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SWITCH DETENT ARRANGEMENT

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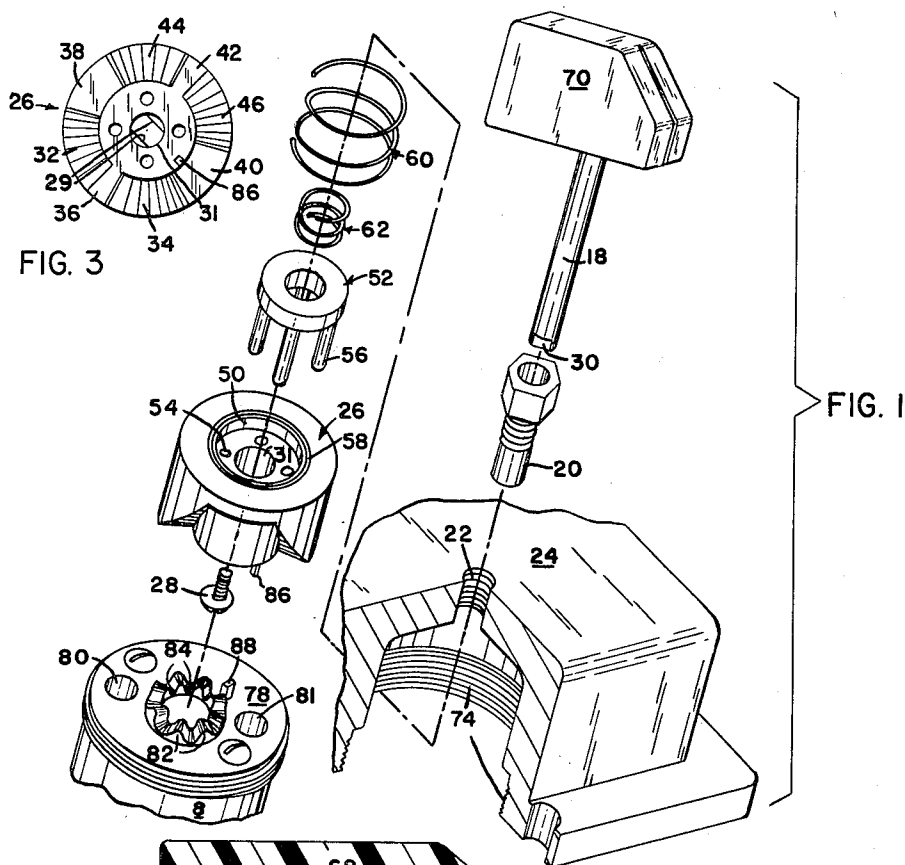


FIG. 1

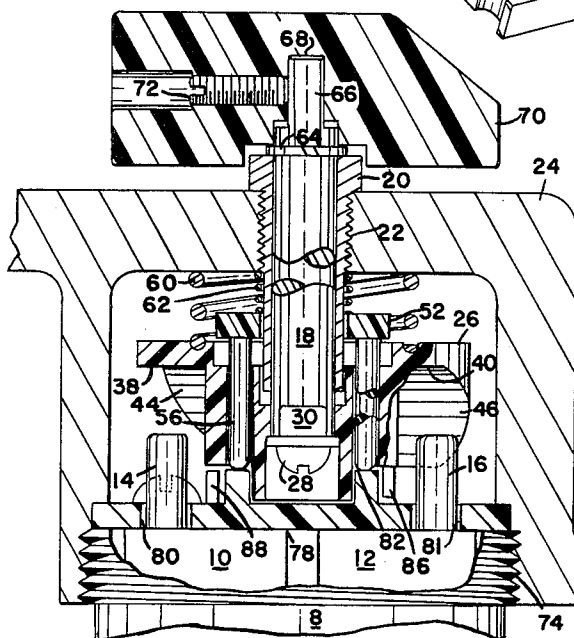


FIG. 2

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## SWITCH DETENT ARRANGEMENT

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2 Claims. (Cl. 200-166)

This invention relates to and has as an object a new and improved switch detent arrangement for releasably locking an operative shaft of a switch unit in selected positions of rotation.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

In the drawings—

FIGURE 1 is an exploded view of the elements comprising the preferred embodiment of the invention.

FIG. 2 is a fragmentary cross-sectional view of the elements of FIGURE 1 shown in an assembled condition and a portion of the switch housing and switch.

FIGURE 3 is a plan view of the switch actuating member.

The preferred embodiment of the invention as shown in the drawings, may be used in conjunction with a switch unit 8 comprising a pair of switches 10 and 12 of the push button type, each of the switches having a reciprocating button or plunger 14 or 16. It is desirable to provide an arrangement for actuating or reciprocating the plungers 14 or 16 from the exterior of the housing in which the switches 10 and 12 are mounted, and to maintain each of the plungers in a depressed position so as to maintain the respective switches 10 and 12 and their associated circuits in an opened or closed condition, as the case may be. To accomplish this, it is necessary to hold the operative shaft 18 which is journaled in a bearing sleeve 20 received in a threaded aperture 22 in the housing 24 in one or more selected positions of rotation in which the plungers 14 or 16 are depressed.

The mechanism for accomplishing this comprises a switch actuating member 26 affixed to the inner end of the shaft 18 by a threaded fastener or the like 28. The member 26 is affixed to the shaft 18 so as to rotate therewith by any convenient means and in the embodiment shown, this comprises the formation of a pair of flats 30 on the inner end of the shaft 18 which are received in an aperture formed in the member 26, this aperture being designated by the number 31, and the aperture is formed at its inner end with a complementally spaced pair of flats 29 not shown.

Referring to FIGURE 3, the member 26 is formed on its undersurface with a pair of sloping cam surfaces 32 and 34 on each side of a top flat portion 36. The surfaces 32 and 34 terminate in a pair of bottom flat portions 38 and 40 which are, in turn, joined to another top flat portion 42 by the sloping cam surfaces 44 and 46. As will be explained hereinafter, the cam surfaces 32, 34, 44 and 46 serve to reciprocate the plungers 14 and 16 of the switches 10 and 12 upon oscillation of the shaft 18.

The upper or top surface of the member 26 is counterbored as at 50 to receive a detent guide member 52, best seen in FIGURES 1 and 2. The bottom surface of the counterbore 50 is formed with a plurality (four in the embodiment shown) of through apertures 54. The detent guide member 52 which is in the form of a ring is provided on the underside thereof with four axially extending pins 56 which are received in the apertures 54 while the upper ringlike portion of the member 52 seats in the

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counterbore 50. A concentric groove 58 is formed in the upper surface of the member 26 a spaced radial distance outwardly from the counterbore 50 to receive the bottom turn of a compression spring 60 which surrounds sleeve 20. A second compression spring 62 of smaller diameter is received within the spring 60 and also surrounds the sleeve 20 on the underside of the housing 24 to urge the member 52 axially inwardly while the spring 60 urges the member 26 and, in turn, the shaft 18 axially inwardly in the sleeve 20.

The shaft 18 is provided at its outer end with a snap ring 64 to hold the shaft 18 captive within the sleeve 20. The outer end of the shaft 18 is provided with a flat portion 66 received within a complementally formed aperture 68 provided in an operating handle 70 which is affixed to the flat portion 66 by means of a set screw or the like 72.

If the switches 10 and 12 are to be encased in housing 24 in an explosion proof manner, it will be noted that the threaded joint between the aperture 22 and the sleeve 20 provides a flame quenching path and the joint between the shaft 18 and the sleeve aperture through which the shaft passes may be of sufficient length and closeness of tolerance to also be flame quenching, thus rendering the entire arrangement explosion proof.

The switch unit 8 is threadably mounted in the housing as at 74 and is formed with an integral detent plate 78 which is provided with a pair of spaced apertures 80 and 81 through which the switch plungers 14 and 16 extend. As will be seen from FIGURE 2, the plungers 14 or 16 and apertures 80 and 81 are positioned a spaced distance apart equal to the radial distance between the bottom flat portions 38 and 40 formed on the underside of the actuating or cam member 26. The detent plate 78 is formed with an annular detent surface made up of a plurality of alternate ridges 82 and grooves 84. The circumference of the detent surface is equal to that of the circle on which the pins 56 carried by the member 52 are located, whereby the pins 56 engage the detent surface and ride over the ridges 82 and grooves 84. The spring 62 serves to urge the member 52 and in turn the pins 56 axially inward to yieldably urge and releasably lock the pins 56 into the grooves 84, thus holding the shaft 18 with which the pins 56 rotate in selected positions of rotation in one of which positions the plungers 14 and 16 are fully depressed and held in a depressed position by means of the cam surfaces 32, 34, 44 and 46.

As best seen in FIGURE 2, for example, the member 26 and cam surface 46 has served to partially depress the plunger 16 of the switch 12 while at the same time, the cam surface 32 (not seen) has partially depressed plunger 14 of switch 10. At this point the opposite pair of pins 56 are riding over the top of a pair of diametrically oppositely located ridges 82 so that upon further rotation of the shaft 18, the member 52 and pins 56 will move axially downwardly, as viewed in FIGURE 2, to the position where the pins 56 are received in the grooves 84, in which position the plungers 14 and 16 will be fully depressed. At this point, the shaft 18 and member 26 is held against return rotation or oscillation under the influence of the spring return pressure exerted by the plungers 14 or 16 by virtue of the pins 56 being held in the grooves 84 through the action of the compression spring 62.

The underside of the member 26 may be provided with a depending stop member 86 which is positioned outside the circumference of the detent surface and a correspondingly positioned upstanding stop member 88 may be formed on the plate 78 to limit the extent of rotational movement of the member 26 and shaft 18.

As will be obvious, the spring 60 will permit axial movement of the detent arrangement to compensate for varia-

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tions in location of the respective parts and independent control of the detent arrangement is achieved by the detent spring 62. Finally, while the arrangement has been shown in conjunction with switches of the push button type, it will be understood that the arrangement may be utilized also in conjunction with toggle switches and the like, and the action of the switches may be varied by the formation of the cam surfaces on the underside of member 26 so that the switches may be actuated simultaneously, alternately, singly or in any manner desired.

What I claim is:

1. A detent arrangement comprising a shaft journaled for rotation in a body member, an actuating member fixed to said shaft for rotation therewith, detent means for releasably holding said shaft and actuating member in selected positions of rotation comprising, a plurality of axially extending pins carried by said actuating member, a detent member having an irregular surface positioned in close proximity to said actuating member, said irregular surface including ridges and grooves over which said pins ride on rotation of said actuating member and yieldable means providing limited axial relative movement

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between said pins and irregular surface to urge said pins into said grooves of said irregular surface.

2. A switch detent comprising a housing, a switch actuating shaft journaled in said housing, a switch actuating member fixed to the inner end of said shaft in the interior of said housing, a switch having an actuator positioned in proximity to said switch actuating member, means formed on said member to operate said switch actuator upon oscillation of said member, a plurality of detent pins carried by said member, a detent plate positioned in axial alignment with said member and pins, said plate being provided with means interfering with said pins upon oscillation of said member, yieldable means providing limited axial movement between said pins and interfering means to releasably urge said pins into engagement with interfering means to hold said shaft in selected positions of rotation with respect to said switch actuator.

No references cited.

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