A control knob for use with a multiturn rotary switch in which means are provided for moving an indicating member radially of the switch shaft to show switch positions over several turns of the shaft.
CONTROL KNOB FOR MULTITURN ROTARY SWITCH

SUMMARY OF THE INVENTION

The present invention relates to a control knob for use with a multi-turn rotary switch.

A primary purpose of the invention is a control knob of the type described including a radially movable indicator which is effective to change radial position for different turns of the switch shaft.

Another purpose is a control knob of the type described which is simply constructed and reliably operable.

Another purpose is a control knob for use with a switch shaft arranged for rotational and axial movement.

Another purpose is a control knob of the type described including a radially movable pointer attached to a manual control knob such that axial movement of the control knob is effective to cause radial movement of the pointer.

Another purpose is a control knob of the type described including a spring which connects a radially movable pointer to an axially and rotationally movable control knob.

Other purposes will appear in the ensuing specification, drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated diagrammatically in the following drawings wherein:

FIG. 1 is a front plan view of a control knob of the type described.

FIG. 2 is an axial section, on an enlarged scale, along plane 2—2 of FIG. 1.

FIG. 3 is a front plan view of the pointer used in the construction of FIGS. 1 and 2, and

FIG. 4 is a top plan view of a detail.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The front panel of an instrument or the like is indicated at 10 and may have an opening 12 mounting a switch shaft 14. The shaft 14 may be part of a rotary switch 15 having a plurality of switch sections in which rotation of the shaft selects a position on a particular switch section and axial movement of the shaft selects a particular switch section. Thus the shaft 14 both reciprocates and rotates.

A fastening nut 16 conventionally attaches the switch to the instrument panel 10.

A control knob is indicated generally at 18 and includes an outer knob portion 20, which may have conventional gripping grooves 22 and an opening 24 in the front for the positioning of suitable indicia to indicate the function of the switch. The control knob may be attached to shaft 14 by means of a set screw or the like 26 positioned within a threaded hole 26.

A pointer or indicator member is indicated at 28 and is shown in detail in FIG. 3. The pointer includes an end portion or point 30 integral with a body portion 32 having an elongated slot 34. The slot 34 receives the nut 16 when the control knob is connected to the switch. Adjacent the body portion 32 and between the body portion and the end portion 30 is a projection 36 which is used to couple the pointer to the knob.

The knob 18 may have an inwardly-directed flange 38 which is peripheral in extent and has an opening 40 of a size and shape to receive the projection 36 on the pointer. Thus the knob and the pointer are coupled together for simultaneous rotation. Note that the slot 40 has a length greater than that of the projection 36 so that the knob 18 may move in an axial direction relative to the pointer.

A spring 42 has a generally flat end 44 positioned within a mating slot 46 in the indicator member. The opposite end 48 of the spring 42 is positioned within an axial slot 50 formed along a portion of the shaft 14. As shown in FIG. 4, the spring end 48 is round to match the shape of slot 50. The spring 42 is fixed in position within slot 50 by set screw 25. As shown, the spring 42 forms an angle of approximately 45° with the indicator member and with the shaft 50, although this is not essential.

In operation, rotation of the knob is effective to rotate the pointer and shaft to give an indication of switch position. After the shaft has been rotated through a given angle, for example a full turn or 360°, to show switch position on a subsequent turn of the switch shaft, the knob 18 is moved inward in an axial direction. The knob can move inward approximately the distance between the control panel and the flange 38. As the knob is moved inward, the shaft will move inward to select a different rotor for subsequent switch operation. The end 48 of spring 42 will move inward and thus spring end 44 will move radially outward. Since the spring 42 is coupled with the pointer 28 by means of the groove 46, the pointer 28 will move radially outward so that it can then be used in connection with a different scale on the front of the instrument panel 10. Thus, as the control knob moves axially, the pointer 28 moves radially. Subsequent rotation of the control knob in the same direction will again move the pointer with the knob to show the position of the switch. The elongated slot 34 provides for movement of the pointer in a direction radially of the switch shaft 14. When the knob is rotated in the opposite direction, the sequence described above is reversed.

The spring 42 in its relationship with the pointer 28 and the control knob 18 functions in much the same manner as a ladder which is resting against the side of a building. If you move the ladder along the ground, toward the building, the end of the ladder against the building must move upwardly. Preferably the spring 42 will be approximately at a 45° angle with both the pointer and the control knob such that the amount of axial movement will approximate the amount of radial movement. Obviously this is not necessary and the degree of movement of the knob and the pointer may be controlled to the extent desired.

The invention should not be limited to an application in which the pointer only has two radial positions relative to the shaft. The knob may be arranged for multiple radial positions of the pointer as there may be a number of different axial positions of the knob and shaft. What is important is to provide a means for changing the radial position of the pointer whenever it is desired to axially move the shaft and knob to select a different switch section.

The invention should not be limited to the particular spring configuration forming the attachment or connection between the pointer and knob. What is impor-
tant is to provide a means for moving the pointer radially in response to axial movement of the knob and shaft.

Whereas the preferred form of the invention has been shown and described herein, it should be realized that there may be many modifications, substitutions and alterations thereto.

We claim:

1. A switch control knob for use with a rotary switch having a rotatable shaft including an indicator member concentric with said shaft, means attached to said shaft for use in rotating the same, said rotating means being axially movable, said indicator member being arranged, relative to said rotating means for rotation therewith, and means for moving said indicator member radially of said shaft in response to the axial movement of said rotating means.

2. The structure of claim 1 further characterized in that the means for moving said indicator member radially of said shaft includes a member connected to said indicator member and movable in response to axial movement of said rotating means.

3. The structure of claim 2 further characterized in that the member connected to the indicating member is flexible.

4. The structure of claim 1 further characterized in that the means for moving said indicating member includes a spring connected to the indicating member and movable by said rotating means.

5. The structure of claim 1 further characterized in that said indicator member is arranged to move generally the same distance radially of said shaft as said rotating means moves axially.

6. The structure of claim 1 further characterized in that the means for moving said indicator member includes a spring connected to said indicator member at one end and having the other end movable by said rotating means.

7. The structure of claim 6 further characterized by and including a slot in the shaft, the other end of said spring being positioned in the slot such that axial movement of said rotating means is effective to move the spring and indicator member.

8. The structure of claim 1 further characterized in that said rotating means and shaft are axially movable.

9. The structure of claim 1 further characterized in that said rotating means includes a flange extending toward said indicating member, an opening in said flange, with a portion of said indicating member being positioned in said opening.

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