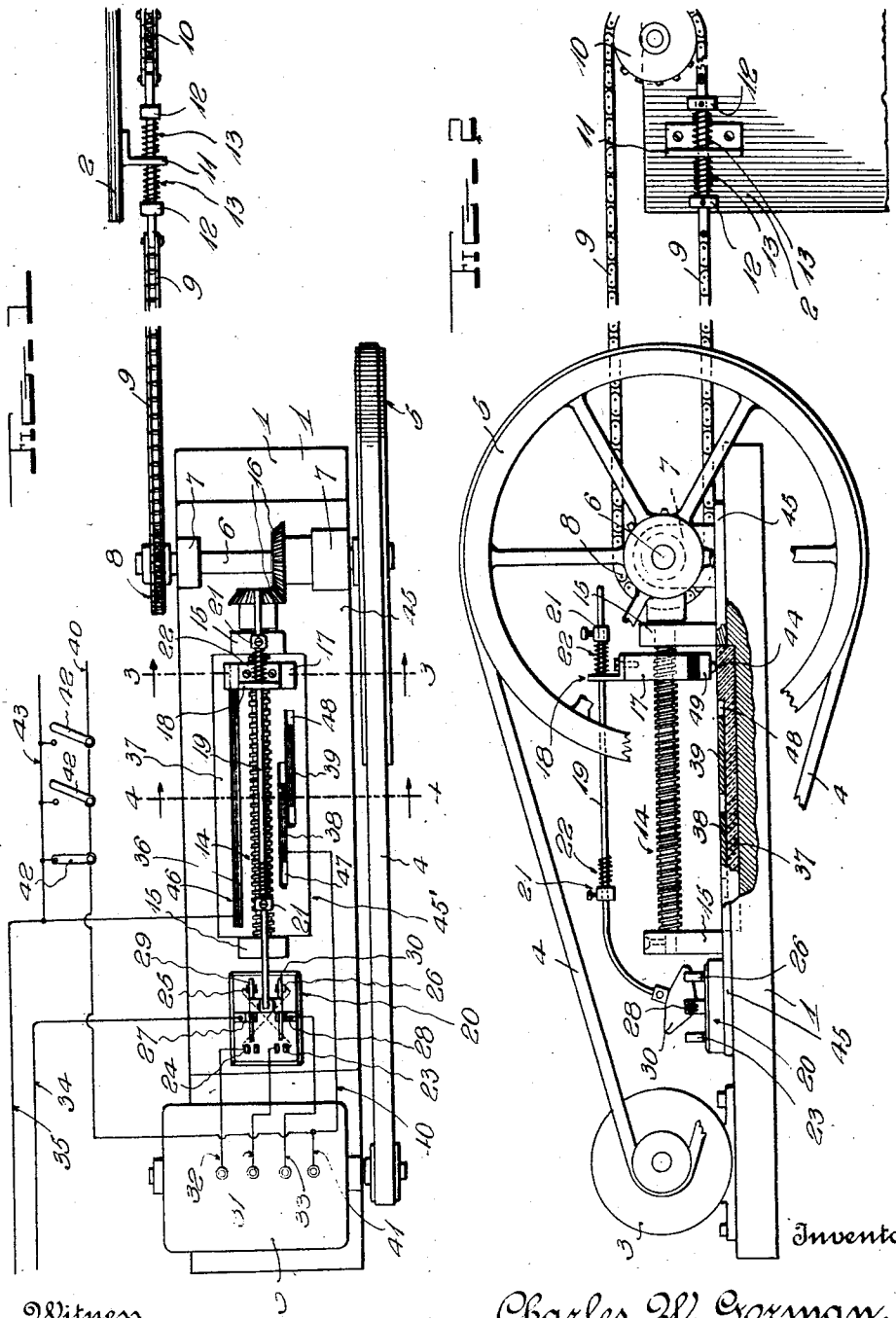
Oct. 9, 1928. 1,686,851

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DOOR OPERATING MECHANISM

Filed April 2, 1925 2 Sheets-Sheet 1



Witness

Inventor

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Attorneys

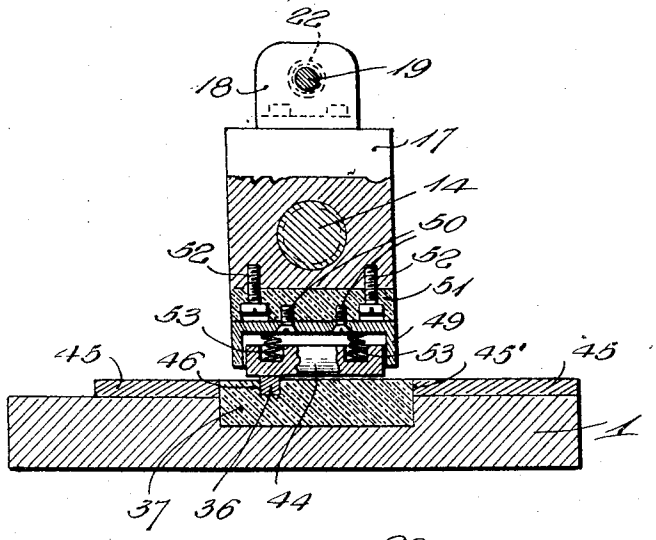
Oct. 9, 1928. 1,686,851

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DOOR OPERATING MECHANISM

Filed April 2, 1925 2 Sheets-Sheet 2

FIG. 3



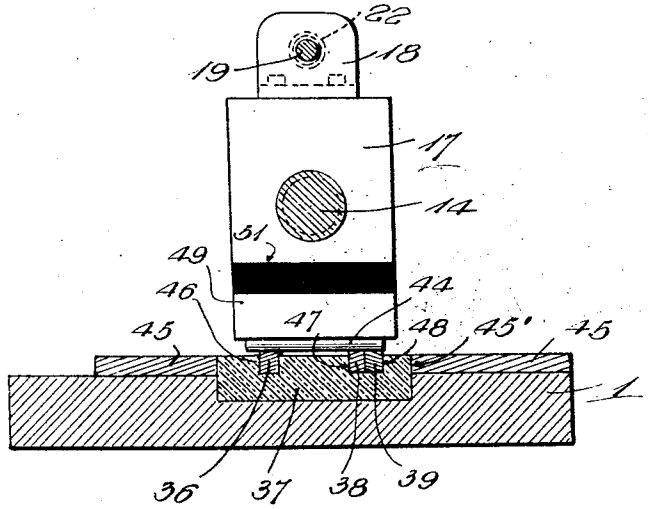


FIG. 4

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UNITED STATES PATENT OFFICE.

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DOOR-OPERATING MECHANISM.

Application filed April 2, 1925. Serial No. 20,255.

This application forms a continuation in part of my U. S. application, Serial No. 647,689, filed June 25, 1923, and allowed September 25, 1924.

Like the original application, the invention relates to electrical mechanisms for opening and closing doors, and has for its principal object to provide an exceptionally simple and inexpensive, yet a highly efficient and reliable arrangement of parts for both opening and closing a door at the will of the operator.

An object of the improved construction shown by the present application, is to greatly simplify the subject matter disclosed in the first application and provide a more compact relation of parts which may be more easily installed.

A further aim is to provide unique motor-controlling means designed primarily for but not necessarily restricted to use in connection with a door-operating mechanism.

With the foregoing and minor objects in view, the invention resides in the novel subject matter hereinafter described and claimed, the description being supplemented by the accompanying drawings.

Figure 1 is a top plan view of a door operating mechanism constructed in accordance with my invention, showing it in operative relation with a portion of a sliding door.

Figure 2 is a side elevation of the parts shown in Fig. 1, parts being broken away and in section.

Figures 3 and 4 are vertical transverse sectional views as indicated by lines 3—3 and 4—4 of Fig. 1.

In the drawings above briefly described, illustrating the preferred form of construction, the numeral 1 designates a base which is adapted to be mounted at any convenient location with respect to a door 2, to be opened and closed. If this door be slidably mounted, as in the present disclosure, the base 1 will be mounted adjacent one upper corner of the doorway.

Mounted upon the base 1, is a reversible electric motor 3, which by means of a belt or the like 4, drives a large pulley 5 on a shaft 6, said shaft being mounted in appropriate bearings 7 rising from the base 1. On one end of this shaft, I have shown a sprocket wheel 8 around which an endless sprocket chain 9 is trained, said chain being also passed around a guide wheel or sprocket 10 disposed at any desired or appropriate location. The lower reach of the chain 9 passes slidably through a guide member or bracket 11 secured to the door 2, shoulders 12 are provided on the chain at opposite sides of this bracket, and coiled compression springs 13 are interposed between the shoulders and bracket, thereby establishing a yieldable connection between the chain and the door. Obviously, when the shaft 6 is driven in one direction by the motor 3, the door will be closed, whereas driving of said motor in the opposite direction, will effect opening of the door. The portion of the chain carrying the shoulders 12 and the springs 13 may well be in the form of a short length of rod, as shown.

An elongated screw 14, is rotatably mounted in appropriate bearings 15 carried by the base 1, said screw being driven by beveled gears 16, from the shaft 6. This screw is threaded through a traveling body 17 and it acts to shift said body gradually from one end to the other end of the screw, when the door is either opening or closing. This body is provided with a guide 18 having an eye through which an operating rod 19 for a motor-reversing switch 20, passes slidably, said rod being parallel with the screw and having trip-collars 21 spaced apart along the length of said screw. Preferably, cushioning springs 22 surround the rod and engage the inner sides of the collars 21. When the body 17 is at one end of the screw, it engages one of the trip springs 22 and shifts the rod 19 to set the reversing switch 20 at one of its two operative positions, while travel of said body to the other end of the screw, causes it to engage the other trip spring 22 and shift the rod 19 to set the switch 20 at its other operative position.

In the present disclosure, the switch 20 is mounted adjacent one end of the screw 14, and said switch includes six stationary contacts 23, 24, 25, 26, 27 and 28. To the contacts 27 and 28, disposed centrally of the switch base, double-throw switch blades 29 and 30 are pivoted, these blades being appropriately connected with one end of the rod 19, to be operated by the latter. Wires 31 and 32 connect the contacts 23 and 24 with two terminals of the motor 3, another wire 33 is shown leading from the contact 28 to another terminal of the motor, and leading to the contact 27 is one of the main current supply wires 34. The other main current conducting wire 35, leads to a contact strip or track 36 carried by an insulating base 37 which is inset in or otherwise suitably se-

cured to the base 1. Parallel with the track 36, is another track formed of relatively adjustable strips or sections 38 and 39 carried by the base 37, one of these strips being connected to a wire 40 having a branch 41 leading to one terminal of the motor 3. By means of one or more push button switches or similar switches 42, the wire 40 may be electrically connected with a wire 43 which branches from the wire 35. At least one of the switches 42 is located at the outside of the door 2 and at least one at the inside thereof, and when either of these switches is closed, current is supplied to the motor 3 to either open or close the door, as the case may be. As soon as the door has moved to a slight extent, a traveling contact 44 carried by the body 17, bridges the gap between the contact tracks 36 and 38—39, so that the switch 42 previously closed, may be released and allowed to open. Then, the trackage and the traveling contact shoe serve to supply current to the motor through the switch 20, so that the movement of the door continues. By the time the door has almost reached the limit of its movement, the contact 44 disengages the track 38—39 and thus the current to the motor 3 is broken. The momentum of the parts however is sufficient to effect feeding of the body 17 along the screw 14, until it engages the trip 22, shifts the rod 19, and reverses the position of the switch 20. All parts now stand idle, until one of the switches 42 is again closed. When this is done however, current is supplied to the motor 3 and the latter is driven in the reverse direction from that in which it previously moved, due to the different setting of the reversing switch 20. The result is that the door is moved in the opposite direction by the motor, until the contact 44 clears the track 38—39. Immediately after this, the member 18 engages one of the trips on the rod 19, thus shifting the latter and again setting the motor-reversing switch 20.

In the preferred form of construction, the bearings for the movable parts are carried by a metal plate 45 which is secured upon the base 1 but is provided with an opening 45′ receiving the insulating base 37. The stationary contact trackage 36—38—39, is preferably mounted on this base 37 in the manner shown. The track or strip 36 is frictionally held in a longitudinal groove 46 in the base 37, and similar grooves 47 and 48 are provided for the strips 38 and 39, said strips 38 and 39 being of less length than their receiving grooves, so that they may be longitudinally adjusted therein as occasion may demand, so as to control the time at which the traveling contact 44 will disengage from operative relation with the stationary contact trackage. The strips 38 and 39 frictionally engage the walls of their receiving grooves 47 and 48 and are by this frictional engagement, held in adjusted position. At no time, are the strips adjusted sufficiently to bring their overlapping inner ends out of electrical contact with each other.

The traveling contact 44 may be mounted in any desired manner. For illustrative purposes, I have shown it slidably received in an open-bottomed metal casing 49, secured by screws 50 to an insulating block 51 which is in turn secured by screws 52 to the lower end of the body 17. Coiled compression springs 53 have been shown acting against the contact 44 and re-acting against the housing 49, to insure proper engagement of the traveling contact with the stationary contacts.

Current travels through wire 35 to stationary contact strip or track 36 into traveling contact 44 which when moved a short ways makes contact with stationary contact strips or tracks 38—39 or completes the connection between contact strips or tracks 36 and 38—39 through wire 40 through wire 41 into motor 3, it will be noted that one side of circuit has been completed to motor. Wire 34 leads to stationary contact 27 on switch 20 through switch blade 29 to contact 25 across switch 20 to contact 23 through wire 31 into motor, this makes the other side of circuit complete.

Note that with the switch in this position, Figures 1 and 2, motor field coil wire 32 connects to wire 33 through contact 24 across switch 20 to contact 26 through switch blade 30 to contact 28. This connection remains the same until traveling contact 44 has passed off of stationary contact 38. Then the electric connection or main feed line has been broken which causes the motor to stop. Immediately after the contact is broken the reversing switch is thrown in the opposite position by shifting lever 19.

Now the motor starting coil wire has been changed so that motor will run in the opposite direction. That is in this position current from wire 34 connected to contact 27 through switch blade 29 to contact 24 through wire 32 into motor, wire 31 is connected to wire 33 through contact 23 through switch blade 30 to contact 28, mechanism is started by closing contacts 42 which completes the circuit between stationary contacts 36 and 38—39 and causes the machine to run, after contact 44 has traveled a short way it completes the circuit between stationary contacts 36 and 38—39. The operator then releases contacts 42 and the mechanism takes care of itself.

Note that when the mechanism is in the position of Figures 1 and 2 that the only place that electric connection is broken is between the contact tracks 36 and 38—39. To set the mechanism in motion, close any one of contacts 42 and the circuit is completed. After traveling contact 44 has moved a short way it takes the place of contacts 42 or completes

the circuit between contacts 36 and 38—39, and keeps the mechanism running until traveling contact 44 runs off of stationary contact 38. Then the connection is again broken and motor stops a short distance afterwards.

Both of these operations are positive and the same except for the position of the reversing switch which changes each time from one to the other so as to make the motor run in one direction one time and the opposite direction the next time.

It will be seen from the foregoing that simple yet effective provision has been made for carrying out the objects of the invention, and while the details disclosed are preferably followed, it is to be understood that within the scope of the invention as claimed, numerous modifications may be made.

I claim:

A mechanism of the class described comprising a base, a reversible electric motor thereon, a screw rotatably mounted on said base and operatively connected with said motor, a reversing switch for the motor mounted on the base, an operating member for said reversing switch having trips at points spaced apart along said screw, and a non-rotatable body engaged with said screw, said body having a portion received between said trips to engage the same and shift said operating member to actuate the reversing switch; together with additional current controlling means for the motor comprising contact trackage mounted on the base parallel with the screw, and a traveling contact engaging said trackage and carried by said body, said traveling contact being adapted to move from operative engagement with said trackage to break the motor circuit, said contact trackage comprising a contact strip and a track parallel therewith formed of overlapping longitudinal adjustable strips.

In testimony whereof I have hereunto affixed my signature.

CHARLES W. GORMAN.