

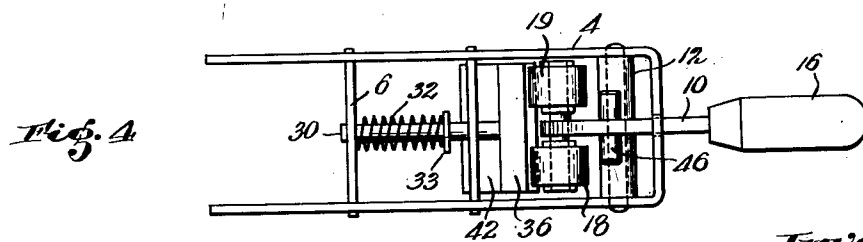
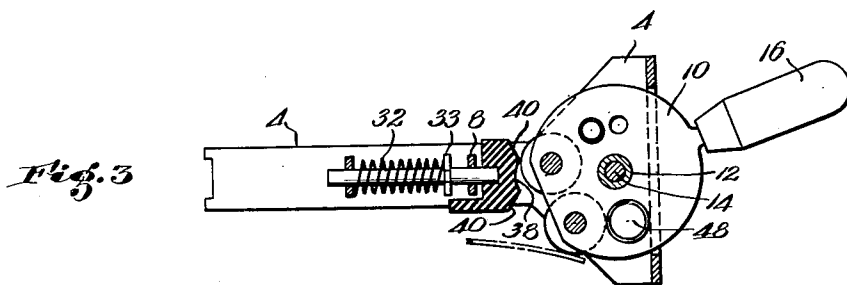
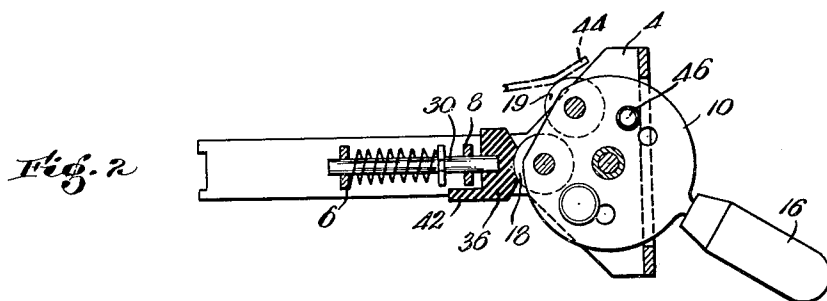
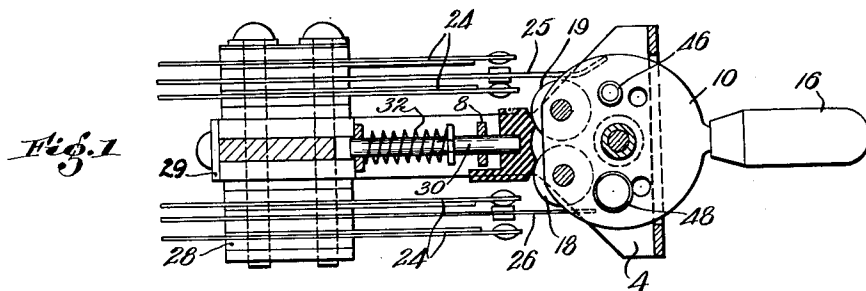
March 3, 1953

F. E. WELD

2,630,499

SWITCH

Filed Feb. 3, 1950



Inventor
Foster E. Weld

By Kenway, Jernsey, Witter
& Hildreth Atty's.

UNITED STATES PATENT OFFICE

2,630,499

SWITCH

Foster E. Weld, Newton, Mass., assignor to The Gamewell Company, Newton Upper Falls, Mass., a corporation of Massachusetts

Application February 3, 1950, Serial No. 142,273

1 Claim. (Cl. 200—1)

1

The present invention relates to switches and more particularly to cam or roller switches in which one or more movable contacts are operated by cam or roller. Switches of this character are exemplified by the patent to Little 2,184,780 dated December 26, 1939.

An object of the present invention is to provide improvements in the switch of the Little patent with a particular view to prevent an overrunning of the switch parts upon a restoring movement to normal position.

Another object is to provide a switch which may be manufactured at low cost and has an exceptionally long operating life.

With the above objects in view the present invention comprises the switch hereinafter described and particularly defined in the claim.

In the accompanying drawings illustrating what is now considered the preferred form of the invention, Fig. 1 is a sectional elevation of the switch; Figs. 2 and 3 are detail views illustrating the switch parts in different operating positions; and Fig. 4 is a plan view of the parts shown in Fig. 3.

The switch shown in the drawings comprises a U-shaped metal frame 4 similar to that of the Little patent. The side arms of the frame are maintained in spaced relation by spacers or struts indicated at 6 and 8. At the front end of the frame a plate 10 of generally circular form is pivoted. The plate is mounted on a hub 12 pressed on a shaft 14. The front of the plate 10 extends through a slot in the frame and carries a suitable handle 16. The plate carries cam rollers 18 and 19 of insulating material, the rollers being supported on shafts which are pressed in the plate. As shown in the drawings, there are four rollers arranged in two pairs, one pair being above and the other below the median line of the cam plate.

The switch is provided with four groups of switch contacts arranged as in the Little patent. Each group of contacts comprises two fixed contacts 24 between which operates a movable contact. One of the movable contacts is shown at 25 for the upper group of contacts in Fig. 1, and at 26 for the lower group. The contacts are suitably mounted in spacers 28 of insulating material and the contact assembly is supported between the strut 6 and an end strap 29.

The contacts may be of either the locking or non-locking type. As shown in the drawing, the upper groups are of the "locking" type whereby when the contact 25 is engaged with the outer contact 24 by turning the handle in a clockwise

2

direction (Fig. 2), this condition is maintained until the switch is manually restored to its position of Fig. 1. The lower groups of contacts as shown in the drawings are "non-locking," whereby when the switch is operated in respect to the lower groups by a counter-clockwise motion of the handle it is not locked but immediately returns to normal position upon release of the switch handle. The non-locking condition is shown in Fig. 3.

A plunger 30 is mounted to slide in openings of the struts 6 and 8. A compression spring 32 bearing between the strut 6 and a collar 33 on the plunger urges the plunger to the right as shown in Fig. 1. At its extreme end the plunger carries a detent block 36 of insulating material having a central concave detent surface 38 conforming approximately to the curvature of the rollers. At the sides the block is formed with inclined surfaces 40 which bear against the rollers when the handle is in neutral position, as shown in Fig. 1. The symmetrical engagement of the surfaces 40 against the rollers provides a centralizing force to hold the switch normally in neutral position. The block is provided with a depending skirt 42 which lies adjacent the strut 8 in order to keep the block in its proper position and prevent its turning on the plunger.

The movable contact springs 25 and 26 are sufficiently long to lie immediately adjacent the rollers. For the "locking" contact groups, the movable springs 25 are each provided outwardly with a bent portion 44 in the same manner as in the Little patent, whereby the spring applies no restoring force from the locking position (Fig. 2), whereas for the springs 26 of the "non-locking" groups, the end portions are straight to engage the rollers as in Fig. 3 and apply a restoring force.

The plate is provided with openings to receive pins for determining the extent of movement thereof and the pins are of different sizes depending on whether locking or non-locking operation is called for. This is as described in the Little patent and forms no part of the present invention. Two such pins are shown at 46 and 48, the former being of small diameter to permit considerable clockwise motion of the plate before the pin strikes the front wall of the frame. The pin 48 has an enlarged portion so that counter-clockwise movement of the plate is more limited.

When the handle is pressed downwardly to turn the plate clockwise, as shown in Fig. 2, the plate turns sufficiently to seat the lower rollers in

3

the concave recess 38 of the plunger. The other rollers are engaged by the portions 44 of the movable contacts whereby no substantial restoring force is applied by the springs. When flipping the handle toward its return position the plunger is depressed sufficiently to unseat the roller from the block and also to move the rollers off the bent part of the springs, whereby the contact springs 25 operate to restore the plate to its central position. Some restoring force is also exerted by the block 36 under the action of the spring 30 after the plate has been turned through a sufficient angle to unseat the rollers.

To operate the lower contact groups, the handle is moved counterclockwise. Owing to the limited movement of the plate, as shown in Fig. 3, the rollers are not moved far enough toward the center to become seated in the block. This is the non-locking condition. The restoring force of the springs 26 acting on the rollers restores the plate to its central position as soon as the handle is released.

The switch is particularly free from any tendency to overrun on a return movement, because of the centralizing tendency of the block 36 in engaging the rollers as shown in Fig. 1. Any slight overrun causes one set of rollers to compress the spring; the force then exerted on the rollers by the block immediately results in turning the plate into neutral position.

The switch is advantageous over that shown in the Little patent because the plate is not subjected to wear under the action of a central plunger. The principal wear occurs between the rollers and the faces 40 of the detent block, but since the engagement between these parts is a rolling contact, the wear is very slight, and a long operating life can be expected.

It will be understood that the invention is not limited to the precise construction herein illustrated and described. For example, while the

4

switch has been described as having four groups of contacts, two locking and two non-locking, it may be constructed for any number of groups on either side of the median line, and the groups may be all of the locking type or of the non-locking type, as required for the circuits in which the switch is to be used.

Having thus described the invention, I claim:

A switch comprising a frame, a plate pivotally mounted on said frame, a pair of rollers rotatably mounted on said plate and disposed symmetrically on opposite sides of a median line of said switch when said plate is in a neutral position, a detent block movable longitudinally along said median line, a spring member pressing said detent block toward said plate, the end of said detent block facing said plate having inclined surfaces symmetrically disposed on opposite sides of said median line and bearing against said rollers to provide a centralizing force for said plate when the plate is in said neutral position, said detent block having a concave surface between said inclined surfaces and facing said plate, said concave surface engaging one of said rollers upon pivotal movement of said plate to an actuating position to thereby retain said plate in such actuating position, and movable contacts engaged and moved by said rollers upon pivotal movement of said plate.

FOSTER E. WELD.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,845,033	Bausch	Feb. 16, 1932
2,184,780	Little	Dec. 26, 1939
2,366,474	Bentley	Jan. 2, 1945
2,497,414	Mossman	Feb. 14, 1950