

Jan. 14, 1964

E. F. DUNCAN
TREADLE SWITCH

3,118,031

Filed March 21, 1961

2 Sheets-Sheet 1

Fig. 1

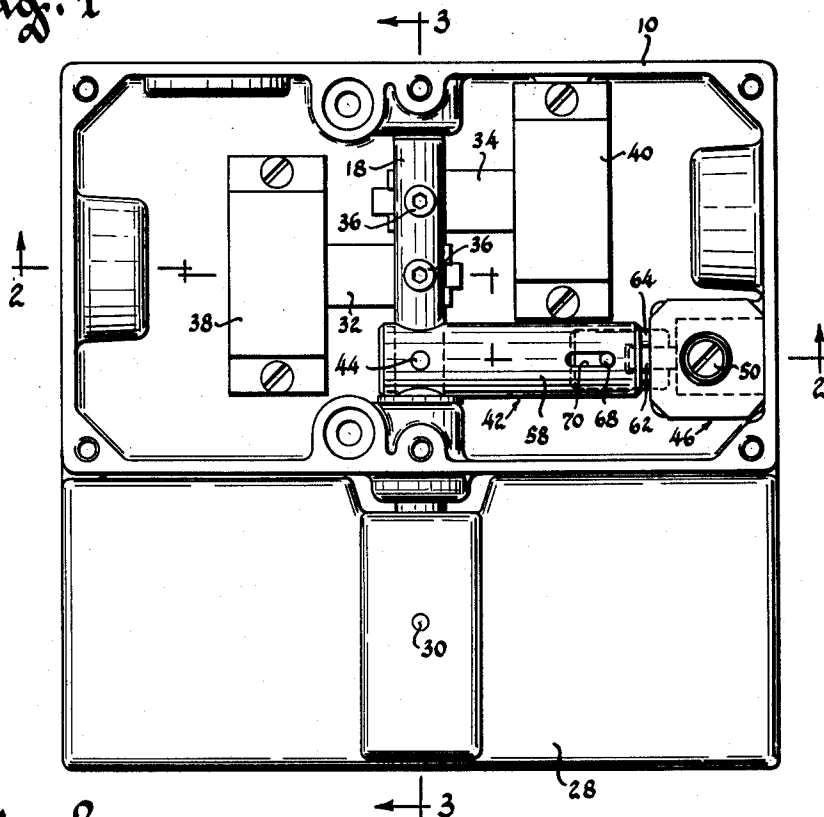
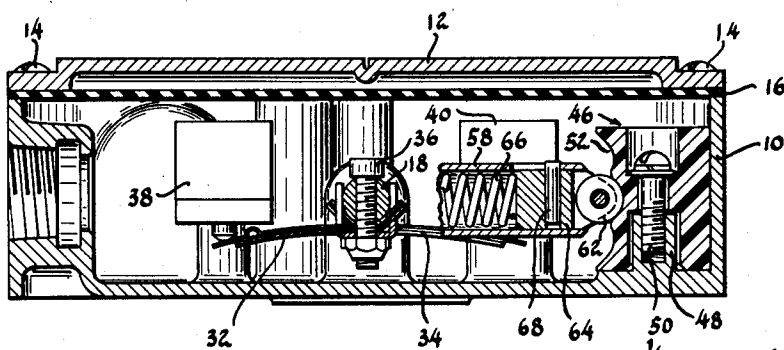


Fig. 2



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Fig. 3

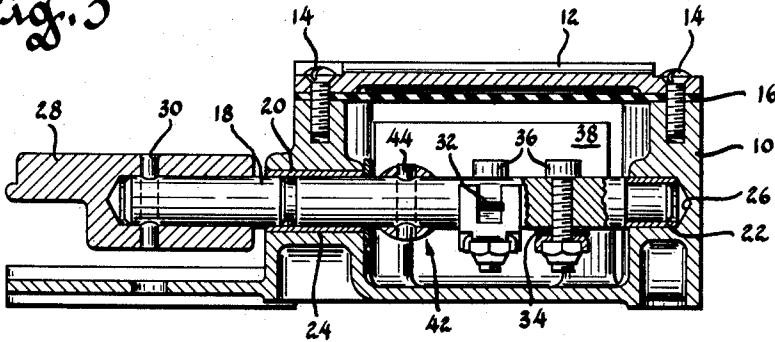


Fig. 4

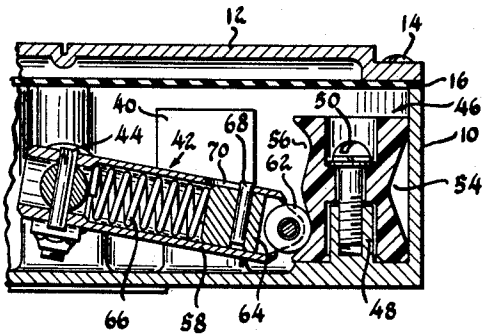


Fig. 5

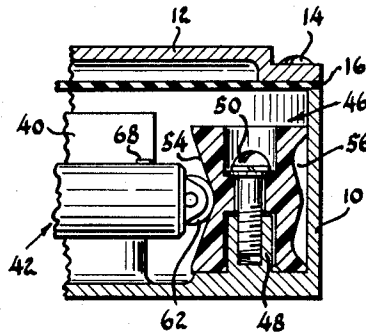
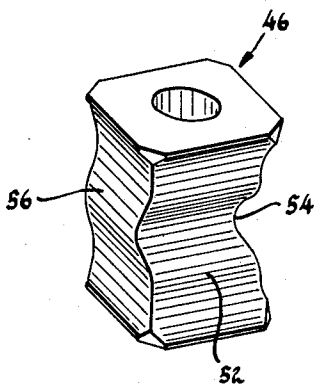


Fig. 6



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3,118,031

TREADLE SWITCH

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6 Claims. (Cl. 200-86.5)

This invention relates to an electrical control device and more particularly, to a cam arrangement for controlling the operation of a switch in which a simple adjustment quickly and without unduly stressing any part of the switch converts a given setting of the switch actuating lever from an indexed to a momentary setting, or vice versa.

The primary object of the present invention is to provide a switch with a variable detent means for selectively altering the mode of operation of the switch.

Another object of this invention is to provide a multiple number of contoured faces on a cam block which can be selectively altered to control the operation of a switch.

A further object is to provide a novel cam follower for a switch.

These objects are accomplished by controlling the position of a rotatable shaft on which a number of switch actuators are mounted. A radial arm is rigidly secured to the shaft and carries a cam follower that engages a cam block having a number of different cam surfaces. The mode of operation of the switch is then determined by the cam surface which is positioned to engage the cam follower.

Other objects and advantages will be pointed out in, or be apparent from the specification and claims, as will obvious modifications of the single embodiment shown in the drawings, in which;

FIGURE 1 is a top view of the switch with the cover removed;

FIG. 2 is a view of the cam block taken on line 2—2 of FIG. 1;

FIG. 3 is a view of the treadle shaft taken on line 3—3 of FIG. 1;

FIG. 4 is a view of the cam surface for end maintained positions;

FIG. 5 is a view of the spring return cam surface on the cam block; and

FIG. 6 is an isometric view of the cam block.

Referring to the drawings in detail, the heavy duty switch includes a casing 10 and a cover 12 secured to the casing by screws 14 and sealed by gasket 16. A shaft 18 is mounted to rotate in bushings 20 and 22 in holes 24 and 26 in the walls of the casing. One end of the shaft extends outward from the casing and supports a treadle 28 rigidly secured to the shaft by pin 30. Spring actuators 32 and 34 are secured to the shaft by screws 36 and engage limit switches 38 and 40 mounted within the casing.

The limit switches control the operating functions of a machine such as "forward" and "reverse" motion. Rotating the treadle will rotate the shaft to actuate one or the other of the limit switches. The angular position of the shaft will determine the operating function which will be performed by the machine after the treadle is released. A cam roller assembly 42 is secured to the shaft by a drive pin 44 and engages one of the faces of a cam block 46 secured to post 48 by screw 50. The cam block can be turned on the peg by removing screw 50 and a different cam surface turned to engage the cam follower. The surfaces of the cam block are designed to provide a three position maintained contact surface 52, a two position spring return surfaces 54 and a two position maintained contact surface 56. With the limit

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switches connected to control forward and reverse motion of the machine, the three position surface will provide forward, reverse and neutral operation. The two position surface will provide forward and reverse and the spring return will always return to neutral.

The cam follower assembly includes a guide cylinder 58 secured to the shaft by pin 44 and a cam roller 62 mounted to rotate in a yoke 64 inserted into the guide cylinder against the bias of spring 66. A pin 68 projects from the yoke into a slot 70 in the side of the guide cylinder to limit the motion of the yoke in the cylinder. The bias of the spring in the guide cylinder will force the cam roller to move on the cam surface until the roller is seated in the selected cam position, thus determining the final angular position of the shaft.

In operation with the three position maintained cam surface positioned to engage the cam roller, the treadle is rotated appropriately to rotate the shaft clockwise (FIGS. 1 and 2) for actuating switch 38. The cam roller will move downward on the cam surface and the yoke will be forced into the guide cylinder against the bias of spring 66 until the treadle is released allowing the roller to drop into the lower groove of the cam surface. The shaft will remain in this position until the treadle is rotated in the opposite direction. When the shaft is rotated in the counterclockwise direction, the cam roller will be moved upward on the cam surface through the neutral groove and into the upper groove actuating the other limit switch.

When the cam block is rotated to the two positioned maintained position, the operation is similar to above except that there is no neutral position for the cam follower, so that one or the other of the limit switches will always be actuated. The third cam surface has only a single groove to cause the cam roller to return the shaft to a neutral position with respect to the limit switches when the treadle is released.

The above arrangement thus provides a variety of switch operations for a treadle type switch that can be quickly and easily changed by a simple adjustment of the cam block.

Although but a single embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. A switch mechanism comprising, a housing, a shaft rotatably positioned within said housing and having an actuator mounted thereon, a switch secured to said housing in operative engagement with said actuator, means for rotating said shaft to one of several positions to actuate said switch, a radially extending arm secured to said shaft, a cam follower supported by said arm, and a selectively positionable cam block in said housing having a plurality of different cam surfaces which are alinable with said cam follower in accordance with the positioning of said block, each cam surface controlling in accordance with its contour the final angular position of the cam follower after the rotating means is released.

2. A switch mechanism according to claim 1, wherein one of said cam surfaces is contoured to provide return of said cam follower to a neutral position when said means for rotating said shaft is released.

3. A switch mechanism according to claim 2, wherein another of said cam surfaces is contoured to hold said cam follower in position said means for rotating said shaft is released.

4. A switch mechanism according to claim 1, wherein said cam follower comprises a roller biased into engagement with the selected cam surface.

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5. A switch mechanism in accordance with claim 1 wherein said cam block is removably fastened to said housing and is formed to abut against a wall of said housing in any of its selected positions to aline the cam surfaces with said cam follower.

6. A switch mechanism comprising, a housing, a shaft rotatably positioned within said housing and having a number of actuators secured thereto, a number of switches corresponding to the actuators secured to the housing in operative engagement with said actuators, treadle means for imparting a rotary motion to said shaft to actuate said switches a radially extending arm secured at one end to said shaft, a spring biased roller cam

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follower mounted on the opposite end of said arm, and a selectively positionable cam block having a plurality of different cam surfaces which are alinable with said cam follower in accordance with the positioning of said block, each cam surface in cooperation with said cam follower providing a different mode of operation for the switches when the treadle means is released.

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