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MECHANICAL RADIO TUNING MEANS

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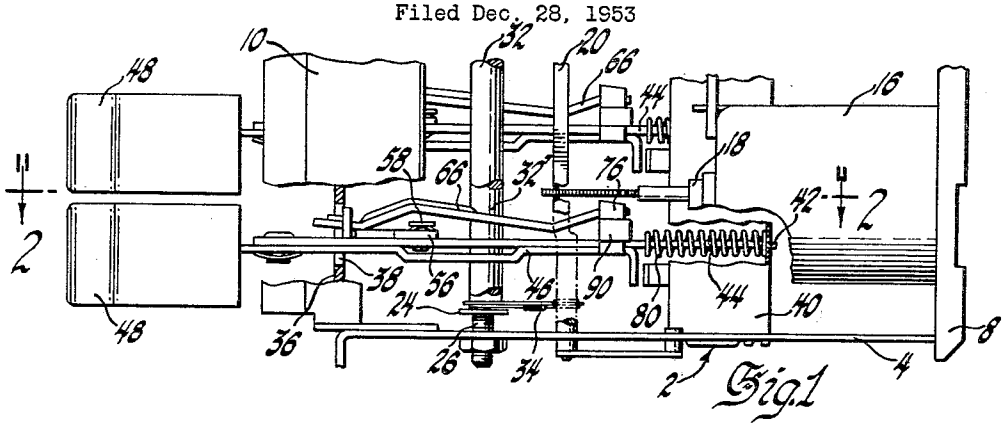


Fig. 1

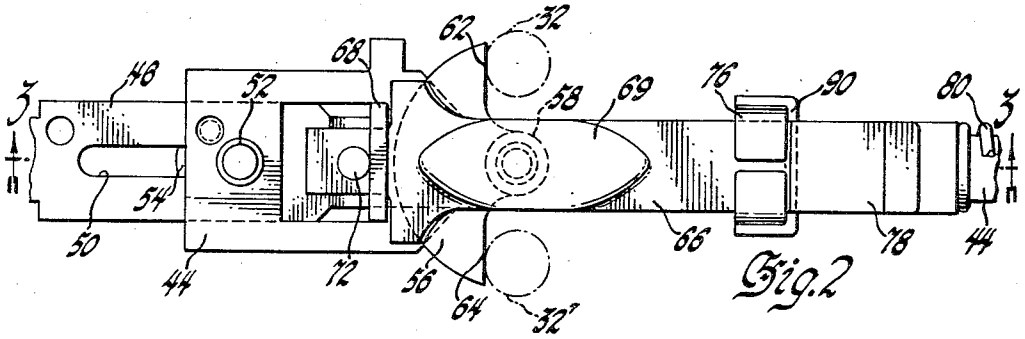


Fig. 2

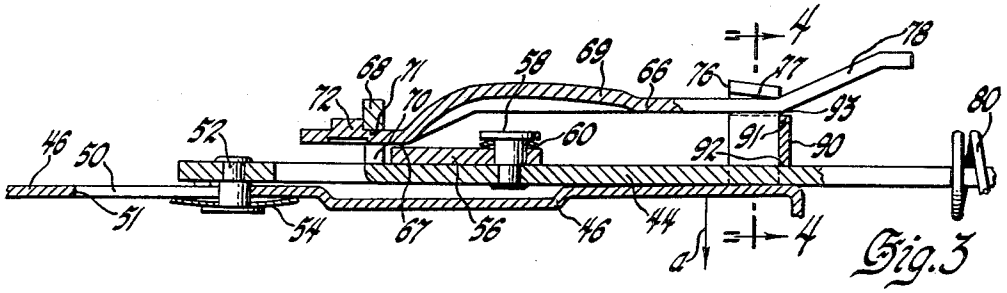


Fig. 3

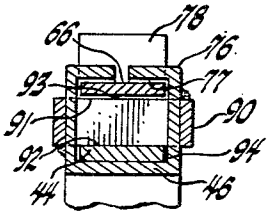


Fig. 4

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MECHANICAL RADIO TUNING MEANS

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13 Claims. (Cl. 74—10.33)

This invention relates to adjustable indexing means specially suited for use in push-button mechanical tuners for automobile radio receivers.

More particularly, the invention relates to reciprocating push-button plunger assemblies of the slidably interconnected, double slide bar variety having an adjustable indexing member, such as an angularly positionable cam carried by one of the slides, and a locking mechanism for locking the adjustable indexing member. The plunger assembly is depressable inwardly to move the assembly as a unit and cause the adjustable cam member to engage an index a movable treadle bar or equivalent mechanism that is operatively associated with the tuning means of the receiver. The locking mechanism of the plunger assembly may comprise a pivotable locking lever carried by one of the slide bars and an engaging member carried by the other of the slide bars for actuating the locking lever.

To prevent binding of the locking lever on the adjustable cam when the plunger assembly is pulled outwardly to unlock the cam, the plunger assembly should include suitable means for effectively stripping or separating the locking lever rom the cam and for preventing sidewise or transverse separation of the slide bars such as would cause the locking lever to contact the adjustable cam while the position of the latter is being adjusted.

The present invention has as an object thereof to provide an improved locking mechanism in a plunger assembly of the described character and which functions to provide positive unyielding locking and separating action of the locking lever and the adjustable cam.

Another object is to provide an improved locking mechanism which, in addition to the foregoing objective, functions to prevent sidewise or transverse separation of the slide bars as would cause binding of the adjustable cam and premature camming action against the treadle bars while the position of the cam is being adjusted.

Another object is to provide an improved locking mechanism that employs camming action for both actuating the locking lever to lock the cam and separating the locking lever from the cam to permit unlocking and setting the position thereof.

The manner in which the foregoing and other objects of the invention are accomplished will be apparent from the following descriptions and drawings wherein:

Fig. 1 is a fragmentary top plan view of an indexing tuning mechanism embodying the present invention;

Fig. 2 is a longitudinal side view of one of the reciprocating slide plunger assemblies employed in the tuning mechanism of Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2; and

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3.

Referring to the drawings, there is shown in Figure 1 a fragmentary portion of an index tuning mechanism corresponding in the main to the tuner shown in U. S. Patent 2,489,544 in the joint names of Bertram A. Schwarz, Howard M. Stelzl and Manfred G. Wright and assigned to the present assignee. Since the present invention is concerned mainly with the plunger assembly for the indexable tuning mechanism, the latter will be treated but briefly herein, and reference may be had to the above patent for a more complete description thereof.

The tuning mechanism includes a box-frame assembly 2 having a pair of spaced side pieces—only one of which is shown at 4—a back portion 8, and a front panel 10. Mounted on the back portion 8 of the frame are a plurality of tunable elements, such as variable inductance coils, only one of which is shown at 16.

Each coil is provided with an adjustable core 18 which is secured to a core bar in the form of a movable transverse member 20 and may be moved inwardly or outwardly to change the inductance thereof as the core bar member 20 is racked back and forth within the frame. The ends of the core bar 20 extend through elongated guide slots in the side frame members and are pivotally connected through links such as 34, to spacing extension members as 24 of the arcuately movable bar assembly.

The treadle bar assembly includes a pair of parallel spaced treadle bar members 32, 32' that extend transversely substantially the width of the frame. The treadle bars are connected at their ends by the spacing members and are spaced, respectively, above and below the reciprocating plunger assembly. The spacing member 24 is pivotally mounted at a point intermediate the treadle bars on a pivot 26 mounted in the side frame member 4. As shown in the aforementioned patent, the treadle bar spacing member opposite member 24 shown herein has a stub shaft thereon that extends through the adjacent side member and is adapted to be rotated by a manually operable tuning mechanism.

Below the transverse front member 10 of the frame is a second frame member 36, which extends the width of the frame and contains a series of guiding and supporting slots 38 to support the reciprocating rods of the plunger assemblies. A similar transverse member 40 in the rear of the frame has a narrow slot 42 carrying the rear of the reciprocating assembly.

As best shown in Figs. 2 and 3, each of the reciprocating plunger assemblies includes a main slide bar 44, which extends through both the front and rear frame members and can slide back and forth therein. In longitudinal slidable relation to the main slide member 44 is a second slide member 46 which extends further to the left and carries at its outer end a manually engageable push button 48. An elongated slot 50 is provided in push-button slide bar 46 for receiving a portion of a rivet 52, that is carried by the outer end of the main slide bar 44. Under one enlarged head of the rivet is a spring washer 54, which provides axial pressure on the rivet and tends to hold the plunger slides together. As is apparent, with rivet 52 positioned in the slot as shown in Fig. 3, inward movement of the button slide bar 46 permits relative slidable movement between the slide bars until rivet 52 contacts side wall 51 after which both slide bars will move together as a unit assembly, which is spring biased to return and normally assume the position shown in Fig. 1 by a coil spring 80 mounted on the inner end of slide bar 44.

Plunger main slide member 44 carries approximately midway of its length an adjustable cam 56, which is pivotally mounted thereto through a rivet 58 and spring washer 60 providing axial pressure therefor. This cam is the adjustable member and in adjusting the angular position thereof about its pivot axis, the treadle bar engaging faces 62 and 64 thereof may be set at different angular

relationship relative to the slide member 44 so that when the cam faces completely engage the transverse rods or treadle bars 32, 32' the tuning mechanism will be adjusted to different positions, depending upon the angular settings of the cam. For all angular settings of the cam other than that shown in Fig. 2, the treadle bar assembly is first engaged by one of the cam faces which proceeds to cam and move the treadle bar assembly until the other face of the cam is brought into engagement therewith, at which time the camming action will cease and the tuner mechanism connected with the treadle bar assembly will be indexed to correspond to the angular setting of the cam.

Means for locking the cam setting in a definite position where it will remain until it is desired to readjust it to a new position is provided by a multiple assembly best shown in Fig. 3. The locking mechanism includes an irregularly shaped lever bar 66, which is bowed to extend over the cam and pivot and has a relatively flat surface 67 which may contact the flat side surface of the cam 56. The central portion of the lever may be provided with a rib 69 to add structural reinforcement thereto. A tongue or yoke 68 is struck or pressed out of and bent at right angles to the main slide bar 44 and has an opening 70 therein which receives the forward end of the locking member 66, the sidewall 71 of the opening 70 providing a fulcrum or pivot for the lever. The forward end of the lever 66 is provided with a projection 72 which engages the forward surface of the tongue 68 to prevent withdrawal of the lever member 66 through the slot 70 once it is assembled.

The locking assembly further includes a strap or shoe 76, which may be integrally formed with the push-button slide bar 46 and extends therefrom around and up over to surround the remainder of the assembly. Strap 76 provides an inclined camming surface 77 that engages the outer surface of the lever 66. The portion of the lever 66 contacted by strap 76 is abruptly inclined and diverges, as shown at 78, from the cam carrying main slide bar 44, so that if the strap 76 carried by slide bar 46 be forced to the rear with respect to the button slide bar 44, the strap would cam surface 78 downwardly and bring the braking or locking surface 67 of the lever 66 and the cam 56 together to maintain the angular setting of the latter.

In accordance with the present invention the strap member 76 of the locking mechanism is provided with an additional element 90 having a camming surface 91, which functions to lift the lever 66 and separate the locking surface 67 thereof from the cam 56, and an oppositely disposed surface 92, which functions to prevent sidewise shifting or separation of slide bars 44 and 46.

Element 90 is shown as a U-shaped element welded or otherwise secured to the upstanding legs of the strap 76 and is positioned between the main plunger slide 44 and the locking lever 66. Surface 91 of element 90 cams the under side or surface of the inclined lever portion 78, when slide bar 46 is pulled outwardly, and forces lever portion 78 outwardly (upwardly in Fig. 3) therefrom to separate locking lever surface 67 from cam 56. Surface 92 of element 90 adjacent slide 44 retains slides 44 and 46 in parallel relation and prevents sidewise or transverse separation thereof as is likely to occur when the plunger assembly is unlocked and the position of the cam 56 is being adjusted. As is apparent any tendency of the slides to separate in the direction of the arrow shown in Fig. 3, would cause strap 76 attached to slide 46 to cam and force the end of lever 66 downwardly and thereby cause locking surface 67 to contact and lock cam 56. Thus, premature camming action of cam 56 against the treadle bar assembly will be had before the cam has been set to a preselected position, and it will not be possible to adjust the setting thereof accurately.

As shown in Fig. 4, the spacing 93 between the inner locking surface 77 of inclined strap 76 and the upper

camming surface 91 of the camming member 90 is just sufficient to permit the lever 66 to slide therethrough. The spacing 94 between the lower side 92 of element 90 and the adjacent side of slide 46 is just sufficient to permit slide 44 to pass readily therethrough and to maintain sidewise play therebetween to a minimum.

As the button slide 46 is pressed in by the operator, locking strap 76 slides on the outer cammed surface 78, pressing down the locking lever 66 to lock the cam. As the same slide is pulled outwardly, the camming side 91 of element 90 adjacent the under or inner side of cammed surface 78 slides on the lower or inner face thereof, pivoting lever 66 in tongue 68 and lifts locking surface 67 to unlock the cam 56.

What is claimed is:

1. In control means having a movable member adjustable to different positions, a reciprocable assembly including a pair of slidably interconnected slide bars, an adjusting element positionable to different settings on one of said slide bars and carried by said assembly to contact said adjustable movable member, locking means for said adjusting element carried by one of said slide bars, means carried by the other of said slide bars contacting and actuating the locking means upon relative longitudinal sliding movement of said bars and means also carried by said other bar contacting said locking means and lifting the same from said adjusting positionable element upon oppositely directed relative longitudinal movement of said bars.

2. In control means having a movable member adjustable to different positions, a reciprocable assembly including a pair of slidably interconnected slide bars, an adjusting element positionable to different settings on one of said slide bars and carried by said assembly to contact said adjustable movable member, locking means for said adjusting element carried by one of said slide bars, means carried by the other of said slide bars contacting and actuating the locking means upon relative longitudinal sliding movement of said bars, means also carried by said other bar contacting said locking means and lifting the same from said adjusting positionable element upon oppositely directed relative longitudinal movement of said bars, and guide means provided on one of said bars preventing sidewise separation of said bars.

3. In control means having a movable member adjustable to different positions, a slidable assembly including two relatively movable slide bars, an adjusting element positionable to different settings on one of said slide bars and carried by said assembly to contact said adjustable movable member, locking means for said adjusting element carried by one of said slide bars, means carried by the other of said slide bars contacting and actuating the locking means upon relative longitudinal sliding movement of said bars and camming means carried by one of said bars contacting said locking means and lifting the same from said adjusting positionable element upon oppositely directed relative longitudinal movement of said bars.

4. In control means having a movable member adjustable to different position, a slidable assembly including two relatively movable slide bars, an adjusting element positionable to different settings on one of said slide bars and carried by said assembly to contact said adjustable movable member, locking means for said adjusting element carried by one of said slide bars, means carried by the other of said slide bars contacting and actuating the locking means upon relative longitudinal sliding movement of said slide bars and camming means also carried by said other side bar contacting said locking means and lifting the same from said adjustable positionable element upon oppositely directed relative longitudinal movement of said bars.

5. In control means having a movable member adjustable to different positions, a slidable assembly including

two relatively movable slide bars, an adjustable cam to contact the movable member carried by one of said slide bars, locking means for the cam carried by the other of said slide bars, a first camming means carried by said other slide bare contacting and actuating said locking means upon relative longitudinal sliding movement of said bars and a second camming means carried by said other slide bar oppositely contacting and positively unlocking said locking means upon oppositely directed relative longitudinal movement of said slide bars.

6. In control means having a movable member adjustable to different positions, a slidable assembly including two relatively movable slide bars, an adjusting element positionable to different settings carried by one of said slide bars and movable therewith into engagement with said movable member for positioning the latter in accordance with the setting thereof, and locking means locking the setting of said adjusting element and including a pivotable member carried by one of said slide bars and a cooperating engaging member carried by the other of said slide bars, said engaging member having a camming portion engaging said pivotable member to lock the setting of said positionable adjusting element when said slide bars are relatively moved in one direction and another camming portion oppositely engaging said pivotable member and readily releasably unlocking and lifting said pivotable member from said adjusting element when said slide bars are relatively moved in the opposite direction.

7. In tuning means for a radio receiver having a reciprocating slide bar assembly including two slidably interconnected slide bars, a positionable cam pivotally mounted on one of said bars, and means for locking the cam, said locking means including a member pivotally mounted on said one slide bar in juxtaposition to said cam and movable to contact the cam and to lock the same against movement around its pivot, rigid unyielding means carried by the other of said slide bars lifting said locking member away from said cam, and camming means carried by said other slide bar and engaging said locking member to contact and lock said cam upon relative longitudinal movement of the two slide bars.

8. In tuning means for a radio receiver having a reciprocating slide bar assembly including two slidably interconnected slide bars, a cam pivotally mounted on one of said bars, and means for locking the cam, said locking means including a member pivotally mounted on said one slide bar in juxtaposition to said cam and movable to contact the cam and to lock the same against movement around its pivot, camming means carried by the other of said slide bars tending to lift and force said locking member away from said cam, and additional camming means carried by said other slide bar and engaging said locking member to contact and lock said cam upon relative longitudinal movement of the two slide bars.

9. In tuning means for a radio receiver, a first reciprocating slide bar having an end protruding from said tuning means, manually engageable push-button means mounted on the protruding end of said slide bar, a second reciprocating slide bar overlapping a portion of the first slide bar, means securing said slide bars together but permitting a limited amount of relative longitudinal movement therebetween, a cam pivotally mounted on the second of said slide bars, locking means pivoted to said second bar and engaging the cam to maintain the same in a desired position, said locking means having a portion thereof divergent from the second bar, camming means carried by said first bar lifting said locking means away from said cam and additional camming means carried by the first bar and engaging said divergent portion of the locking means forcing the locking means toward cam clamping position upon relative motion of the two slide bars.

10. In tuning means for a radio receiving set, a reciprocating slide bar assembly comprising two parallel slide bars, means securing the two bars together and permitting limited relative longitudinal motion thereof, a cam pivotally mounted on one of the bars, locking means for the cam pivotally mounted on said one bar, said locking means including an inclined portion, camming means carried by the other of said slide bars and adapted to engage the inclined portion of said locking means and force the locking means against the cam upon movement of the camming means against the inclined portion upon relative longitudinal movement of the two bars, and lifting means also carried by said other bar positively separating said locking means from said cam upon opposite relative longitudinal movement of the two bars.

11. In reciprocating indexing means for engaging a rotatable member movable to different angular positions, a pair of elongated slide bars secured together to have a limited amount of relative motion in a longitudinal direction and unit reciprocatory motion, an indexing cam pivotally mounted on one bar and adapted to contact said rotatable member at diametrically opposite points upon travel of the slide bar assembly toward the rotatable member, locking means for the cam pivotally mounted on the same bar and including an inclined portion, camming means lifting said locking means away from the cam, and additional camming means carried by the other of said slide bars engaging the inclined portion of said locking means and locking said indexing cam.

12. An adjustable indexing means for a rotatable tuning member for a radio receiver comprising a pair of elongated slide bars secured together to have a limited amount of relative slidable motion in a longitudinal direction, a cam pivotally mounted on one of said bars and adapted to contact said rotatable member at diametrically opposite points, locking means for said cam pivotally mounted on said one bar, a camming means on the other of said bars extending over said locking means and causing the latter to move about its pivot upon relative motion between the two slide bars to lock the cam, and lifting means carried by the other bar oppositely moving the locking means about its pivot and positively separating the locking means from said cam upon oppositely directed relative motion between the two slide bars to unlock the cam.

13. An adjustable indexing means for a rotatable tuning member in a radio receiver, said indexing means comprising a pair of elongated slide bars secured together to have a limited amount of realtive slidable motion in a longitudinal direction, an adjustable element pivotally mounted on one of said bars and adapted to contact and move said rotatable tuning member when brought into engagement therewith, locking means for said adjustable element including a lever pivotally mounted on said one slide bar and connecting means including a first camming surface above said lever on the other of said slide bars causing said lever to move about its pivot upon relative slidable motion between the two slide bars to lock said adjustable element and a second camming surface below said lever on said other slide bar oppositely moving said lever about its pivot to unlock said adjustable element upon oppositely directed relative slidable motion between the two slide bars, said connecting means providing a positive cam connection between said other slide bar and said lever in either direction of relative longitudinal movement of said bars.

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