

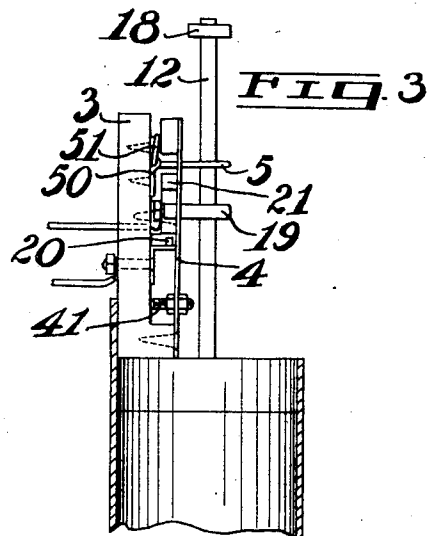
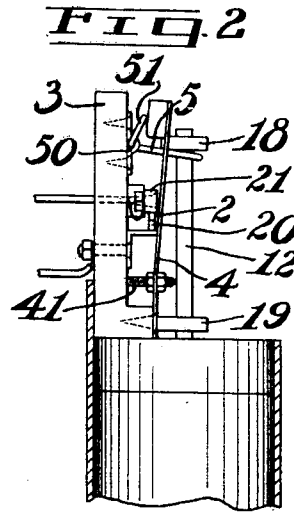
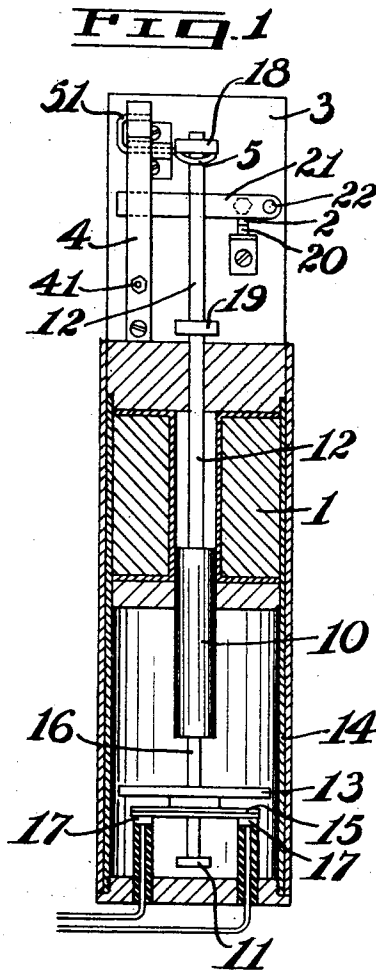
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E. W. WAY

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AUTOMATIC SOLENOID SWITCH

Filed March 14, 1921



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UNITED STATES PATENT OFFICE.

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AUTOMATIC SOLENOID SWITCH.

Application filed March 14, 1921. Serial No. 452,187.

To all whom it may concern:

Be it known that I, EUGENE W. WAY, a citizen of the United States of America, and resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Automatic Solenoid Switches, of which the following is a specification.

My invention relates to solenoids and to an automatic controlling switch for continuously reciprocating solenoids. In particular my invention relates to a solenoid which is continuously reciprocated to make-and-break a switch controlling the current to a sign flasher or the like.

The object of my invention is to provide a controlling switch for such a solenoid which will insure its positive action and which will insure the making and breaking of the control switch without inclination to hesitate or, as it is termed, to "stutter".

My invention comprises those novel parts and combinations thereof which are shown in the accompanying drawings, described in the specification, and particularly defined by the claims terminating the same.

In the accompanying drawings I have shown my invention in the form which is now preferred by me.

Figure 1 is a section through the solenoid complete, showing my control switch in front elevation.

Figure 2 is side elevation of the control switch showing the parts in switch-closed position.

Figure 3 is a side elevation of the control switch showing the parts in the switch-open position.

In solenoid flashers of the type shown in Figure 1 the core 10 of the solenoid is vertically movable through the center of the windings 1. At the lower end of a downward extension 16 is carried a stop collar 11. A stem 12 projects upward from the core and is movable therewith. A plunger 13 is movable with the extension 16 within an oil reservoir 14. These two elements constitute a dashpot arranged to retard the downward movement of the core under the influence of gravity, but not to retard its upward movement. A contact plate or bridge 15 is slidable upon the downward extension 16 of the core and is adapted to seat upon two separated contacts 17 to close the lighting circuit of the flasher. The contact plate 15 is seated during downward

movement of the core 10 and unseated by its upward movement due to the stop 11 engaging it.

In the device of the type described the switch which controls the reversal of the direction of movement of the core 10 is sometimes unreliable, and will not positively make-and-break, or remain in either position. The result is that the bridge 15 is not securely seated upon the points 17, and it tends alternately to be seated and to be unseated therefrom, causing a flickering or stuttering of the lights. It is to eliminate this that my invention is particularly intended.

Collars or stops of any description, as indicated at 18 and 19 are secured upon the stem 12 at separated points thereon. It is evident that the stem 12 might be made entirely separate from the core 10 and to be connected to move therewith or that the equivalents of collars 18 and 19 need not be secured directly upon the core, but arranged to be movable therewith. The form shown, however, is in common use upon such solenoids and is the form which I now prefer.

The control switch comprises complementary switch members 2 and 20, the latter being fixed upon an insulating baseboard 3. The switch member 2 is mounted upon a switch arm 21 which is pivoted by one end at 22 in the baseboard 3. Outward from its pivoted end the switch arm 21 is engageable by a latch 4 which is secured to the baseboard 3 and which is engageable with the switch arm 21 to hold it in switch-open position. The normal tendency of the switch arm 21, is, however, to move into switch-closed position due to the effect of gravity thereon. It is evident, of course, that a spring may be substituted for the action of gravity, the intention being that the switch arm 21 should normally tend to move into switch-closed position and that it be normally restrained from taking that position by the action of the latch 4.

I have shown the latch 4 as consisting of a plate of resilient metal secured by one end to the baseboard 3 and having its free end projecting upward beyond the end of the switch arm 21. An adjustable set screw 41 may be employed to adjust the tension of the spring plate 4 and thus its frictional holding effect against the switch arm 21. Upward movement of the stem 12 causes the

collar 19 to engage the switch arm 21 to move it into switch-open position where it is held by the frictional engagement of the latch 4, while reverse or downward movement of the stem 12 causes the release of the switch arm 21 and the consequent closing of the switch members 2 and 20, by the engagement of collar 18 with tripping means to be later described.

The tripping means which I have shown consist of a lever which is pivoted between its ends at 50 upon the baseboard 3. One arm 51 is bent upward to lie beneath the outer end of the latch 4. The other arm 5 of the lever is bent forward and positioned adjacent the stem 12 in the path of the collar 18. It is shown herein as curved about the stem 12. As the stem moves downward the trip arm 5 is moved downward by the collar 18 moving the arm 51 forward and projecting the latch 4 outward sufficiently to permit the switch arm 21 to fall into switch-closed position.

The device described operates positively to move the switch members 2 and 20 into open and closed positions alternately. There can be no stuttering due to imperfect making and breaking of these switch members, because the stem 12 moves upward with considerable force and momentum when the solenoid is energized and the switch arm 21 is thus thrown into switch-open position where it is positively held by the latch 4. As the stem 12 moves downward the latch 4 is moved outward so that the switch arm 21 may drop of its own weight, and this will always cause it to make a positive and sure contact, whereupon the latch 4 is again released to hold it in position. It has been demonstrated in actual use that this device will eliminate the stuttering or flickering caused by control switches which were not positively acting.

What I claim as my invention is:

1. In a switch, in combination with a solenoid and a stem movable with its core, a pair of complementary switch members, a switch arm carrying one of said switch members and normally tending to remain in

switch-closed position, a resilient spring latch frictionally engageable with said switch arm to retain the same in switch-open position, and means operable by movement of said stem for automatically disengaging said latch to permit closing of the switch.

2. In a switch, in combination with a solenoid and a stem movable with its core, a pair of complementary switch members, a switch arm carrying one of said switch members and normally tending to remain in switch-closed position, a latch engageable with said switch arm to retain the same in switch-open position, a pivoted trip lever engageable with said latch, and engageable by said stem to disengage said latch from the switch arm, whereby the latter may move to switch-closed position.

3. In a switch, in combination with a solenoid and a stem movable with its core, a pair of complementary switch members, a switch arm carrying one of said switch members and normally tending to remain in switch-closed position, a resilient spring latch frictionally engageable with said switch arm to retain the same in switch-open position, and means upon said stem for automatically disengaging said latch to permit closing of the switch, and means movable with said stem for reengaging said latch with the switch arm to open the switch.

4. In a switch, in combination with a solenoid and a stem movable with its core, a pair of complementary switch members, a switch arm carrying one of said switch members and normally tending to remain in switch-closed position, a latch engageable with said switch arm to retain the same in switch-open position, a trip lever pivoted between its ends, one arm thereof being engageable beneath the outer end of said latch, and the other arm thereof being positioned adjacent said stem, and means upon said stem for engaging the latter arm of the trip lever to disengage said latch from the switch arm, whereby the latter may move to switch-closed position.

Signed at Seattle, King County, Washington this 5th day of March, 1911.

EUGENE W. WAY.