

C. R. YOUNG
ELECTRIC DOOR OPENER
Filed May 7, 1935

2 Sheets-Sheet 1



C. R. Young

INVENTOR

Y *Victor J. Evans & Co.*

ATTORNEY

WITNESS

Sept. 1, 1936.

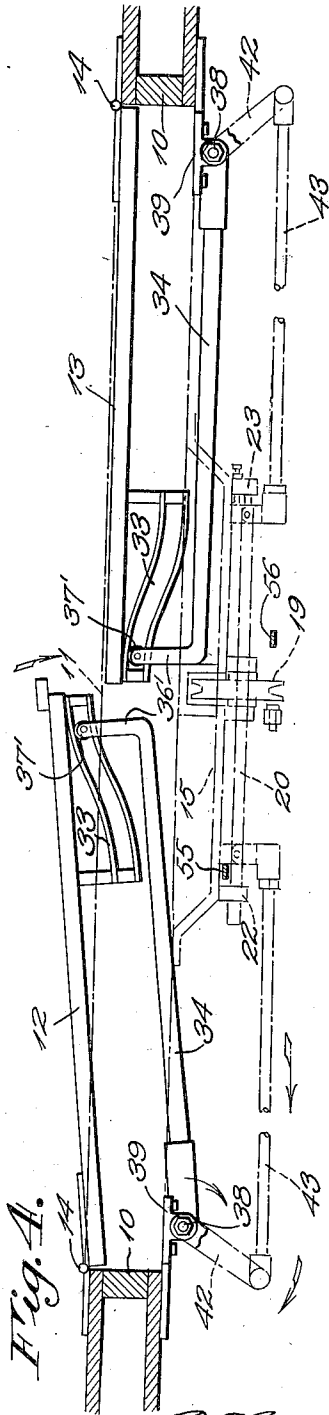
C. R. YOUNG

2,053,172

ELECTRIC DOOR OPENER.

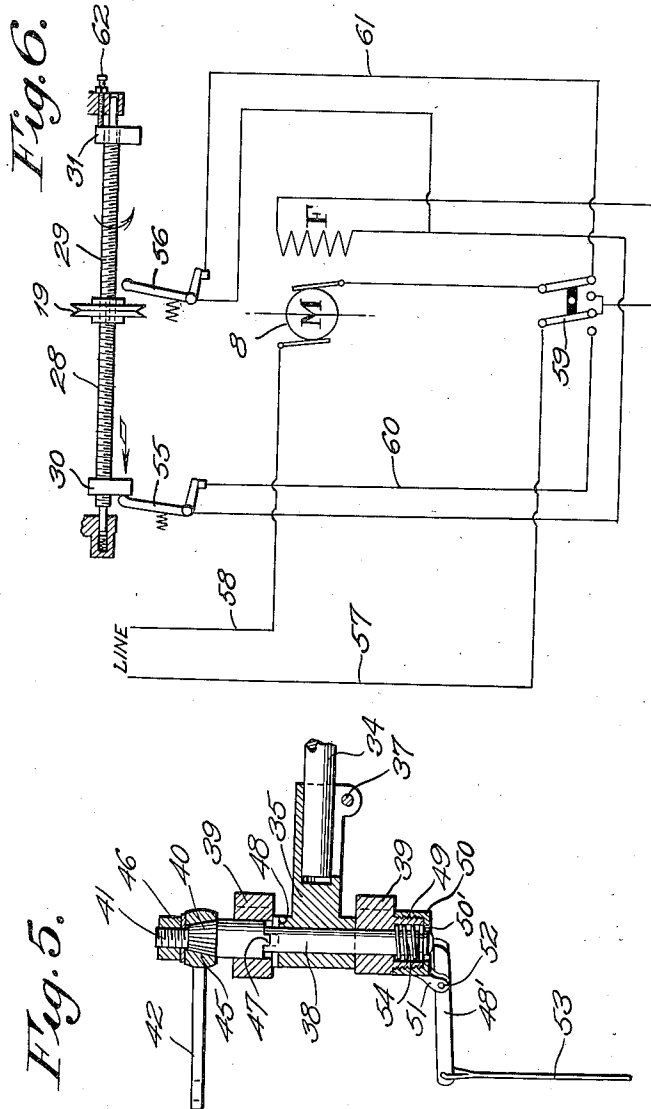
Filed May 7, 1935

2 Sheets-Sheet 2



VA
R. E. Wise

WITNESS



C. R. Young.

INVENTOR

BY *Victor J. Evans & Co.*

ATTORNEY

UNITED STATES PATENT OFFICE

2,053,172

ELECTRIC DOOR OPENER

Cecil R. Young, Aberdeen, S. Dak.

Application May 7, 1935, Serial No. 20,258

1 Claim. (Cl. 268—63)

This invention relates to door operating mechanism of the power operated type employed for opening and closing garage doors.

An object of the invention is to provide an improved construction of motion transmitting mechanism whereby one of the doors will close ahead of the other to prevent jamming of the doors.

A further object is to provide an improved construction of crank pivot for the door operating lever whereby the door may be manually operated should the power fail.

A further object is to provide an improved mounting for the threaded shaft whereby the shaft may move longitudinally against the pressure of a spring through the traveling nuts to permit the doors to open and close without jamming.

A further object is to provide an extremely simple and durable device of this character which will be formed of a few inexpensive parts that will not easily get out of order.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming part of this specification,

Figure 1 is a plan view of my improved door operating mechanism.

Figure 2 is a front elevation of the parts shown in Figure 1.

Figure 3 is a longitudinal sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a plan view showing the lag of one of the doors while closing.

Figure 5 is a longitudinal sectional view through the crank pivot.

Figure 6 is a diagrammatic view with parts in section showing the wiring diagram and switches controlled by the traveling nuts.

Figure 7 is a detail sectional view showing the spring pressed thrust bearing of the threaded shaft.

Referring now to the drawings in which like characters of reference designate similar parts in the various views, the doorway in which the door operates is defined by two vertical side jams 10 and a horizontal door head 11. The door structure comprises two swinging doors 12 and 13 which are hinged as shown at 14 to the sides of

the doorway and which are adapted to have their swinging edges come together at the center of the doorway.

The door operating mechanism is mounted on the door head 11 above the doors and comprises a frame 15 which is in the nature of a bar the central portion of which is offset to extend parallel with the door head and the ends of which are inclined toward the door head and securely attached thereto by screws 16 or other similar connectors. The frame is provided centrally with a U-shaped yoke 17 the bight of which is rigidly secured to the door head by a screw 18 or other connector. The yoke forms a housing for a sheave 19 carried upon the feed screw or threaded shaft 20.

The threaded shaft is journaled at opposite sides of the center in bearing boxes 21 which are bolted or otherwise secured to the frame 15 substantially flush with the sides of the yoke 17. The ends of the threaded shaft are journaled in bearing boxes 22 and 23 which are of novel construction. The bearing box 22 is provided with an extension 24 which houses a helical spring 25. A thrust ball 26 and a seat 27 therefore are urged by the spring against the end of the threaded shaft. The bearing box 23 journals the end of the threaded shaft and permits endwise movement of the shaft through the bearing.

The shaft is provided with feed threads 28 and 29 of opposite pitch or lead so that rotation of the shaft causes two traveling nuts 30 and 31 mounted thereon to move in opposite directions with respect to each other. The shaft is driven by an electric motor shown at 8 through a belt 9 passing over the sheave 19. The sheave is splined to the threaded shaft by means of suitable keys 32 which permit the threaded shaft to slide through the sheave endwise in either direction but anchors the sheave against rotation on the threaded shaft. The purpose of this endwise longitudinal movement is to permit one of the doors closing just prior to the mating door and prevent jamming as will later be fully explained.

Each door is provided on the inner face with a track or channeled guide 33 which is secured at any preferred manner to the door near the edge thereof and is spaced at the inner end a slight distance from the door. The guide curves gently throughout its length as shown and provides a sliding connection between the door operating lever 34 and the door. The door operating lever is provided at one end with a T shaped head 35 the lateral branch of which is split and provided on opposite sides of the split with perforated lugs

through which a set screw 37 is passed to secure the head to the lever. The outer end of the lever is bent abruptly laterally toward the door as shown at 36 and equipped with a roller 37 which fits in the guide 33.

The lever 34 swings around a vertical pivot pin 38 which is secured to the door head by spaced bearing boxes 39 between which the head 35 of the lever is received. The pivot pin extends above the upper bearing box and is provided with a tapered portion 40 and beyond the tapered portion with a screw threaded extremity 41.

A crank 42 is fixed to the upper end of the pivot pin. A link 43 is connected at one end to the crank and at the opposite end is connected to the corresponding traveling nut, said end of the link being preferably threaded into an opening in the nut and locked in place by means of a lock nut 44. The crank is provided with an eye 45 which is tapered to receive the tapered portion 40 of the pivot pin and a nut 46 is threaded on to the end of the pivot pin and binds the eye tightly to the pivot pin.

A pair of lugs 47 project downwardly from a shoulder formed on the pivot pin and seat in slots 48 formed in the upper edge of the bearing of the door operating lever 34. The pivot shaft may be raised vertically to disengage the lugs from the slots and permit manual operation of the doors should a fuse blow or the power fail. To disengage the pivot pin a lever 48 is provided. The lower bearing box 39 of the pivot pin is formed with a cylindrical extension 49 over which a cap 50 is threaded, the cap being provided with ears 51 between which the lever is pivoted as shown at 52. A chain or pull cord 53 is connected to the free end of the lever and may be pulled to cause the working end of the lever to lift the pivot pin bodily until the lugs 47 disengage from the slots 48 whereupon the door may be manually operated. A helical spring 54 surrounds the lower end of the pivot pin and is confined under tension between the inner wall of the extension 49 and a washer 50 carried in a slot formed circumferentially in the pivot pin. The spring exerts a downward pressure against the washer to urge the pivot pin downwardly and maintain the lugs 47 tightly seated in the slots 48.

The circuit breakers 55 and 56 are mounted adjacent to the threaded shaft and are disposed in the paths of travel of the nuts 30 and 31 as best shown in Figure 6. The two supply circuit wires are indicated at 57 and 58 one of these leading to a remote control switch of either the button or toggle type having a switch arm 59 adapted to be moved from one position to the other to place the wire 57 in circuit with either of the wires 60 or 61. In operation, assuming the doors are closed, the remote control switch 59 may be operated and the switch closes and starts the motor which in turn rotates the threaded shaft to feed the traveling nuts inwardly toward each other and through the linkage mechanism including the link 43 crank 42 and lever 34 the doors will be opened. The traveling nut 31 has in the meantime tripped the rod 56 to the switch and

opens the circuit breaker and reverses the switch so that the next time the remote button is pressed the circuit breaker is closed and the motor will run in the opposite direction thus returning the doors to closed position.

It is desirable that one door closes slightly ahead of the other as shown best in Figure 4. As clearly shown in this figure a set screw 62 is threaded through the bearing 23 and forms a stop to limit outward travel of the traveling nut 31 on the threaded shaft. A similar set screw 63 is secured by a bracket 64 to the frame 15 as shown in Figure 8 and provides a stop to limit inward travel of the nut 30 on the threaded shaft. In operation as the doors close the door 13 associated with the nut 31 will close slightly ahead of the other door and when the traveling nut is stopped by the set screw 62 the threaded shaft will be fed by the nut endwise to compress the spring 25 until the other traveling nut 30 has closed the door 12 and in turn opened the switch. In opening the door 12 will open until its associated traveling nut 30 is stopped by the set screw 63 and then the nut 30 will in turn feed the threaded shaft endwise in the bearing 23 and finish opening the door 13. It will now be clear that when one of the doors is thus enabled to lag slightly behind the other in closing any tendency of the doors to jam will be positively prevented.

It will be apparent that the mechanism above described may be employed for opening folding doors as well as swinging doors by merely adapting the lever arm to fit the folding doors as will be understood.

From the above description it is thought that the construction and operation of my invention will be fully understood without further explanation.

What is claimed is:

Mechanism for operating garage doors and the like comprising the combination with a doorway and a pair of doors mounted to swing into and out of the doorway, of an individual actuating lever for each door, a frame bar having a central offset portion extending parallel with the head of the doorway and having the ends inclined toward the head and terminally secured to the head of the doorway, a U-shaped yoke at the center of the frame bar having the bight rigidly secured to the head of the doorway, bearing boxes on the frame bar substantially flush with the sides of the yoke, bearing boxes near the ends of the frame bar, a threaded shaft in said boxes and being adapted to move endwise through the boxes, a driving pulley splined on the shaft within said yoke, an electric motor for driving said pulley, a spring in one of the bearing boxes resisting endwise movement of the shaft, crank pivots, the inner ends of said levers being connected to said crank pivots, traveling nuts on said shaft, links connected to said traveling nuts and to said crank pivots, and means for disconnecting one of the crank pivots from the associated operating lever whereby the doors may be manually operated should the power fail.

CECIL R. YOUNG.