May 30, 1933. J. W. SCROGGS 1,911,293

GARAGE DOOR OPENER

Filed July 26, 1929 5 Sheets-Sheet 1

Fig. 1.

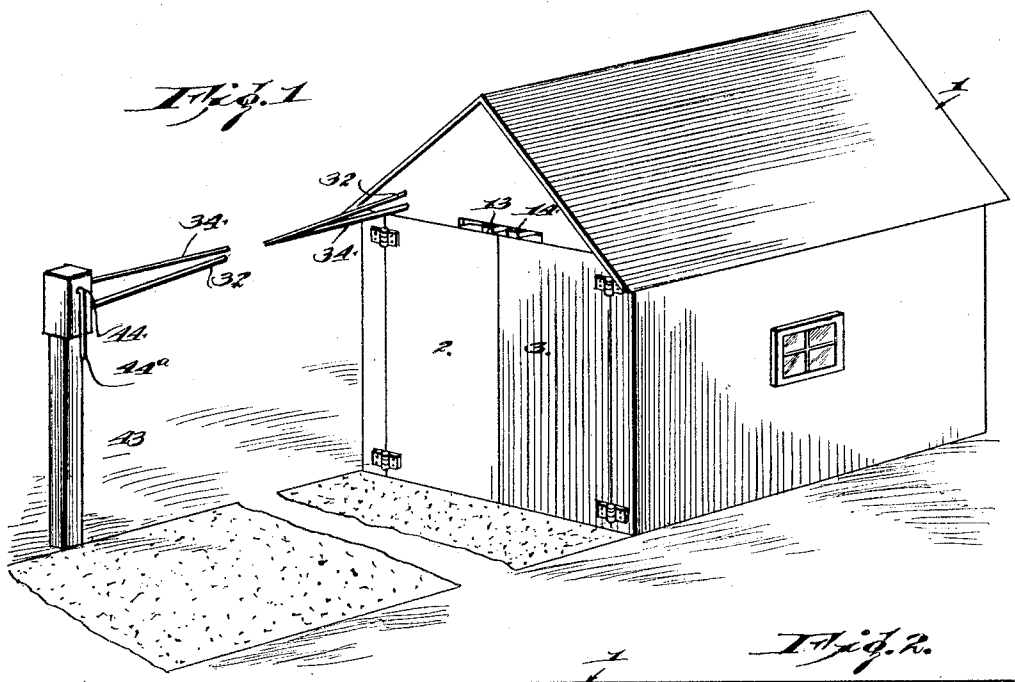


Fig. 2.

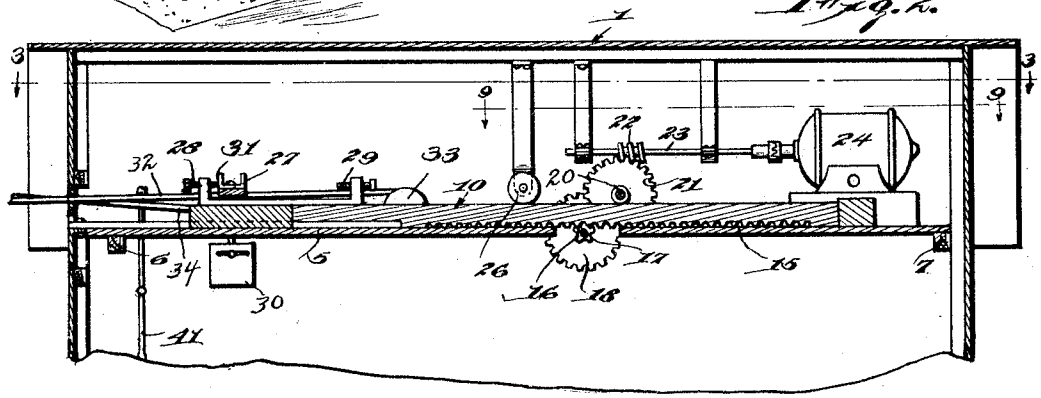
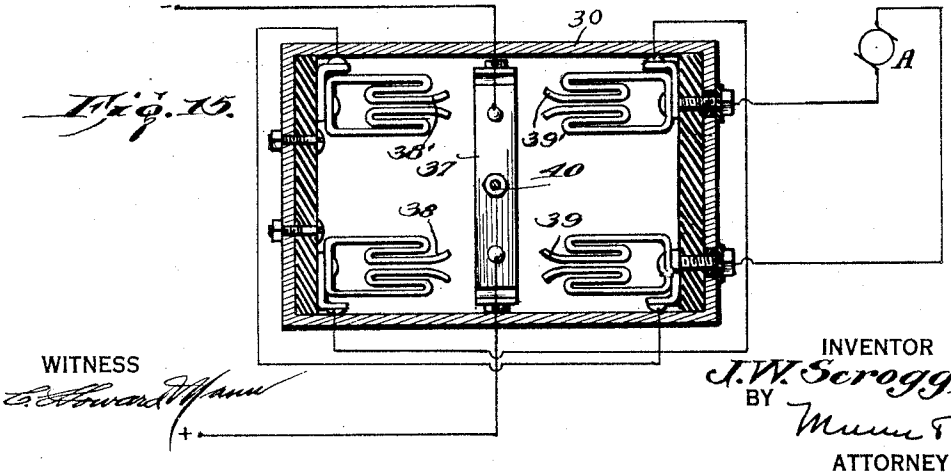


Fig. 15.



WITNESS

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GARAGE DOOR OPENER

Filed July 26, 1929 5 Sheets-Sheet 2

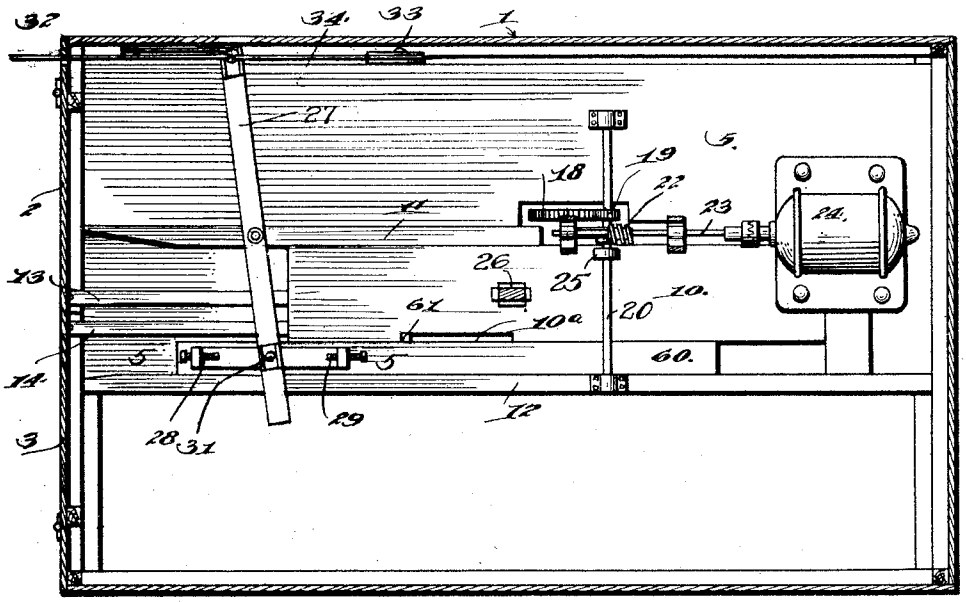

Fig. 3.

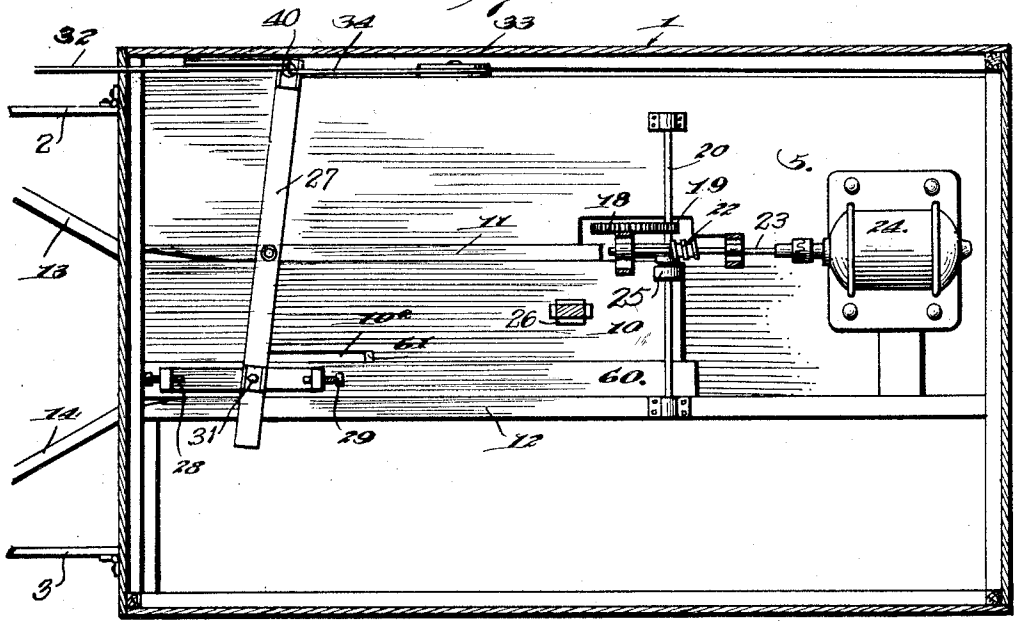

Fig. 4.

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GARAGE DOOR OPENER

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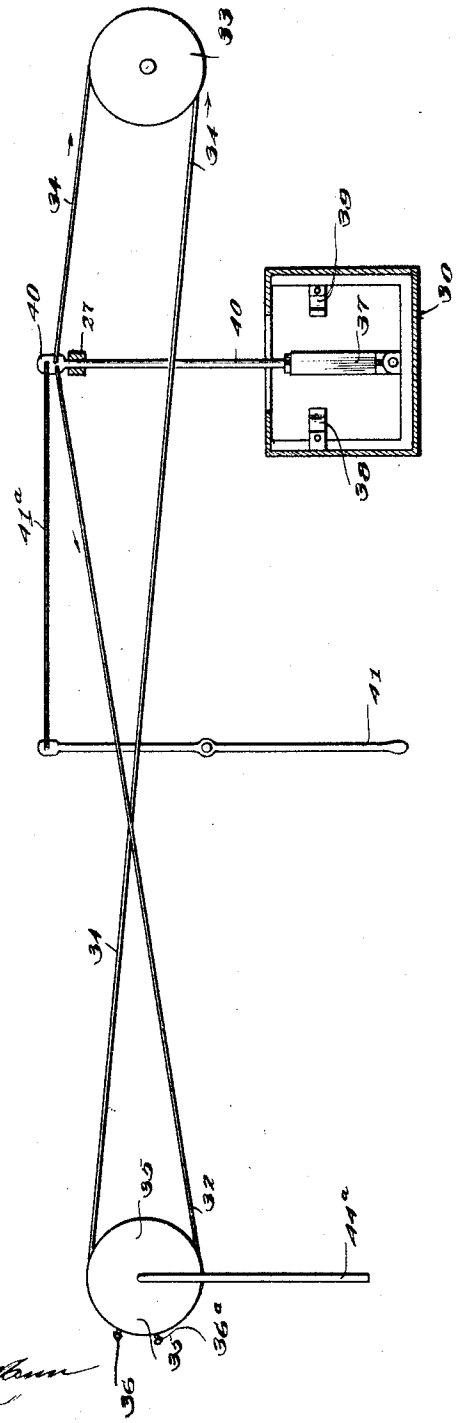

Fig. 16.

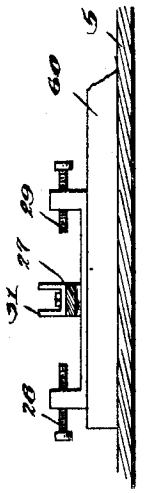

Fig. 5.

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GARAGE DOOR OPENER

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Fig. 6.

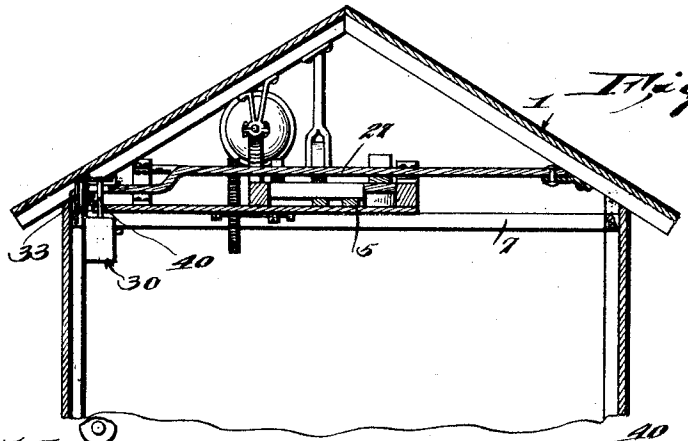


Fig. 7.

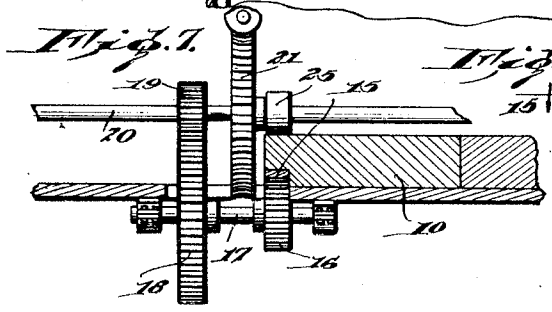


Fig. 8

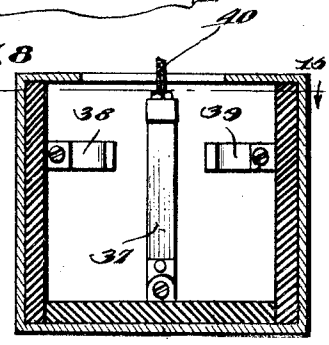
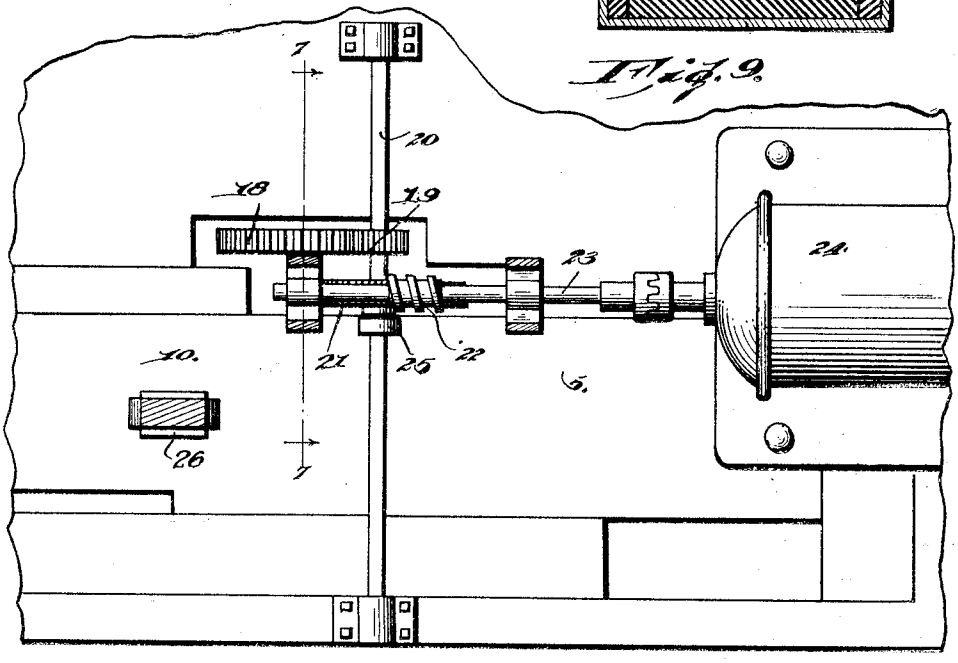


Fig. 9.



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GARAGE DOOR OPENER

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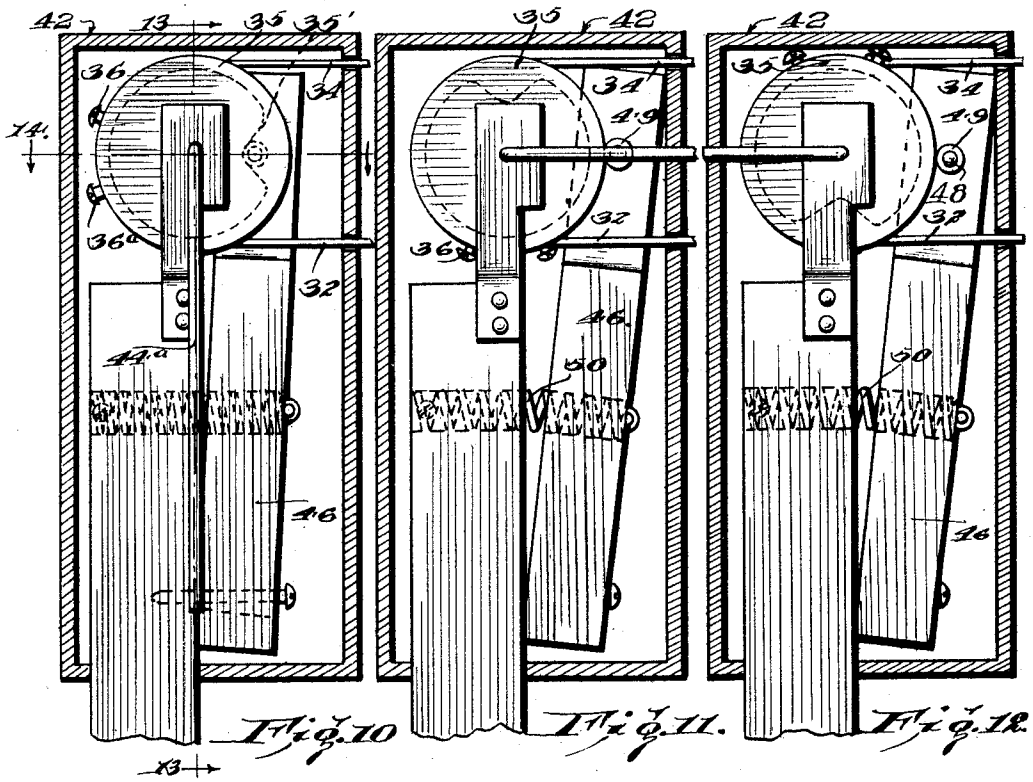

Fig. 10. Fig. 11. Fig. 12.

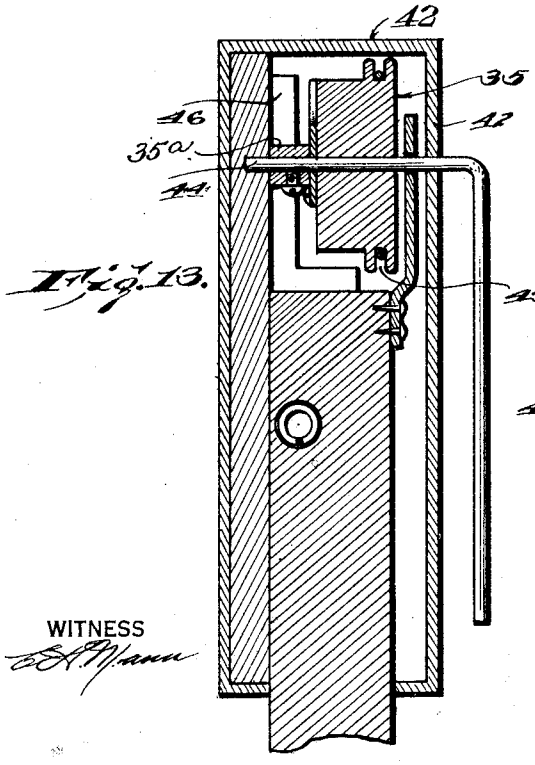

Fig. 13.

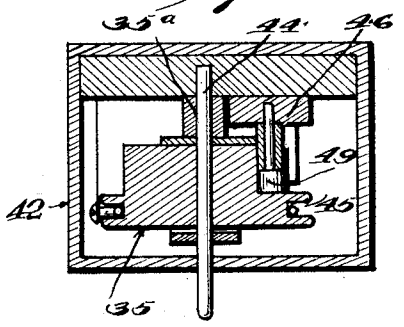

Fig. 14.

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Patented May 30, 1933 1,911,293

UNITED STATES PATENT OFFICE

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GARAGE DOOR OPENER

Application filed July 26, 1929. Serial No. 381,338.

This invention relates to garage door openers of the type operated from a car.

A primary object of the invention is to so construct and mount an apparatus of this character that garage or other doors or gates either single or double may be opened and closed by the driver of a vehicle without leaving his seat; and which operates to keep the door locked except when so actuated.

Another object of the invention is to so construct such an apparatus that it may be operated by an inconspicuous arm attached to the car so that the driver without any effort whatever on his part finds the doors opening as he approaches and closing behind him as he backs his car out leaving the doors closed and locked; or if preferred the apparatus may be operated directly by a finger or hand of the driver.

In carrying out these objects, the invention is susceptible of a wide range of modification without departing from the spirit or sacrificing any of the advantages of the claimed invention; there being shown in the drawings for illustrative purposes a preferred and practical form, in which:

Figure 1 represents a perspective view of a garage equipped with this improved door opener, the doors shown in closed position;

Fig. 2 is a vertical longitudinal section through the garage with the doors shown closed;

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 2;

Fig. 4 is a similar view with the doors shown in open position and the opening parts correspondingly placed;

Fig. 5 is a detail longitudinal section taken on the line 5—5 of Fig. 3;

Fig. 6 is a transverse vertical section of the upper portion of the garage showing the door opening mechanism therein;

Fig. 7 is an enlarged detail sectional view taken on the line 7—7 of Fig. 9;

Fig. 8 is a vertical section through the reversing switch.

Fig. 9 is an enlarged horizontal section on the line 9—9 of Fig. 2;

Figs. 10, 11 and 12 show vertical sections through the housing post illustrating the various positions of the actuating lever or handle and the cam controlled thereby for the operation of the reversing switch;

Fig. 13 is a horizontal section through the rear portion of the cam housing; and

Fig. 14 is a similar view taken at right angles to Fig. 13.

Fig. 15 is a horizontal section taken on line 15—15 of Fig. 8.

Fig. 16 is a diagrammatic view of the operating cables and their connection.

In the embodiment illustrated a garage 1 of any desired construction is shown provided at its front end with outwardly opening double doors 2 and 3 to which the opener constituting this invention is designed to be applied. It may be also applied with suitable adaptations to any kind of a garage or other door.

Mounted in the upper portion of the garage on a suitable platform 5, here shown supported by transverse beams 6 and 7, is a longitudinally movable carriage 10 arranged to slide with its companion sliding piece 60 between guides 11 and 12 and to the front end of which carriage are pivotally connected arms or pitmen 13 and 14. These pitmen 13 and 14 are also pivoted to the doors 2 and 3 so that when the carriage 10 moves forward the doors will be swung outwardly into open position (see Fig. 4) and when the carriage is retracted the doors will be closed as shown in Fig. 3. On the lower face of the carriage 10 is a longitudinally extending rack 15 which meshes with a pinion 16 carried by a shaft 17 to which shaft is also fixed a gear 18 which meshes with a spur gear 19 on a shaft 20. A worm gear 21 fixed to the shaft 20 meshes with a worm 22 on the driving shaft 23 of the motor 24.

When the motor is in operation the carriage will be actuated through these intermeshing gears, whose purpose is to diminish the speed of the motor and increase its force for moving the carriage 10.

A roller 25 is loose on the shaft 20 and engages the upper face of the carriage 10 which in connection with another roller 26 holds the carriage against vertical movement and insures its proper reciprocation.

A circuit breaking lever 27 is pivotally mounted intermediate its ends on guide 11 and extends transversely across the carriage 10 as shown clearly in Figs. 3 and 4. This lever 27 is designed to swing between two adjustable stops 28 and 29 designed for a purpose presently to be described.

A reversing switch 30 wired to the motor 24 as shown in Fig. 15 includes a pivoted switch blade 37 connected with lever 27 by an arm 40. This lever 27 is actuated by the studs or stops 28 and 29 carried by the sliding member 60. The normal position of the lever 27 is midway between the stops 28 and 29 and the sliding piece 60 which carries these stops is reciprocated by lug 61 attached to its side and engaged by the end walls of a recess 10*a* in the side of the carriage 10. The length of this recess and the spacing of the stops 28 and 29 are such that just before the carriage 10 reaches either end of its journey one of the stops 28 or 29 comes into contact with the block or nib 31 carried by the lever and pushes the lever 27 and thereby moves the arm 40 and with it the switch blade 37 away from the contact pieces 38 or 39 thus breaking the current and stopping the motor leaving the doors either open or closed as the case may be.

The stops 28 and 29 cannot through the lever 27 and the arm 40 push the switch blade 37 to exactly the middle or neutral position between the two contacts 38 and 39. This is accomplished by means of a lever controlled cam 35, presently to be described.

The switch 30 is a double pole, double throw switch with two laterally spaced blades 37 carried by the arm 40 and which blades cooperate with four contact pieces 38 and 39 and 38′ and 39′. These contact pieces are arranged in pairs and spaced apart, contact 38 being opposite contact 39 and connected by a suitable wire with contact 39′ while contact 38′ is opposite 39′ and is connected by a wire with contact 39. These pairs of contacts are arranged in the path of the blades 37 of the switch lever so that when the switch lever is swung in one direction the blades 37 will engage the contacts 38 and 38′ and when swung in the opposite direction they will engage contacts 39 and 39′. One of these positions of the blades causes the motor to rotate in one direction and the other position causes it to rotate in the opposite direction.

Connected with the end of the lever 27 which is secured to the arm 40 of the reversing switch are two cables 32 and 34. The cable 34 then passes forwardly and is trained around a pulley 33 and extends out through the front portion of the garage and is secured to the periphery of the cam 35 by a screw 36 while cable 32 extends directly through the front portion of the garage without being trained around a pulley and is also secured to the periphery of the cam 35 by means of a screw 36*a*. The cam 35 is in the form of a pivoted wheel or disk having one side mutilated to form a substantially heart-shaped cam. The notch or recess 35′ is made with rounded outer corners being designed to cooperate with a roller 49 mounted on a stud 48 projecting laterally from the free end of a lever 46 fulcrumed at the end opposite to the end carrying the stud in a suitable housing 42 mounted on a post in position to be out of the reach of children and affords protection for the operating mechanism of the cam so that it will not be affected by the weather.

This heart-shaped cam 35 is mounted on a shaft 44 which extends through the side of the casing 42 and is held spaced from said side by means of a spacing sleeve 35*a* to provide room for the lever 46 which carries the roller 49. This roller 49 is held yieldably engaged with the periphery of the cam 35 by means of a spring 50 and constitutes a spring pressed brake. The shaft 44 is provided with a vertically depending arm 44*a* which is designed to be operated by the driver of the machine whereby the cam 35 is rotated according to the direction in which the doors are to be actuated as will be hereinafter more fully described.

A groove 45 is formed in the periphery of the cam 35 through the un-notched portion thereof and is designed to receive the cables 32 and 34 which are fastened to the cam by adjusting screws 36 and 36*a* around which the cables are wound and which keeps the cables taut. These cables are on diametrically opposite sides of the pulley and extend in parallel planes passing through openings in one side wall of the housing 42, see Figs. 10, 11 and 12. Before entering the garage the cables 32 and 34 cross each other as is shown clearly in Fig. 1 so that 32 where it enters the garage is disposed in a plane above the cable 34.

It will thus be seen that every movement of the switch arm 40 is transferred to the cam 35 through the cables 32 and 34 and the movement of the circuit breaking lever 27 above described infallibly turns the cam so that the roller 49 enters the notch in the cam, the spring 50 pressing the roller down into said notch causing it to turn the cam until the roller reaches the bottom of the notch. At that moment, that is, when the roller reaches the bottom of the notch in the cam all the parts are in their normal neutral position, that is, with the handle 44*a* pointing downward, the switch blades 37 midway between the contact pieces of the switch 30 and lever 27 midway between the stops 28 and 29.

A lever 41 is fulcrumed intermediate its ends on a suitable support within the garage and is connected at one end by means of a suitable connection preferably a cable 41*a*

with the switch control lever 27 through arm 40 and the operation of this lever produces the same effect as does the moving of the handle 44*a*. If desired this lever 41 may be accessible from the outside of the garage through a suitable door with a lock and key for the outside so that should the outside operating mechanism for the lever for any reason refuse to function the lever 41 may be used to open the doors 2 and 3.

The wires shown in Fig. 15 preferably lead to a dwelling or office where they are connected by a switch to the main house electric circuit and its meter and when this switch is opened the garage is securely locked until this switch is closed again.

When the parts are in normal resting position with the handle 44*a* disposed vertically with roller 49 at the bottom of the notch 35′ of the cam (see Figs. 1 and 10) and the switch lever blades 37 midway between the contacts 38, 38′ and 39 and 39′, as shown in Figs. 8 and 15, and the circuit breaking lever 27 midway between the stops 28 and 29 with the doors closed, an approaching car will pass in close proximity to the vertical handle 44*a* which may be engaged by the hand of the driver or by an arm inconspicuously attached to the car and this handle will be moved in the direction in which the car is moving. For instance, when the handle 44*a* is moved to the right the cable 34 passing around the pulley 33 pulls the arm 40 to the right so that the blades 37 of the switch engage the contact pieces 39 and 39′ thus starting the motor and opening the doors. When the handle 44*a* is moved to the left the cable 32 pulls the arm 40 so that the blades 37 engage the contact pieces 38 and 38′ thereby starting the motor and closing the doors. It will thus be seen that the movement of the handle 44*a* will turn the heart-shaped cam 35 and the roller is pressed into the cam notch 35′ by the spring 50. When the roller reaches the bottom of the notch it holds the cam and all of the parts connected therewith in the exact position desired. It will thus be seen that the arm 44*a* of the shaft 44 to which the cam is fastened may be swung either to the right or to the left approximately through a quadrant of a circle, the cam being rotated according to the direction in which the doors are desired to be actuated. The movement of the handle 44*a* will turn the cam 35 until the roller 49 is out of the notch 35′ and if it is not moved far enough the roller actuated by spring 50 will move the cam and the handle 44*a* back to initial position. It is also of course understood that the circuit breaking lever 27 being attached to the arm 40 of the reversing switch is moved from its normal central position towards the stop 29 ready to to be engaged by it as the carriage 10 moves forward so that when the carriage reaches its extreme forward limit and abuts the front frame member 4 the doors will be opened and the lug 61 by its engagement with the front end wall of recess 10*a* will have moved the stop carrying slide 60 forward a sufficient distance to cause stop 29 to engage the lug 31 on the lever 27 and swing said lever carrying with it the switch lever arm 40.

The worm and gears connected therewith operate to decrease the speed of the apparatus and to increase the effective force thereof, the forward movement of the carriage operating to open the doors by means of the pitmen 13 and 14 and just before the carriage reaches the end of its journey the end wall of the recess 10*a* comes into contact with the lug 61 on the slide 60 and causes the stop 29 to press against the current breaking lever 27 which acting through the arm 40 moves the switch lever 37 away from the contact pieces of the switch breaking the current and stopping the motor. The stops 28 and 29 are adjustable to insure the breaking of the current at the proper time. As the lever 27 is thus moved cable 34 connected thereto exerts a sufficient pull to turn the cam 35 until the roller 49 enters the notch. The spring 50 pressing the roller against the periphery of the cam thus continues the rotation of the cam till the roller reaches the bottom of notch, and thus the cam 35, the roller 49, the handle 44*a* the arm 40 and the levers 27 and 37 connected thereto are all moved back to their original initial positions awaiting the next manipulation of the handle 44*a*.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will, of course, be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention or its scope as claimed.

I claim:

1. In combination with a movable closure; of a reciprocable carriage connected to open and close said closure, a motor connected to drive said carriage, means for reversing the motor to move the carriage in opposite directions for opening and closing the closure, means located at a point remote from the closure to operate said motor reversing means, and means operable by the carriage to actuate said motor reversing means, said carriage operated means being connected to the remotely operable means to ensure the parts assuming initial position after the closure has been operated.

2. In combination with a movable closure, a reciprocable carriage connected to open and close said closure, an electric motor connected to drive said carriage, a reversing switch wired to said motor, a lever connected to operate said switch, means located in the path of said lever and operable by the carriage to

position said means to engage the lever and stop the motor at predetermined intervals, and means connected with said lever and operable from a point remote from the closure for actuating the lever to open or close the closure.

3. The combination with a movable member, a reciprocable carriage connected to operate said member, means for actuating said carriage, cables connected to control said actuating means, a cam connected with said cables, and means for operating said cam to control the cable.

4. The combination with a movable member, a reciprocable carriage connected to operate said member, means for actuating said carriage, cables connected to control said actuating means, a cam connected with said cables, a lever for operating said cam to control the cables.

5. The combination with a movable member, a reciprocable carriage connected to operate said member, means for actuating said carriage, cables connected to control said actuating means, a cam connected with said cables, and means for operating said cam to control the cable, and resilient means for holding said cam in adjusted position.

6. In combination with a movable closure, a reciprocable carriage, a link connecting said closure and carriage whereby the closure is actuated by the carriage, worm gear mechanism for operating said carriage to open or close the closure, said mechanism operating to lock said closure in either open or closed position, a motor connected to drive said worm gear, a switch to start and stop said motor, a lever for actuating said switch, lever operating means operable from a point remote to control the direction of travel of the carriage, and cooperating members, one carried by said lever and the other operable by the carriage to shift the lever for opening or closing the switch when the carriage reaches a predetermined point.

JOSEPH W. SCROGGS.