May 14, 1935. J. FREZZOLINI 2,001,416

AUTOMATIC GARAGE DOOR OPENER

Filed Sept. 14, 1932

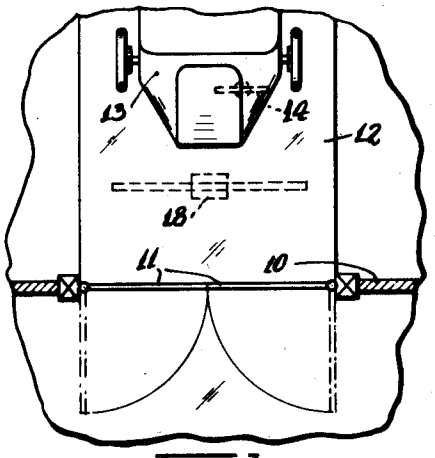


Fig. 1.

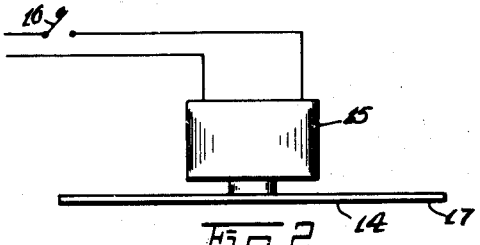


Fig. 2.

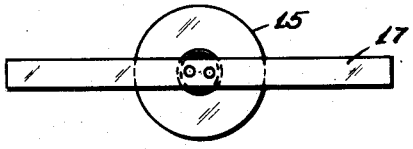


Fig. 3.

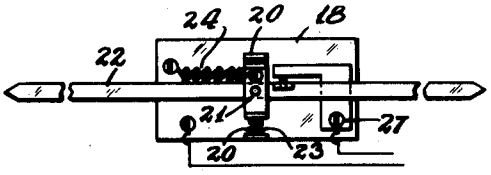


Fig. 4.



Fig. 5.

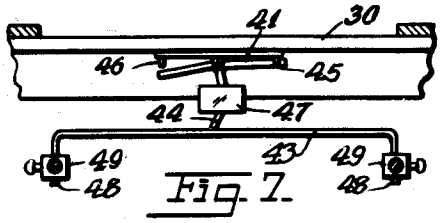


Fig. 7.

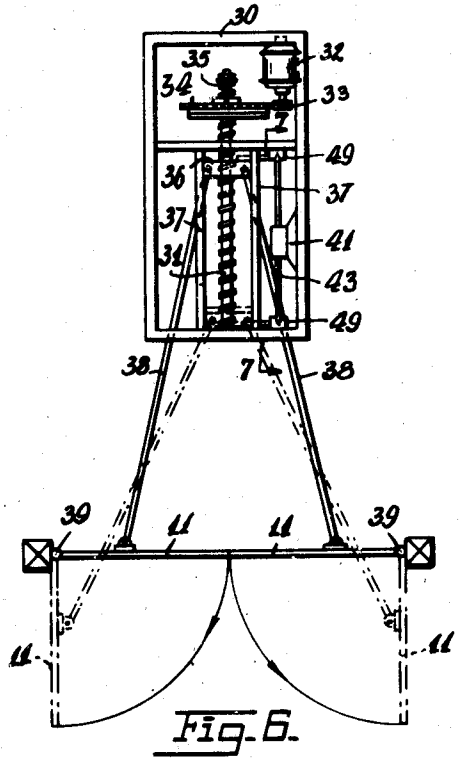


Fig. 6.

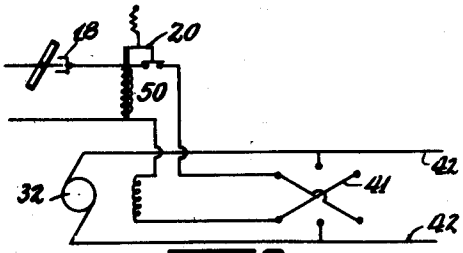


Fig. 8.

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AUTOMATIC GARAGE DOOR OPENER

James Frezzolini, New York, N. Y.

Application September 14, 1932, Serial No. 633,056

2 Claims. (Cl. 268—33)

This invention relates to new and useful improvements in an electric motor driven door opener adapted for the opening and closing of garage doors, and other doors.

The invention has for an object the construction of a device as mentioned which is characterized by the provision of an electric motor connected with a transmission terminating in a a rotative screw, and a follower engaged upon said screw and connected with linkage adapted to open and close the doors depending upon the direction of rotation of said screw.

More particularly it is proposed to arrange a reversing switch in circuit with said motor operated automatically as the follower reaches the ends of its stroke for causing the reversing of said motor.

Furthermore, as another object it is proposed to provide a gravity switch, or any type of self-opening and coil closing switch in series with said reversing switch and adapted to cut the current through the motor upon operation of the reversing switch in either direction.

Furthermore, the invention proposes the provision of a circuit including said coil to cause the closing of the switch and thus operation of the motor.

The invention is particularly adapted to the provision of a magnetic unit upon a moving vehicle adapted to operate a momentary switch in circuit with said coil so as to cause the opening and closing of the garage doors as desired for convenience of the operator of the motor vehicle.

The invention still further proposes the construction of a device as mentioned which is simple and durable and which may be manufactured and sold at a reasonable cost.

For further comprehension, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawing, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawing forming a material part of this disclosure:

Fig. 1 is a plan view of a portion of a garage and the roadway to the front of the doors thereof, and showing an automobile approaching.

Fig. 2 is a side elevational view of a magnetic unit intended to be carried by the vehicle.

Fig. 3 is a bottom view of Fig. 2.

Fig. 4 is a plan view of a momentary switch adapted to be operated by the magnet shown in Figs. 2 and 3.

Fig. 5 is a side elevational view of Fig. 4.

Fig. 6 is a plan view of the mechanism for opening and closing the garage doors.

Fig. 7 is a fragmentary sectional view taken on the line 7—7 of Fig. 6.

Fig. 8 is a schematic wiring diagram of the device.

The reference numeral 10 indicates generally a garage equipped with a pair of swinging doors 11; while the invention is to be disclosed relative to swinging doors it is not intended to limit it to such construction. The dot and dash lines in Fig. 1 illustrate the open position of the doors. To the front of the doors there is located a roadway 12 upon which an automobile 13 is shown in position. This automobile is provided with an electro-magnet 14 secured upon its bottom side. This magnet comprises a coil 15 in circuit with some source of power such as the battery of the vehicle and a hand switch 16 which preferably should be located on the dash board of the vehicle or in any other position for convenient engagement by the vehicle operator. An iron core 17 is used in conjunction with the coil 15 to conclude the electro-magnet. The arrangement is such that when the switch 16 is depressed the magnet is energized and adapted to cause the closing of a switch 18 located to the front of the doors 11. This switch 18 is shown in detail in Figs. 4 and 5.

The switch 18 comprises a base plate 19 having a pair of spaced upward directed prongs 20. A yoke 21 is pivoted upon the prongs engaging the prongs 20 so as to be pivotally supported and a cross bar 22 is secured upon this yoke and extends to both sides thereof. A spring 23 is arranged coaxially upon one of the trunnion elements and acts between the yoke 21 and the prongs 20 for urging the yoke in one direction. Another spring 24 acts between the yoke 21 and the base plate 19 for urging the yoke in the other direction. These springs are so designed as to balance each other and cause the yoke to assume a neutral position. Arranged upon the peg 19 there is located a ground terminal 25 from which the current may reach a contact finger 26 carried upon the cross bar 22. The circuit may continue from the contact finger 26 if the cross bar 22 is tilted to the live wire terminal 27. The switch is so designed that upon energization of the electro-magnet 14 the bar 22 will be caused to pivot in one or the other direction and cause the closing of the switch 18.

A frame 30 is located in the vicinity of the doors 11 and rotatively supports a screw 31. This screw is situated at right angles to the doors 11

when the latter elements are closed. An electric motor 32 is supported upon the frame 30 and is in connection with a transmission adapted to drive the screw 31 in one direction or the other. In greater detail the motor 32 is provided with a pinion meshing with a gear 34 connected with the screw 31 by the provision of a slip friction clutch 35.

A follower 36 is threadedly engaged upon the screw 31 and is guided against a pair of parallel bars 37 mounted upon the frame 30. This follower is adapted to move from one end of the screw to the other and vice-versa to cause the opening and closing of the doors. Linkage is connected between the follower 36 and the doors 11 and comprises a pair of bars 38 pivotally connected upon the follower 36 and upon the doors 11 at points spaced from the hinges 39 of the doors. The arrangement is such that the doors assume the open positions indicated by the dot and dash lines engaged in Fig. 6 when the follower is extended to the other end of the screw.

A circuit is provided for controlling the rotation of the motor 32 and includes a self opening and coil closing switch 40 and a reversing switch 41. The reversing switch is schematically shown in Fig. 3 and is shown connected with leads 42 for connection with a source of power and is adapted to reverse the flow of current through the field of the motor.

A means for reversing in succession the reversing switch 41 as the follower 36 reaches the ends of its stroke has been provided and comprises a rod 43 supported upon the operating lever 44 of the control mechanism for snapping the switch 41 in one or the other of its positions. The details of the switch will not be given here since it forms no part of the invention and are generally known. As shown in Fig. 7 the blades of the switch are closed against the contacts 45 at one side. The blades may pivot to the other side so as to close with the contacts 46. The mechanism for snapping the blades into one or the other direction is housed within the casing 47 rigidly secured upon the base of the switch. The rod 43 has its ends 48 bent downwards and adjustable fingers 49 are secured upon the ends 48 and extend into the path of motion of the follower 36 clearly shown in Fig. 6. A starting circuit is provided and includes the coil 50 of the self opening and coil closing switch 40 and the momentary switch 18.

The operation of the device may be traced by assuming the doors closed and the vehicle approaching. The driver closes the switch 16 so as to energize the magnet. Thus as the car moves over the momentary switch 18 the circuit will be closed between the finger 26 and the terminal 27. Consequently a current will flow through the coil 50 of the self opening and coil closing switch 40. This current causes the switch to close, and consequently the circuit including the electric motor 32 is now closed and the motor operates. Rotations from the motor cause turning of the screw 31 and the follower 36 moves along the screw to open the doors 11. As the follower reaches the end of its stroke it engages against one of the fingers 49 and causes pivoting of the lever 44 and operation of the mechanism within the casing 48 which throws the switch 41 in the other direction. The motor 32 is now connected to operate in the reverse order but such operation will not take place just now because during the reversing of the switch 41 the circuit through the motor was opened momentarily and consequently the self opening switch 40 assumed its opened position. The garage doors are now opened.

To close the garage doors it is necessary that the momentary switch 18 be operated again such as, for example, when the vehicle is driving from the garage. The circuit will then be closed through the coil 50 which in turn closes the switch 40 and causes operation of the motor 32 which now rotates in the opposite direction and closes the door 11. When it reaches the end of its stroke, the follower 36 will strike the other finger 49 and cause the reversing of the switch 41. During the reversing of the switch the self opening switch 40 will open and so break the circuit through the electric motor.

In addition to the momentary operating switch 18 other switches should be used to shunt this switch and be operable by key-control or any other arrangement so that the garage doors may be opened without the necessity of moving the magnet over the switch 18. Such construction is not illustrated on the drawing since it will be readily understood by those skilled in the art.

While I have shown and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:—

1. An operator for garage doors comprising a rectangular frame having a cross piece intermediate the ends thereof, a threaded shaft journalled in said cross piece and in one end of said frame, said shaft extending through said cross piece, a friction clutch mounted on the free end of said shaft, an electric motor mounted in said frame adjacent said clutch, gearing connecting said motor to said clutch to drive said shaft, guide members in said frame extending from said cross piece on opposite sides of said shaft to the end of said frame, a follower having a portion engaging said shaft and in guided relation with said guide members, means connecting said follower to said doors to operate same, means in said frame to control said motor comprising a snap action switch connected to said motor to drive the same in opposite directions located within said frame between one of said guide members and the side of said frame, a bar extending parallel with said shaft and operatively connected with said snap action switch to operate the same, the ends of said bar being bent at right angles to said shaft, and adjustable fingers on the ends of said bent portions of the bar extending into the path of said follower to be engaged thereby to operate said switch.

2. An operator for garage doors comprising a rectangular frame having a cross piece intermediate the ends thereof, a threaded shaft journalled in said cross piece and in one end of said frame, said shaft extending through said cross piece, a friction clutch mounted on the free end of said shaft, an electric motor mounted in said frame adjacent said clutch, gearing connecting said motor to said clutch to drive said shaft, guide members in said frame extending from said cross piece on opposite sides of said shaft to the end of said frame, a follower having a portion engaging said shaft and in guide relation with said guide members, means connecting said follower to said doors to operate same, means in said ..ame to control

said motor comprising a snap action switch connected to said motor to drive the same in opposite directions located within said frame between one of said guide members and the side of said frame, a bar extending parallel with said shaft and operatively connected with said snap action switch to operate the same, the ends of said bar being bent at right angles to said shaft, and adjustable fingers on the ends of said bent portions of the bar extending into the path of said follower to be engaged thereby to operate said switch, and means for setting said motor in operation comprising a switch located to one side of said doors and adapted to be operated by a magnet carried by a vehicle, said switch comprising a base, a yoke upstanding from said base, a bar pivoted on said yoke by a horizontal axis and extending on either side of said yoke, a pair of springs acting on said bar to hold the same in horizontal position and to return the same to horizontal position from any inclined position, and contact means on said bar operative by tilting of said bar in either direction to close a circuit through said motor.

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