Feb. 6, 1962 M. S. BANN 3,019,667

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Filed June 16, 1959 2 Sheets-Sheet 1

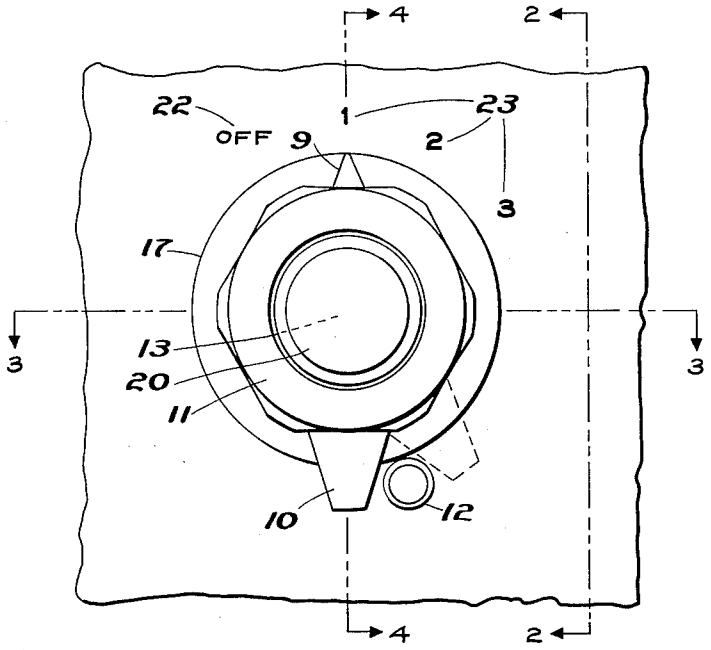


FIG. 1

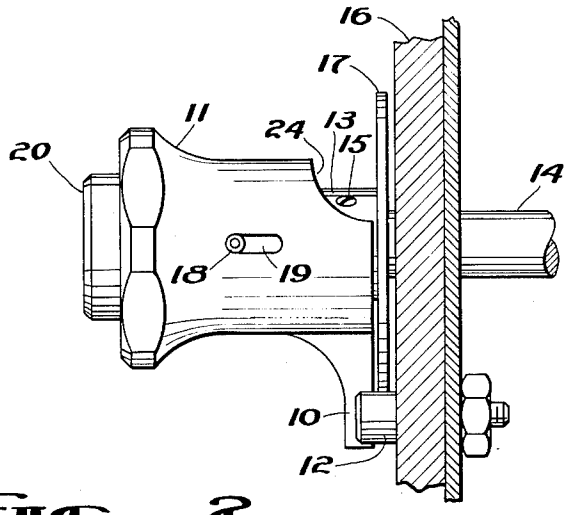


FIG. 2

INVENTOR.
MICHAEL S. BANN
BY Morris Moody
ATTORNEY

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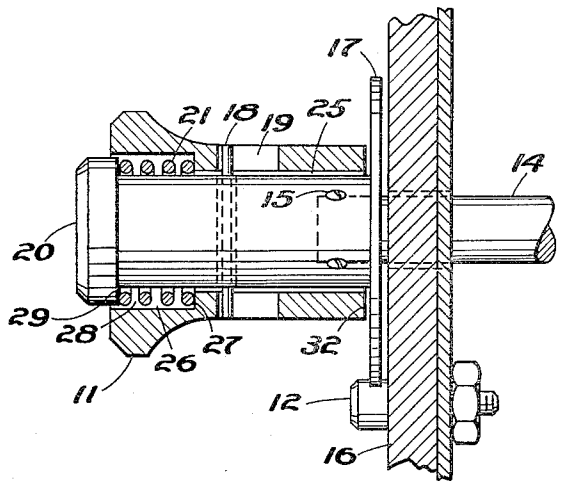


FIG. 3

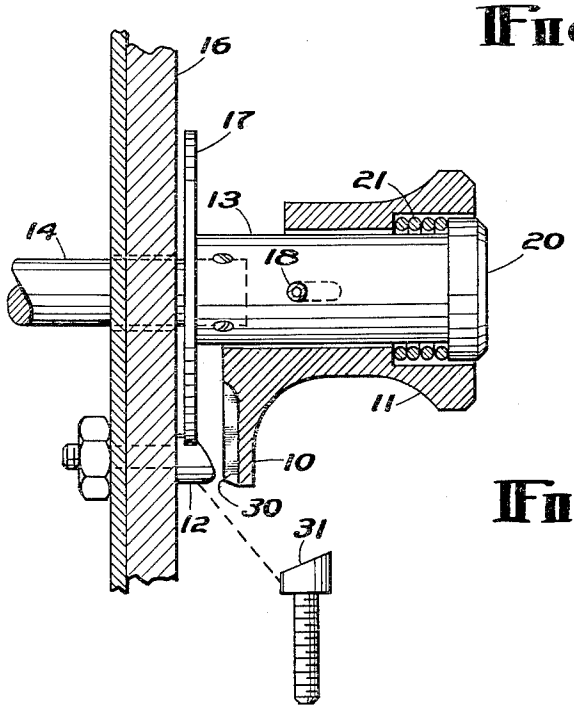


FIG. 4

INVENTOR.
MICHAEL S. BANN
BY Mann Moody
ATTORNEY

United States Patent Office

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KNOB

Michael S. Bann, Orange County, Calif., assignor to Collins Radio Company, Cedar Rapids, Iowa, a corporation of Iowa

Filed June 16, 1959, Ser. No. 820,827
7 Claims. (Cl. 74—528)

This invention relates generally to an improved actuating knob for electronic equipment, and more particularly to a manual control knob provided with a simple and effective unidirectional locking mechanism.

For some types of electronic radio equipment it is desirable to have a manual control knob incorporating a unidirectional locking member to prevent accidental actuation of the knob from the "on" to the "off" position. To be effective, a knob of this type must be capable of easy rotation from the "off" to an energized position, but it must incorporate a positive locking device which prevents rotation of the knob to the "off" position in the absence of a special effort exercised by the equipment operator.

It is therefore an object of this invention to provide a manual control knob for electronic equipment which includes a positive spring locking mechanism.

A further object of this invention is to provide a manual control knob of the above described type which can be easily rotated from an "off" position to one of several energized positions, but which is prevented from free rotation to the "off" position by a positive locking mechanism.

Another object of this invention is to provide a manual control knob having a positive spring biased locking mechanism which is ineffective when the knob is rotated from an "off" position to an energized position, and which effectively prevents the return of the knob to the "off" position.

A still further object of this invention is to provide a control knob which requires physical effort on the part of an operator to rotate it from an energized to an "off" position, thus preventing subconscious or accidental operation thereof.

With the foregoing and other objects in view, the invention resides in the following specification and appended claims, certain embodiments and details of construction of which are illustrated in the accompanying drawings in which:

FIGURE 1 illustrates in front elevation the control knob and locking mechanism in operative mounted position on a fragmentary portion of a control panel;

FIGURE 2 is a view in side elevation of the knob of this invention taken along the plane of line 2—2 in FIGURE 1;

FIGURE 3 is a longitudinal sectional view through the knob of this invention taken along the line 3—3 in FIGURE 1 with the knob in normal position; and

FIGURE 4 is a longitudinal sectional view at right angle to the view of FIGURE 3, showing the knob in a raised position to disengage the lock mechanism.

Referring to FIGURE 1 of the drawings, a control knob 11 is mounted on a rotatable center pin 13 which is supported by means (not shown) to extend through a panel member 16. On panel member 16 are indicia 22 and 23; 22 representing the deenergized position of knob 11 and 23 the several energized positions. A skirt portion 17 is attached to the center pin 13 and is rotatable therewith. Pointer mark 9 is provided on the face of skirt portion 17 for the purpose of indicating the position of the control knob relative to indicia 22 and 23. Extending from a portion of knob 11 is a lug 10 which, in cooperation with a pin 12 set in the face of panel 16, forms a locking mechanism. Knob 11 and lug 10 are movable longitudinally of center pin 13 and locking pin 12.

In FIGURE 2, center pin 13 extends through the center portion of tubular knob 11 and is attached to a driven shaft 14 by means of set screws 15. A cutaway section 24 is provided in the rear portion of knob 11 to allow access to set screws 15. A Rollpin 18 extends transversely through center pin 13 and rests in longitudinal slots 19 provided in the sides of knob 11. Rollpin 18 rides in slots 19 when knob 11 is moved longitudinally of center pin 13, and upon rotation of knob 11, the Rollpin transmits torque to centerpin 13. In some instances it may be desirable to omit center pin 13 and to attach knob 11 directly to driven shaft 14 by means of set screws 15. In this case Rollpin 18 would extend transversely through driven shaft 14 and into slots 19 of knob 11.

In FIGURE 3, center pin 13 is illustrated as extending through the tubular opening 25 formed in knob 11. The outer end portion of the opening is of an enlarged diameter as shown at 26, thus forming a seat 27 for one end of a helical spring member 21 which rests in a space 28 between the sides of enlarged opening 26 and center pin 13. Center pin 13 is formed with an enlarged head portion 20 which provides a seat 29 for the other end of spring 21. Spring 21 reacts axially of knob 11 and center pin 13 to keep surface 32 of the knob in contact with skirt 17 of the center pin when the knob 11 is in the normal position. Knob 11 can move longitudinally over head 20 for a distance governed by the length of enlarged opening 26 and the extent of compressibility of helical spring 21.

In FIGURE 4, lug 10 extending from knob 11 is shown as being provided with a cammed surface 30 which allows the lug to move easily over pin 12 when the knob 11 is rotated from the "off" to an energized position. To facilitate a smoother camming action, pin 12 may also be provided with a cam surface 31 to cooperate with surface 30 of lug 10.

In the operation of this invention, when the knob 11 is rotated from the "off" to an energized position, cam surface 30 of lug 10 cooperates with the surface of pin 12 to cause the knob to move longitudinally of center pin 13 against the bias of spring 21. Rollpin 18 transmits torque to center pin 13, causing rotation of the center pin and driven shaft 14, and as lug 10 and pin 12 move knob 11 longitudinally of center pin 13 against the bias of spring 21 to allow the lug to pass easily over the pin 12, Rollpin 18 is caused to move transversely in slot 19. After lug 10 has passed over pin 12, spring 21 expands causing the knob 13 and the lug 10 to snap back into position below the pin 12. If the knob 11 is now rotated from an energized position toward the "off" position, lug 10 engages pin 12, and knob 11 must be manually moved longitudinally of center pin 13 in order that lug 10 may pass over the locking pin 12.

It should be obvious to one skilled in the art that this invention provides a novel and improved control knob for electronic radio equipment which incorporates a simple and effective unidirectional locking mechanism. The arrangement and components utilized for this invention may be subject to numerous modifications well within the purview of the inventor who intends only to be limited by the specification and a liberal interpretation of the appended claims.

I claim:

1. A control knob for an instrument panel comprising a rotatable driven shaft extending through said panel, a knob member formed with a central opening to receive said driven shaft, a torque transmitting member interconnecting said driven shaft and knob members so as to allow limited axial movement of said knob relative to said driven shaft, and a positive unidirectional locking mechanism, said mechanism including a lug member extending from said knob and a pin projecting from said panel, at least one of said lug or pin members having a

cammed surface which cooperates with the surface of the other member to cause the knob to move axially and pass easily over the pin when the knob is rotated from the off to an energized position.

2. A control knob for an instrument panel comprising a rotatable driven shaft extending through said panel, a centerpin secured to said driven shaft, a knob member formed with a central opening to receive said centerpin, a torque transmitting member interconnecting said centerpin and knob members so as to allow limited axial movement of said knob relative to said centerpin, and a positive unidirectional locking mechanism, said mechanism including a projecting member carried by said knob, said projecting member having a single cammed surface and a pin extending from said panel, the cammed surface of said projecting member cooperating with the surface of said pin to cause the knob to move axially and pass easily over the pin when the knob is rotated from the "off" to an energized position.

3. A control knob for an instrument panel comprising a rotatable driven shaft extending through said panel, a centerpin secured to said driven shaft, a knob member formed with a central opening to receive said centerpin, a torque transmitting member interconnecting said centerpin, a torque transmitting member interconnecting said centerpin and knob members so as to allow limited axial movement of said knob relative to said centerpin, and a positive unidirectional locking mechanism, said mechanism including a lug extending from said knob and a pin projecting from said panel, said lug and pin having cooperating cam surfaces which cause the lug to pass easily over the pin when the knob is rotated from the "off" to an energized position.

4. A control knob for an instrument panel comprising a rotatable driven shaft extending through said panel, a centerpin secured to said driven shaft, a knob member formed with a central opening to receive said centerpin, a helical spring member seated between said knob and centerpin within said central opening to bias the knob in the direction of the panel, a torque transmitting member extending transversely of said centerpin through said knob member so as to allow limited axial movement of said knob relative to said centerpin, and a unidirectional locking mechanism, said mechanism including a lug which extends from a portion of said knob and a pin which projects from said panel, said lug having a cammed surface which cooperates with the surface of said pin to cause said lug member to pass easily over the pin when the knob is rotated from the "off" to an energized position.

5. A control knob for an instrument panel comprising a rotatable driven shaft extending through said panel, a centerpin secured to said driven shaft, a knob member having aligned longitudinal slots in the side portions thereof, said knob member being formed with a central opening to receive said centerpin, a helical spring member seated between said knob and centerpin within said central opening to bias the knob in the direction of the panel, a rod extending through said centerpin and resting in the aligned slots in the sides of said knob member so as to allow a limited axial movement of said knob relative to said centerpin, and a unidirectional locking mechanism including a lug which extends from a portion of said pin which projects from said panel, said pin having a cammed surface which cooperates with the surface of said lug member to cause the lug to pass easily over the pin when the knob is rotated from the "off" to an energized position.

6. A control knob for an instrument panel comprising a rotatable driven shaft extending through said panel, a centerpin secured to said driven shaft, a skirt member provided on said centerpin in a position adjacent to said panel, a knob member formed with a central tubular opening to receive said centerpin, a spring member seated between said knob and centerpin within said central tubular opening, said spring reacting axially to maintain the knob member in contact with the skirt of said centerpin, a torque transmitting member extending transversely of said centerpin through said knob member, said torque transmitting member allowing limited axial movement of said knob relative to said centerpin but preventing rotational movement of said knob relative to said centerpin, a lug extending from said knob in a plane parallel to said panel, a pin projecting from said panel in a plane perpendicular to said panel, said lug and pin cooperating to form a positive unidirectional locking mechanism for said knob.

7. A control knob for an instrument panel comprising a rotatable driven shaft extending through said panel, a centerpin secured to said driven shaft, said centerpin having an enlarged head portion on one end thereof, a skirt member having indicator means thereon, attached to the opposite end of said centerpin adjacent said panel, a knob member formed with a central tubular opening to receive said centerpin, said opening being of extended diameter adjacent the outer face of said knob to receive the enlarged head portion of said centerpin, a helical spring member seated in the enlarged opening in said knob, said spring member reacting axially between the knob and the enlarged head portion of the centerpin to maintain the knob member in contact with the skirt of said centerpin, a rod etxending transversely of said centerpin through said knob member, said rod allowing limited axial movement of said knob relative to said centerpin but preventing rotational movement of said knob relative to said centerpin, a lug extending from said knob in a plane parallel to said panel, a pin projecting from said panel in a plane perpendicular to said panel, said lug and pin members provided with cooperating cammed surfaces which cause said lug member to pass easily over the pin when the knob is rotated from an "off" to an energized position.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,019,667 February 6, 1962

Michael S. Bann

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 62, before "including" insert -- , said mechanism --; column 4, line 1, before "pin", first occurrence, insert -- knob and a --.

Signed and sealed this 5th day of June 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents