged from push button 139 of switch 140. The attendant from outside of the building has operated push button on remote control switch 144 for causing reversal of the motor through wires 148 from switch member 142, while the motor is still running. This is what set the mechanism operating through motor 97 for causing the doors to move back to closed position. As soon as the doors are about to be finally placed in fully closed position abutment 45 of the doors again engages under and snaps automatically under beveled surfaces 61 of the latching arms 62, and so the doors are latched and held in closed position.

From the foregoing it will be seen that attention has been bestowed upon the garage doors to render them efficient in operation under nearly all conditions of service they will encounter. It will be seen that, due to the leverage 150 of the platform 99 for the motor 97, upon screw rod 101 acting as its pivotal center of movement, the weight of the motor is overhanging to the rear, thus pulling upon the belt 94 in a manner effective to impart to it the desired amount of tension. In order to tighten or loosen the belt, all it is necessary to do is to turn nut 105 on screw rod 101 which will move fork 104 of the motor bottom 98 and slide the motor to the right or left according to which way the nut advances on the screw rod. This makes the motor overhang more or less as may be desired.

Should the doors meet any obstruction while closing, the motor 97 turning to the right in a clockwise direction will show a tendency to climb down the belt, so to speak, thus tilting the motor bodily to the front and causing a loosening of the belt to a point where a man's hand between the doors will not be injured.

The telescopic push arms or link arms 48, 49 are the means whereby the doors may be operated manually, and, at the same time remain connected for electric operation should the electric mechanism be accidentally started.

It will be noted that pulling the handle 79 or 80 of the push rod 69 for unlatching the doors can be done while the doors are being electrically operated, and also that the electric mechanism can be started functioning without harm at any interval of hand operation thereof, since the doors automatically hook themselves up for electrical operation.

The sharp points 37a of the hinge plates on the opposite sides of the doors assist, together with the saw teeth 15 on the steel spline strips 14 in the grooves of the adjoined planking of the doors, to prevent the edges of the planking sliding one on the other and assure that the door at all times will be held in perfect shape. The continuous hinges keep the distance from center to center of the hinge pintles constant in all kinds of weather allowing the mechanism to work correctly. The method of hanging the jamb door on the opposite side of the hinge causes the lower outside corner

of the door to split or divide any packed snow or ice that may accumulate here instead of packing it against the jamb, and pulling the hinges. The jamb door allows the doors to operate with an ordinary car bumper three inches inside of the threshold. The entire device is foolproof.

We do not mean to confine ourselves to the exact details of construction herein set forth save as pointed out in the appended claims.

What we desire to claim is:

1. In a device as described, oppositely arranged swingable doors, a door framework upon which said doors are mounted, motor-operated oppositely movable members, means for guiding said members in movement, brackets carried by said doors, means establishing a slidable oscillatable connection between each of said members and one of said brackets for actuating the opening of the latter swingably, a keeper carried terminally by each of said members, a latch engaging each keeper to hold the doors against opening movement, and means slidable on said members for displacing the latches as said members move initially, said slidable means adapted to swing upwardly.

2. In a device as described, a pair of oppositely arranged and movable door operating members, outwardly swinging doors carrying brackets, a door framework upon which said doors are operatively mounted, telescoping link arms pivotally secured at one end upon said door operating members, and movable therewith, a pair of latching members having their inner ends rigidly secured upon said framework and their outer latching parts projecting in the path of movement of said link arms, keepers projecting upwardly from said door brackets engaged by said latching parts of the latching members to hold the door in closed position, said link arms being pivotally trunnioned into said door brackets for swinging them to open position, a latch releasing member pivotally mounted upon the outer end of each link arm and engageable with one of said latching members to displace same, and means for automatically stopping said motor controlled by said link arms in movement.

3. In a device as described, a pair of oppositely movable members, motor-operated means for actuating the movement of said members, means for rectilinearly guiding said members in movement, a pair of telescopic link arms having their inner ends pivoted to said movable members, U-shaped members having the inner ends of their opposing arms pivoted to said link arms in straddling relation, a pair of latching members having their inner ends hingedly mounted in fixed position, a door frame, a pair of swinging doors mounted to said door frame and carrying brackets, outwardly offset arms extending upwardly from said brackets and providing journal bearings into which said link arms are swivably mounted, keepers carried by said journal bearings of said brackets engaged by said latching members for holding the doors in closed position, and means carried by the bight portions of said U-shaped members engageable with said latching members advancingly for disengaging the same from said keepers.

4. In a device as described, a door frame, a pair of oppositely arranged and swingable doors in said frame carrying brackets, motor-operated longitudinally arranged oppositely movable members carried in guided relation upon the frame, a pair of oppositely extending telescopic link arms pivotally connected at one end to said movable

members, outwardly curving upwardly extending arms on said brackets, carrying horizontal bearing portions, the outer ends of said link arms having depending pins swivellably mounted in said bearing portions, a keeper mounted upon each of said bearing portions, latching members having their inner ends pivotally mounted upon said frame and having outer latching ends engageable with said keepers to hold the doors closed, and means pivotally mounted in straddling relation to the depending pins of said link arms constrained to be forced upwardly upon movement of said push rods to engage said latching members for the purpose of retracting them from said keepers.

5. In a device as described, a door frame, a pair of oppositely arranged swinging doors mounted in said frame, brackets carried by said doors having outwardly spaced upwardly extending arms terminating in bearing portions, a pair of oppositely extending link arms having their inner ends pivotally mounted in said bearing portions, motor-controlled oppositely movable horizontally disposed members to which the inner ends of said link arms are pivotally attached for joint movement with said link arms, said link arms being automatically adjustable in length, as said doors swing to open position, keepers carried by said bearing portions, latching members vertically movable upon said frame and having latching terminals which engage said keepers to hold the doors closed, and also formed with lateral beveled lugs, and means carried at the outer ends of said link arms exerting a wedging action against the beveled lugs of said latching members for disengaging them from said keepers.

6. In a device as described, a door frame, a pair of oppositely arranged and swinging doors mounted in said frame, and carrying rigid brackets, said brackets having outwardly spaced upwardly extending arms terminating in horizontal bearing portions, said bearing portions being formed with slots, horizontally disposed oppositely movable members on said door frame, a pair of oppositely movable telescopic link arms having their inner ends pivotally attached to said members and having downturned pins at their outer ends projecting into the slots of said bearing portions, a pair of horseshoe-shaped members straddling the outer ends of said link arms and having the inner ends of their arms pivoted to said link arms respectively, beveled terminals carried by the bight portions of said horseshoe-shaped members movable with the link arms, latching members pivotally mounted upon said frame for vertical movement, keepers carried by said bearing portions, the outer ends of said latching members hooking over against said keepers to latch the same, said horseshoe-shaped members engaging with their beveled terminals against the hooking ends of the latching members to disengage the latter from said keepers, and motor controlled means for actuating said movable members.

7. In a device as described, a door frame, a pair of oppositely aligned doors hingedly mounted for swinging movement to said door frame, brackets carried by said doors having outwardly spaced upwardly extending arms terminating in bearing portions, a pair of latching levers pivotally mounted upon said door frame projecting forwardly of the latter towards said bearing portions, latching heads upon said latching members, keepers carried by said bearing portion engaged by said latching heads to hold the doors closed, lateral

right angular lugs formed upon the latching members having under beveled surfaces, a pair of oppositely movable door opening link arms having a universally connected mounting in said bearing portions, levers pivotally mounted to the connected ends of said link arms at one end and extending under the beveled surfaces of said latching members, and beveled surfaces formed upon said last-named levers engageable with the beveled surfaces of said latching members for disengaging them from said keepers.

8. In a device as described, a door frame, a pair of oppositely arranged doors hingedly mounted upon said frame, means for separately latching said doors in closed position, and means shiftable longitudinally and engaging said doors for the purpose of swinging them to open position and for initially actuating said disengaging means.

9. In a device as described, in combination a door frame, a pair of oppositely arranged and swingable doors hingedly mounted to said frame, a pair of longitudinally movable members arranged above the doors having connections for swinging the doors to open position, horizontal bars carried by said member having oppositely beveled ends, guides in which said members and bars are movable as they advance, an elongated lever being pivoted between its ends to said frame above said doors and having its outer end formed with an offset lug, switch means pressingly engaged by said offset lug of said lever for closing an electrical circuit, a motor included in said circuit, means operated by said motor for actuating said movable members, said lever having a right angular arm projecting in the path of movement of said bar, a roller mounted upon the terminal of said right angular arm with which said bar has rolling contact as the members advance for depressing said lever, disengaging the offset arm thereof from said switch means for disrupting the motor circuit.

10. In a device as described, in combination, a door frame, a pair of swinging doors mounted hingedly in said frame, an electric motor upon said frame, an electrical circuit including said motor, a pair of oppositely movable and rectilinearly guided door operating members, a bar overlying one of said members having beveled opposite ends, also adapted to be guided in movement with said members, a switch member on said frame having a circuit closing or opening means movable in opposing directions including an arm projecting into the path of movement of said bar-carrying member, another switch included in said circuit including a movable lever mounted on said frame having a terminal arm also projecting from the frame in the path of the bar on said member, being depressed when engaged by the latter during movement of said member, for holding closed the circuit, a pin on the bar-carrying member disposed immediately in advance of the projecting arm of the first named switch just prior to engagement of the bar with the arm of the second named switch, the reverse movement of the movable member, set by the circuit closing means of the first switch, causing said pin to engage the projecting arm of the last named switch for setting the first switch for motor starting operation.

11. In a device as described, a frame, doors movably operated therein, mechanism upon said frame overhead for actuating said doors collectively, an electric motor for operating said mechanism, an electric circuit to said motor, a motor circuit closing switch, a lever pivoted to said frame

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and extending longitudinally thereon, having one end engaging said switch for closing said circuit and having another free end bent at an angle and projecting forwardly of the frame, means moving rectilinearly of the last named end of the lever and in engagement therewith for actuating continuously said lever to keep the circuit closed to said motor for a predeterminative period, said lever being in circuit disrupting position when said means is disengaged therewith, and a pull cord upon the right angular end of the lever for manually tilting said lever to operate said switch for closing said circuit initially.

12. In a combination, a door frame, doors movably operated therein, mechanism for actuating said doors, an electric motor for operating said mechanism, releasable means engaging said doors to latch them closed, a starting switch for said motor, a reversing switch for said motor, an actuating arm for each switch projecting in back of the doors, means for manually actuating the arm of the starting switch to move said doors, means movable with the doors for initially disengaging the latching means therefrom, means initially en-

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gaging the arm of the starting switch for holding the starting switch in circuit closing position until doors are fully moved, and means movable with said doors and operable just prior to completion of movement of the doors for engaging the arm of the reversing switch for resetting the starting circuit to the motor.

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