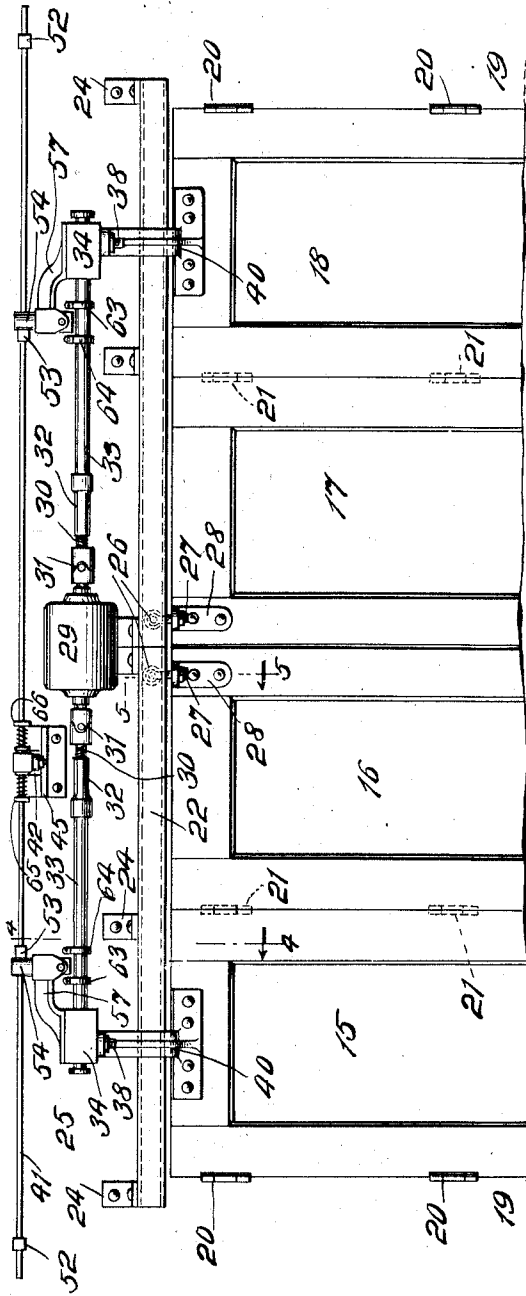
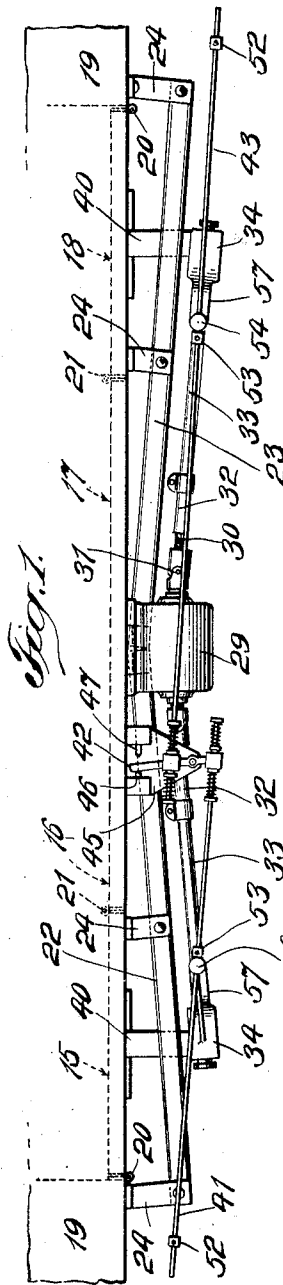


1,282,128.

Patented Oct. 22, 1918.
3 SHEETS—SHEET 1.

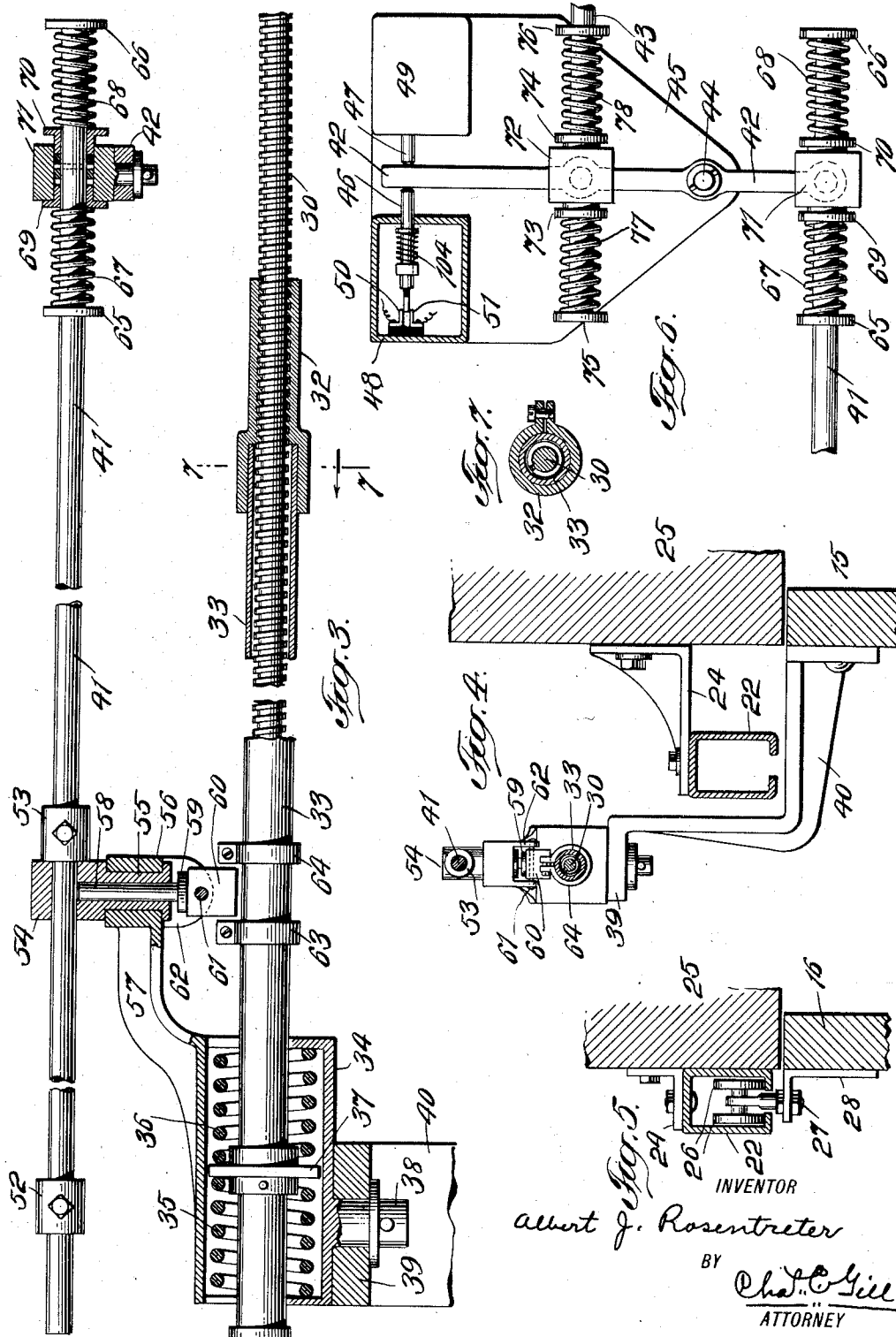


Inventor
Albert J. Rosentreter
By his Attorney
Chas. C. Gill

1,282,128.

A. J. ROSENTERER.
DOOR OPERATING MECHANISM.
APPLICATION FILED JULY 7, 1917.

Patented Oct. 22, 1918.
3 SHEETS—SHEET 2.

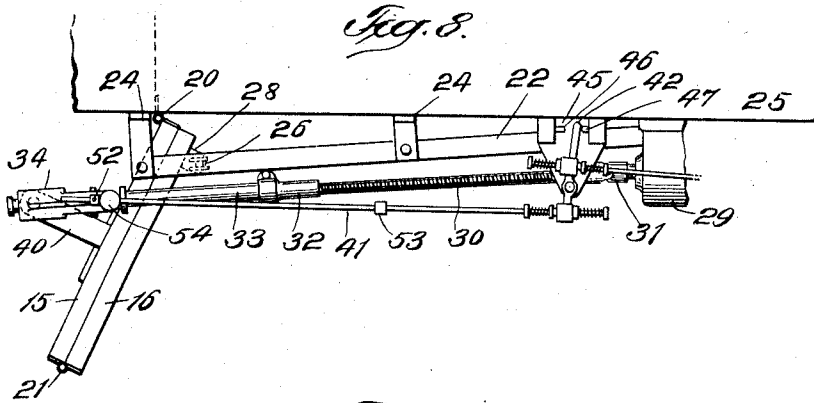
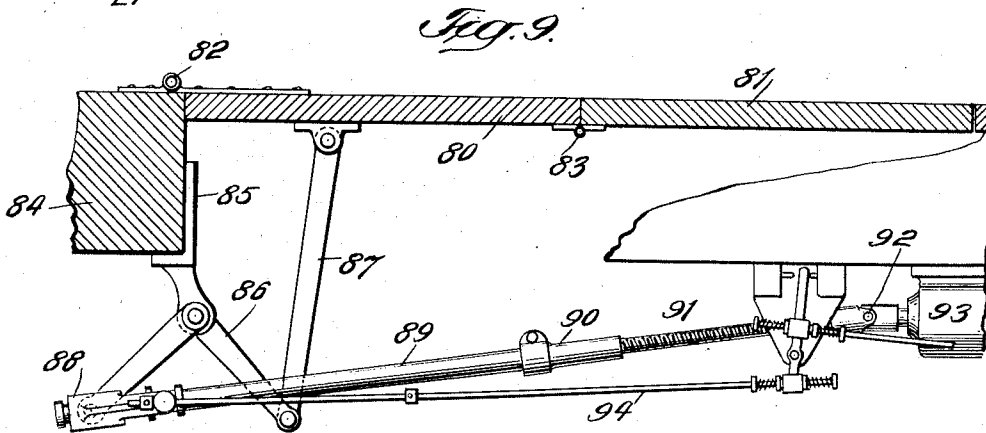
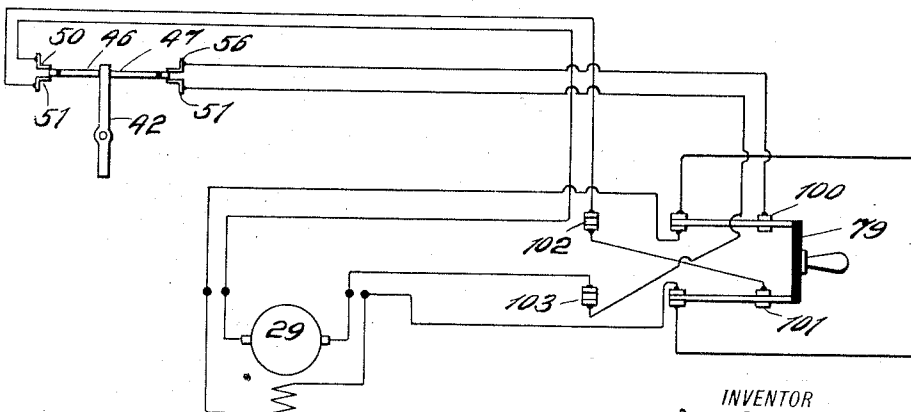


INVENTOR
A. J. Rosentreter
BY
Chas. C. Gill
ATTORNEY

A. J. ROSENTERER.
DOOR OPERATING MECHANISM.
APPLICATION FILED JULY 7, 1917.

1,282,128.

Patented Oct. 22, 1918.
3 SHEETS—SHEET 3.



INVENTOR
Albert J. Rosentreter

BY
Chas. C. Gill
ATTORNEY

UNITED STATES PATENT OFFICE.

ALBERT J. ROSENTRETER, OF BOONTON, NEW JERSEY, ASSIGNOR TO EDGAR ZABRISKIE, OF MAPLEWOOD, NEW JERSEY, AND FRANK E. HUTCHINS, OF NEW YORK, N. Y.

DOOR-OPERATING MECHANISM.

1,282,128.

Specification of Letters Patent.

Patented Oct. 22, 1918.

Application filed July 7, 1917. Serial No. 179,148.

To all whom it may concern:

Be it known that I, ALBERT J. ROSENTRETER, a citizen of the United States, and a resident of Boonton, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Door-Operating Mechanisms, of which the following is a specification.

The invention pertains more particularly to mechanism for operating the doors of garages, although equally applicable to other doors and situations, and it consists in the novel features, arrangements and combinations of parts hereinafter described, and more particularly pointed out in the claims.

I present my invention herein as applied to two pairs of hinged doors with the hinges for the two outer doors arranged for the swinging of said doors either outwardly or inwardly, as may be predetermined, and with hinges connecting the two inner doors to the front stiles of the two outer doors arranged to permit said inner doors while being opened to fold against the said outer doors, thus creating in a convenient way a wide opening at the doorway for the entrance of automobiles and the like.

The mechanism of my invention is designed to be electrically operated, and to this end and to carry out the further purposes of my invention I provide two outwardly diverging tracks or tramways to receive rollers swiveled to the upper front stiles of the two inner doors so that during the opening movement of the doors the front portions of the inner doors may be suitably supported and said doors be caused to fold against the two outer doors, and further I provide a reversing motor whose shafts are connected with screw-threaded or worm shafts engaging nuts and suitable connections leading therefrom to the two outer doors, for opening said doors when the motor is operating in one direction and closing said doors when the motor is operating in the reverse direction. The movement of the two outer doors is relied upon to, in cooperation with the aforesaid tracks or tramways, to move the two inner doors to open and closed positions.

My invention also provides means for cushioning the opening and closing movements of the doors and also for avoiding any jamming of the parts which might ensue

by a continued motion of the motor under 55 momentum after the power has been cut off therefrom. I also provide means for automatically cutting off the power from the motor at the ends of the proper movements of the doors and also in the event of 60 some obstruction to the opening or closing movements of the doors or accident to the apparatus whereby if the motor continued in motion some damage might ensue,

My invention is applicable to a single pair 65 of doors opening either outwardly or inwardly, but I present the same herein as applied to two pairs of doors having simultaneous operation and each pair being equipped with the features of my invention. 70

The building equipped with the doors and door operating features of my invention will be provided with suitable switch mechanism whereby an attendant by moving a switch in one direction may start the motor 75 in operation to open the door and by moving said switch in a reverse direction reverse said motor in operation to close the doors.

The invention will be fully understood from the detailed description hereinafter 80 presented, reference being had to the accompanying drawings, in which:

Figure 1 is a front elevation, partly broken away, of a set of four hinged doors equipped with the door operating mechanism of my invention, said mechanism being utilized both for opening and closing the doors;

Fig. 2 is a top view of the same;

Fig. 3 is a longitudinal section, partly 90 broken away, of a portion of the door operating mechanism, this figure illustrating the mechanism shown at the upper left hand portion of Fig. 1;

Fig. 4 is a vertical section through a portion 95 of one door, the door framing and a part of the operating mechanism, taken on the dotted line 4-4 of Fig. 1;

Fig. 5 is a vertical section through a portion 100 of the door, door framing and operating mechanism, taken on the dotted line 5-5 of Fig. 1;

Fig. 6 is a top view, partly in horizontal section and partly broken away, of certain switch mechanism, hereinafter described, 105 for automatically cutting off the power from the motor at the ends of the movements of the doors and also should there arise an ob-

struction to the operating mechanism during either the opening or closing movements of the doors;

Fig. 7 is a vertical section through a portion of the operating mechanism taken on the dotted line 7-7 of Fig. 3;

Fig. 8 is a top view, partly broken away, of a portion of the mechanism shown at the left hand side of Fig. 1, the two left hand doors being, in Fig. 8, shown in their open position;

Fig. 9 is a top view, partly broken away, of the mechanism of my invention and presents a modification in that the doors are hinged to open inwardly into a garage or other room, whereas in Figs. 1 to 8 inclusive said doors are shown as hinged to open outwardly, and

Fig. 10 is a view diagrammatically illustrating the electric circuits.

In the drawings, 15, 16, 17, 18 denote a set of four doors, the outer doors 15, 18 being hinged to the general framing 19 of the building, and the doors 16, 17 being hinged at their back stiles to the front stiles of the doors 15, 18, and the hinges being so arranged, when desired, as indicated in Figs. 1, 2 and 8, as to permit during the opening movement of the doors, the doors 15, 18 to swing outwardly and the doors 16, 17 also to swing outwardly and fold against the rear faces of the doors 15, 18. 20 designates the hinges for the doors 15, 18 and 21 the hinges connecting the doors 16, 17 with the doors 15, 18, respectively.

Above and somewhat to the front of the doors I provide outwardly diverging tracks or tramways 22, 23, which are open at their lower edges and at their upper side are secured to supporting brackets 24, which are fastened to the framing 25 over the doors. The tracks 22, 23 are adapted to receive and afford tramways or rails for rollers 26 carried by vertical rods 27 which are swiveled in the upper horizontal portions of brackets 28 fastened to the front stiles of the doors 16, 17. The rollers 26 are swiveled because they travel along the diverging courses presented by the tracks 22, 23 during the opening and closing movements of the doors, and hence during such movement of the doors said rollers 26 adapt themselves in the varying positions of the doors to the tracks 22, 23. The doors 16, 17 are supported by being hinged to the doors 15, 18 and also by means of the rollers 26 confined within the tracks or tramways 22, 23.

The actuating mechanism for opening and closing the doors comprises a reversing motor 29 of commercial type secured to the frame 25 and projecting frontwardly beyond the doorway for the doors, and in the present instance I utilize the motor 29 for simultaneously operating the two pairs

of doors shown in Fig. 1, the mechanism extending from the motor for actuating the doors 15, 16 being in all essential respects the same as the mechanism extending from said motor for operating the doors 17, 18. The mechanism for operating each pair of doors comprises a worm shaft 30 whose inner end is connected by a universal joint 31 with the shaft of the motor, so that said worm 30 may be driven from said motor and also readily yield to such angular movement as it may be required to take during the opening and closing movements of the doors. The worm or screw-shaft 30 is more clearly illustrated in Fig. 3, and said shaft extends through a nut or internally threaded sleeve 32 and through a sleeve 33 which is connected with said nut at one end and at its other end extends within and through a horizontally chambered box 34 containing two coiled springs 35, 36, respectively, disposed at opposite sides of a disk 37 fastened upon said sleeve 33. The box 34 is swiveled by means of a pin 38 upon a horizontal member 39 of a supporting bracket 40 which extends below the track 22 or 23, as the case may be, and is fastened to the upper portion of the outer door, and the purpose of swiveling the box 34 upon the bracket 40 is to permit said box to yield angularly with the sleeve 33 and threaded shaft or worm 30 during the opening and closing movements of the doors.

The operation of the mechanism thus far particularly described is, as follows: Assuming that the doors 15, 16, 17, 18 are in closed position and it is desired to open them, the motor 29 will be set in motion to rotate the shafts 30 within the nuts 32 and in a direction to cause said nuts to travel outwardly from said motor. The effect of this rotation of the shafts 30 is to cause the nuts 32 and sleeves 33 to travel outwardly on said shafts and cause the disks 37 on said sleeves to press against the springs 35 and through said springs against the boxes 34 and outer portions of the brackets 40, which will then operate as cranks to turn the doors 15, 18 outwardly on their hinges 20 in the manner represented in Fig. 8, and at the same time the doors 16, 17 will, by reason of their connection with the doors 15, 18, follow said doors 15, 18 and fold against the same, the rollers 26 connected with said doors 16, 17 following along the outwardly diverging tramways 22, 23 and being sustained and guided thereby. The pressure of the disks or the like 37 against the springs 35 is cushioned by said springs so that the doors are opened without shock or strain, and in addition the springs 35 serve to take up such movement as may be imparted to the sleeves 33 from the screw-shafts or worms 30 by the momentum of the motor 29 after the current has been cut off from said motor, and

I regard this particular feature of the operation as important. During the opening movement of the doors the boxes 34 may swivel on the brackets 40 and the inner ends 5 of the threaded shafts or worms 30, by reason of the universal joints 31, may yield to such angular movement as the boxes 34 may have, relieving the operative mechanism from strain during the opening movement of the doors and permitting said doors to open uniformly and positively and in an efficient manner.

When it is desired that the doors shall be closed, the motor 29 is reversed in motion 15 and imparts a reverse motion to the worms or shafts 30, and this results in said shafts 30 imparting a reverse travel to the nuts 32 and sleeves 33, drawing said nuts and sleeves inwardly toward the motor and causing the disks 37 on said sleeves to press against the springs 36 in the boxes 34 and act against the crank arms or brackets 40 to move the doors 15, 18 to closed position, said doors 15, 18 at this time causing the doors 16, 17 25 to unfold therefrom and travel along the tramways or tracks 22, 23 to their initial closed position. During the closing movement of the doors, the boxes 34 may swivel on the brackets 40 and the threaded shafts 30 or worms 30 may yield by reason of the universal joints 31 to such extent as may be required by the movement of the doors. During the closing movement of the doors, the springs 36 serve to permit the doors to be closed without slamming and also to permit any extra turn or more of the motor, under momentum, after the power has been cut off therefrom without jamming the shafts and nuts 32 together. The springs 36 40 operate on the closing movement of the doors in the same manner that the springs 35 operate on the opening movement of the doors. The disk 37 constitutes merely a bearing or shoulder for engaging the 45 springs 35, 36 and may be of any suitable form or construction.

I also provide automatic means for cutting off the current from the motor 29 at the ends of the opening and closing movements of the doors and also at any intermediate points in said movements, in the event of obstruction to the movement of the doors, and this mechanism comprises a rod 41 connected with a pivoted switch 42 and extending to the left, looking at Figs. 1, 2 and 3, and a rod 43 extending from said switch 42 to the right for coöperation with the mechanism provided for the doors 17, 18. The switch 42 is mounted on a pin 44 60 extending upwardly from a plate 45, and said switch 42 at its free end lies between conductors 46, 47, which are movable in boxes 48, 49 mounted on said plate 45 and which contain contact plates 50, 51 adjacent to the inner ends of the conductors 46, 47

and comprised within the circuit wires. The rod 41 has suitable spaced-apart collars 52, 53 thereon to serve as stops, and said rod 41 to the limit accorded by said stops is slidable within a sleeve 54 having a depending 70 portion 55 loosely mounted within a sleeve 56 formed on the bracket-arm 57, which may be integral with the box 34. The sleeve 54 by reason of its depending portion or stem 55 may have rotary movement within 75 the sleeve 56, so as to accommodate itself and the rod 41 to the movement of the arm 57. Within the depending portion of the sleeve 54 is mounted a vertical pin 58 (Fig. 3) which is in the nature of a brake and has 80 a lower head 59 resting upon a pivoted block 60, the latter being pivotally secured by means of a pin 61 between depending side portions 62 of the sleeve 56. Upon the sleeve 33 are two collars 63, 64, one being at 85 each side of the block 60 and extending above the lower edge of the same, as shown in Fig. 3. During the opening movement of the doors the sleeve 54, looking at Fig. 3, will travel outwardly on the rod 41 and 90 may, when reaching the stop 52, shift the rod 41 sufficiently to move the switch 42 and break the circuit through the motor, and during the closing movement of the doors the sleeve 54 upon reaching the collar 53 95 and moving slightly farther against said collar, may shift the rod 41 to break the circuit through the motor. The circuit through the motor therefore is automatically broken at the end of the opening movement of the doors and at the end of the closing movement of the doors. The rod 43 is equipped with collars 52, 53, and the box 34 for the right hand doors 17, 18 is provided with an arm 57 and associated with a sleeve 105 54 and other features extending from the sleeve 54 to the sleeve 33, including the collars 63, 64 on said sleeve, the parts being duplicated for each pair of doors.

It may happen that due to obstruction to 110 the doors or other cause, the motor should have the current cut off therefrom before the doors reach either their open position or their closed position, and to effect this result is the purpose of the brake pin 58, head 115 59 thereon, block 60 and collars 63, 64. If during either the opening or closing movement of the doors, one or the other collars 63, 64 should press against and tilt the block 60 sufficiently to bind the brake pin 58 120 against the rod 41 (or the rod 43 as the case may be), the sleeve 33 then in motion and acting through said brake pin will transmit its motion to said rod 41 (or the rod 43) and thereby cause said rod to act through the 125 switch 42 and cut off the current from the motor, thus bringing the motor to rest and causing the parts of the mechanism to remain stationary until the difficulty, whatever it might be, could be corrected, and in 130

this way avoiding strain or breakage of the parts.

The rods 41, 43 are cushioned in their relation to the switch 42, as shown in Figs. 3 and 6. The rod 41 is provided with collars 65, 66 and springs 67, 68 bearing against said collars and against collars 69, 70 at the opposite sides of a block 71 pivotally mounted on the end of the switch 42 and through which block the rod 41 may have a limited sliding movement, being cushioned in said movement in one direction by the spring 67 and in the other direction by the spring 68. The springs 67, 68 cushion the movement of the rod 41, and hence at no time is there any harsh action of said rod against the switch 42. The rod 43 in its connection with the switch 42 is provided with the same mechanism with which the rod 41 is equipped, this mechanism comprising a block 72 mounted on the switch, collars 73, 74 connected with opposite sides of said block, collars 75, 76 on the rod 43 and springs 77, 78 on said rod 43, the spring 77 being between the collars 73, 75 and the spring 78 being between the collars 74, 76. The rod 41 is cushioned by the springs 67, 68 and the rod 43 is cushioned by the springs 77, 78, and these cushioning springs are useful, whether the current is cut off from the motor by the engagement of the sleeve 54 with one or the other of the collars 52, 53 on the rod 41 at the ends of the opening and closing movements of the doors or whether due to accident or other irregularity, the brake pins 58 are caused to engage the rod 41 or the rod 43 and by binding against the same effect the cutting off of the current from the motor 29.

The motor will be included in an electric circuit and the current may be applied thereto or cut off therefrom by the manual movement of a switch 79 and other connections to be hereinafter referred to and which are illustrated diagrammatically in Fig. 10.

In Fig. 9 I illustrate a modification of my invention which resides merely in providing suitable levers for causing the doors to fold inwardly into the garage when being opened instead of outwardly therefrom, and this arrangement of the doors does not involve any change in the operative mechanism hereinbefore described, except that the same will be connected with said levers.

In Fig. 9 the doors are numbered 80, 81 and the hinges therefor 82, 83. Upon the jamb 84 is secured a bracket 85, and this bracket has pivoted in its end portion a bell-crank-lever, one arm 86 of which is connected by a link 87 with the door 80 and the other arm of which is pivoted to a box 88 (corresponding with the aforesaid box 34) connected with the sleeve 89 which corresponds with the sleeve 33 of Fig. 3. The sleeve 89 is connected with a nut 90 which receives the threaded shaft 91 connected by a

universal joint 92 with the shaft of the motor 93. 94 denotes the switch operating rod corresponding with the rod 41 of Fig. 3. The connection of the rod 94 with the sleeve 89 is the same as that described with respect to the construction shown in Fig. 3, and therefore further explanation at this place is not required. When the sleeve 89 is caused to travel inwardly, it operates through the bell-crank-lever and link 87 to push the door 80 outwardly to open position, and this door will take with it the door 81. In the construction shown in Fig. 9 the door 81 will be equipped with rollers and a tramway corresponding with the rollers and tramway on the door 16, shown in Fig. 5. In the construction shown in Fig. 9 the sleeve 89 travels inwardly toward the motor when pushing the door 80 to open position, and has a reverse travel when the link 87 is to draw the door 80 to closed position.

The diagram of the circuits illustrated in Fig. 10 represents the usual and ordinary wiring for a reversing motor of commercial type. When the switch 79 is turned to the position shown in Fig. 10 engaging the contacts 100, 101 the circuit is made to rotate the motor in one direction, and when the switch 79 is turned to engage the contacts 102, 103 a circuit will be made to rotate the motor in the reverse direction, and when the switch 79 is turned to an intermediate position between the contacts 100, 101 and 102, 103 there will be no circuit through the motor and the motor will not operate. The only addition I have made to the wiring of the motor is the presence of the pivoted switch 42 and contacts 46, 47 in the switch boxes 48, 49 which are in themselves of commercial type. The contacts 46, 47 are rods engaged within the boxes 48, 49 by springs 104. The tips of the rods 46, 47 are conductors and insulated from the body of said rods, and normally the tips of both rods 46, 47 are in electrical connection with the conducting contact plates 50, 51 of both switch boxes 48, 49. When the switch 42 is in its normal position shown in Figs. 6 and 10, the tips of both rods 46, 47 engage the contacts 50, 51 and the wiring is then in condition for the switch 79 to be turned into engagement with the contacts 100, 101 or with the contacts 102, 103. When the rod 41 or the rod 43 is pulled to move the switch 42, said switch will press against and drive inwardly one of the rods 46, 47, according to which of the rods 41, 43 may be pulled, this pulling being either by engagement with one of the collars 52, 53 or by the action of the brake-pin 58, and when the switch 42 is turned to drive one of the rods 46, 47 inwardly, the spring 104 of the other rod will draw said rod outwardly toward the switch 42 and remove its conducting tip portion from electrical engagement with the contact

plates 50, 51, thereby breaking the circuit and stopping the motor. My invention, therefore, does not modify the motor nor its wiring nor the switch 79, but merely interposes in the wiring a limit switch for breaking the circuit through the motor at the ends of the movements of the doors and also in the event of an accident preventing the doors from opening while the motor is in operation.

My invention has been so fully described hereinbefore that further explanation as to the construction and operation of the several features seems to be unnecessary. I do not limit my invention to its application to two pairs of doors since the features constituting the invention are merely duplicated for the two pairs of doors. The invention is equally applicable to one pair of doors, as will be readily understood, and the doors may be opened either inwardly or outwardly as the occasion may render convenient.

What I claim as my invention and desire to secure by Letters-Patent, is:

1. Door operating mechanism comprising in combination with a door, an electric motor, a screw threaded shaft connected with said motor, a nut to travel on said shaft, means connecting said nut with the door including an interposed cushion to permit the nut to have limited movement independently of the door, and means operable from the said nut for cutting off the power from the motor when the door jams.

2. Door operating mechanism comprising in combination with a door, an electric motor, a screw threaded shaft connected with said motor, a nut to travel on said shaft, means connecting said nut with the door including interposed opposite cushions to permit the nut to have limited movement in either direction independently of the door, and means operable from said nut for cutting off the power from the motor when the door jams.

3. Door operating mechanism comprising in combination with an inner door hinged to the door framing and an outer door hinged to said first door and to be folded toward the same on the opening of said doors, an electric motor, a screw threaded shaft flexibly connected at one end with said motor, a nut to travel on said shaft, means flexibly connecting said nut with said inner door and including means for permitting said nut to have limited movement independently of said doors, means operable from said nut for cutting off the power from the motor at the ends of the opening and closing movements of the doors, means operable from said nut for actuating the power cut-off means when the doors jam and a supporting and guiding track for said outer door.

4. Door operating mechanism comprising in combination with a door, an electric motor,

a screw-threaded shaft connected with said motor, a nut to travel on said shaft, a sleeve connected with said nut, a box connected with the door and containing oppositely disposed springs, a shoulder on said sleeve interposed between said springs, whereby said nut may have limited movement in either direction after power has been cut off from the motor, a cut-off switch for cutting off power from the motor and means connected with said box for actuating said switch to break the circuit at the ends of the opening and closing movements of the door.

5. Door operating mechanism comprising in combination with a door, an electric motor, a screw-threaded shaft connected with said motor, a nut to travel on said shaft, a sleeve connected with said nut, a box connected with the door and containing oppositely disposed springs, a shoulder on said sleeve interposed between said springs, whereby said nut may have limited movement in either direction after power has been cut off from the motor, a cut-off switch for cutting off power from the motor, and means connected with said sleeve for actuating said switch to break the circuit when the door jams.

6. Door operating mechanism comprising in combination with a door, an electric motor, a screw-threaded shaft connected with said motor, a nut to travel on said shaft, a sleeve connected with said nut, a box connected with the door and containing oppositely disposed springs, a shoulder on said sleeve interposed between said springs, whereby said nut may have limited movement in either direction after power has been cut off from the motor, a cut-off switch for cutting off power from the motor, a rod for actuating the same having definitely spaced apart shoulders thereon, an arm connected with said box, and a sleeve connected with said arm and slidable on said rod between its said shoulders, whereby said sleeve by engaging one or the other of said shoulders at the end of the opening or closing movement of the door may cut off the power from said motor.

7. Door operating mechanism comprising in combination with a door, an electric motor, a screw-threaded shaft connected with said motor, a nut to travel on said shaft, a sleeve connected with said nut, a box connected with the door and containing oppositely disposed springs, a shoulder on said sleeve interposed between said springs, whereby said nut may have limited movement in either direction after power has been cut off from the motor, a cut-off switch for cutting off power from the motor, a rod for actuating the same and a brake operable from said sleeve for engaging said rod to move the same and cut off power from said motor when the door jams.

8. Door operating mechanism comprising in combination with an inner door hinged to the door framing and an outer door hinged to said first door and to be folded toward the same on the opening of said doors and away from the same on the closing of said doors, an electric motor, a screw-threaded shaft flexibly connected at one end with said motor, a nut to travel on said shaft, a sleeve connected with said nut, a box swiveled to said inner door and containing oppositely disposed springs, a shoulder on said sleeve interposed between said springs whereby said nut may have limited movement in either direction after power has been cut off from said motor, a wheel swiveled on said outer door, a track for said wheel supporting and guiding said outer door, a cut-off switch for cutting off power from the motor, a rod for actuating the same having definitely spaced apart shoulders thereon, an arm connected with said box, and a sleeve pivotally connected with said arm and slidable on said rod between its said shoulders, whereby said sleeve by engaging one or the other of said shoulders at the end of the opening or closing movement of the doors may cut off the power of said motor.

9. Door operating mechanism comprising

in combination with an inner door hinged to the door framing and an outer door hinged to said first door and to be folded toward the same on the opening of said doors and away from the same on the closing of said doors, an electric motor, a screw-threaded shaft flexibly connected at one end with said motor, a nut to travel on said shaft, a sleeve connected with said nut, a box swiveled to said inner door and containing oppositely disposed springs, a shoulder on said sleeve interposed between said springs whereby said nut may have limited movement in either direction after power has been cut off from said motor, a wheel swiveled on said outer door, a track for said wheel supporting and guiding said outer door, a cut-off switch for cutting off power from the motor, a rod for actuating the same, and a brake operable from said sleeve for engaging said rod to move the same and cut off power from said motor when the doors jam.

Signed at New York, in the county of New York and State of New York, this 6th day of July, A. D. 1917.

ALBERT J. ROSENTER.

Witnesses:

ARTHUR MARION,
CHAS. C. GILL.