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B. A. SCHWARZ ET AL

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RADIO TUNING MEANS

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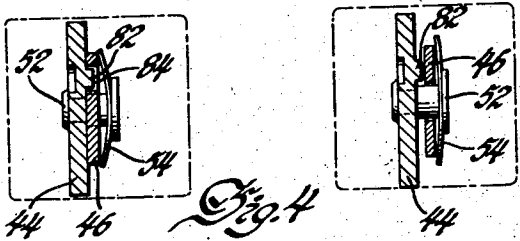
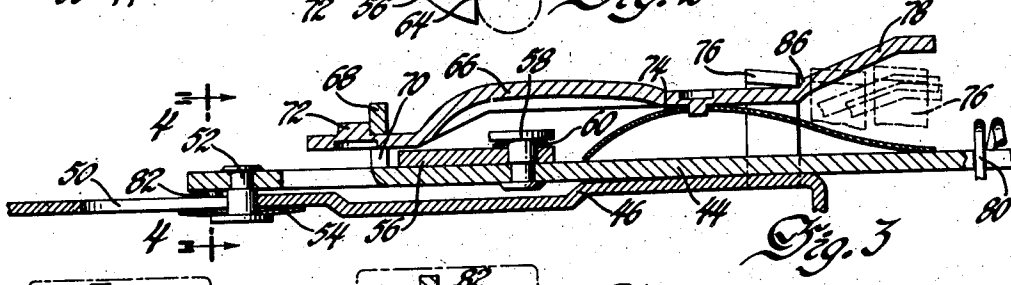
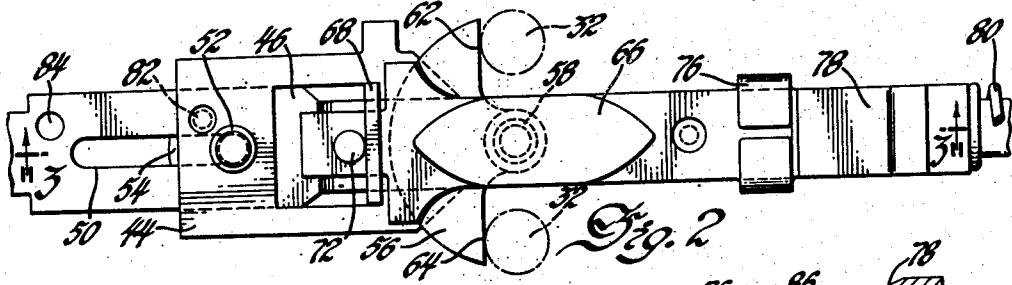
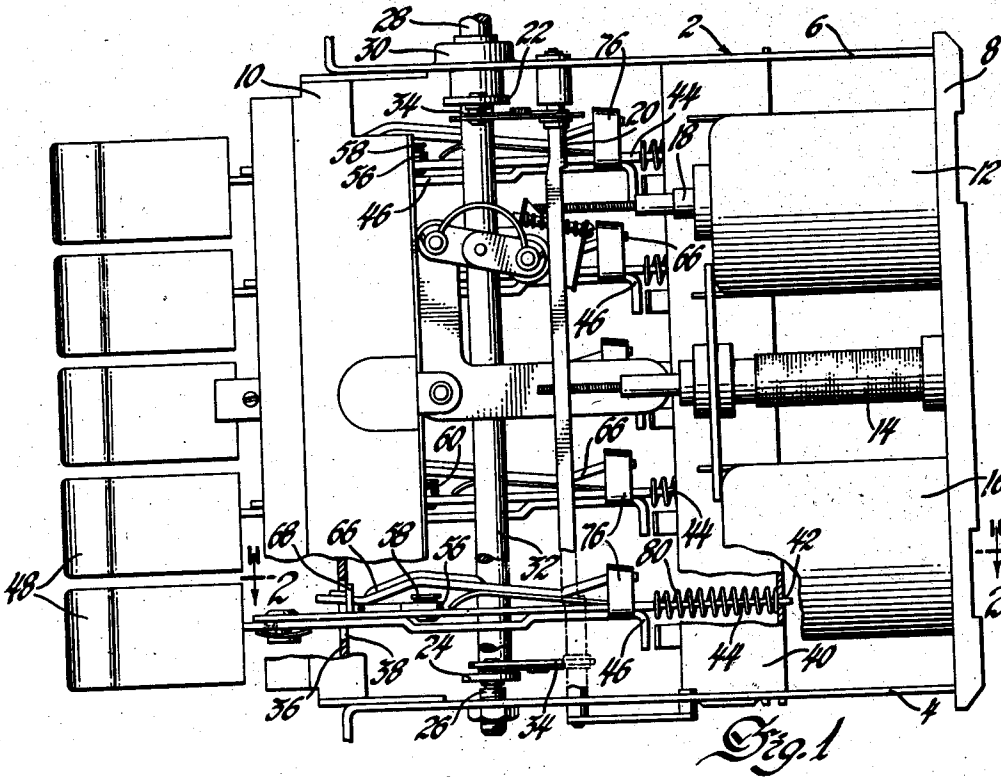


Fig. 5
Inventors
Bertram A. Schwarz,
Howard M. Stelzl &
Manfred E. Wright
Spencer, Willits, Helwig & Bailley
Attorneys

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RADIO TUNING MEANS

Bertram A. Schwarz, Howard M. Stelzl, and Manfred G. Wright, Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich., a corporation of Delaware

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6 Claims. (Cl. 74—10.33)

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This invention relates to indexing means, and more particularly to adjustable indexing means of the general nature of those used for push button tuning of radio receiving apparatus. Many different mechanisms have been designed and used to bring a radio receiver into various points of resonance for the reception of a plurality of pre-set or adjusted stations. One form which has achieved considerable popularity has been the reciprocating rod or bar, push button type, which lends itself well to a flat compact assembly and requires a minimum amount of space. This makes it particularly desirable in automotive radio receivers where space is always at a premium. These reciprocating rods usually carry an adjustable cam which is pivoted thereto and which engages a mechanism to transmit motion to the tuning means. This cam may be adjusted about this pivot and locked at different angular positions to index the tuning mechanism and bring in the station desired by the operator. Various locking means have heretofore been provided, most of which require considerable manipulation before the cam unlocked, the set tuned to a new position, the cam brought to its innermost limit to move it to its new position and then re-locked in that position.

It is, therefore, an object of our invention to provide a simple, easily released locking means for the adjustable member or cam of an automatic or push button tuning means.

It is a further object of our invention to provide locking means which is applied by spring pressure for holding the cam for tuning purposes.

It is a still further object of our invention to provide locking means for an adjustable cam that can be actuated without the removal of any parts of the tuner, such as, for example, the push buttons.

It is a still further object of our invention to provide locking means that may be released by pulling the push button out beyond its normal spring biased position, and which may be reset and re-locked by merely forcing the button completely inward to its limit of travel.

With these and other objects in view which will become apparent as the specification proceeds, our invention will be best understood by reference to the following specification and claims and the illustrations in the accompanying drawings, in which:

Figure 1 is a top plan view of an indexing tuning means embodying our invention.

Figure 2 is a longitudinal side view of one of

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the reciprocating bar or rod assemblies, looking in the direction of arrows 2, 2 of Figure 1.

Figure 3 is a sectional view taken on the line 3, 3 of Figure 2.

Figure 4 is a sectional view taken on the line 4, 4 of Figure 3; and

Figure 5 is a view similar to Figure 4, showing the parts in releasing position.

Referring now more specifically to the drawings, there is shown in Figure 1 a box frame 2, consisting of two side pieces 4 and 6, a back portion 8, and a front panel 10. This forms a roughly rectangular frame within which the majority of the equipment to be described is mounted. In most radio receivers of the superheterodyne type, it is necessary to tune three circuits, namely two RF circuits, and an oscillator circuit. The particular parts necessary for this are here illustratively shown to be those applicable to a so-called permeability tuned set, or one in which the inductance in these circuits is varied in contra-distinction to those of well-known type in which the capacity is varied. This is accomplished by having a coil and core combination in which the core is made of very finely divided or comminuted pieces of iron, which core can be slid into or out of the coil to change the inductance thereof. Coils 12, 14 and 16 are utilized in the present tuner for this purpose, coils 12 and 16 varying the inductance in the radio frequency circuits, and 14 varying the inductance in the oscillator circuit.

The adjustable cores 18, which cooperate with the coils just mentioned, are secured to a movable transverse member 20 and as it moves back and forth within the frame, the cores are either inserted into or withdrawn from the coils to change the inductance as desired. The ends of the transverse member 20 extend through guide slots (not shown) in the side frame members 4 and 6, which act as a track to keep the transverse member in position. Two vertical members 22 and 24 are provided on opposite sides of the frame. Member 24 is pivoted on pivot 26, mounted in said frame member 4, and threadedly adjusted so that axial pressure can be brought to bear on the part. Member 22 is in like manner pivoted in the opposite frame member 6, and in that case the pivot consists of a shaft 28, rigidly connected to the member 22, and extending through side member 6 in a bearing assembly 30. This shaft 28 extends to a manually operable tuning mechanism, not shown, as it forms no part of the present invention.

Members 22 and 24 are connected together by a

plurality of cross members 32, which are spaced apart and between which the reciprocating bars or rods move. The upper end of each of these vertical members is connected by a link 34 with the transverse member 20. It will thus be evident that as the vertical members 22, 24 are moved about their pivots, either by pressure on the transverse members 32 or by manual force through shaft 28, this rotational movement will be transmitted through links 24, to the member 20, and it will move in its track or guideway to tune the inductances. This same motion could be used to drive a variable condenser.

Below the transverse front member 10 of the frame is a second frame member 36, which extends across the whole frame and contains a series of guiding and supporting slots 38, to support the reciprocating rods and cam supporting assemblies. A similar transverse member 40 in the rear of the frame has a narrow slot 42 carrying the rear of the reciprocating assembly. In the present instance five assemblies or push buttons have been shown. This number is, of course, merely illustrative, as any number may be provided, depending upon the desires of the operator or manufacturer.

Since each assembly is identical, only one will be described, and that is best shown in detail in Figures 2 and 3, and consists of the main bar 44, which extends through both the front and rear frame members and can slide back and forth. In longitudinal slidable relation to this member 44 is a second similar member 46, which is so secured thereto that it may slide longitudinally with respect to the first under certain conditions, and which extends further to the front and carries at its outer end a manually engageable push button 48. This bar 46 is provided with a relatively long slot 50, through which passes one portion of a rivet 52, carried by the outer end of the bar 44, the rivet having under one enlarged head a spring washer 54, providing axial pressure on the rivet and tending to hold the two bars together. The member 44 likewise carries approximately midway of its length an adjustable cam 56, which is pivoted to the bar through a similar rivet 58, which also has a spring washer 60 providing axial pressure therefor. This cam is the adjustable member and in turning it about its axis, the engaging faces 62 and 64 may be set at different angular relationships so that when they engage the transverse rods 32, they will bring the mechanism to different positions, depending upon their angular settings.

There must, of course, be means provided to lock the cam in a definite position where it will remain until it is desired to readjust it to a new position. This locking means is provided by a multiple assembly shown best in Figure 3, and consisting of an irregularly shaped bar 66, which is bowed to extend over the cam and pivot, coming down to provide a relatively large area which may contact the flat side surface of the cam, and extending forward thereof. The bar 44 has a tongue 68 pressed out of its surface and bent at right angles, in which tongue there is provided an opening 70 through which the forward end of the locking member 66 proceeds and which acts as a pivot therefor, this forward end also being provided with a projection 72 which engages the forward surface of the tongue 68 to prevent withdrawal of the member 66 through the slot 70 once it is assembled. A bowed spring member 74 is secured to the lower surface of the portion of the bar 66 to the rear of the cam, and tends to keep

the bar 66 and the bar 44 apart, or to keep the locking surfaces separated. A strap 76 extends from the bar 46 around and up over the remainder of the assembly and engages the outer surface of the bar 66, the contour of that portion of the bar being divergent, as shown at surface 78, from that of the bar 44, so that if the strap 76 be forced to the rear with respect to bar 44, it would pull that surface 78 down, as shown in the dotted line positions, collapsing the spring 74, and bring the braking or locking surfaces of the bar 66 and the cam 56 together to maintain the later in its locked position.

As shown in Figure 3, the cam is unlocked and the push button retracted to the left to the limit of its travel. The set may now be tuned to a desired station by manual means (not shown), which positions the bars 32 in a given angular position about their pivots. The operator then presses inwardly on the button which first carries the whole assembly to the right, as shown in these figures. The surfaces 62 and 64 engage the bars 32, first one, depending upon the bar 32 first engaged, and then the other, until the two seat against the diametrically opposite bars 32. This stops the cam from any further rotation or unit inward travel and with it, of course, any possible travel of the bar 44 or the locking bar 66, pivotally attached thereto. Slide 46 is also limited in travel due to the steep rise 86 in member 66 operating in conjunction with spring 74. However, the bar 46 may now slide with respect to the bar 44 if additional force is exerted allowing strap 76 to move over steep rise 86, and this causes the strap 76 to force the inward end of the bar 66 down to lock the cam in this position. When it reaches the inner end of its travel, the bar assembly is locked to a new given cam position, which as a unit may be spring biased to its outer position with the push button in normal location, and thenceforth the cam will always turn the rocker assembly to this spot upon any future actuation of this button. To unlock, of course, it is only necessary to pull any one of the buttons outwardly beyond its normal position, which causes the bar 46 therein to move outwardly with respect to bar 44, and thus bring the assembly back to the condition shown in Figure 3. A coil spring 80 encircles that portion of bar 44 between notch on bar 44 and the rear panel 40 to normally eject the assembly to keep the push button out so that the cam is not in engagement with the transverse bars 32 except upon indexing. Each of the bar assemblies, of course, is operated in the same manner.

It was found under some conditions, particularly those in which the construction was used in an automobile radio receiver where the vibration is considerable, that after an extended period of time or over very rough pavement that there was a tendency for bar 46 to move outwardly with respect to the bar 44 and thus unlock the assembly. We have provided locking means to prevent this which consists of a small raised projection 82 on the side of the bar 44, which is adapted to fall into a mating opening 84 in the side of the bar 46, so that when these two come into alignment, they will be locked together by spring pressure unless they are pulled sideways to allow the projection 82 to come out of the associated opening 84. This side movement is permitted by the length of the shaft of the rivet 52 being somewhat longer than the combined thicknesses of the two bars plus the spring washer 54, which may be flattened by the side force on the push button.

This removal operation or side motion is best shown in Figure 5, and when the operator has pushed the button to the side to permit the parts to move apart, he can then pull it out and reset the cam to a new position.

It will thus be evident that we have provided a novel means for locking and unlocking adjustable cams for use in mechanical push button tuners.

We claim:

1. In tuning means for a radio receiving set, reciprocating slide bar assembly comprising two parallel slide bars, means for securing the two bars together to provide limited relative longitudinal motion, a cam pivotally mounted on one of the bars, locking means for the cam pivotally mounted on the same bar in juxtaposition to the cam to move in a plane at right angles to the face of the cam and when in contact therewith lock the same against movement around its pivot, spring biasing means tending to force the locking means away from the cam, camming means carried by the other bar and engaging the locking means to force the locking means against the spring bias upon relative longitudinal movement of the two slide bars and additional locking means to maintain the two slide bars in that position when the cam is locked.

2. In tuning means for a radio receiving set, a first reciprocating slide bar, manually engageable means mounted on the protruding end of said bar, a second reciprocating slide bar overlapping a portion of the first, means to secure the two bars together but provide a limited amount of relative longitudinal movement, said securing means including deformable means to allow the bars to be moved laterally, one of said bars having an opening therein and a mating projection in the other bar adapted to enter the opening in the first to prevent relative longitudinal movement of the two bars unless one is pulled sideways to remove the projection from the opening.

3. In tuning means for a radio receiving set, a first reciprocating slide bar, manually engageable means mounted on the protruding end of said bar, a second reciprocating slide bar overlapping a portion of the first, means to secure the two bars together but provide a limited amount of relative longitudinal movement, said securing means including deformable means to allow the bars to be moved laterally, one of said bars having an opening therein, a mating projection in the other bar adapted to enter the opening in the first to prevent relative longitudinal movement of the two bars unless one is pulled sideways to remove the projection from the opening, a cam pivotally mounted on the second bar, locking means pivoted to the 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, spring means tending to bias the locking means away from the bar and means carried by the first bar engaging the divergent portion of the locking means to force the locking means in toward cam clamping position upon relative motion of the two bars, said mating projection entering the opening to prevent longitudinal movement between the two bars when the cam is locked.

4. In tuning means for a radio receiving set, a first reciprocating slide bar, cam means pivotally mounted thereon which can be set to different angular positions, locking means for the cam carried by the bar, a second slide bar secured to the first by means providing a limited amount of relative longitudinal motion and a small amount of transverse motion, means carried by the second bar to engage and move the locking means, a projection on one of said bars and a mating opening in the other bar at the full locking position so that the second bar must be moved laterally far enough to disengage the projection from the opening before it can be slid longitudinally to unlock the cam.

5. In control means having a movable member which it is desired to adjust to different positions, a slidable assembly, adjustable means on the assembly to engage and move the member, manually engageable means extending from the assembly for locking the adjustable means and a second locking means actuatable by said same manually engageable means to maintain the first in locked position.

6. In control means having a movable member which it is desired to adjust to different positions, a slidable assembly including two relatively movable slide bars, an adjustable cam to contact the movable member carried by one of the bars, locking means for the cam carried by the bar, means carried by the other bar to contact and actuate the locking means upon relative longitudinal sliding movement and second locking means to prevent such relative longitudinal movement.

BERTRAM A. SCHWARZ.
HOWARD M. STELZL.
MANFRED G. WRIGHT.

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