

Nov. 15, 1949

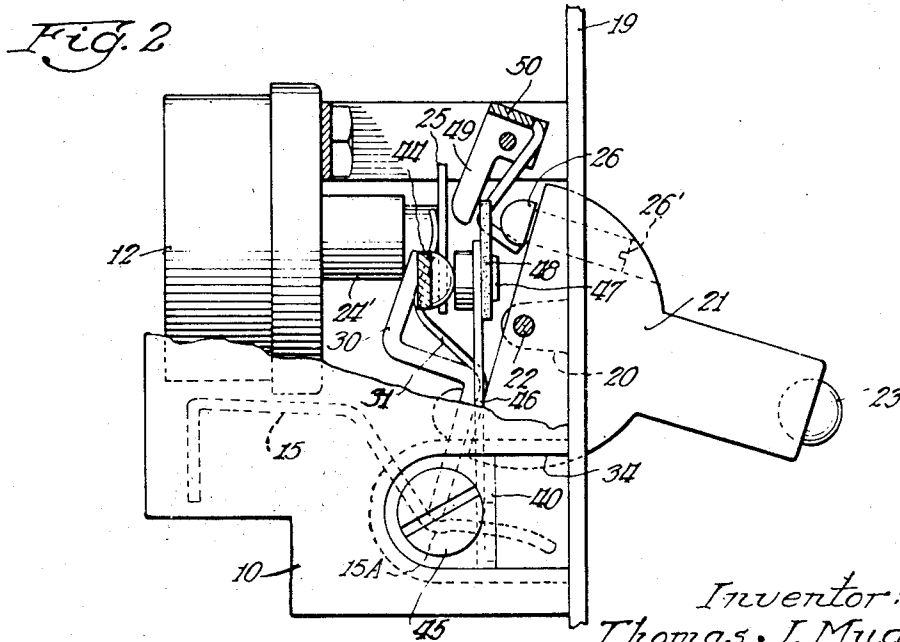
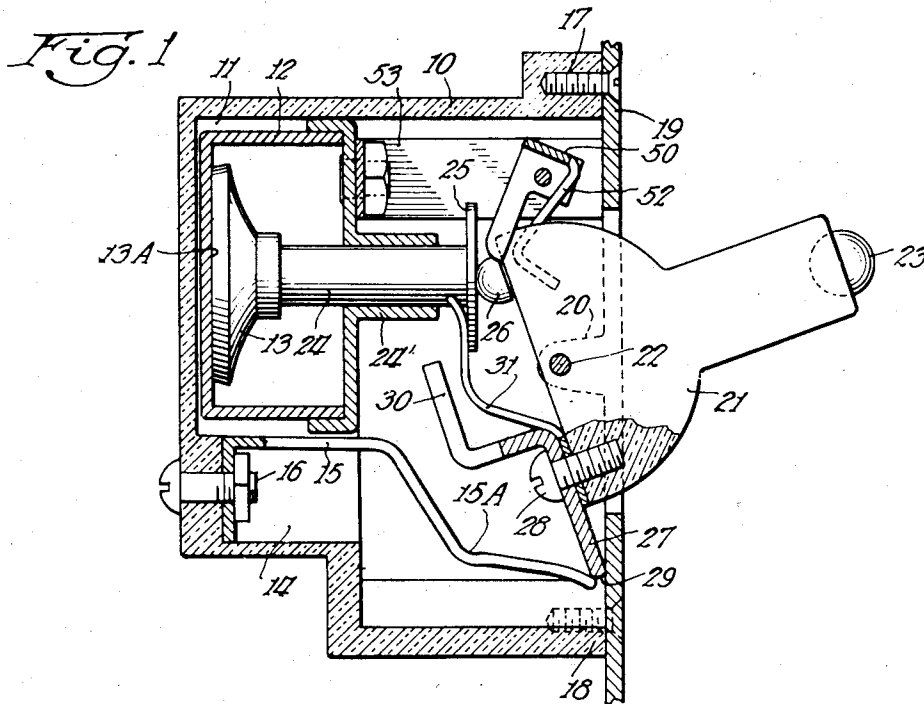
T. J. MUDON

2,488,024

DELAYED-ACTION SWITCH

Filed Dec. 26, 1945

2 Sheets-Sheet 1



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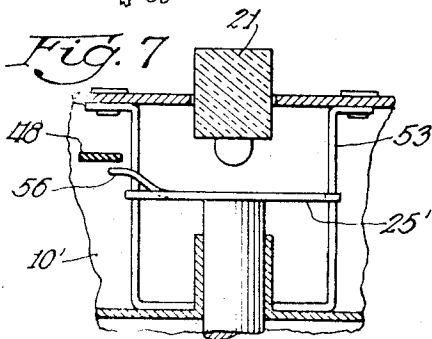
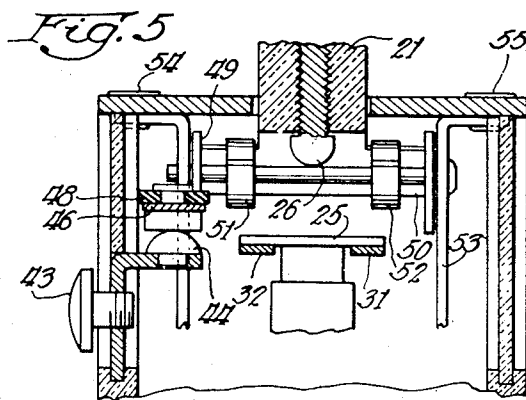
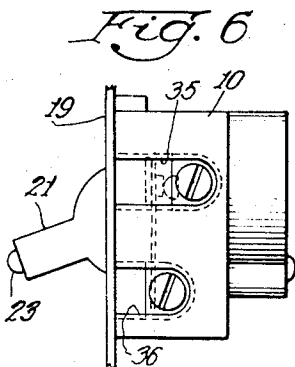
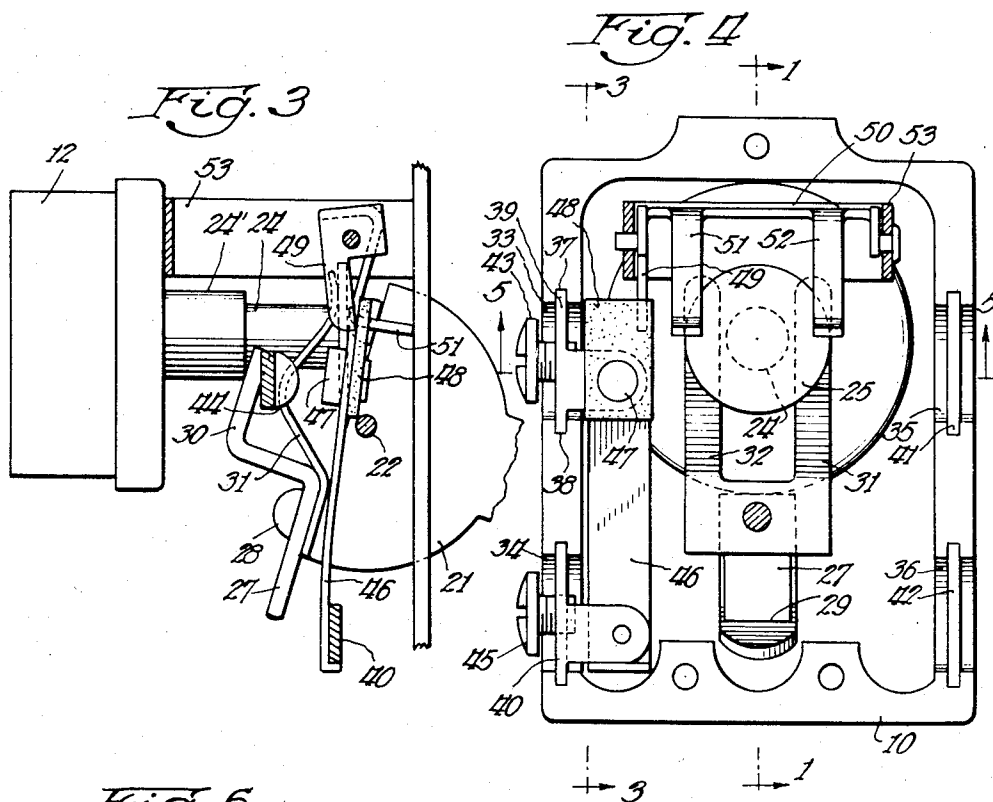
T. J. MUDON

2,488,024

DELAYED-ACTION SWITCH

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,488,024

DELAYED-ACTION SWITCH

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Application December 26, 1945, Serial No. 637,219

9 Claims. (Cl. 200—34)

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My invention relates to switches and is particularly directed toward a novel switch construction of the general type shown and claimed in my prior application, Serial No. 558,207, filed October 11, 1944. It is the principal purpose of my invention to provide a simplified switch construction of this character embodying a suction cup time delay mechanism which is enclosed for protection, wherein the switch handle itself carries means for engaging the stem of the time delay mechanism to cause both time delay action, and at the will of the operator, instantaneous operation of the switch.

It is a further purpose of my invention to provide in a switch of this character, a novel combination between the time delay apparatus and the contact making and breaking mechanism, whereby simple spring contact arms may be employed. A further purpose of my invention is to provide a switch mechanism embodying means for delaying the opening of the switch in combination with a casing having provision for right hand or left hand wiring, or both, and single pole or double pole contacts.

My invention is embodied in a device using a simple toggle switch handle wherein the switch handle in combination with a suction cup having a stem fixed thereto provides means for getting either instantaneous opening and closing of a circuit in response to movement of the handle, or instantaneous closing of the switch contacts with a delay in the opening of the switch contacts after the handle is moved to the open position for a preset time. The handle itself carries the means whereby the time delay may be regulated. In addition the stem of the suction cup delay device serves to operate the contacts in order to cause opening of the circuit. Thus the number of switch parts is reduced to a very few, and the switch may be made small in size with all of the advantages of a simple toggle switch plus the time delay features.

The nature and advantages of my invention will appear more fully as the description proceeds in connection with the accompanying drawings, wherein a preferred form of the invention is shown. It should be understood, however, that the drawings and description are illustrative only, and are not to be taken as limiting the invention except insofar as it is limited by the claims.

In the drawings:

Figure 1 is a longitudinal sectional view through a switch embodying my invention;

Figure 2 is a view partly in side elevation and partly in section, showing the switch handle

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moved to position to cause an opening of the contacts after the time delay;

Figure 3 is a fragmentary sectional view taken on the line 3—3 of Figure 4;

Figure 4 is a plan view with the handle removed of the switch mechanism;

Figure 5 is a sectional view taken on the line 5—5 of Figure 4;

Figure 6 is a side view of the switch taken from the opposite side to that of Figure 2 and showing wiring terminals as applied to both sides of the switch; and

Figure 7 is a fragmentary sectional view illustrating a modified form of the contact operating mechanism whereby the contact spring is directly actuated by the stem of the suction cup.

Referring now in detail to the drawings, my invention is shown as embodied in a casing 10 which may be made of any suitable material such as a molded synthetic resin. This casing has a well at 11, in which a container 12 houses a suction cup 13 of the type shown in my prior application, Serial Number 592,093. The well of the switch casing also has a slight extension 14 at one side of the circular portion 11 in which a spring bar 15 is secured by a screw bolt 16. The casing has screw threaded portions at 17 and 18 by which a mounting plate 19 can be attached thereto. The mounting plate is provided with ears 20 to secure a switch handle 21. The handle is pivoted on a pin 22 that extends through the ears 20. Preferably the handle is made of a solid body of insulating material, and has embedded in the end thereof, a luminous element 23. This element 23 is made visible in the darkness by the use of the so-called luminous paint which has the characteristic of giving off light after having been exposed to the light for a substantial length of time.

The suction cup device 13 has a stem 24 that projects through a sleeve 24' toward the switch handle 21. The stem 24 has a flat head 25 thereon, and the handle 21 carries an adjustable screw threaded pin 26 for engaging the head 25, and pushing the stem downward to set the suction cup. The pin 26 has a slot 26' in the outer end thereof, so that it can be turned by a set screw to vary the amount it extends below the handle and thus vary the degree to which the suction cup is pressed downward.

The switch handle has a forked bar 27 fixed thereon opposite the pin 26 by means of a screw 28. The forked bar 27 has an end portion 29 that is adapted to engage the mounting plate 19 to limit the movement of the handle 21 toward

contact closing position. There are two forks 30 offset downwardly from the main body portion of the bar 27, these two forks being positioned so that as the handle is swung from the position shown in Figure 1 to the position shown in Figure 2, these forks move under the head 25 so as to tend to lift it. In addition to the forks 30 the handle carries a pair of spring arms 31—32 directly engaging the head 25 in all positions of the switch. These spring arms are aligned with the forks 30 so that the forks 30 may pick up the spring arms and positively lift the head 25 at any time that is desired. The spring arms 31—32 are sufficiently light that when the suction cup 13 is forced down against a polished surface 13A, provided in the bottom of the container 12, they will merely furnish the necessary lift to gradually cause the suction cup 13 to creep and release itself from the surface 13A. Of course the forks 30, when they are moved into position, may exert enough force to lift the suction cup instantaneously.

The contacts and wiring terminals for the switch are mounted in slots 33, 34, 35 and 36 provided in opposite sides of the casing 10. The slots 33 and 35 are substantially deeper than the slots 34 and 36. Each slot has grooves 37 and 38 to receive wiring terminal plates 39 and 40, or insulating plates 41 and 42, which are used to fill the slots. As shown, the wiring terminal and contact carrying member 39 has a screw 43 for screwing a wire thereto, and in addition carries a contact point 44. The wiring terminal 40 has a screw 45 for screwing the lead thereto, and which serves as a mounting for a spring 46, the free end of which has a contact 47 thereon positioned to engage the contact 44. A block 48 of insulation is also mounted on the free end of the spring 46, and projects beyond the spring so as to engage an actuating finger 49. The actuating finger is mounted on a rocker bar 50 which has spaced arms 51 and 52 positioned to engage the head 25 as it is moved upward by the springs 31 and 32. The rocker bar 50 is pivoted in a yoke 53 which is mounted directly on the top of the container 12. The yoke 53 is also riveted by rivets 54 and 55 to the mounting plate 19 so as positively to position the container 12 and the handle 21 with respect to each other. Thus all of the parts of the switch are carried by the mounting plate 19 with the exception of the spring bar 15. The spring bar 15 is adapted to engage the rear end portion 29 of the bar 27 and form at the bend 15A thereof a stop which determines the position of the handle for time delay actuation of the switch. When immediate operation of the switch is desired the operator merely has to apply additional pressure to the switch handle in a downward direction when the handle is in the position shown in Figure 2 and this will operate to move the forks 30 toward the head 25 in position to back up the springs 31 and 32 so closely that the head will be forced against the power of the suction cup into position to open the contacts 44 and 47.

In the form of device shown in Figure 7 the rocker bar 50 is dispensed with and the head 25' is modified so as to provide a contact lifting finger 56 that will engage the bar 48 of insulation on the spring 46. The head is so shaped that the yoke 53 serves as a guide therefor, to prevent any rotation thereof that might otherwise get the actuating finger 56 out of position.

From the foregoing description it is believed

that the nature and advantages of my invention will be clear to those skilled in this art.

Having thus described my invention, I claim:

1. A time delay switch comprising a suction cup, a smooth plate positioned to be engaged thereby, a stem for pressing the cup and plate together, a head on the stem, a pair of contacts, a spring arm carrying one contact and normally holding it against the other contact in opposition to said head, a pivoted lever having a handle, means on said lever operable to engage said head and move the suction cup and plate together when the lever is rocked in one direction, spring means on said lever engaging the head and urging the suction cup and plate apart when the lever is rocked in the other direction to separate said contacts.

2. In a switch, a mounting plate, a handle pivoted thereon, a suction cup delay mechanism comprising a suction cup, a smooth plate positioned to be engaged thereby, and a stem for pressing the cup and plate together, a head on the stem, means on the handle adapted when the handle is rocked in one direction to engage one side of the head and press the cup and plate together, a spring arm on the handle engaging the other side of the head and tending to press the cup and plate apart with an increased tension when the handle is rocked in the other direction, and a circuit controlling element actuated by said head.

3. In a switch, a mounting plate, a handle pivoted thereon, a suction cup delay mechanism comprising a suction cup, a smooth plate positioned to be engaged thereby, and a stem for pressing the cup and plate together, a head on the stem, means on the handle adapted when the handle is rocked in one direction to engage one side of the head and press the cup and plate together, a spring arm on the handle engaging the other side of the head and tending to press the cup and plate apart with an increased tension when the handle is rocked in the other direction, a stationary contact, a spring arm, a movable contact thereon, and means actuated by said head for moving the movable contact against the force of the spring arm.

4. A time delay switch comprising a mounting plate, a handle pivoted thereon for rocking movement, a suction cup casing spaced from the plate, means securing the casing to the plate, a suction cup in the casing, a stem on the cup projecting toward the mounting plate and slidable through the casing whereby the suction cup may be pushed toward and away from the interior wall surface of the casing facing the mounting plate, an adjustable pin on the handle positioned to engage the stem and push it away from the plate when the handle is rocked in one direction, a spring yoke on the handle engaged with the stem to urge it toward the mounting plate when the handle is rocked in the other direction, and circuit control means actuated by said stem.

5. A time delay switch comprising a pair of contacts, means to move one of said contacts away from the other, a suction cup delay mechanism having a stem operatively connected to said means, a rocking switch handle having a spring means thereon yieldingly urging the stem in one direction against the delay of said suction cup when the handle is rocked in one direction, and means on the handle operable upon further movement of the handle in said direc-

tion for positively moving the stem to effect separation of said contacts.

6. A time delay switch comprising a pair of contacts, means to move one of said contacts away from the other, a suction cup delay mechanism having a stem operatively connected to said means, a rocking switch handle having a spring means thereon yieldingly urging the stem in one direction against the delay of said suction cup when the handle is rocked in one direction, means on the handle operable upon further movement of the handle in said direction for positively moving the stem to effect separation of said contacts, and means engaging the handle, yieldingly to oppose said further movement thereof.

7. In a switch of the character described, a pair of contacts and means to move one of said contacts away from the other comprising a rocking lever, a suction cup delay mechanism having a stem having a head positioned to be engaged and depressed by a portion of said lever, a spring on said lever extending on the opposite side of said head from said portion to yieldingly lift the stem, and a contact moving member positioned in the path of said head.

8. In a switch of the character described, a pair of contacts and means to move one of said contacts away from the other comprising a rocking lever, a suction cup delay mechanism having a stem having a head positioned to be en-

gaged and depressed by a portion of said lever, a spring on said lever extending on the opposite side of said head from said portion to yieldingly lift the stem, and a contact moving member positioned in the path of said head, said portion of the lever including a stem head engaging part adjustable in the lever to project more or less toward the stem to vary the depression thereof.

9. In a switch of the character described, a pair of contacts and means to move one of said contacts away from the other comprising a rocking lever, a suction cup delay mechanism having a stem having a head positioned to be engaged and depressed by a portion of said lever, a spring on said lever extending on the opposite side of said head from said portion to yieldingly lift the stem, a spring stop adjacent said lever offering increased resistance to movement of said lever when it reaches a position to cause said spring to yieldingly lift the stem.

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REFERENCES CITED

The following references are of record in the file of this patent:

FOREIGN PATENTS

Number	Country	Date
690,298	Germany	Apr. 22, 1940