Dec. 8, 1942. O. E. ROSEN 2,304,477

ELECTRIC VALVE ACTUATOR

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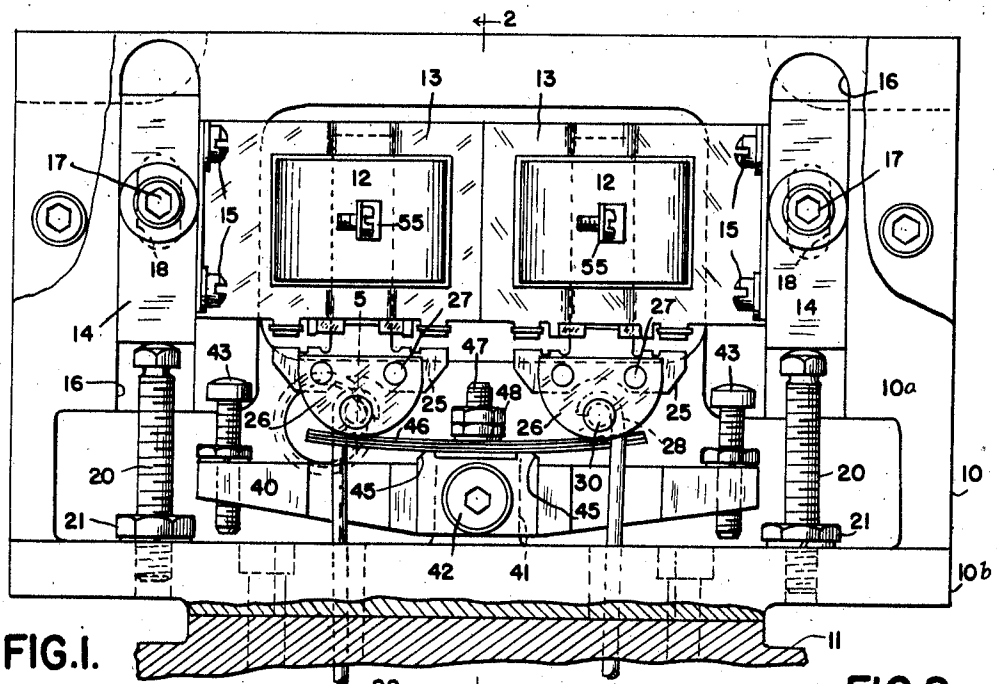


FIG.1.

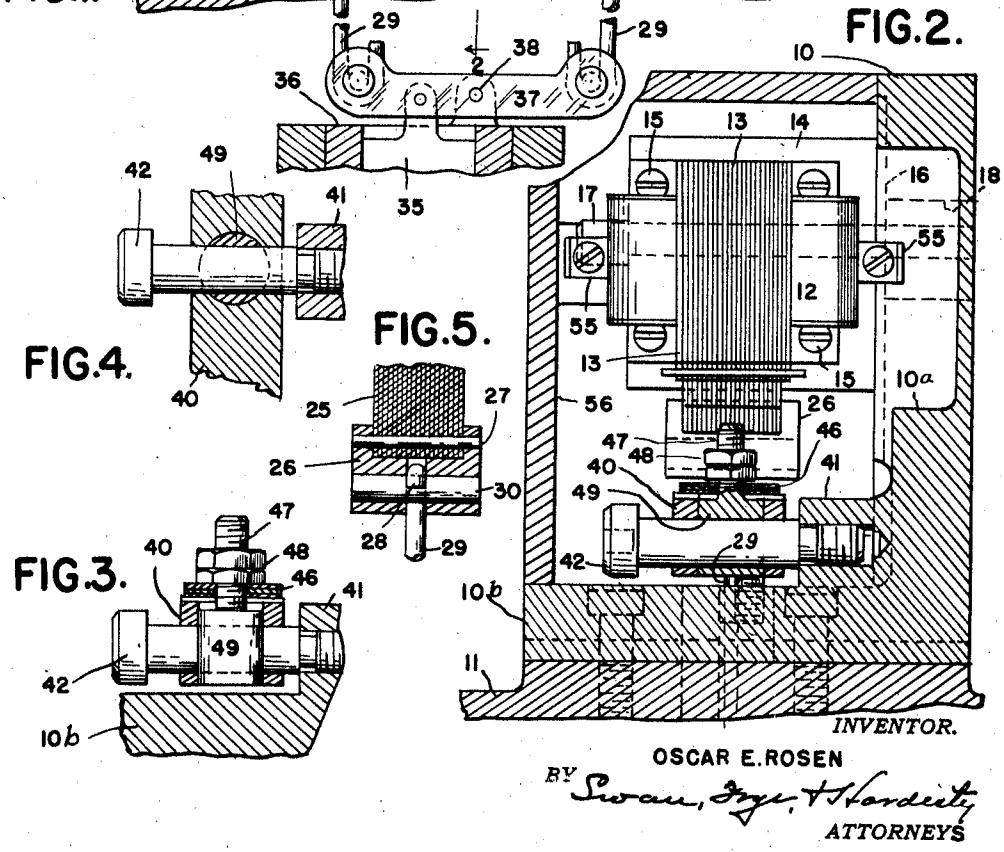


FIG.2.

FIG.4.

FIG.5.

FIG.3.

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ELECTRIC VALVE ACTUATOR

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6 Claims. (Cl. 175—337)

The present invention relates to electric means designed specifically for two-way valve actuation, though not limited to such use as it may be used for the actuation of any device required to be moved in either of two directions alternately or in any other order.

Among the objects of the invention is a device of the kind indicated which will be positively and instantaneously returned to neutral position upon cessation of the actuating impulse.

Another object is a device of the kind indicated in which the amount of movement of the moving parts may be accurately adjusted.

Still another object is a device of the kind indicated in which the return from actuated position to the neutral position is through the action of a leaf spring adjustably tensioned.

Other objects will readily occur to those skilled in the art upon reference to the following description and the accompanying drawing in which:

Figure 1 is a front elevation of the device.

Figure 2 is a central vertical sectional view as on line 2—2 of Figure 1.

Figures 3, 4 and 5 are sectional views of details of construction.

In the drawing an L-shaped frame member 10 is shown as mounted upon a suitable support 11 and fixed to its upright portion 10a are a pair of solenoids 12, these being mounted in suitable frames 13 fixed to square non-magnetic bases 14 as by screws 15. The bases are set in grooves 16 in the face of frame portion 10a and held in position by means of screws 17 passing through the slots 18. Accurate vertical adjustment of the solenoids may be accomplished by the screws 20 threaded into the base portion 10b, the heads of the screws acting against the bases 14 and being fixed in adjusted position by lock nuts 21.

As shown best in Figure 1, each solenoid is provided with a T-shaped core 25 and each core 25 carries at its lower end a non-magnetic block 26 fixed thereto as by pins 27, which block is slotted in its lower face to receive the hooked end 28 of a rod 29, this hook extending over a pin 30 passing through the slotted block 26.

The lower ends of the rods will be connected to the device to be actuated and in Figure 1 is shown a portion of a two-way valve 35 designed to be moved up or down from a neutral position in its casing 36. In order to accomplish such movement the lower ends of the rods 29 are hinged to the two ends of a lever 37 pivoted in its center, as at 38, while the valve is pivoted upon the lever at a point half way between the center 38 and the pivot point of one of the rods 29. This arrangement provides for equal movement in each direction but of course any other arrangement may be made if desired.

Control of the movements of the cores 25 and attached parts, particularly the provision for returning the parts to neutral position, is shown as consisting of a lever 40 pivotally mounted on a suitable lug 41 by means of a screw 42 passing through the lever into the lug, being shouldered to prevent binding of the lever. This lever 40 has at each end a screw 43 by means of which the movement of the lever may be accurately limited.

Also carried upon the lever 40 and resting upon spaced lugs 45 is a laminated spring 46, the ends of which extend to beneath the blocks 26 and are tensioned to exert strong spring pressure against the blocks tending to thrust them upwardly.

These springs 46 are held in place and their tension adjusted by means of the screw 47 and nuts 48, which screw is fixed to or forms a part of a cylindrical plug 49 fitted into a suitable opening in lever 40 at the center thereof and itself provided with a passage for the pivot screw 42.

The plug 49, therefore, serves as an anchor for the spring adjusting screw 47 and also as a brake upon the lever 40 in its oscillations.

Suitable electric connections may be made to the solenoids 12 through the binding posts 55 and a suitable cover 56 may be placed over the moving parts.

What I claim is:

1. A device of the character described consisting of a frame and a pair of spaced solenoids with their axes parallel, means for supplying electric current thereto, a support for each solenoid attached to the frame, a movable core member for each solenoid projecting beyond the said support, adjustable means for controlling the movements of said core members, said adjustable means consisting of an elongated centrally pivoted arm extending beneath said core members and in spaced relationship thereto, means for adjusting said arm about its pivot, a spring surmounting and attached intermediate its ends to the said pivoted arm with the ends of said spring free and respectively in engagement with the core members extending beyond the said supports, a lever to cause actuation of a two-way device, and parallel spaced rods each connected at one end to a core member and extending beyond the said spring and pivoted arm

and connected at their other ends to the ends of the said lever.

2. A device of the character described consisting of a frame and a pair of spaced solenoids with their axes parallel, means for supplying electric current thereto, an adjustable support for each solenoid attached to the frame, means for adjusting said supports, a movable core member for each solenoid projecting downwardly beyond the said support, adjustable means for controlling the movements of said core members, said adjustable means consisting of an elongated centrally pivoted arm extending beneath said core members and in spaced relationship thereto, means for adjusting said arm about its pivot, an elongated leaf spring surmounting and attached intermediate its ends to the said pivoted arm with the ends of said spring free and respectively in engagement with the core members extending beyond the said supports, a lever to cause actuation of a two-way device, and parallel spaced rods each connected at one end to a core member and extending beyond the said spring and pivoted arm and connected at their other ends to the ends of the said lever.

3. A device of the character described consisting of a frame and a pair of spaced solenoids with their axes parallel, means for supplying electric current thereto, a vertically adjustable support for each solenoid attached to the frame, spaced vertically adjustable screws mounted in said frame and in engagement with said supports to effect adjustment of the supports and solenoids when desired, a movable core member for each solenoid projecting downwardly beyond the said support, adjustable means for controlling the movements of said core members, said adjustable means consisting of an elongated centrally pivoted arm extending beneath said core members and in spaced relationship thereto, means for adjusting said arm about its pivot, a leaf spring surmounting and attached by suitable means intermediate its ends to the said pivoted arm with the ends of said spring free and respectively in engagement with the core members extending beyond the said supports, the said attaching means for said leaf spring also constituting means to variably adjust the tension of the said spring, a lever to cause actuation of a two-way device, and parallel spaced rods each connected at one end to a core member and extending beyond the said spring and pivoted arm and connected at their other ends to the ends of the said lever.

4. The device as claimed in claim 3, wherein the said arm is provided with spaced upstanding projections intermediate its ends, the said projections being on opposite sides of and adjacent the pivotal connection of the arm, and with the said spring supported on and engaging each of the projections.

5. A device of the character described consisting of a frame of substantially L-shape provided with side portions and a pair of spaced solenoids with their axes parallel, means for supplying electric current thereto, a vertically adjustable support for each of the solenoids respectively attached to opposite sides of the frame, vertically adjustable screw means mounted in the frame under and engaging each of the said supports, a movable core member for each solenoid projecting beyond the said support, adjustable means for controlling the movements of said core members, said adjustable means consisting of an elongated centrally pivoted arm extending beneath said core members and in spaced relationship thereto, means for adjusting said arm about its pivot, an elongated spring surmounting and attached by screw means intermediate its ends to the said pivoted arm with the ends of said spring free and respectively in engagement with the core members extending beyond the said supports, the said screw means also constituting means to variably adjust the tension of said spring, a lever to cause actuation of a two-way device, and parallel spaced rods each connected at one end to a core member and extending beyond the said spring and pivoted arm and connected at their other ends to the ends of the said lever.

6. The device as claimed in claim 5, wherein the said arm is provided with upstanding spaced projections intermediate its ends, the said projections being on opposite sides of and adjacent the screw means and pivotal connection of the arm, and with the said spring supported on and engaging each of the projections.

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