March 3, 1942. LE ROY J. LEISHMAN 2,275,369

LOCKING MEANS FOR AUTOMATIC TUNERS

Filed Nov. 22, 1937

Fig. 1

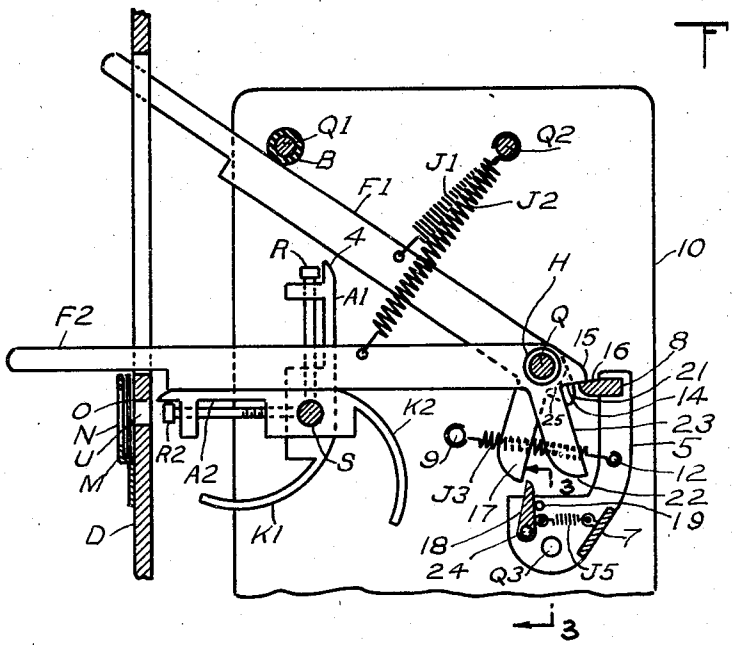


Fig. 2

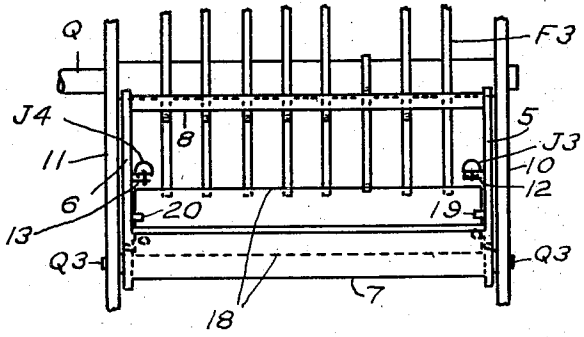
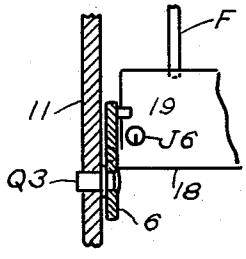


Fig. 3



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LOCKING MEANS FOR AUTOMATIC TUNERS

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10 Claims. (Cl. 74—10)

The invention herein described relates to improvements in automatic or semi-automatic apparatus for tuning radio equipment, and more particularly to the class of tuning appartus having a plurality of selectively operable controls each adapted to tune in a predetermined transmitting station. Such controls are usually provided with springs to return them to the original inoperative position after each tuning operation. It is thus impossible to tell what station has been tuned in without looking at the dial. If a radio set employing such controls is used in an automobile, the vibration of the car throws the set out of tune, as the relatively short movement of the controls makes it impossible to use the conventional worm-gear arrangement for locking the condenser rotor in any position to which it may be turned. One of the objects of the present invention is to eliminate these difficulties by providing means for locking each of the selectively movable station controls in the position to which it is moved when tuning in the station, and for unlocking such control upon the subsequent operation of one of the other tuning members. Another object is the provision of means for unlocking a control without the necessity of locking another in order to release the first. Still other objects will appear as the description proceeds.

In the accompanying drawing:

Fig. 1 is a side view of the mechanism with one of the supporting end-plates omitted and the escutcheon and index-tab holder shown in section.

Fig. 2 is a rear elevation of the locking mechanism.

Fig. 3 is a cross-section of part of Fig. 1, taken on line 3—3.

Although the locking mechanism hereinafter described is intended for use on any device capable of rotating a control shaft to a predetermined angular position upon the movement in one direction of a lever or similar member, this specification will describe its use in connection with a radio tuner of the type disclosed and claimed in my co-pending application, Ser. No. 154,819. When the locking arrangement is used on an automatic tuner of this kind, shaft S, Fig. 1, is connected to the gang condenser shaft by 2—1 gears (not shown, because this feature does not form a part of the present invention), but shaft S may be connected directly to the condenser shaft by suitable coupling if the tuning mechanism covers an angle substantially equal to that through which the condenser rotor turns.

Positionable member A1, Fig. 1, is in a position 90 degrees from that to which it is rotatable when lever F1 is pressed down. The lower edge of this lever engages the positionable member on the rounded end 4 and rotates it until it assumes the position in which positionable member A2 is shown in the figure. If member A1 were initially in a position 180 degrees from that illustrated, it will be obvious that the pressing of lever F1 would engage the rounded end K1, thus turning the rotatable member until the movement of lever F1 and the positionable member, or lever, would be mutually arrested.

To "set" this type of tuner, index tab O beneath the lever to be set is first removed from the recess between the holder M and escutcheon D. The lever is then pressed all the way down, as indicated by the position of lever F2. This brings the set screw R2 into alignment with hole U in the escutcheon. By means of a screw-driver inserted through this hole, the set-screw is then released. This permits shaft S to turn freely while the positionable lever is held in a fixed position. It will be evident that a station may then be tuned in by the regular tuning knob (not shown), thus establishing a definite angular relation between arm A2 and the shaft. After the desired station has been carefully tuned in in this manner, set-screw R2 is again tightened.

Movably mounted on rod or studs Q3 are two rocker members 5, Figs. 1 and 2, and 6, Fig. 2. These rockers are held together by members 7 and 8. A spring J3 is fastened to stud 9 on end plate 10 and to stud or projection 12 on the rocker, and a similar spring J4 connects projection 13 on rocker 6 with a stud (not shown) on end plate 11, Fig. 2. These springs pull the rockers toward the operating levers and cause member 8 to hook under edge 14 of projection 15 on the rear end of the depressed lever. Edge 14 of projection 15 and edge 16 of member 8 are preferably tapered so that springs J3 and J4 wedge member 8 firmly under projection 15, thus assuring that the operating lever will be held tightly against the positionable member, keeping it definitely in the tuned-in position.

If lever F2 is locked in the position shown in Fig. 1, and lever F1 is then pressed down, the rear edge of projection 17 on lever F1 will engage ratchet-bar 18, pressing it against pin 19 on rocker 5 and pin 20 on rocker 6. This action pushes the rocker back and causes bar 8 to slip out from under projection 15 on the rear end of lever F2. Spring J2 then pulls lever F2 back up to its normal inoperative position against bumper B, which may be a tube of rubber or other resilient material around a rod Q1 extend-

ing from one end plate to the other. After the locked lever has been released in this way, lever F1 engages end 4 of positionable member A1 and rotates it while the following described operations are taking place. As lever F2 moves to its inoperative position, the rounded edge 22 of projecstud or shaft Q3, the free end of ratchet-bar 18 where it remains momentarily. As projection 17 continues to press back, rotating the rocker on stud or shaft Q3, the free end of ratchet-bar 18 soon moves out of engagement with projection 17 and springs J3 and J4 pull on rockers 5 and 6, causing the rounded portion of bar 8 to strike the rounded portion of projection 21 on lever F1. The release of ratchet-bar 18 by projection 17 permits the rounded edge 22 of projection 23 to press on the rounded edge of the ratchet-bar, causing it to turn on pivot 24 away from pins 19 and 20 against the action of spring J5 and another similar spring J6, Fig. 3, on the other end of the ratchet-bar. As soon as the end of projection 22 and the edge of the ratchet-bar pass each other, springs J5 and J6 return the ratchet-bar to the position shown in Fig. 1, where it is ready to be engaged by the lower projection of the next operating lever that is pressed down. As lever F1 continues on the downward stroke, projection 21 slips past the end of bar 8 and springs J3 and J4 pull bar 8 firmly under the lower edge of projection 21. These parts will then occupy the position that the corresponding parts of lever F2 occupy in the figure. Lever F1 and positionable member A1 will then be locked in the tuned-in position until another operating lever is pressed.

The distance from the free end of ratchet-bar 18 to the fulcrum Q3 of the rocker assembly must be so short that a slight movement of one of the levers will tilt the rocker sufficiently to effect the release of the locked lever before the lever being operated has engaged its cooperating positionable member or cam.

The dotted line 25 at the rear of hub H in Fig. 1 indicates the back of a special release lever F3, Fig. 2, which does not otherwise appear in Fig. 1, because in this view its edges coincide with those of lever F1 excepting for the rear portion now under discussion. It will thus be seen that this lever is identical to the others with the exception of the fact that it has no rear projection like projections 15 and 21 of levers F2 and F1 respectively. It will be obvious that the pressing down of this lever having no rear projection will unlock any operating lever that may be depressed without itself being locked, as there is nothing for the locking bar 8 to hook under. This release lever is provided to move any locked lever out of the way so that the set may be tuned by the manual tuning knob, which is not shown in any of the figures because it forms no part of this invention. This release lever is not essential, as any of the operating levers may be used to unlock any other lever without itself becoming locked by merely moving the lever far enough to produce the unlocking action and then permitting the lever to flip back up. No lever is locked down until it has reached the extreme limit of its motion.

The equipping of a lever-tuned radio set with this mechanism enables anyone to identify the station that is tuned in by merely noting which lever is locked down. Furthermore, sets subject to vibration, such as automobile receivers, cannot be detuned by such vibration if the stations are tunned in by levers having the locking provisions herein described or some similar embodiment of the invention.

Although the preferred form of my invention is substantially as described, it will be obvious to those skilled in the art that various modifications, omissions, additions or substitutions are possible without departing from the spirit of the invention.

My claims are:

1. In a device for angularly positioning a control of a radio instrument, a combination including: a rotatable element; a plurality of independently operable mechanisms comprising means by which said element may be rotated in either direction upon movement of a member of said mechanism in one direction; and a movable structure comprising a first means adapted to lock the moving parts of any of said mechanisms against further movement and a second means adapted to effect the release of said parts; each of said mechanisms having a first shoulder adapted to be engaged by said first means to effect the locking of the moving parts of said mechanism, and a second shoulder adapted to actuate said second means.

2. In an instrument for angularly positioning a control of a radio device, a combination including: a rotatable element; a plurality of independently operable mechanisms comprising means by which said element may be rotated; and an angularly movable structure comprising a first means adapted to engage a member of any of said mechanisms and lock it in a definite position and a second means for effecting the release of said member; each of said mechanisms comprising a member having a first abutment adapted to be engaged by said first means, and a second abutment adapted to engage said second means and move said assembly to release any locked member; said first means positioned further than said second means from the substantial axis of rotation of said structure.

3. In a device for angularly positioning a control of a radio instrument, a combination including: a rotatable element; a plurality of independently operable mechanisms each comprising an operating means and instrumentalities by which said element may be rotated to a predetermined angular position during an operating stroke of said means in one direction; and a latching means adapted under action of a spring to lock any of said operating means in the position that said means occupies at the end of its operating stroke; each of said operating means having a first shoulder for moving said latching means against the action of said spring, and a second shoulder adapted to be engaged and wedged by said latching means when said operating means has reached the end of its operating stroke; said shoulders being so spaced with respect to the cooperating parts of the latching means that said element is invariably rotated after said first shoulder has moved said latching means and before said second shoulder has been engaged by said latching means.

4. In a device for positioning a control of a radio instrument, a combination including: a reversibly movable control element; a cover plate; a plurality of mechanism for effecting the movement of said element each to a predetermined position, each of said mechanisms comprising a movable member operable through the plane of said plate and having a restoring spring for holding said member in a normally inoperative first position; each of said mechanisms also comprising adjustable means for predetermining the position to which said element will be moved upon movement of the associated member from said first posi-

tion to a second position; and a latching means for locking any of said members in said second position against the action of its restoring spring; each of said members having means to actuate said latching means to unlock the previously locked member; and a plurality of male screws each individual to one of said adjustable means for retaining said adjustable means in adjusted position; said plate apertured to permit said screws to be operated from the front of said plate.

5. In a device for angularly positioning a control of a radio instrument, a combination including: a rotatable positionable member; a plurality of independently operable devices each comprising an operating means and positioning means by which said member may be rotated to a predetermined angular position upon movement of said operating means in one direction, and a spring for yieldingly holding said operating means in a rest position; and means for preventing the return of said operating means to said rest position under action of said spring and for urging said positioning means against said member.

6. In a radio station selector, a rotatable positionable member and a movable manual for positioning the same, the positionable member and the manual being provided with two pairs of coacting contact portions, the engagement of one pair of contact portions serving to effect the positive rotation of the positionable member in one direction, the engagement of the other pair of contact portions serving to effect the positive rotation of the positionable member in the opposite direction, and the engagement of both pairs of contact portions serving to stop and lock the positionable member in its selected position, and a latching means for said manual, said latching means being active on said manual for urging both pairs of contact portions into engaged and locked position.

7. In a radio station selector, a rotatable positionable member, a movable manual comprising contact portions for engaging said positionable member to rotate and position the latter, and latching means for said manual, said latching means being movable into latching position when the manual is moved to operative position, said latching means having a part exerting a force on the said manual to hold the contact portions thereof in pressing engagement with the said positionable member.

8. In an instrument for positioning a control of a radio device, a combination including: a movable control element; a plurality of individually operable mechanisms each comprising a selector, a retaining spring for said selector, and means by which said element may be moved in either of opposite directions to a predetermined position upon movement of said selector against the action of said retaining spring; a movable latching means comprising a bar disposed transversely to said selector; and resilient means for moving said latching means in one direction; each of said selectors having a shoulder that intersects the line of motion of the adjacent portion of said bar when said selector has reached the end of its movement against the action of said retaining spring so that the pressure of said bar on said shoulder will urge said selector toward the extreme end of said movement against the action of said retaining spring.

9. In a device for angularly positioning a control of a radio instrument, a combination including: a rotatable element; a plurality of independently operable mechanisms comprising means by which said element may be rotated in either direction upon movement of a member of any one of said mechanisms in one direction; and a pivoted structure comprising a first means adapted to lock the moving parts of any one of said mechanisms against further movement and a second means adapted to effect the release of said parts; each of said mechanisms having a first part adapted to be engaged by said first means to effect the locking of the moving parts of any one of said mechanisms, and a second part adapted to actuate said second means.

10. In a device for angularly positioning a control of a radio instrument, a combination including: a rotatable element; a plurality of independently operable mechanisms comprising means by which said element may be rotated in either direction upon movement of a member of any one of said mechanisms in one direction; and a pivoted structure comprising a first means adapted to restrain the moving parts of any one of said mechanisms against further movement and a second means adapted to effect the release of said parts; each of said mechanisms having a first part adapted to be engaged by said first means to effect the immobilization of the moving parts of any one of said mechanisms, and a second part adapted to actuate said second means.

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