A. C. ELDER.

DOOR OPENER.

APPLICATION FILED SEPT. 4, 1920.

1,410,901.

Patented Mar. 28, 1922.

3 SHEETS—SHEET 1.

Fig. 1

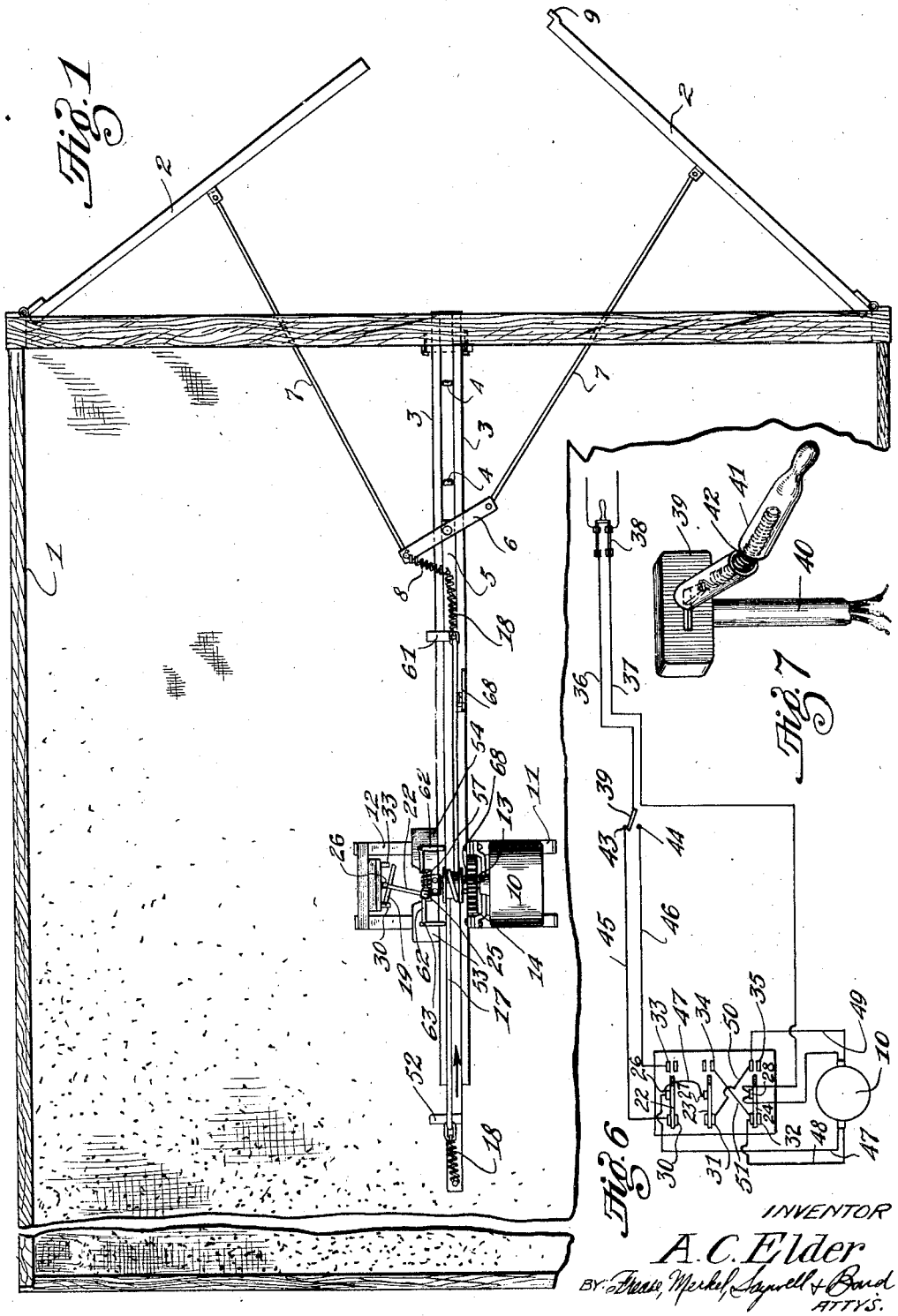


Fig. 7



Fig. 6



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3 SHEETS—SHEET 2.

Fig. 2

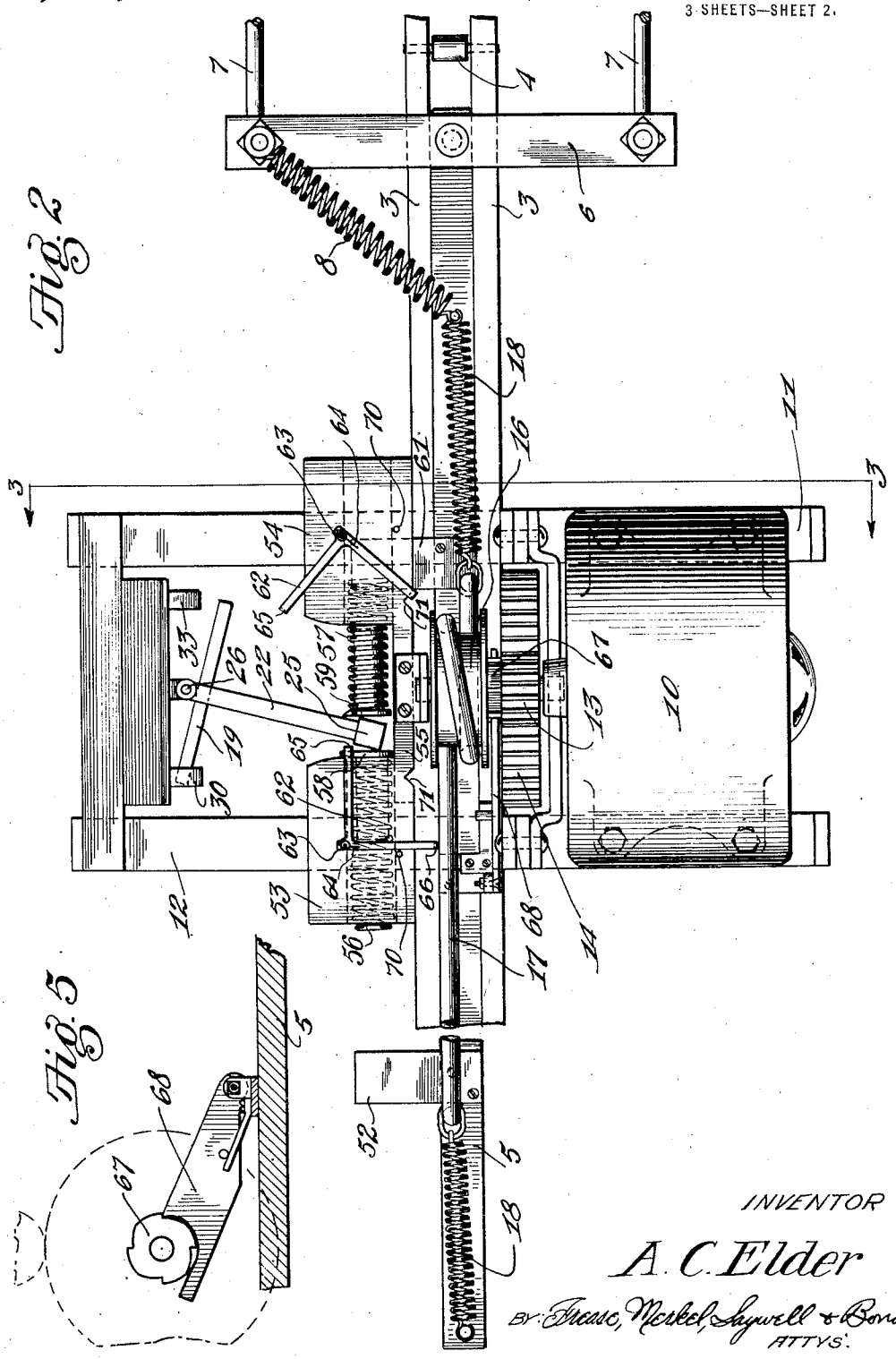



Fig. 5




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3 SHEETS—SHEET 3.

Fig. 3

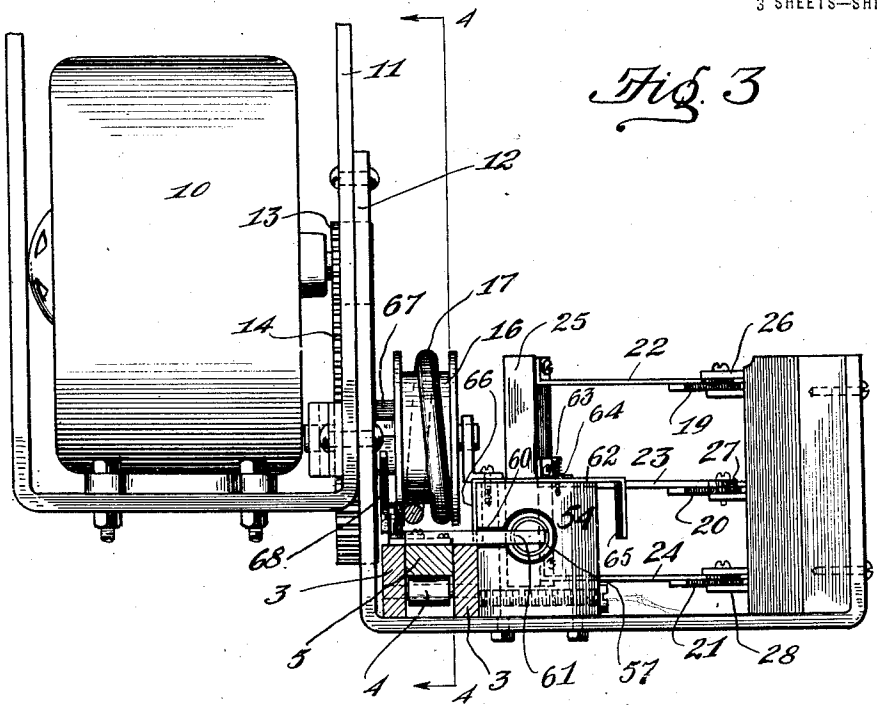
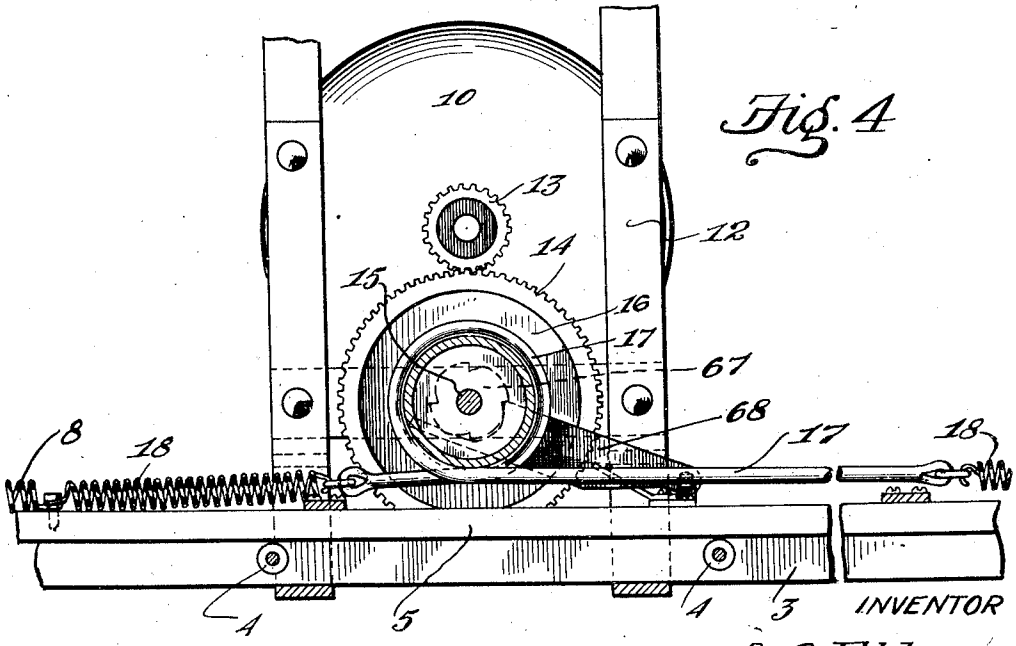



Fig. 4




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# UNITED STATES PATENT OFFICE.

AUSTIN C. ELDER, OF CANTON, OHIO.

## DOOR OPENER.

1,410,901. Specification of Letters Patent. Patented Mar. 28, 1922.

Application filed September 4, 1920. Serial No. 408,123.

*To all whom it may concern:*

Be it known that I, AUSTIN C. ELDER, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Door Opener, of which the following is a specification.

This invention relates to door openers and more particularly to a power actuated device adapted for opening heavy doors such as are used upon garages and similar buildings.

The objects of the invention are the provision of a motor operated device arranged to open and close the doors, means being provided whereby the driver of an approaching vehicle may manually put the motor into operation, means being provided for automatically stopping the motor at the proper time.

Other objects are the provision of means for locking the device when the doors are in the closed position; to provide means for automatically reversing the motor when the door reaches the fully opened or closed position; and to generally simplify and improve devices of this character.

With these objects in view the invention consists in the novel arrangement of parts hereinafter described, illustrated in the accompanying drawings, and pointed out in the appended claims, it being understood that various changes in the form, size and details of construction may be made within the scope of the claims without departing from the invention.

The invention thus set forth in general terms is illustrated in the accompanying drawings forming part hereof in which—

Figure 1 is a plan view of the device showing the same applied to a pair of swinging garage doors, portions of the garage being shown in section.

Fig. 2 is a plan view on an enlarged scale of the operating mechanism.

Fig. 3 a section on the line 3—3, Fig. 2.

Fig. 4 a section on the line 4—4, Fig. 3.

Fig. 5 a detail view of the locking mechanism.

Fig. 6 a diagrammatic view of the reversing switch and wiring; and

Fig. 7 a perspective view of the controlling switch.

A practical embodiment of the invention is disclosed in the accompanying drawings forming a part of this specification in which similar numerals of reference indicate corresponding parts throughout the several views.

A portion of the walls of a garage or similar building is shown at 1, a pair of swinging doors 2 of usual construction being provided at the entrance of the building. A horizontal guide comprising a pair of spaced side members 3 between which are located rolls 4, is suspended from the ceiling of the building and extends longitudinally through the building being centrally located with reference to the swinging doors 2.

A bar 5 is mounted upon the rolls 4 between the side members and has pivotally mounted at its forward end a singletree 6 which is connected by means of links 7 to the doors 2. A spring 8 is connected to one end of the singletree and to the bar 5 in order to cause the door upon that side to close slightly ahead of the other door which is provided with the overlapping strip 9 of usual construction.

A motor 10 is mounted upon a bracket 11 suspended from the ceiling adjacent to the guide way above described, a bracket 12, connected to the bracket 11, preferably supporting the rear portion of said guide. A pinion 13 is mounted upon the motor shaft and meshes with the gear wheel 14 mounted upon a shaft 15 which is journaled in suitable bearings provided upon said bracket, a drum 16 being fixed upon said shaft.

A belt 17, or other suitable flexible member, is passed around the drum 16, the extremities thereof being connected to the forward and rear extremities of the bar 5 by means of coil springs 18 which are provided for the purpose of keeping a tension upon the belt.

A reversing switch is provided for reversing the motor, this switch being arranged to be operated automatically to stop the motor as the doors reach the fully opened or fully closed positions and to be automatically moved into position to cause the motor to be rotated in the opposite direction when the motor is again started. This switch is preferably mounted upon the bracket 12 and comprises three blades indicated by the numerals 19, 20 and 21 which are mounted intermediate their extremities upon the arms 22, 23 and 24 respectively, all of said arms being connected to a single handle 25. The arms 22, 23 and 24 are pivotally connected to the posts 26, 27 and 28 respectively.

Upon one side of the switch are provided the spaced pairs of contacts 30, 31 and 32 arranged to be engaged by the blades 22, 23 and 24 respectively when the switch is in one position and similar contacts 33, 34 and 35 are provided upon the other side of the switch and arranged to be engaged by the blades when the switch is in the other position.

A pair of wires 36 and 37 lead from a suitable source of electric supply, preferably from the house, being controlled by a switch 38 within the house. The wire 36 leads to the controlling switch 39 which is mounted upon a post 40 at a point outside of the garage, the handle 41 of the switch being located in position to be operated by the driver of an approaching vehicle. This handle is preferably made in two sections as shown at Fig. 7, connected by a coil spring 42 or a similar flexible member which will permit of the free end of the handle being struck by the driver of the vehicle without damaging the switch. The wire 37 leads to the post 28 and then to the motor 10.

The contacts 43 and 44 are arranged to be selectively engaged by the switch blade 39, a wire 45 connecting the contact 43 with the pair of contacts 30 and a wire 46 connecting the contact 44 with the pair of contacts 33. The post 26 is connected with post 27 by a wire 47 which also leads to the motor. The contacts 32 and 35 are connected to opposite sides of the motor by the wires 48 and 49 respectively. The contacts 31 and 35 are connected by a wire 50 and a similar wire 51 connects the contacts 32 and 34.

When the controlling switch 39 and the reversing switch are in the positions shown in Fig. 6, the motor will be operated in a direction to open the garage doors. When the doors have reached the fully opened position the finger 52 upon the inner end will be moved into position to operate the reversing switch to stop the motor and throw the reversing switch into the opposite position as will be hereinafter described.

A pair of blocks 53 and 54, connected by a strip 55 are supported upon the bracket 12 adjacent to the reversing switch, each of said blocks having a longitudinal bore, the coil springs 56 and 57 respectively being located therein, plungers 58 and 59 respectively being located within said springs, the heads of said plungers engaging opposite sides of the handle 25 of the reversing switch.

Slots 60, extending into the bores in the blocks 53 and 54 allow the fingers 52 and 61 to pass into the bores and engage the springs 56 and 57. For the purpose of normally holding one of the plungers 58 or 59 within the bore, at all times, an angular catch 62 is pivoted at 63 upon the top of each block, a coil spring 64 being located around the pivotal point and connected to one arm of the catch to normally hold the downwardly depending finger 65 in engagement with the adjacent plunger.

The finger 66 is provided upon the other leg of each catch 62 and arranged to be engaged by the adjacent finger 52 or 61 as the doors reach the fully opened or fully closed position.

In order to prevent the doors from being opened by an unauthorized person a ratchet 67 is mounted upon the shaft 15 and arranged to be engaged by the spring pressed pawl 68 which is carried upon the bar 5 and so located that it will engage the ratchet 67 when the doors reach the closed position.

Assuming the parts to be in the position shown in Fig. 2 with the doors closed; in order to start the motor to open the doors the switch blade 39 is moved into contact with the contact point 43 as shown in Fig. 6, completing the circuit to the motor and starting the motor to operate in a direction to move the bar 5 outwardly in the direction of the arrow shown in Fig. 1 and through the singletree 6 and links 7 opening the doors 2.

As the bar 5 is moved forwardly until the doors have almost reached the fully opened position, the finger 52 will engage the spring 56 and compress said spring until said finger 52 strikes the finger 66 upon the adjacent catch 62 which position is coincident with the fully opened position of the doors.

The catch will be rocked upon its pivot releasing the plunger 58, the compressed spring 56 thrusting said plunger against the handle 25 of the reversing switch and throwing the switch into the opposite position, stopping the motor and leaving the reversing switch in position to operate the motor in the reverse direction.

As the handle 25 of the reversing switch is thus thrown into the other position the plunger 59 and spring 57 will be moved back into the bore in the block 54, the finger 65 upon the adjacent catch 62 engaging the outer end of the plunger and holding the same in this position.

It will be noted that a pin 70 is provided in each block 53 and 54 to limit the movement of the catches 62 when in the normal position, while notches 71 are provided to receive the fingers 66 of the catches when the catches are released.

When it is desired to close the doors, the switch blade 39 is moved into engagement with the contact 44 operating the motor in the reverse direction and moving the bar rearwardly, and through the singletree 6 and links 7 pulling the doors into the closed position, the spring 8 causing one door to close slightly in advance of the other. The finger 61 will engage the spring 57 and release the adjacent catch 62 as the doors reach the closed position, the reversing switch be-

ing thrown into the opposite position and the motor stopped in the same manner as above described.

When the switch 38, within the house, is opened it will be impossible to operate the doors through the switch 39 and the doors cannot be pulled open manually as the pawl 68 engages the ratchet 67 upon the shaft 15 and thus prevents movement of the drum 16.

Although the device is illustrated as applied to swinging doors, it will be understood that the same mechanism may be applied to a sliding door as well without any change in the construction of the device, the singletree and links being eliminated and the bar 5 attached directly to the door. It will, of course, be understood that where the device is attached to a sliding door it will be located transversely across the garage or other building, adjacent to the door.

I claim:

1. A door operating mechanism including a reciprocating bar operatively connected to the door, a motor operatively connected to the bar, a reversing switch for operating the motor, spring pressed plungers, means upon the bar for releasing one of said plungers to actuate the switch to circuit breaking and reverse position when the door reaches the fully opened and fully closed position and a manually controlled switch for closing the circuit to said reversing switch.

2. A door operating mechanism including a reciprocating bar operatively connected to the door, a motor operatively connected to the bar, a reversing switch for operating the motor, spring pressed plungers engaging opposite sides of said switch, a catch cooperating with each plunger, one of said catches normally engaging the adjacent plunger, means upon the bar for releasing the operative catch to actuate the switch to circuit breaking and reverse position when the door reaches the fully opened and fully closed position and a manually controlled switch for closing the circuit to said reversing switch.

3. A door operating mechanism including a reciprocating bar operatively connected to the door, a motor operatively connected to the bar, a reversing switch for operating the motor, spring pressed plungers engaging opposite sides of said switch, a catch cooperating with each plunger, one of said catches normally engaging the adjacent plunger, means upon the bar for compressing the spring upon said plunger and releasing the operative catch to actuate the switch to circuit breaking and reverse position when the door reaches the fully opened and fully closed position and a manually controlled switch for closing the circuit to said reversing switch.

4. A door operating mechanism including a motor, a drum operatively connected to the motor, a reciprocating bar adjacent to said drum, a belt located around the drum and connected at its extremities to the ends of the bar, means operatively connecting the bar to the door, means for manually starting the motor and means for automatically stopping the motor when the door reaches the fully opened and fully closed position.

5. A door operating mechanism including a motor, a drum operatively connected to the motor, a reciprocating bar adjacent to said drum, a belt located around the drum and connected at its extremities to the ends of the bar, means operatively connecting the bar to the door, a reversing switch for operating the motor, means upon the bar for automatically actuating the switch to circuit breaking and reverse position when the door reaches the fully opened and fully closed position and a manually operated switch for closing the circuit to the reversing switch.

In testimony that I claim the above, I have hereunto subscribed my name.

AUSTIN C. ELDER.