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ADJUSTABLE DETENT CONTROL KNOB

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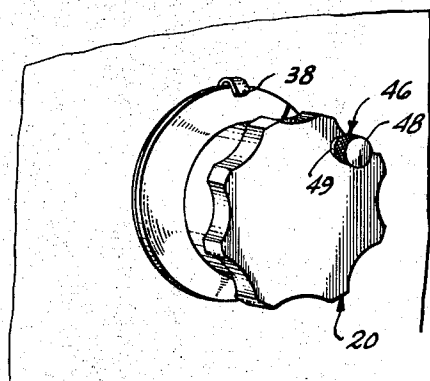


Fig. 1

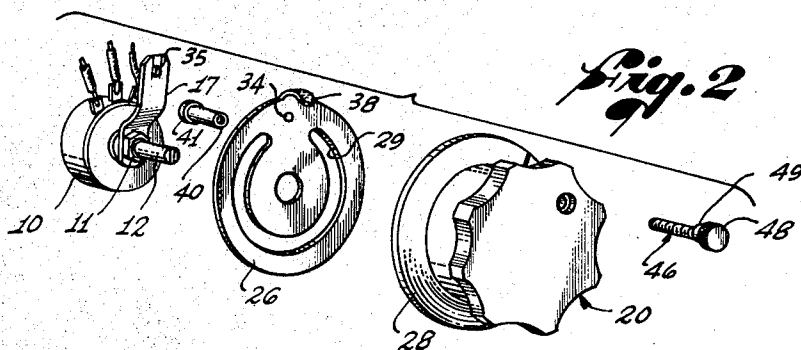


Fig. 2

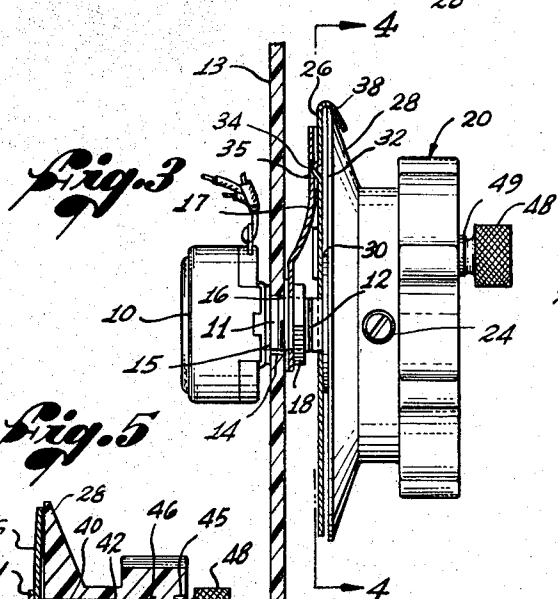


Fig. 3

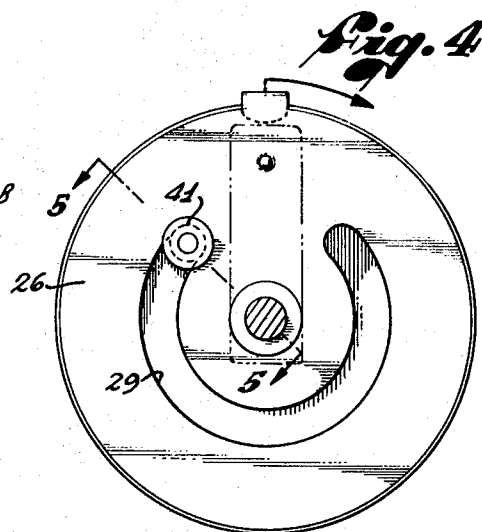


Fig. 4

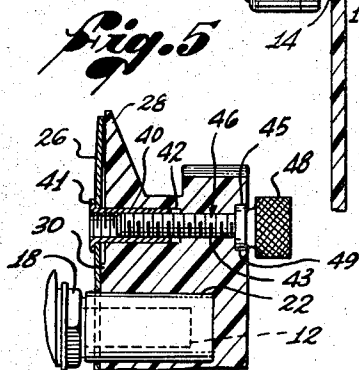


Fig. 5

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ADJUSTABLE DETENT CONTROL KNOB
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6 Claims

ABSTRACT OF THE DISCLOSURE

An adjustable knob for application to control devices such as panel-mounted rheostats, potentiometers, tuning controls, etc., provided with an adjustable detent device which can be set in a selected position of the knob, and permits return of the knob to that position without need to observe or remember it.

FIELD OF THE INVENTION

This invention relates to adjustment knobs for the rotatable shafts of electrical control devices of potentiometers, rheostats, tuning controls, and the like, and more particularly to devices by which the knob may be returned to a previously selected position without observing the position or remembering it.

BACKGROUND OF THE INVENTION

It often occurs that a control knob of an electrical device has one position of rotation at which a special condition prevails in an electric circuit controlled thereby, and it becomes desirable to be able to return the knob quickly to that position unerringly, without observation of a dial setting, or the position of a pointer, and without listening for an audible signal, or remembering the setting in any way. It is the purpose of the present invention to provide an adjustable control knob having such a capability.

BRIEF DESCRIPTION OF THE INVENTION

The invention, in a present preferred form, is applicable to a panel-mounted control device having a rotatable shaft. The knob is secured to such shaft in the usual way. Under the control device mounting nut, adjacent the knob side of the panel, is placed an arm, preferably a spring arm, and adjacent the rearward face of the knob is a detent plate cooperable with a detent element on the spring arm. This plate is rotatable on the outside of a slightly projecting portion of the knob's shaft bushing. The plate has an arcuate slot, concentric with the shaft, and an internally screw-threaded sleeve projects through this slot, and has a clamping head or flange wider than the slot. The sleeve projects freely into a bore extending into the back face of the knob. This bore meets a reduced counterbore, and a threaded pin, with a knurled head on its end, extends into the counterbore, and is screw-threaded into the sleeve. This threaded pin or screw is screwed into the sleeve until its head engages a shoulder on the outer face of the knob, and when screwed tight, the detent plate is locked by the head of the sleeve tightly to the knob. The spring arm has a depression, hole, or socket, and the plate a protuberance engageable with this socket. In use, the plate is first unscrewed from fixation to the knob by loosening the aforesaid screw. The plate is positioned so that the protuberance thereon engages the depression, hole, or socket in the spring arm. The knob will then turn relative to the spring arm and the detent plate. It is rotated to the desired, selected position. The threaded pin is then screwed tight, clamping the detent plate to the knob for rotation therewith. When the knob is rotated away from the position thus selected, it can be returned to that position independently of dial markings simply by

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finding the position, by "feel," at which the detent protuberance on the detent plate finds and enters the socket on the spring arm.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a knob in accordance with the invention;

FIG. 2 is an exploded view showing component parts of the knob of FIG. 1;

FIG. 3 is a view partly in elevation and partly in transverse medial section, showing the knob in side elevation as mounted on the shaft of a panel-mounted control device;

FIG. 4 is a view taken in accordance with the section line 4—4 of FIG. 3; and

FIG. 5 is a detailed section taken on line 5—5 of FIG. 4.

DESCRIPTION OF A PREFERRED EMBODIMENT

The electrical control device rheostat, or tuning member is designated generally at 10. This tuning member has projecting from one face thereof the usual screw-threaded sleeve or bushing 11, in which is journaled the rotatable control shaft 12 of the device 10. To mount the device 10 onto the instrument panel 13, the latter is provided with an aperture 14 to receive the bushing 11, and a washer 15 is positioned between the control device and panel 13, around bushing 11. Mounted on bushing 11 on the opposite or front side of panel 13 is first a washer 16, then a spring arm 17, suitably perforated at one end to receive the bushing 11, and finally a clamping nut 18 which, when set up, secures the control device and the bushing end of the spring arm tightly to the panel. The spring arm 17 will be seen to be bent outwardly from the panel 13 and into a position such that its outer end portion lies in a plane parallel to the panel, and adjacent but spaced slightly in back of the rearward face of the knob, generally designated by the numeral 20. The knob 20 has a usual axial bushing 22 for snug reception of the shaft 12, which is fastened in place, entirely conventionally, by means of a set screw 24 as seen in FIG. 3.

The knob bushing 22 will be seen to project somewhat beyond the rearward face of the knob, and rotatable on the projecting extremity of the bushing is a detent disc 26, of a diameter preferably equal to or slightly less than the diameter of the conventional dial flange 28 at the rear of knob 20. The disc 26 has an arcuate slot 29 therein extending, in this case, for approximately 270° of angle, the arcuate edges of the slot being struck about the central axis of the knob as a center. As here shown, the knob has on its rearward face a slightly raised hub-like portion 30, and the aforementioned detent disc 26 lies immediately adjacent the face of this hub-like portion 30, and thus normally stands spaced slightly in back of the dial flange 28 of the knob. Radially outside this portion 30, the disc 26 is capable of a slight yielding or resilient deflection towards and finally against the rearward face 32 of the dial flange 28 of the knob (FIG. 5). Disc 26 has a small protuberance 34 which is engageable in a hole or socket 35 in the end portion of the spring arm 17 when rotated to the position of FIG. 3. As will appear, the spring arm 17 functions as an index or reference member. Rotation of the disc 26 from this position, relative to the panel and to the fixed spring arm 17 will result in separation of the protuberance 34 from the socket 35 with a slight resistance permitted either by resilient deflection of the disc 26, or of the spring arm 17, or both. Similarly, assuming the disc 26 to be initially in a position in which the protuberance 34 is out of registration with the socket 35, the disc can be rotated into the position of registration, slight deflection of the spring arm, the disc, or both permitting the protuberance to ride over

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the spring arm to the socket. Preferably, the disc 26 has at its periphery a tab 38 bent over the dial flange 28, in a convenient position to be reached by the fingers of the operator to facilitate the rotation of the disc 26 when desired.

A means is provided for clamping the disc 26 against rotation relative to knob 20, and as here shown comprises a screw means in the form of an internally threaded sleeve 40 mounted for axial movement in a bore extending into the rearward side of the knob, in a position off-center from the axis of the knob, and so as to extend through the aforementioned arcuate slot 29. On the outer end of this sleeve 40 is a clamping head or flange 41, which is wider than the slot 29 so as to overlap the margins thereof, and which is engageable with the disc 26. The sleeve 40 thus projects freely or with a light frictional fit, into a bore 42 extending into the back face of the knob. This bore 42 meets a reduced counterbore 43 extending into the knob from its front face. Preferably, and as here shown, the counterbore 43 meets an enlarged counterbore 45 immediately adjacent the front face of the knob. A thumb screw 46 is screwed into the sleeve or bushing 40 through counterbores 43 and 45. The screw has a knurled head 48 and as a part of the head, or just inside it, an integral flange 49 which seats against the bottom of the counterbore 45. Rotation of the screw head 48 draws the sleeve 40 inwardly into the knob so that its head 41 acts to clamp the disc 26 tightly to the rearward face of the knob dial 28. Rotation in the reverse direction of course unclamps the disc 26 for free rotation.

In the contemplated mode of use of the knob, the disc 26 is first positioned with its protuberance 34 seated in the socket 35. The screw 46 being loosened, the knob can then be turned relative to the spring arm and the detent plate or disc 26 bearing the protuberance. Clearly, the engagement of the protuberance in the socket in the spring arm prevents rotation of the disc with the knob at this time, frictional engagement between the disc and the knob being insufficient to cause disengagement of the protuberance 34 from the socket 35. The knob is thus rotated to a desired, selected position, the detent disc 26 remaining in its fixed position relative to the spring arm. The screw 46 is then screwed tight, clamping the detent plate to the knob for rotation therewith (FIG. 5). When the knob is thereafter rotated away from the position thus selected, it can be returned to that position independently of dial markings simply by finding the position, by "feel," at which the detent protuberance on the detent plate finds and enters the socket on the spring arm 17.

The spring arm 17 is so formed as to assure seating of the protuberance 34 in the socket 35 when the disc 26 is thus clamped to the back of the knob. This of course means that the spring arm 17 is so formed and mounted as to stand normally in a position close to the rearward side of the knob, i.e. such that when the disc 26 is clamped against the knob, the spring arm 17 will be in a position such that the protuberance 34 will re-engage with the socket 35 when these elements are registered.

It will be seen that I have thus provided a control knob which can be operated to position an electrical device in a selected position, and thereafter quickly set in such a way that the knob, after being rotated away from the selected position, can be returned quickly and precisely to the selected position without benefit of dial markings, and without benefit of recall of the location of the selected position of adjustment.

I claim:

1. A position finder for an electrical control device mounted on a fixed support and having a rotatably adjustable control shaft extending therefrom, comprising: a knob adapted to be fixed onto said shaft;

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a detent plate positioned immediately rearward of said knob and arranged for rotation relative to the knob about the axis of said control shaft;

releasable clamping means on said knob for clamping said plate to said knob to rotate therewith;

index means mounted tightly relative to said fixed support and having a portion positioned adjacent to said detent plate; and

cooperable detent elements on said index means and detent plate spaced radially from said shaft, said elements being interengageable at a predetermined position of rotation of said detent plate to automatically yieldingly lock to one another and thereby exercise a yielding restraint against rotative displacement of said plate from said position.

2. The subject matter of claim 1, wherein the portion of said index means having one of said detent elements is resiliently deflectable in directions toward and from said knob to facilitate engagement and disengagement of said detent elements.

3. The subject matter of claim 1, wherein the portion of said detent plate having one of said detent elements is resiliently deflectable in directions toward and from said knob to facilitate engagement and disengagement of said detent elements.

4. The subject matter of claim 1, wherein the portions of said index means and detent plate having said detent elements are resiliently deflectable in directions toward and from said knob to facilitate engagement and disengagement of said detent elements.

5. The subject matter of claim 1, wherein the control device is to be mounted on an apertured panel, and wherein said control device has a threaded sleeve surrounding a portion of said shaft where the shaft protrudes from the control device, said sleeve protruding through the aperture in the panel;

said index means comprising a spring arm mounted at one end on said sleeve;

a nut on said sleeve for clamping said spring arm to said panel; and

said spring arm extending radially from said sleeve, and its outer end portion lying adjacent to said detent plate.

6. The subject matter of claim 5, wherein:

said releasable clamping means comprises a thumb screw mounted in said knob, on an axis parallel to but spaced radially outward from the central portion of the knob, for rotation relative to the knob but supported against axial translation therein from front to rear;

a threaded screw means in said knob threadedly engaged with said thumb screw, said screw means having a clamping head; and

said detent plate having an arcuate slot therein, concentric with said shaft, which receives an outer portion of said screw means, with said head on said screw means overlapping a margin of said slot, so as to engage said detent plate.

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