April 15, 1952 H. H. HALL 2,592,891

ELECTRICALLY ACTUATED CLOSURE OPERATOR

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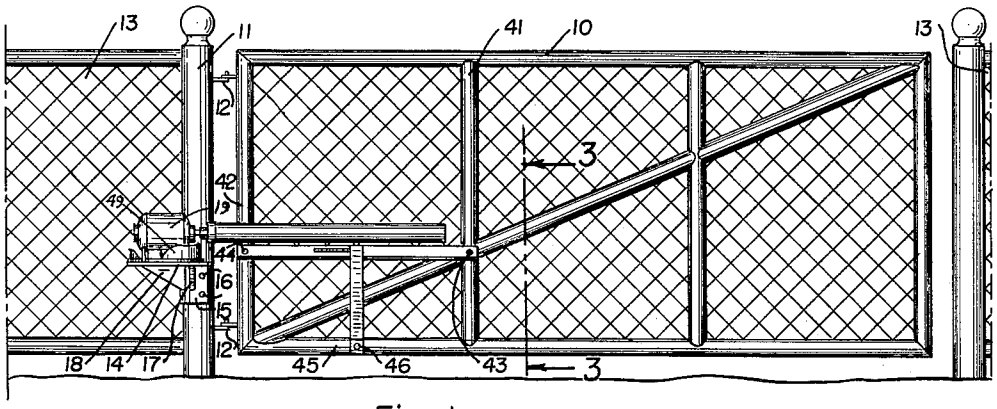

Fig. 1

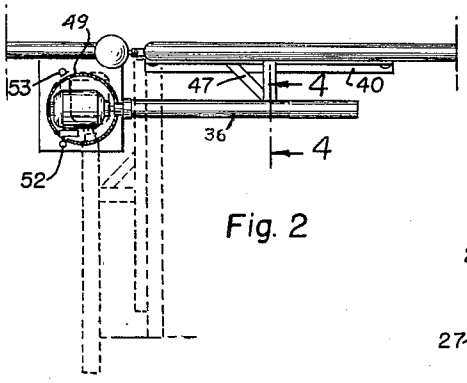

Fig. 2

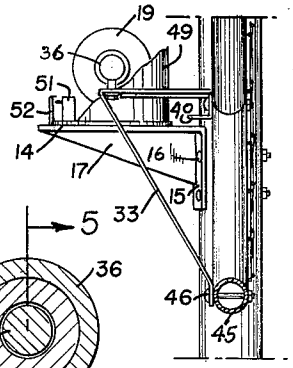

Fig. 3

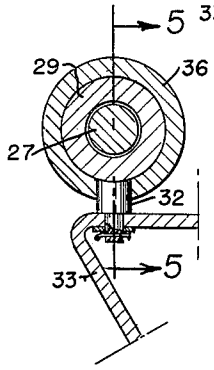

Fig. 4

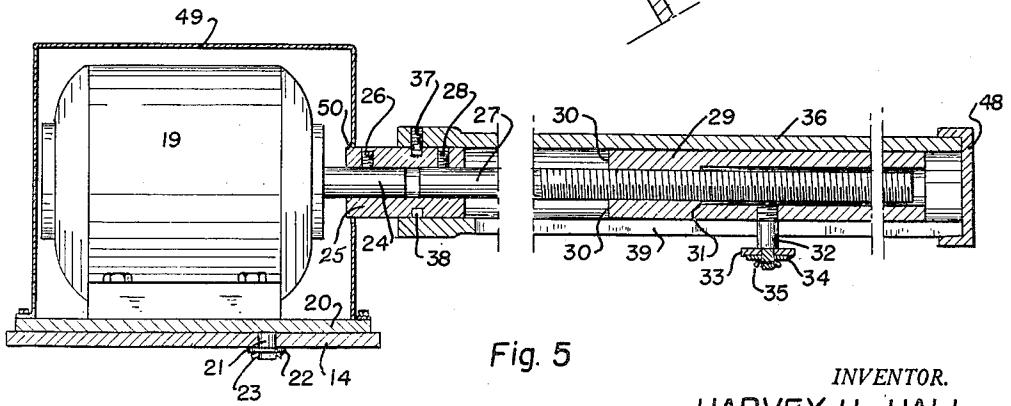

Fig. 5

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ELECTRICALLY ACTUATED CLOSURE OPERATOR

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7 Claims. (Cl. 268—65)

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This invention relates to improvements in power actuated closure operating devices.

While power actuators for closures such as gates, doors, and the like, have formerly been proposed, it is believed that their relatively restricted use has been largely due to the complicated nature thereof and the attendant high cost of manufacture.

One of the objects of this invention is to provide an electrically operated actuator for pivotally mounted closures, such as gates, which is extremely simple in construction and hence may be manufactured at low cost.

Another object is to provide an actuator which may be quickly attached to present closure constructions.

Another object is to provide an actuator which employs a pivotally mounted motor and a screw directly driven thereby, rotation of the latter operating a threaded member, pivotally connected to the closure.

A further object is to provide housing means for protecting the moving parts of the device.

Still further objects, advantages, and salient features will become more apparent from a consideration of the description to follow, the appended claims, and the accompanying drawing, in which:

Figure 1 is a side elevation showing the subject of the invention attached to a conventional gate, a portion of the motor housing being broken away;

Figure 2 is a top plan thereof;

Figure 3 is a section taken on line 3—3, Figure 1;

Figure 4 is an enlarged section taken on line 4—4, Figure 2; and

Figure 5 is a section taken on line 5—5, Figure 4.

Referring in detail to the drawing, Figure 1 illustrates a conventional closure, such as gate 10, which is swingably mounted on gate post 11 by suitable hinges 12, the gate being interposed in any opening, such as that illustrated in fence 13.

A support 14 having a semicircular flange 15 welded or otherwise secured thereto is fixedly mounted to gate post 11 by screws 16 which extend through the flange, preferably adjacent opposite vertical edges thereof, the support being braced by gusset plates 17, 18 welded at their vertical and horizontal edges to the flange and support, respectively.

A reversible electric motor 19 is secured to a base plate 20, this plate having a pivot pin 21 secured thereto and extending through support

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14 and retained thereon by a washer 22 and cotter key 23. As shown in Figure 5 the pivot pin is somewhat off center to the center of mass of the motor in a direction toward the operating mechanism to be subsequently described.

The motor 19 is provided with a conventional drive shaft 24 to which is secured a tubular coupling 25, by means of a set screw 26. A threaded shaft 27 has one end thereof secured to the coupling by set screw 28, this shaft threadedly engaging an internally threaded tube 29. The threads in the tube extend only part way of its length, as indicated between points 30, 31, the remainder of the tube being of a size to receive, in journaled relation, the periphery of the threads on the screw. This is illustrated somewhat exaggerated in Figure 5, the space between the screw and tube representing only the normal clearance required for the journal relation. This tube is provided with a pin 32, extending laterally thereof, which pivotally engages a bracket 33, a washer 34 and cotter key 35, effecting securement of the pin to the bracket.

A housing tube 36 surrounds the entire length of the screw and the movable tube engaging same, this housing tube having one end journaled on coupling 25 and prevented from axial movement on the coupling by a screw 37, which engages in a circular groove 38 in the coupling. An elongated slot 39 is provided in the wall of housing tube 36 at the bottom thereof, through which pin 32 projects and in which it slides rectilinearly when the screw rotates. A cap 48 closes the outer free end of housing tube 36.

Bracket 33 may be secured to the closure in any suitable manner so that it will be rigid therewith, and for purpose of illustration an angle iron 40 is secured at its ends to vertical members 41, 42 of the closure by means of screws 43, 44, respectively. The lower end of bracket 33 is secured to rail 45 of the closure by screw 46, and the upper end secured to the angle iron member in any suitable manner. A brace 47 extends between angle iron 40 and bracket 33 to preclude any relative movement between the bracket and closure.

A housing 49, shown in section in Figure 5, and broken away in Figure 1, covers the motor and protects it from the elements. As shown, this housing is secured to base plate 20, a circular aperture 50 being provided to receive coupling 25. If desired, housing 49 may be secured to support 14, in which case aperture 50 is slotted to permit coupling 25 to swing therein as the motor moves about pivot pin 21.

Any suitable limit switch may be provided to automatically stop rotation of the motor when the gate swings to either open position as shown by dotted lines in Figure 2, or to closed position as shown by full lines in Figures 1 to 3. For purpose of illustration a limit switch **51** is shown attached to the motor and swingable therewith which engages stop pins **52, 53** at the two limits of movement of the closure. Operation of the motor may be initiated by a switch disposed at any convenient point. After this switch is operated the motor will continue operation until the closure reaches one or the other of its limits of travel. Since switches of this type are well known in the art and constitute no part of the invention per se, details thereof have been omitted in the drawing to simplify the disclosure.

In operation, rotation of screw **27** moves tube **29** axially of the screw, thus varying the distance between pivot pins **21** and **22**, this change of length swinging the closure about its hinges **12**. During this operation the motor, its housing, and all of the actuators connected to the coupling swing as a unit about pivot pin **21**.

It will now be apparent that all of the operative parts are enclosed and protected from the weather. Due to the irreversibility of screw **27** and tube **29**, the closure will be locked at any position at which the motor stops. In event of power failure, cotter key **35** may be removed from pin **32**, the latter removed from bracket **33**, after which the closure may be manually operated. The device is of utility for gates, for fences of factories, private estates, etc. Due to the relatively small number of parts, and the simplicity thereof, the device may be economically manufactured and readily installed.

Having described the invention what I claim as new is:

1. In a gate of the type mounted to a gate post for swinging movement about a vertical axis adjacent an end of the gate, the combination therewith, of a support secured to and extending laterally of the gate post, a reversible motor disposed on top of said support and pivotally secured thereto for swinging movement about a vertical axis, a drive shaft for said motor rotatable about a horizontal axis, a screw directly connected axially to said drive shaft forming an extension thereof, a tube threadedly engaging said screw, a pivot pin secured to said tube extending radially thereof, a housing tube surrounding said screw and tube, means anchoring the housing tube to the motor to hold it from longitudinal movement when the screw is rotating and the tube is moving along the screw, the housing tube having a slot extending lengthwise thereof, the pivot pin passing through said slot; a bracket means fixedly secured to the gate extending laterally thereof, said bracket having a bearing near its outer end for receiving the pivot pin.

2. The combination defined by claim 1 wherein said drive shaft and screw are connected together with a tubular coupling, said one end of the housing tube being journaled on said coupling.

3. The combination defined by claim 2 including means for preventing relative axial movement between said coupling and housing tube.

4. The combination defined by claim 3 wherein the preventing means comprises an annular groove in the coupling, and abutment means carried by the housing tube having a portion thereof disposed within the groove.

5. The combination defined by claim 4 including closure means for the other end of the housing tube.

6. The combination defined by claim 5 including a limit switch for automatically disconnecting a source of electric current to the motor when the gate swings to one of its limits of movement.

7. The combination defined by claim 6 wherein said limit switch is actuated by swinging movement of said motor.

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