

Dec. 16, 1941.

S. A. CROSBY ET AL

2,266,711

CONTROL APPARATUS

Filed May 29, 1940

2 Sheets-Sheet 1

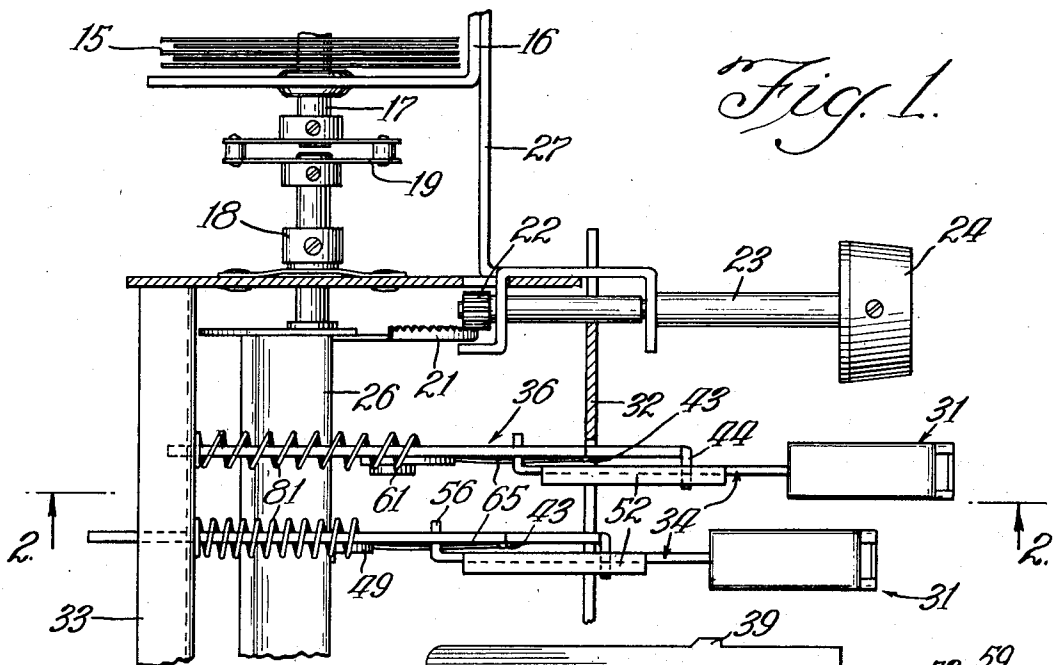


Fig. 1.

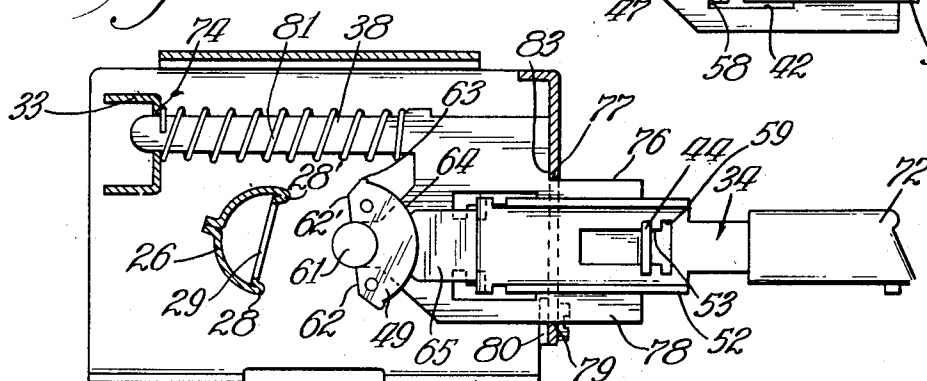
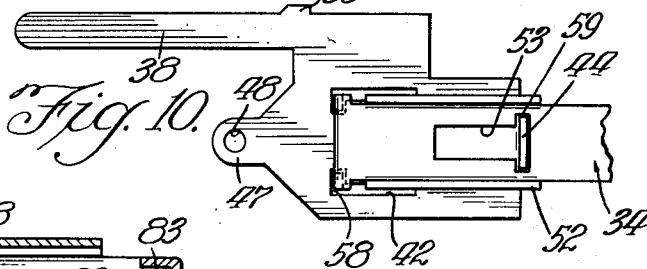


Fig. 10.

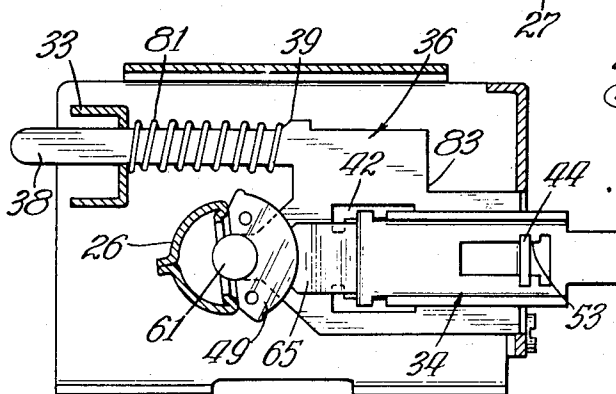


Fig. 3.

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2 Sheets-Sheet 2

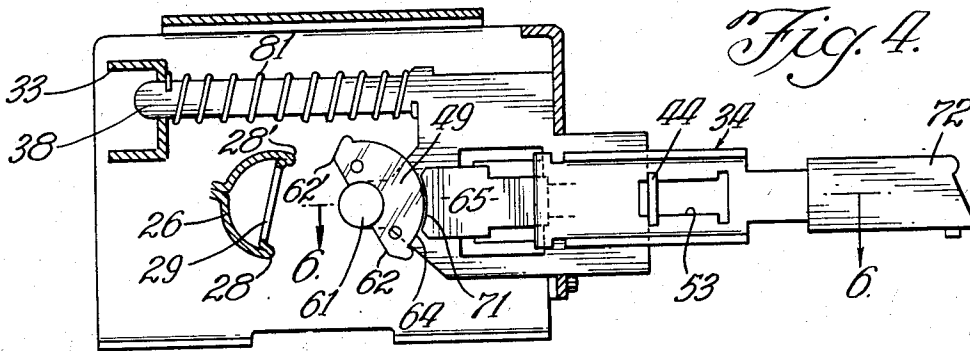


Fig. 4.

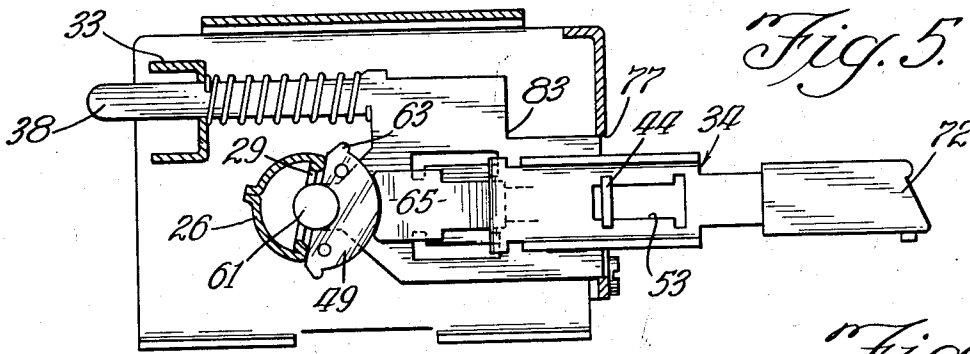


Fig. 5.

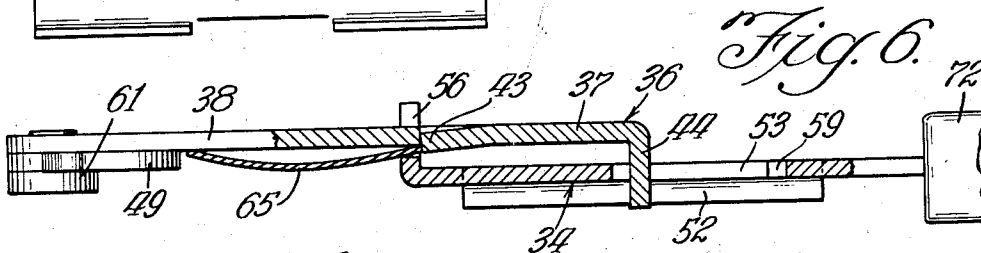


Fig. 6.

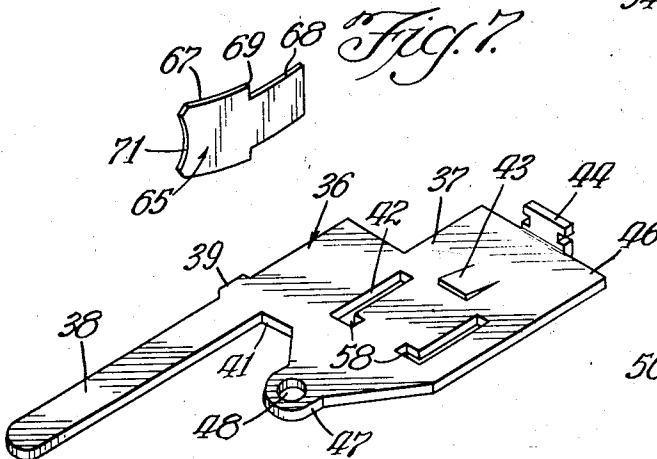


Fig. 7.

Fig. 9.

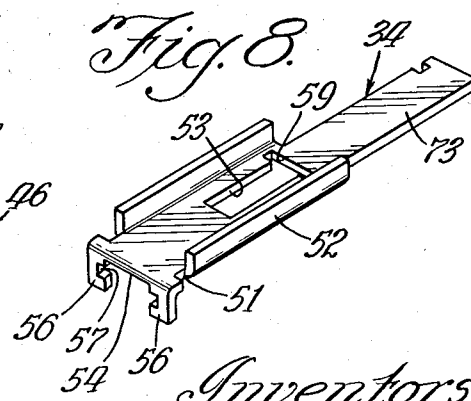


Fig. 8.

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UNITED STATES PATENT OFFICE

2,266,711

CONTROL APPARATUS

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Application May 29, 1940, Serial No. 337,900

18 Claims. (Cl. 74-10)

This invention relates to tuning devices for radio apparatus and in particular to automatic tuning devices of a mechanical type in which the force applied to the push button corresponding to a station which is to be tuned, supplies the rotative force for turning the tuning condensers or other frequency changing means. This invention relates to the structure of co-pending applications Serial No. 343,641 and 348,161, filed July 2, 1940, and July 29, 1940, respectively, which such applications carry the claims dominating the structure of the present application.

One form of the mechanical tuning devices of the prior art generally includes a rotatable treadle bar in operative connection with the tuning condensers; a linearly movable station selector unit being adapted to move the treadle bar to effect a movement of the condensers to a particular predetermined tuning position corresponding to the station identified by the selector unit. In these devices adjustable cam means are usually mounted on the selector unit having engaging portions thereon adapted to be moved into engagement with corresponding engaging portions on the treadle bar; the concurrent engagement of all engaging portions determining the tuning position of the condensers. The cam is generally locked in its adjusted position by screw means threadably secured in the selector units and adapted to effect a frictional engagement with the cam to prevent any moving of the cam from its adjusted position. Access to the adjusting screws is usually provided from the outside of the radio receiver, the adjustments generally being made by the use of a screw-driver or like means. Considerable difficulty and inconvenience is encountered in the cam adjustment of these prior art devices by virtue of the fact that the selector units must be held in engagement with the treadle bar or in home position during the adjusting operation. The adjusting operation thus requires the use of both hands of the radio operator, one hand for holding the selector unit in its home position and the other hand for manipulating the screw-driver. Particularly in instances such as in small portable receiver sets where the selector units are spaced relatively close together, but little room is provided for the positioning of the hands. Apart from the inconvenience resulting from this lack of working space, the accuracy of the adjustment is impaired by the tendency of the selector unit to move out of its home position, so that a failure to maintain the unit in positive

engagement with the treadle bar at all times during the adjustment operation often results in the setting of the cam at a position other than that which will provide for the desired tuning condition.

A further disadvantage of the prior art devices is the poor locking action provided by the usual screw means. The cam is generally of relatively narrow width and the engaging portions on the cam and friction holding means of arcuate contour so that but small frictional surfaces are available for holding the cam in a locked position. Any tendency, therefore, for a tilting or canting of one or both of the engaging surfaces relative to each other results in a line contact rather than a surface engagement between such surfaces, whereby to appreciably reduce the frictional holding pressure. Because of this fact, many of the adjustments are only of a temporary nature since the cam is readily moved out of its adjusted position after but relatively few actuations of the selector unit.

An object of this invention, therefore, is to provide an improved control device for controllable apparatus which is particularly adapted for use as an automatic tuning device for radio receiving apparatus.

A further object of this invention is to provide a positive, simple locking device for a movable element, with the locking being effected as a result of a wedging action in the locking device.

Another object of this invention is to provide automatic tuning apparatus in which the station selector units are simply and easily adjusted for a particular tuning condition by the use of spring means.

A further object of this invention is to provide an automatic tuning device which is of simple, rugged construction and comprised of but few parts which are readily formed by stamping or punching operations so as to be produced commercially at a minimum of cost.

A feature of this invention is the provision of an adjustable element in a control unit, which may be adjusted to a predetermined control position and then locked in such position, all by the use merely of one hand in a very simple operation.

A further feature of this invention is found in the provision of a tuning device in which the station selector units are completely assembled by an interlocking engagement of the component parts thereof.

Another feature of this invention is found in the provision of a tuning device having an exten-

sible selector unit comprised of an actuating and an operating member interlockingly engaged for relative slidable movement. An adjustable cam is mounted on the operating member, and a substantially flat spring arranged between the two interlocked members is adapted on contraction of the unit to a closed position by relative movement of the two members to spread longitudinally and project a locking or holding force at one end toward the cam for locking the cam in its adjusted position.

A still further feature of this invention is the provision of a tuning device having an extensible selector unit including a locking spring for an adjustable cam, in which the locking spring is normally free of any tension when the unit is in its extended position so as to provide for a free movement of the cam, and which exerts a pressure on the cam to lock it in an adjusted position when the unit is in a closed position. A wedging action is employed in the locking operation of the cam.

Yet another feature of this invention is the provision of a tuning device having a selector unit including an adjustable cam, in which the cam locking means are adapted to positively hold the cam in its adjusted position by the direct application thereon of a strong spring force applied over a substantial portion of said cam.

Further objects, features and advantages of this invention will become apparent from the following description when taken in connection with the accompanying drawings in which:

Fig. 1 is a fragmentary plan view of the invention;

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is a view illustrated similarly to Fig. 2 showing the selector unit in a home position;

Fig. 4 is a side elevation of a station selector unit showing the arrangement of the parts thereof prior to its adjustment for a particular tuning condition;

Fig. 5 is a view illustrated similarly to Fig. 4 showing the selector unit after adjustment has been completed, but prior to locking;

Fig. 6 is an enlarged sectional view taken along the line 6—6 of Fig. 4;

Fig. 7 is a view in perspective of the spring for locking the selector unit in its adjusted position;

Fig. 8 is a view in perspective of the push rod for a selector unit;

Fig. 9 is a view in perspective of the carriage member for a selector unit; and

Fig. 10 is a side elevational view showing the assembly of the push rod and carriage.

The tuning device of the invention is illustrated, in Fig. 1 with representative resonant frequency changing means which includes a tuning condenser 15 having a fixed frame 16 and a rotatable shaft 17, which is rotatable through 180° to provide the full range of tuning. The condenser 15 is suitably connected to the radio receiving set (not shown). The shaft 17 is suitably connected to shaft 18 through coupling means 19, and the shaft 18 is provided with a gear segment 21 which meshes with a pinion 22 mounted at one end of a tuning shaft 23. Rotation of the shaft 23 by turning knob 24, tunes the condenser 15 to a given frequency, in an obvious manner. It is understood that other types of frequency changing mechanism may be substituted for the condenser 15.

The shaft 18 also carries a treadle bar 26, the

opposite end of the bar (not shown) being suitably rotatably mounted in the housing or frame structure 27. The treadle bar or rotary control means 26, as shown in Fig. 2, is in one piece, of hollow construction, and of substantially semi-circular section, the substantially diametrically opposed ends 28 and 28' thereof being supported by an integral slotted portion 29. Rotation of the treadle member 26, is obtained by actuation of the tuning knob 24 and also by actuation of the station selector or push button units 31 which are slidably supported in the frame wall portion 32 and bracket member 33.

Each unit 31 includes an actuating member 34 and an operating member 36 which are assembled in an interlocked but slidable engagement. The operating or carriage member 36 (Fig. 9) is of flat irregular shape and is integrally formed with a body portion 37 and an extending finger portion 38; the inner end of the finger being defined by a projecting shoulder 39 and a side 41 of the body portion 37. The portion 37 is formed substantially centrally thereof with inwardly facing L-shaped apertures 42 and a bumped up or lip portion 43, which is arranged between the apertures near one end thereof. A bent portion 44 of substantially T-shape is formed at the end 46 of the body portion 37, the opposite end 47 having an aperture 48 for an adjustable cam 49, which will be explained. The operating member 34 (Fig. 8) is of substantially flat shape and is provided near its end 51 with longitudinally extending bent or flange portions 52, a substantially T-shaped aperture 53 being formed between the portions 52. Bent oppositely in direction from the portions 52, but also at the end 51, is a substantially U-shaped portion with legs 56 having recesses 57 formed on the inner sides thereof. A transverse recess 54 extends intermediate the two legs.

In the assembly of the actuator unit 31 the leg portions 56 of the push rod or operating member 34 are positioned in the portions 58 of the apertures 42 to provide for their dovetail engagement with the carriage member 36 in a usual manner, the T-shaped portion 44 being dovetailed with member 34 by its initial positioning in the portion 59 of the aperture 53. This dovetailed engagement, which is clearly shown in Figs. 1 and 6, provides for a relative longitudinal movement of the members 34 and 36 so that each unit 31 may be extended and contracted, yet without permitting the members 34 and 36 to become disengaged except at the initial assembling position just described.

The cam 49, previously mentioned, (Fig. 2) is pivotally mounted on a stud or pin 61 which is journaled in the aperture 48 of the carriage 36. The cam is relatively narrow and of semi-circular section having flat diameter portions 62 and 62' arranged on opposite sides of the pivot pin 61. Abutments 63 formed at each end of the arcuate portion 64 serve to limit the pivotal movement of the cam about pin 61 by engagement with a spring 65, the apertures 66 formed in the cam adjacent each abutment 63 serving merely to pilot the punching die in the production of the cams 49.

The flat spring 65 (Figs. 6 and 7) is slightly arcuate in a longitudinal or lengthwise direction and formed of an enlarged section 67 and a reduced section 68, which sections are defined by a shoulder portion 69. Although the spring 65 acts to limit the angular movement of the cam 49, its principal function is in locking holding, or re-

taining, as the operation may variously be called, the cam in an adjusted position. The spring 65 is arranged between the adjustable cam 49 and the lip portion 43 of member 36, the spring end 71 being of an arcuate configuration to correspond with the arcuate portion 64 of the adjustable cam member 49. Spring portion 68 is adapted to fit between the leg members 56 of the push rod 34 at the recess 54 so as to be normally held in such recess when the members 34 and 36 are in their opened or extended position. By virtue of the entire assembly slight movement of the spring 65 relative to the actuator structure is permitted both longitudinally and transversely when the members 34 and 36 are in their open position. In this position the cam 49 is entirely free of any frictional pressure as exerted by the spring 65, and is freely movable about its pivot point 61. On moving of the members 34 and 36 into their closed position, the push rod 34 at the recess 54 slides on the spring 65 to urge the spring laterally with somewhat of a wedging action between such spring and the carriage member 36. With the longitudinal displacement of the spring 65 being limited by a lug 43 and cam 49, this action of the push rod 34 provides for the exertion of a spring pressure both longitudinally and laterally of the spring, the longitudinal displacement of the spring being less than its lateral displacement so that the spring acts as a toggle to apply a magnified loading pressure on the adjustable cam 49, whereby to frictionally lock the cam 49 in the angular position which it has at the time the members 34 and 36 are being closed. That is, the longitudinal movement of the member 34 relative to the member 36 in engagement with one side of the bowed unit, or spring 65, applies a pressure to the same intermediate its ends tending to straighten or flatten it and apply pressure endwise from the point engaged. The pressure against the member 49 increases during the flattening so that it finally locks or holds the member 49 firmly in a particular predetermined position.

Because of the slight longitudinal and transverse play of the spring 65 relative to its mounting prior to the moving of the members 34 and 36 to their closed position, the initiation of the clamping or wedging action acts first to seat the arcuate spring portion 71 firmly against the cam surface 64 before the exertion of any pressure resulting from the toggle action of the spring. A positive and flush engagement is thus obtained between the relatively large engaging arcuate surfaces of the cam 49 and spring 65 so that a maximum frictional pressure is effected between such surfaces to provide for a positive locking of the cam in its adjusted position. The lateral pressure exerted by the spring in locking position is adapted to hold the carriage 36 and push rod 34 in their assembled closed position. The shoulder portions 69 of the spring when engaged by the leg portions 56 limit the closing movement of the push rod 34 relative to the carriage 36, to prevent the legs from reaching the disassembly position with reference to the apertures 58, and hence define the closed position of the unit 31. The cam 49, is released from its locked position simply by pulling the member 34 outwardly relative to the member 36 to its open position, in which position (Fig. 6) the spring 65 is permitted to bow outwardly and the tension is removed. The limit of this movement is attained upon engagement of the lug 44 and edge of the narrow end of the aperture 53. In production the cam

49 is mounted on the carriage prior to the interlocking assembly of the carriage and the push rod. An actuating button 72 is securely mounted upon the end 73 of the push rod, and such button can be pulled upon to extend the push rod 34 as well as pushed upon to move the entire unit 31.

If it is desired to disassemble a unit 31 for any reason this is accomplished in exact reverse order as to the elements of the units as compared to the assembly thereof. With the unit in the position of Fig. 6, the spring 65 is lifted out of position, and the rod 34 moved toward the cam until the legs 56 are aligned with the apertures 58, and the lug 44 aligned with the portion 59 of the aperture 53. The mounting for each unit in the frame for the control apparatus will normally prevent this disassembly after the complete apparatus has been put in operating condition.

Each unit 31 (Fig. 2) is assembled in the frame 27 by location of the finger 38 in a slot 74 formed in the bracket 33, the side 76 of the carriage body portion 37 being positioned in a recess 77 provided in the panel 32, with the opposite side 78 thereof supported in a guiding slot 79 formed in a retaining plate 80 which is attached to the frame 27. The unit is thus slidably supported to provide for linear movement of the unit and hence of the cam 49 into engagement with the treadle bar 26.

The normal operation of the selector unit in providing for the turning of the treadle bar 26 and hence of the condenser unit 15 to a predetermined tuning position is best understood from Figs. 2 and 3; the cam 49, carriage 36 and push rod 34 being in their locked positions. As indicated in Fig. 2, the cam 49 and bar 26 are shown as being inclined toward each other with the engaging portions 28' and 62' closer together than the engaging portions 28 and 62. Thus on actuation of the unit 31 the portions 28' and 62' are first brought into engagement, the continued linear movement of the unit 31 effecting a counter-clockwise rotation of the bar 26 until engagement is made between the portions 28 and 62, as shown in Fig. 3. The engagement of both pairs of corresponding portions 28 and 62, and 28' and 62' represents the home or tuned position of the unit. The radio receiver is thus tuned from the condenser setting indicated by the position of the treadle bar in Fig. 2 to the changed setting shown in Fig. 3, the selector unit after release being returned to its idle position by the action of the coil spring 81, which is mounted on the finger 38 and arranged in compression between the bracket 33 and the projection 39 and side portion 41 of the body portion 37. This action of the unit is similar for any relative positioning of the bar 26 and the cam 49, the engagement of the corresponding engaging portions on the bar and the cam nearest together at the start of unit actuation serving to rotate the bar 26 in a direction and to a position at which the face edges of the cam are both in engagement with the corresponding face edges 28 and 28' of the treadle bar.

In other words, the selector unit is always pushed inwardly to the same longitudinal position when the condenser is in a tuned position, and the treadle bar and cam are in flush engagement at this position, but at such tuned position the angular position of the treadle and cam faces will vary in accordance with the particular frequency being tuned in with the condenser. During this normal operation of the unit it is to be understood that the selector unit is in its con-

tracted position with the cam 49 and members 34 and 36 locked in a relatively fixed position by the pressure exerted by the spring 65.

In the adjustment of the cam 49 to set it to a predetermined angular tuning position, the station selector 31 is extended with the members 34 and 36 in an open position, whereby to release such members and the cam 49 from the locking pressure exerted by the spring 65, this unit arrangement being shown in Figs. 4 and 6. The treadle bar 26 is turned to a particular tuning position by operation of the tuning knob 24, the treadle being held in such position by the normal condenser load applied on the shaft 18. Normally an appropriate tuning scale is provided to indicate the position of the teeth of the segment 21 and of the pinion 22 be of V-type so as to reduce to a minimum the occurrence of any backlash therebetween, and the segment 21 is also under slight spring tension. The condenser 15 is thus readily and accurately tuned by adjustment of the knob 24. On the application of manual pressure on the push rod 34 at the button 12, the initial friction between the rod 34 and the spring 65 is sufficient to provide for a concurrent linear travel of both the push rod 34 and the carriage 36 against the pressure of the spring 81. On engagement of the cam portion 62' with the bar portion 28', the cam 49, by virtue of its free pivotal movement when the members 34 and 36 are in their open position as was previously fully described, is rotated angularly. The bar 26 meanwhile remains immovable and in the tuning position obtained by manipulation of the tuning knob as just described. This rotation of the cam is continued until the corresponding portions 28 and 62, on the bar and cam, respectively, are also brought into engagement. In this position the carriage 36 is positively stopped due to the fact that the axis of the treadle bar and the longitudinal axis of the unit 31 are in the same horizontal plane, so that the continued application of pressure on the push rod 34 effects a linear movement only of the push rod relative to the carriage. This movement slides the face of the recess 54 over the spring, and serves to clamp the spring 65 between the rod 34 and carriage 36. As was explained, the initial moving of the rod 34 relative to the carriage 36 acts first to align or seat the portion 71 of the spring with the portion 64 on the cam, so that a flush and positive engagement is provided between these portions prior to the actual application of any spring pressure on the cam. The movement of the push rod continues until engagement thereof is effected with the shoulder portion 69 on the spring 65, which engagement occurs when the selector unit 31 is in its home position as indicated in Fig. 5. The push rod, carriage, and cam are thus securely locked by the spring in a relatively fixed position, representing the contracted position of the selector unit 31, with the cam 49 being adjusted to the particular tuning position of the bar 26 as set by the operation of the tuning knob 24. During this actuation of the unit 31 the tuning knob 24 remains untouched and the radio operator need only use one hand in all of the manipulations of the selector unit 31 described, with the treadle bar and the associated condenser unit 15 supplying all of the necessary reaction to the adjusting forces to make the desired adjustments possible.

On release of the push rod 34, the selector unit

31 in its contracted position is returned to its starting or idle position by the return spring 81. Later actuation of the unit will thus rotate the bar 26 from any position which it might have to a position corresponding with the angular adjustment of the cam 49 to tune in a desired predetermined station. As has been described, release of the cam 49 to permit angular adjustment for setting to a different station or control position is obtained by merely pulling on the push rod 34 in a direction toward the right, as viewed in Fig. 2, away from the treadle bar 26. The engagement of the abutments 63 on the cam 49 with the spring section 67 limits the angular rotation of the cam relative to the spring to prevent the cam from rotating into a position which would prevent a full surface engagement between the cam surface 64 and spring face 71. The shoulders or abutments 63 are spaced a distance apart to permit an angular rotation of the cam which is slightly greater than the normal angular rotation of the treadle bar for covering the tuning range of the frequency changing means.

The invention thus provides for a tuning or control device which is comprised of but few parts of simple construction adapted for ready and cheap production in large quantities. The complete assembly of a selector unit by an interlocking or dovetail engagement of all of the component parts thereof, provides for a further reduction in manufacturing costs by the complete elimination of screws, nuts and similar securing means, and the saving of time required for the assembly. The accurate adjustment and positive locking of the adjustable cam for the station selector unit by the use of spring means insures peak tuning upon each operation of a selector unit. In addition all setting and operating manipulations of the selector unit can be readily accomplished with one hand, and without the use of supplementary tools.

Although the invention has been described with reference to a preferred embodiment only, it is to be understood that modifications and alterations thereof can be made which are within the full intended scope of the invention as defined by the appended claims.

We claim:

1. In radio control means having rotary tuning means, an extensible station selector unit adapted when in contracted position to rotate said tuning means, said unit including a pair of relatively extensible members, an adjustable element supported on one of said two extensible members selectively engageable with the rotary tuning means, means for normally maintaining said two members in slidable extensible relation, and holding means supported on one of said extensible members having a raised portion, said holding means engageable by and adapted to be substantially straightened by the other of said members upon sliding contraction of said two members so as to move at least one end thereof lengthwise, with said holding means in its substantially straightened position engaging said adjustable element in the contracted position of said members to releasably hold said adjustable element against angular movement relative to said unit.
2. In control apparatus having movable control means, a selector unit for moving said control means to predetermined control positions including a pair of relatively movable members with one of said members having an adjustable driving element thereon, means for normally preventing lateral disconnection of said two members but

permitting relative slidable movement lengthwise of the unit, a bowed spring normally retained at one end against longitudinal movement relative to said one member and movable at the other end into frictional engagement with said driving element, said spring being normally retained on said one member by said other member, with said spring upon slidable movement of said other member being urged laterally by said other member and extended longitudinally in at least the direction toward said driving element and engaging said driving element, and frictionally retaining said driving element against angular movement.

3. In control apparatus having movable control means, the combination of frame means, a selector unit movably mounted upon said frame means for movement toward and away from said control means, said selector unit including an operating member, a driving member adjustably mounted on said operating member, an actuating member on said operating member, means connecting said operating member and said actuating member but permitting relative slidable movement between said members, and means to releasably retain said driving member in an adjusted position and releasably retain said actuating and operating members against relative slidable movement, said retaining means including a bowed unit on said operating member in engagement therewith and extensible lengthwise of the operating member in one direction for operative connection with said driving member to retain the driving member in adjusted position, with said actuating member in engagement with and urging said bowed unit laterally at one portion thereof to extend said bowed unit and said bowed unit in its extended position providing a holding force for releasably holding said interconnected actuating and operating members against relative movement.

4. In radio tuning means having rotary tuning means, an extensible station selector unit adapted to rotate said tuning means when in a contracted position, adjustable means supported on said unit and operatively engageable with said rotary tuning means, and releasable means operatively connected with said adjustable means to retain said adjustable means fixed when the unit is in a contracted position and moving out of a retaining position relative to said adjustable means when said unit is in an extended position, said releasable means having at least one portion which is raised laterally from a straight-line position when the unit is in an extended position and depressed substantially to a straight-line position in the contracted position of the unit.

5. In radio tuning apparatus having rotatable tuning means, a station selector unit for rotating said tuning means and including a carriage and a push member in movable interlocked engagement with said carriage, said push member and carriage being relatively movable to at least two different positions, adjustable means mounted on said carriage and adapted for connection with said tuning means, holding means operatively connected with said adjustable means mounted in said unit on said carriage and retained thereon by means including said push member, said holding means having a portion expandible and contractible longitudinally of said unit toward and away from said adjustable means and being in a non-holding position with reference to said adjustable means when said carriage and push member are in one position, and being in a hold-

ing position with reference to said adjustable means when said push member and carriage are in a second position.

6. In control apparatus having movable control means, selector means for moving said control means to a predetermined control position including an interconnected but relatively slidable carriage portion and an extensible portion, an adjustable member supported on said carriage portion, a unit on said carriage portion for initiating a holding force for said adjustable member, means on said carriage portion for limiting the movement of at least a portion of said unit in one direction, said extensible portion being positioned with reference to said unit to limit the movement of another portion thereof in another direction, and with said extensible portion being movable toward said adjustable member and engaging said unit during such movement to laterally displace said another portion of said unit and extend said unit by said lateral displacement into operative engagement with said adjustable member to releasably hold said adjustable member in an adjusted position, said unit in adjustable member holding position also frictionally retaining said carriage and extensible portions against relative movement.

7. In control apparatus having rotary control means, the means for actuating said rotary control means including two relatively movable telescoped units, adjustable means on one of said units, and holding means operatively connected with said adjustable means, said holding means including a portion raised from a straight-line position when the adjustable means is movable for adjustment, and depressible toward a straight-line position to move one end thereof lengthwise and provide a holding force for said adjustable means for fixing the same in an adjusted position, with one of said units engaging said portion and movable relative thereto to depress said portion in movement in one direction and permit the raising thereof in movement in the opposite direction.

8. In control apparatus having rotary control means, the means for actuating said rotary means including a pair of relatively movable units, adjustable means on one of said units, and means for normally frictionally retaining said adjustable means in an adjusted position having an end portion operatively connected with said adjustable means and another end portion positioned intermediate said two units with a depressible portion intermediate said two end portions, with the other unit being movable on said one unit over a portion of said retaining means and engaging the same in a manner to depress said portion when the other unit is in one position, with said portion being raised when said second member is in another position, said retaining means rendering said adjustable means stationary when said intermediate portion is depressed and said adjustable means being movable for adjustment when said intermediate portion is raised.

9. In control apparatus having rotary control means, the means for actuating said rotary control means including in combination two relatively movable interconnected units, adjustable means on one of said units normally retained stationary in an adjusted position, and means supported intermediate said two units and in engagement with each operatively connected at one end with said adjustable means and having a raised portion when the adjustable means is in a

movable condition, means for limiting the movement of said supported means lengthwise of said one unit at the other end, with said other unit being movable over said raised portion and depressing the same to extend said one end thereon lengthwise and provide a retaining force for the adjustable means to retain it stationary in an adjusted position.

10. In control apparatus having rotary control means, actuating means for said rotary control means including a supporting unit, an adjustable member mounted on said unit, means on said unit extending longitudinally thereon operatively connected at one end with said adjustable member and movable at one portion in a direction into and out of a substantially straight-line position for said means, a movable member mounted on said unit in engagement with said means and movable thereover to apply pressure to said means when it is out of a substantially straight-line position with such pressure tending to straighten the same, a stop at the other end of said means, with said adjustable member and said stop experiencing a pressure exerted endwise by said means which increases as said movable member is moved over said means in the straightening action.

11. In control apparatus having rotary control means, the means for actuating said rotary control means including the combination of a pair of relatively movable interconnected units, adjustable means mounted on one of said units, friction holding means operatively connectible with said adjustable means including means supported on said one unit and normally raised out of a straight-line position in non-holding position, with one end portion of said supported means positioned intermediate said two units and having the other of said units in operative engagement therewith, said other unit being slidable toward said adjustable means and acting on said supported means in a manner to depress the same toward a straight-line position as it moves toward said adjustable means and extend one end of said supported means toward said adjustable means to provide a holding force therefor.

12. In control apparatus having rotary control means, the means for actuating said rotary means including in combination adjustable means operatively connected with said rotary control means, a first unit supporting said adjustable means, a second unit supported on said first unit and movable relative to said first unit having means guiding such relative movement, a bowed unit operatively connected at one end with said adjustable means and having a peak portion intermediate the ends in one position of said bowed unit, and a stop on said first unit at the other end of the bowed unit, with said bowed unit supported on said slidable unit in a position such that the portion adjacent the stop lies beneath a portion of the second unit, and with the second unit being movable over said peak portion to depress said portion and extend said one end toward said adjustable means to provide a holding force to maintain said adjustable means stationary.

13. In control apparatus having movable control means, a control position selector unit for moving said control means including movable supporting means, adjustable means mounted on said supporting means, and holding means for said adjustable means having one portion with a part thereof raised laterally from a substantially straight-line position when the adjustable means

is free to be adjusted and movable means maintained on said supporting means operatively engageable with said one portion and movable intermediate a holding position and a non-holding position, with said portion being operatively connectible with said adjustable means, and with the movable means upon movement relative to said supporting means from a non-holding position to a holding position urging said part toward a substantially straight-line position to provide a holding force for application to said adjustable means to maintain it releasably fixed against adjustment.

14. In radio tuning apparatus having rotatable tuning means, a station selector unit for the tuning means movable between two stop positions, said unit including supporting means, finger operated means on said supporting means and longitudinally slidable relative thereto, adjustable means mounted on said supporting means, and friction applying means operatively connected with said adjustable means mounted in said unit on said supporting means and retained thereon by means including said finger operated means, said friction applying means having a portion expandible and contractible longitudinally of said unit toward and away from said adjustable means, said finger operated means adapted to be pulled slidably outwardly relative to said supporting means when said unit is at one stop position to permit said portion to contract longitudinally to remove the holding friction from the adjustable means, and said finger operated means adapted to be pushed slidably inwardly relative to said supporting means when said unit is in the other stop position and acting to expand said portion longitudinally upon said slidable inward pushing movement.

15. In control apparatus having movable control means, a control position selector unit for moving said control means including movable supporting means, adjustable means mounted on said supporting means, a spring having a relatively smooth face on one side carried on said supporting means operatively connected with said adjustable means, and means on the supporting means operatively engaging the spring on said face thereof and movable relative to said supporting means, said movable means in one operating position permitting said spring to bow laterally to remove a holding force from said adjustable means, and being movable to another operating position and urging said spring toward a substantially straight-line position on said movement to provide a holding force for said adjustable means.

16. A control unit for controllable apparatus including a pair of movably interlocked members, adjustable means on one of said members, with the other member being non-rotatably longitudinally movable relative to said one member in one longitudinal direction to release the adjustable means and in the opposite direction to effect a holding of said adjustable means, means operatively connecting said adjustable means and said other member including a resilient portion movable laterally relative to said one member upon selective movement of said other member into said release and said holding positions, and means interlockingly connecting said pair of members but permitting relative movement thereof including a projecting portion on one member having a pair of oppositely disposed outstanding ears, with the other member having an opening therein and a body portion on each side of said opening,

and with each ear extending outwardly over a corresponding body portion.

17. A control unit for controllable apparatus including a pair of relatively but non-rotatably movable interconnected members, each of said members being flat over the greater portion thereof, adjustable means on one of said members, holding means adapted selectively to be in a holding position and in a non-holding position for said adjustable means supported upon said one member and operatively connecting said other member and said adjustable means, said holding means including a relatively flat spring having a portion movable laterally when the holding means is changed from one of said positions to the other, and with said one member having an opening therein, said other member having a portion extending substantially at right angles thereto with a part thereon movable in said opening and an outstanding ear on said part positioned over said one member adjacent said opening on one side of said one member,

and said extending portion having another part on the other side of said one member operatively connected with said holding means when said holding means is in holding position.

18. A tuning control unit for radio apparatus including a pair of interconnected but relatively movable members, adjustable means on one of said members, and holding means operatively connecting the other member of said pair and said adjustable means, said holding means including a relatively flat spring and adapted to be selectively in a holding and in a non-holding position for said adjustable means, means supporting said spring upon said one member, said spring having a portion movable laterally when the holding means is changed from one of said positions to the other, and with said other member being movable relative to said one member to effect said lateral movement of said portion of said spring.

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