

Dec. 1, 1931.

G. G. HILL

1,833,943

DOOR OPERATING APPARATUS.

Filed July 19, 1927

3 Sheets-Sheet 1

FIG. 1.

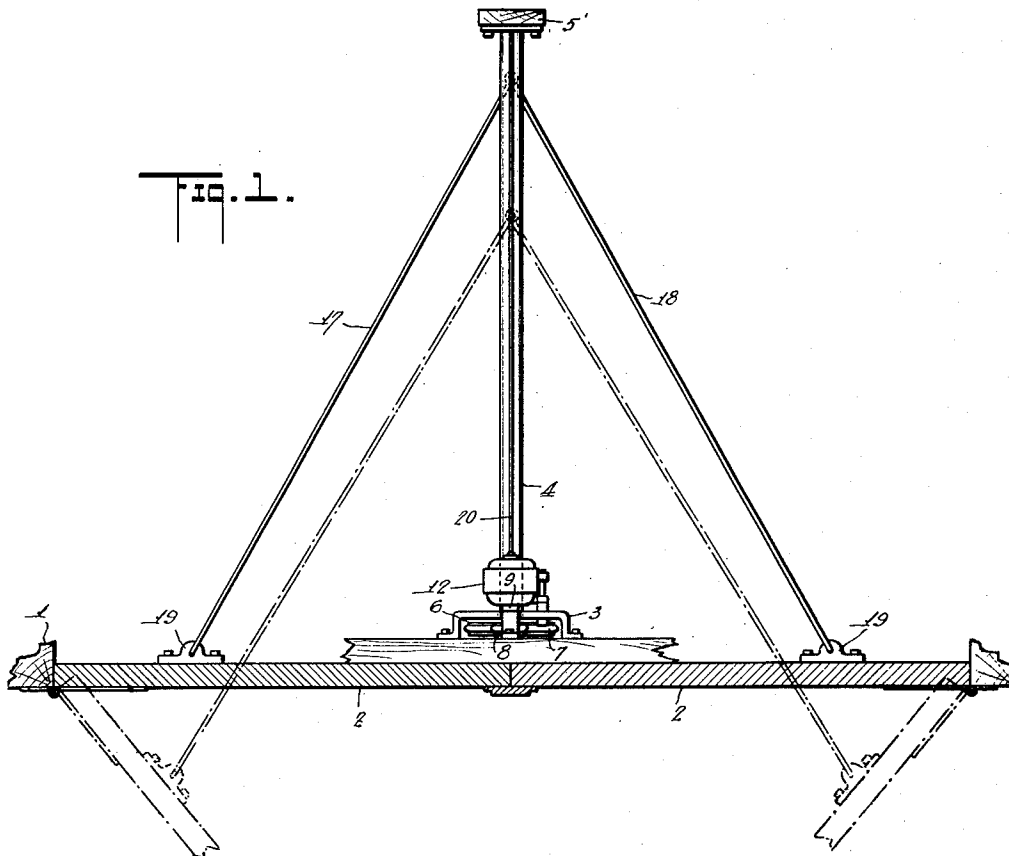
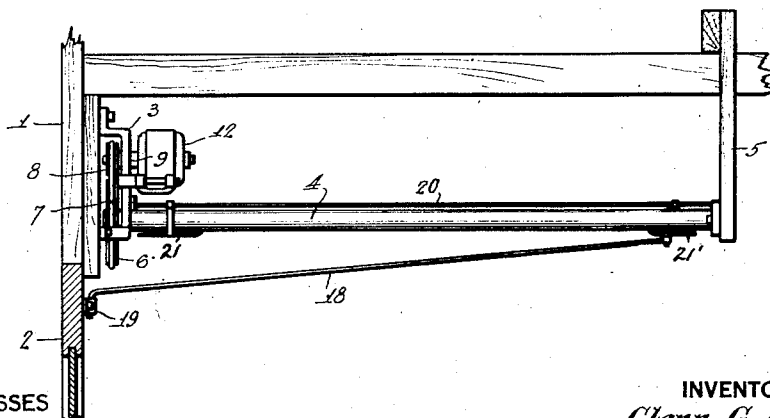


FIG. 2.



WITNESSES

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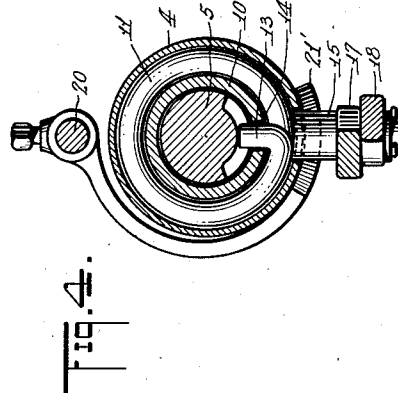
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Fig. 5.

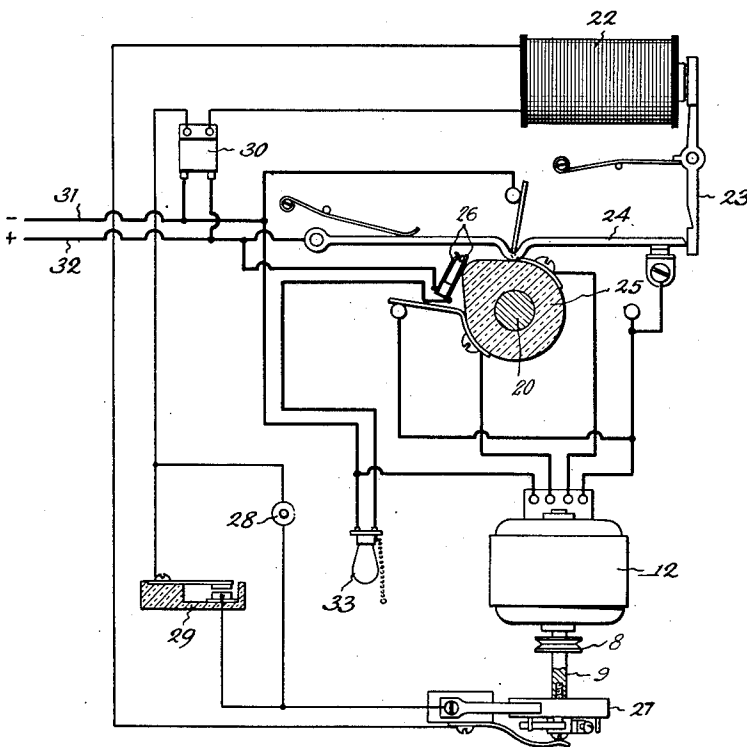
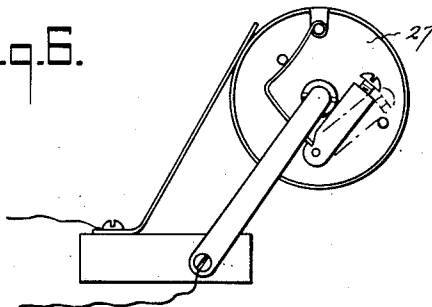


Fig. 6.



WITNESSES

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DOOR OPERATING APPARATUS

Application filed July 19, 1927. Serial No. 206,942.

This invention relates to door operating apparatus and is particularly adapted for use in connection with the doors of garages and the like although of course the invention is not limited to this specific use.

An object of the invention is to provide mechanical means electrically operated and controlled for opening and closing the doors.

A further object is to provide means of this character which can be readily installed at a minimum cost and which will most efficiently perform the functions intended.

With these and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts which will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings—

Figure 1 is a sectional plan view illustrating my improved apparatus;

Figure 2 is a view in side elevation looking at the right of Figure 1, the door being shown in section;

Figure 3 is an enlarged view, mainly in elevation but partly broken away and in section, illustrating my improved follower and adjacent parts;

Figure 4 is a view in transverse section on the line 4—4 of Figure 3;

Figure 5 is a view showing one form of electric diagram illustrating the electric control of my improved apparatus;

Figure 6 is an enlarged view in end elevation showing a safety cut-out on the end of the motor shaft.

1 represents a building or other analogous structure having a pair of hinged doors 2, 2, and while I shall describe my invention in connection with the operation of a pair of doors it is obvious that the apparatus may operate a single door with equal efficiency.

A supporting bracket 3 is fixed to the building above the doors 2, and a tubular casing 4 extends from the bracket 3 to a supporting hanger 5' and is located in horizontal position, as shown. Within this tubular casing 4 a screw 5 has rotary mounting and this screw 5 has a pulley 6 at one end connected by

a belt 7 with a pulley 8 on the drive shaft 9 of an electric motor 12.

A follower 10 in tubular form is mounted to move on the screw 5 and has a coil spring 11 around the same, one end of the coil spring constituting a lug 13, projecting through an opening or slot 14 in the sleeve 10 and into engagement with the threads of the screw 5. The other end of the spring is fixed to a finger 15 which is movable in a longitudinal slot 16 in the tubular casing 4, and the lower end of this finger 15 is connected to a pair of links 17 and 18, which in turn are connected to brackets 19 on the doors 2.

20 represents a rocker shaft which is mounted in brackets 3 and the hanger 5', respectively, and carries a pair of cams 21, 21' adjacent its respective ends. These cams are engaged by the finger 15 to cause the shaft 20 to rock and operate a polarity reversing switch, shown in Figure 5.

In Figure 5 I illustrate a diagram which may be employed in connection with my improved apparatus although I do not limit myself to any particular electric circuit or circuits.

The motor 12 is provided with a safety cut-out 27 which through centrifugal action holds a magnet circuit open while the motor is running. 22 represents the magnet above referred to which controls an armature 23 adapted to support an arm 24 when the latter is elevated by the polarity reversing cam 25.

This cam 25 is fixed to the rocker shaft 20 so that when this shaft is moved by the action of the finger 15 against the cams 21, 21' the cam 25 will be shifted from one position to another. I have shown the cam in position to hold a pair of contacts 26 together, closing a circuit to a light bulb 33 so that the garage or other building is illuminated while the doors are open. When the cam 25 is moved in a clockwise direction from that indicated in Figure 5 the polarity of the motor will be reversed.

28 represents a push button and 29 a switch which may be operated by a car running over the same, both of which are included in circuit with the magnet 22 and the safety cut-out 27, and I may employ a transformer

in the circuit between the line conductors 31 and 32 and the circuit of the magnet 22.

The electric light 33 is included in circuit with the contacts 26 so that this light is illuminated while the motor is running and is extinguished when the motor stops, or at least that portion of the movement which comprises the opening of the doors, and remains illuminated while the doors are open, and the circuit is opened or broken when the doors are closed.

The diagram shows the parts in position with the doors opening. It is apparent that when the cam 25 is shifted in a clockwise direction, the arm 24 will be elevated and caught by the armature 23 and held in this position to open the circuit to the motor until such time as the magnet is energized either by the push button 28 or the switch 29.

I make no specific claim to the diagram nor to the parts referred to as I employ standard equipment as my invention is directed to the mechanical means which are operated and controlled by the electric means to cause the doors to open and close through the medium of the motor and screw, as above described.

I do, however, claim the structural features of my improved follower, as it will be apparent that the spring not only couples the follower element to the screw but also cushions the contact of parts, reducing noise and stress to a minimum.

Various changes and alterations might be made in the general form of the parts described without departing from my invention and hence I do not limit myself to the precise details set forth but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

I claim:

1. An apparatus adapted to operate a door, including a screw having a rotary mounting, means for turning the screw, a slotted tubular casing enclosing the screw, a sleeve mounted on the screw and constituting a follower, a coil spring around the sleeve having one end projecting from the sleeve and into engagement with the threads of the screw, a finger to which one end of the spring is secured, said finger projecting through the slot in the tubular casing, and means engaged by the finger to reverse the direction of turning of the screw.

2. An apparatus adapted to operate a door, including a screw having a rotary mounting, means for turning the screw, a slotted tubular casing enclosing the screw, a sleeve mounted on the screw and constituting a follower, a coil spring around the sleeve having one end projecting through the sleeve and into engagement with the threads of the screw, a finger to which one end of the spring is se-

cured, said finger projecting through the slot in the tubular casing, a rocker shaft, means on the rocker shaft for reversing the direction of movement of the screw, and cams on the rocker shaft engaged by the finger.

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