A rotary switch has a shaft that can be manually rotated and reciprocated. A detent structure normally holds the shaft in a selected axial position. The detent mechanism includes a retaining clip having lugs that can be manually bent to lock components in assembled relation, and a resilient clip ensuring continuous electrical continuity between the control shaft and the mounting means whereby the control shaft is grounded.
ROTARY SWITCH WITH RETAINING CLIP FOR GROUNDING SHAFT TO CHASSIS TERMINAL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to rotary switches such as timers utilized in home appliances, and more specifically to a switch having a novel detent mechanism by which the control shaft of the timer is grounded and by which the same can be manually assembled and maintained in assembled relation.

2. Prior Art

Heretofore it has been commonplace to manufacture switches in timers with an insulative housing, a control shaft extending therefrom for manual manipulation, the shaft not being connected to any switch element electrically. Thus such prior control shaft does not need to be insulated or grounded.

SUMMARY OF THE INVENTION

According to this invention, means are provided by which such a timer or switch shaft is grounded through the mounting means so that in the event that there is an internal failure by which a potential is applied to the control shaft, then if a service man comes in contact with such shaft, as could be the case after a control knob has been removed, he could not become injured because of the ground connection. Either the fault would burn itself out or the line fuse would blow.

Accordingly, it is an object of the present invention to provide a rotary switch, such as of the timer type, wherein the control shaft is grounded.

A further object of the present invention is to provide a structure for a detent mechanism by which the control shaft of a rotary switch is grounded.

Another object of the present invention is to provide a detent mechanism in a timer or similar rotary switch whereby the same can be assembled or disassembled manually.

A further object of the present invention is to provide a rotary switch having a detent mechanism which is so constructed that as a consequence of mounting the timer, the detent mechanism cannot become disassembled.

Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description of the accompanying drawing in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

ON THE DRAWING

FIG. 1 is a fragmentary plan elevational view of a rotary switch, such as a timer having a detent mechanism by which the control shaft of the timer is grounded, provided in accordance with the principles of the present invention;

FIG. 2 is a fragmentary side elevational view of the mounting and detent portion of the timer shown in FIG. 1, in association with a mounting panel;

FIG. 3 is a slightly enlarged cross-sectional view taken along line III—III of FIG. 2; and

FIG. 4 is a side elevational view of the retaining clip shown in FIG. 2 prior to its assembly.

AS SHOWN ON THE DRAWING

The principles of the present invention are particularly useful when embodied in a rotary switch or timer such as shown in FIG. 1 generally indicated by the numeral 10. The switch 10 includes a housing 11 of insulative material which is provided with a pair of mounting posts 12,13, each of which is threaded from the end for receiving a mounting screw 14 for mounting on a panel 15. If the panel 15 is not grounded, a grounding lead 16 may be secured by screw 17 to the panel 15 and the switch 10.

The rotary switch 10 contains conventional switch elements and terminals, and as all of these are known, there is no necessity for further illustrating or describing them. For the purpose of the present invention, it is sufficient to understand that the switch 10 includes a control shaft 18 which is rotatably mounted in a shaft aperture 19 in the housing 11, the same being also reciprocable therein. Rotation of the shaft as well as reciprocation of the shaft 18 effect appropriate selective operation or control of the various switch elements contained in the rotary switch 10.

The mounting posts 12,13 are disposed at opposite sides of the shaft aperture 19. The housing further has a shoulder 20 facing away from the axis of the shaft aperture 19, the shoulder 20 occupying a space between the mounting posts 12,13. The mounting posts 12,13 are provided with a pair of spaced slots 21,22 which open toward the axis of the shaft aperture 19. A pocket 23 is provided in the housing that opens into at least one of the slots 22.

The selector shaft 18 normally has a knob secured to the outer end thereof for use in effecting reciprocation and rotation thereof. The selector shaft 18 includes a pair of circumferential grooves or recesses 24,25 which form part of or cooperate with a detent mechanism, generally indicated at 26. The detent mechanism 26 includes a generally U-shaped spring 27, having at least one finger 28 that is received in one recess and a further finger 29 received in the same recess. The end of the spring 27 by which the fingers 28,29 are joined together is bent into an L-shape as shown in FIG. 2, so that a leg thereof 30 extends into and is retained within the pocket 23. Each of the fingers is thus urged radially into the groove or recess 24 or into the groove or recess 25.

The detent mechanism 26 further includes a retaining clip 31 having an end 32 that is received in the slot 21 and an end 33 which is received in the slot 22. Movement of the retaining clip 31 into the slots is restricted in one direction by means of a flange 34 which engages the shoulder 20. At the time that the retaining clip 31 is installed, it has a configuration such as shown in FIG. 4 which includes a pair of lugs 35,36 which readily pass over the ends of the mounting posts 12 and 13. The lug 35 has an ear 37 and the lug 36 has an ear 38 and these likewise clear the mounting posts 12 and 13. The ears 37,38 lie in a plane parallel to the flange 34 and after the retaining clip 31 has been fully received in the slots 21,22, then the lugs 35,36 are bent downwardly from the position shown in FIG. 4 to the position shown in the other views. Upon doing so, the ears 37,38 are translated so as to be able to engage the side of the mounting posts 12,13 which faces away...
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from the shoulder 20. Thus during manual bending thereof, the lugs 35,36 so move that the ears 37,38 move in a plane parallel to the flange 34. When such assembly-type of bending is completed, the lugs 35,36 are disposed to engage the ends of the mounting posts 12,13. Thereafter, when the assembly is secured to the mounting panel 15 as shown in FIG. 2, it is not possible for the lugs 35,36 to bend away from such position.

As shown on the drawing, each of the lugs 35,36 is integral with the main portion of the retaining clip 31. Each lug as shown in FIG. 3 for the lug 36, has a pair of strips 40,41 of tapering cross sections so that there is an area of reduced cross section 42,42 at which the actual bending will take place.

The detent mechanism 26 further includes a resilient clip 43 located as shown in FIG. 1 and 2 and arranged as shown in FIG. 3. The resilient clip 43 comprises electrically conductive material that has a loop 44 at one end which extends about the finger 28, and then extends about the other finger 29 and has a free shape 20 which urges it against the underside of the retaining clip 31 to form an electrical connection therewith.

If for some reason, one of the energized electrical elements within the housing 11 should come in contact with the inner end of the control shaft 18, such element 25 is immediately connected to ground through a path that includes the support shaft 18, the resilient spring fingers 28 and/or 29, the resilient clip 43, the retaining clip 31 including its lugs 35,36 which are disposed to be positively secured against the mounting panel 15 by the mounting screws 14. If any supplemental grounding is necessary, the lug 35 is provided with a supplemental grounding lug 46 which has a threaded aperture for receiving the grounding screw 17.

With the screws 14,17 removed so that the timer is detached from the panel 15, the described structure can be disassembled by the mere expedient of raising the lugs 35,36 from the position shown in FIG. 2 to that shown in FIG. 4 whereupon the ears 37,38 will readily clear the mounting posts 12,13, thereby permitting the retaining clip 31 to be slid out of the slots 21,22 in a direction which is away from the viewer in FIG. 2.

Although various minor modifications may be suggested by those versed in the art, it should be understood that we wish to embody within the scope of 45 the patent warranted hereon all such embodiments as reasonably and properly come within the scope of our contribution to the art.

We claim as our invention:

1. A rotary switch assembly having switch elements and including:
   a. a housing of insulative material within which the switch elements are disposed;
   b. a metallic selector shaft rotatably and axially slidable supported on said housing and arranged to operate the switch elements;
   c. a detent mechanism carried by said housing and operative on circumferential groove means in said shaft to hold it axially;
   d. at least one mounting post on said housing threaded to receive a mounting screw; and
   e. means for completing an electrical grounding path from said selector shaft to the mounting screw.

2. A rotary switch according to claim 1, in which said grounding path means extends through said detent mechanism to at least one lug overlying said mounting post.

3. A rotary switch according to claim 2, in which said detent mechanism includes:
   a. a spring having a resilient finger tangentially receivable in said groove means; and
   b. a retaining clip trapping said spring on said housing, and having said lug, said spring and said retaining clip being resiliently urged into electrical contact with each other.

4. A rotary switch according to claim 1, in which said retaining clip is urged together electrically.

5. A rotary switch according to claim 1, in which said mounting posts overlie a pair of said lugs.

6. A rotary switch assembly having switch elements and, including:
   a. a housing within which the switch elements are disposed, said housing having a pair of mounting posts disposed at opposite sides of a shaft aperture, and a shoulder facing away from the axis of said shaft aperture and disposed between said mounting posts, said mounting posts having a pair of spaced slots opening toward the axis of said shaft aperture;
   b. a metallic selector shaft arranged to operate the switch elements, and rotatably and reciprocably supported by said housing in said aperture, and having at least one circumferential recess;
   c. a spring having at least one resilient finger tangentially receivable in said recess, and yieldable radially in response to axial movement of said shaft; and
   d. a retaining clip received in said housing slots for retaining said spring, said clip having a flange along one side of said spring for engaging said shoulder, said clip having two lugs secured to the ends thereof, each lug having an ear parallel to said flange, said lugs being manually bendable such that each of said ears can move in a plane parallel to said flange for moving to and from a position where said ear engages a side of said mounting post facing oppositely to said shoulder and each said lug engages the end of one of said mounting posts, whereby said lugs are precluded from bending when said switch assembly is mounted on said posts.

7. A rotary switch assembly according to claim 6 in which one end of said spring is L-shaped, said end being received in a housing pocket opening into one of said slots.

8. A rotary switch assembly according to claim 7, which includes a resilient clip of electrically conductive material urging said spring and said retaining clip together.

9. A rotary switch assembly according to claim 1, in which said spring has two fingers received in said recess, said resilient clip engaging both of said fingers.

10. A rotary switch assembly according to claim 6 in which each of said lugs is integrally secured to said retainer clip by at least one strip of reduced cross section at which said bending is located.

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