Jan. 11, 1949. F. A. DAWSON 2,458,690

TUNING AND INDICATING MECHANISM

Filed April 3, 1946 2 Sheets-Sheet 1

Fig. 1

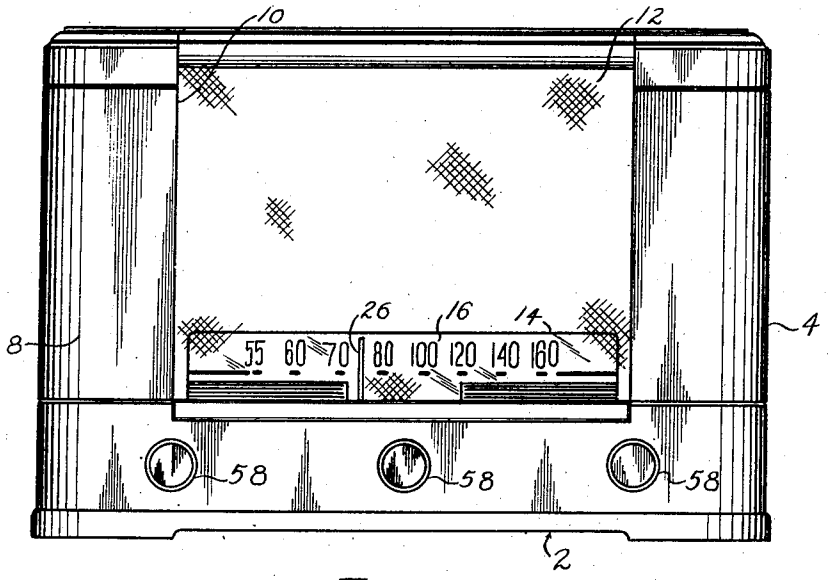
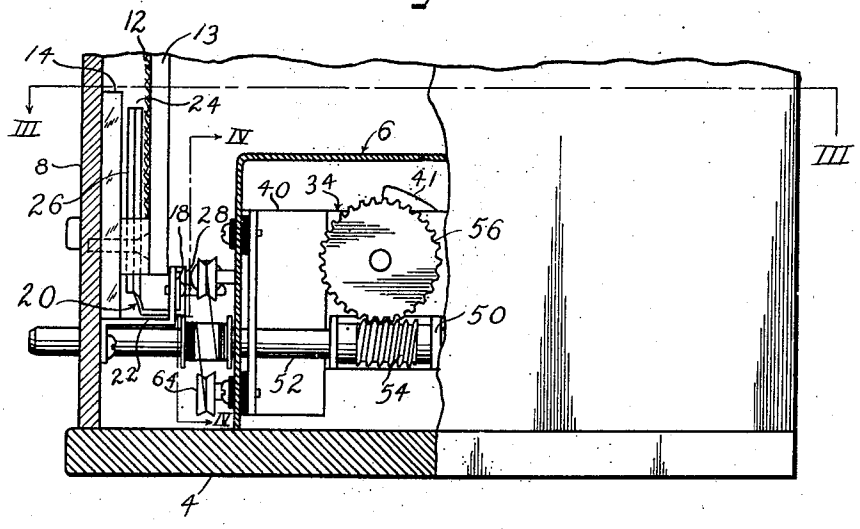


Fig. 2



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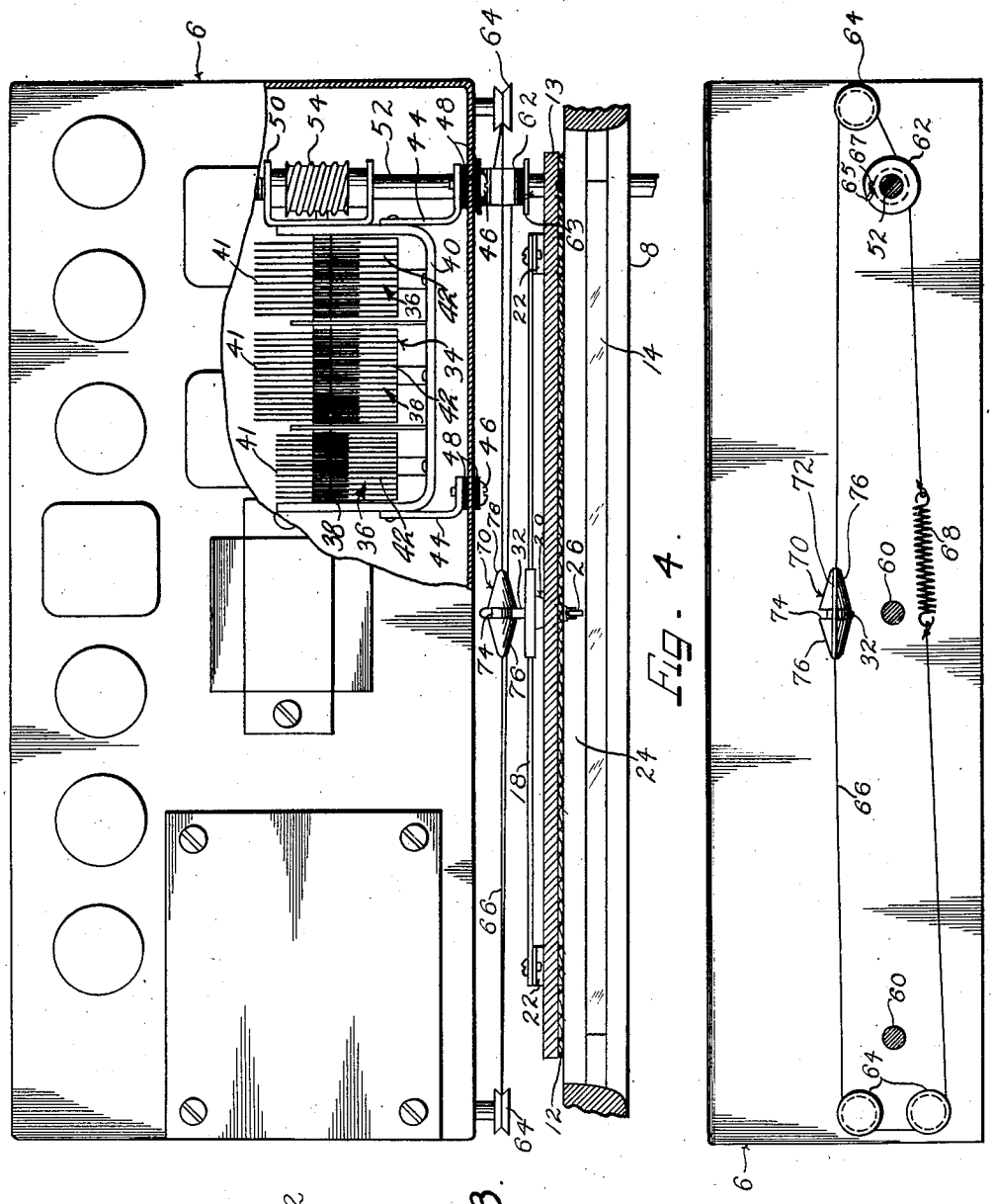


Fig. 4.

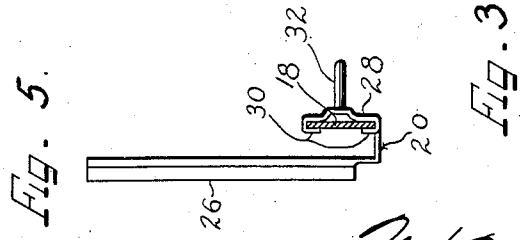


Fig. 3.

Fig. 5.

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TUNING AND INDICATING MECHANISM

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12 Claims. (Cl. 250—16)

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This invention relates to a tuning and indicating mechanism which is particularly applicable to radio receivers but may be applied to any device wherein the problem arises of visually indicating the position of a movable control member.

In all radio receivers the problem arises of visually indicating on the exterior of the cabinet the position of a movable tuning member which is located in the interior of the receiver. Such tuning mechanism generally takes the form of a bank of condensers which are rotated by a common shaft. In many modern radio receivers it has been found desirable to provide a tuning indicator comprising a pointer linearly movable across a linear dial. Such arrangement has the desirable features of affording ready observation by the operator of the position of the indicating member on the dial and further lends itself to improving the aesthetic appearance of the radio receiver.

To effect a driving connection between the rotating shaft which controls the tuning mechanism and the linearly movable indicating pointer, various types of continuous cord drives have been heretofore utilized. Such continuous cord drives, however, have been subject to several disadvantages. In the first place, it is generally necessary for ease of effecting the tuning of the radio receiver to any particular station to provide a considerable amplification factor between the movement of the tuning mechanism and the correlated movement of the tuning indicator. In the constructions heretofore known, such amplification has been achieved by driving the tuning mechanism by a large pulley which is in turn driven by the continuous cord. A substantially smaller pulley on the manually operated tuning shaft supplies driving movement of the continuous cord. The tuning indicator is then connected to a linear portion of the cord lying intermediate the large and small driving pulleys. This arrangement was obviously undesirable in that it required a substantial amount of space to mount the large driving pulley for the tuning mechanism which complicated the cabinet design of small so-called "table model" receivers. Furthermore, since the tuning mechanism was also driven by the cord drive, a substantial amount of power had to be transmitted by the cord drive and accordingly slippage of the cord on its driving pulley frequently occurred, resulting in misalignment of the position of the tuning indicator with the position of the tuning mechanism. Finally, at any time that it was desired to service the set, the entire cord drive had to be disassembled and the following re-assembly operation and synchronization of the position of the tuning indicator with the tuning mechanism was laborious and time consuming.

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Accordingly it is an object of this invention to provide an improved tuning and indicating mechanism particularly adaptable to radio receivers.

Another object of this invention is to provide an improved tuning and indicating mechanism utilizing a cord-like driving member and characterized by the fact that the cord-like driving member is required to move only the tuning indicator while the tuning mechanism is directly driven from the manual control shaft, thus eliminating slippage of the cord drive and positional misalignment of the tuning indicator with the tuning mechanism.

A further object of this invention is to provide a tuning mechanism wherein the amplification of movement between the tuning indicator and the tuning mechanism is obtained by gearing between the manually operable tuning shaft and the tuning mechanism, thus eliminating the necessity for large size pulleys or the like for driving the tuning mechanism.

A particular object of this invention is to provide an improved detachable connection between a member movable in correlation with the tuning mechanism of a radio receiver and a movable tuning indicator, such detachable connection being so arranged as to eliminate the necessity for disassembly of the driving mechanism during servicing of the radio receiver.

A further object of this invention is to provide an improved tuning and indicating mechanism for a radio receiver wherein a cord-like driving member for the tuning mechanism is mounted on the chassis of the receiver, a tuning indicator is movably mounted on the sabinet of the receiver, and a detachable connection is provided between the tuning indicator and the driving member which permits the removal of the chassis from the cabinet without disassembly of the driving member and automatically reconnects the tuning indicator with the driving member in proper synchonized relation thereto upon the reassembly of the chassis of the radio receiver into the cabinet.

A specific object of this invention is to provide a continuous cord drive on the chassis of a radio receiver which is rotatable by a manually operable tuning knob, a tuning indicator movably mounted on the cabinet of the receiver, and an improved detachable connection between the movable tuning indicator and the continuous cord which is automatically detachable upon re-

moval of the chassis from the receiver and automatically connectible in proper synchronized relationship upon the reassembly of the chassis in the receiver.

The specific nature of the invention as well as other objects and advantages thereof will be apparent to those skilled in the art from the following detailed description of the appended drawings, which, by way of preferred example, illustrates one embodiment of the invention.

In the drawings:

Figure 1 represents a front elevational view of a table type radio receiver embodying a tuning and indicating mechanism constructed in accordance with this invention;

Figure 2 is a side elevational view, partly in section of the radio receiver of Figure 1;

Figure 3 is a sectional view of Figure 2 taken along the plane III—III thereof with parts omitted for clarity;

Figure 4 is a partial sectional view taken along the plane IV—IV of Figure 2; and,

Figure 5 is a side elevational view of the tuning indicator showing it in assembly with its guide rail.

As shown on the drawings:

Referring to Figure 1, the radio receiver 2 comprises a cabinet 4 and a radio chassis 6 removably secured in the interior of cabinet 4 by suitable screws (not shown). The front wall 8 of cabinet 4 is provided with a large rectangular opening 10 and a cloth grille 12 is suitably supported on baffle 13 to cover the opening 10 but is disposed in rearwardly spaced relationship with respect to the front wall 8 of the cabinet. It will be understood to those skilled in the art that a suitable loud speaker (not shown) will be mounted within the cabinet 4 in position such that the open face of the loud speaker is disposed immediately rearward of the baffle 13.

Along the base of opening 10 in the front wall 8 of the cabinet an upstanding transparent dial scale member 14 is suitably mounted. Scale member 14 is preferably formed from plastic or other transparent material and carries suitable tuning graduations 16 on the face thereof.

The tuning indicator 20 has an upstanding rod-like portion 26 which is movable across the face of indicating scale 14 by sliding movement of indicator 20 on a track 18. As best shown in Figures 2 and 3, the track 18 is mounted in rearwardly spaced relation to the front wall 8 of the cabinet by means of a pair of generally Z-shaped brackets 22. The track 18 extends horizontally across the front of the cabinet and is disposed rearwardly of and below the cloth grille 12. The indicator 20 rides in space 24 provided between the rear of the scale 14 and the front face of the cloth grille 12.

The indictor 20 is a generally U-shaped member having a long rod-like arm 26 which cooperates with the scale 14 to afford a visual indication of the position of a tuning mechanism which will be described. The short arm 28 of indicator 20 is of generally rectangular shape and is provided at each of its corners with bent over tabs 30 which surround the track 18 and thus slidably support the indicator 20 for movement along track 18. In the central portion of the arm 28 of the indicator 20 a horizontal pin 32 is provided which projects rearwardly toward the chassis 6 and affords a connection with the tuning mechanism in a manner that will be described.

The chassis 6 comprises the usual box-like,

open bottom, metallic casing upon which all of the various elements of the radio receiver are supported. At any suitable location within the chassis 6 a tuning mechanism 34 is mounted. The tuning mechanism 34 may obviously comprise any form of variable condensers or inductors and here is shown as comprising a bank of three variable condensers 36, the movable plates 41 of which are mounted for co-rotation on a shaft 38. A U-shaped support member 40 is provided which mounts the fixed plate 42 of the condensers 36 and also journals the shaft 38. The support member 40 is secured to chassis 6 by a plurality of L-shaped bracket members 44. The brackets 44 are secured to chassis 6 but insulated therefrom by screws 46 and insulating washers 48.

U-shaped bearing member 50 is rigidly secured to one arm of support 40 and journals a manual control shaft 52. A worm 54 or any other suitable gear is secured to manual control shaft 52, preferably lying in between the arms of bearing member 50. A worm gear 56 is secured to the end of shaft 38 projecting out of the support member 40 and cooperates with worm 54 to drive the movable plate 41 of condensers 36 at a substantially lower rater of speed than the manual control shaft 52.

Manual control shaft 52 projects forwardly out of chassis 6 and, when the chassis 6 is assembled in cabinet 4, manual control shaft 52 will project through a suitable hole in the front wall 8 of the cabinet and the projecting end thereof will detachably receive an operating knob 58. As will be understood by those skilled in the art, various other control shafts 60 may be provided also extending from the chassis 6 out through the front wall 8 of the cabinet to receive suitable control knobs 58. Such additional shafts may be utilized for volume control, off-on control, tone control, etc.

On that portion of manual control shaft 52 which projects out of chassis 6, a cord driving drum 62 is suitably secured to manual control shaft 52, or if desired, the drum 62 may be integrally formed on manual control shaft 52. A plurality of spaced pulleys 64 are rotatably mounted on the front wall 7 of chassis 6 and cooperate with drum 62 to guide a continuous cord driving member 66.

As will be shown, the cord 66 functions as a driving member for the movable indicator 20 and accordingly the pulleys 64 are suitably located on the chassis wall 7 so that a portion of the cord 66 follows a path parallel and adjacent to the linear path of movement of indicator 20. As will be understood by those skilled in the art the cord 66 is wrapped around the surface of drum 62 several times to obtain frictional engagement with the drum surface and the ends of the cord 66 are respectively secured to opposite ends of a tension spring 68 thereby insuring the maintenance of a predetermined tension on the cord 66 at all times. To further insure a non-slipping engagement between the drum and the cord, the side walls 63 of the drum are provided with slots 65 which receive knotted ends 67 of cord 66.

In accordance with this invention a detachable driving connection is effected between the driving cord member 66 and the movable tuning indicator 20. Such detachable connection is obtained by the provision of a connector 70 which is secured to the cord 66 in that portion of the cord which moves in a path adjacent and parallel to the path of tuning indicator 20. The connector

70 is mounted in surrounding relation to cord 66 by means of a longitudinal passage 72 centrally provided therethrough. To eliminate the necessity of threading the cord 66 through connector 70 the longitudinal passage 72 may be conveniently formed by a longitudinal slot cut through the connector member 10. The connector 70 is secured to cord 66 by any suitable manner as by crimping, cementing, etc. In the central portion of connector member 70 an annular slot 74 is provided which is suitably shaped to receive the projecting pin portion 32 of tuning indicator 20. Hence a detachable driving connection is thus obtained between the driving cord member 66 and the movable tuning indicator 20. Such connection will be automatically interrupted upon removal of the chassis 6 rearwardly out of the cabinet 4.

To automatically reestablish the driving connecting between the movable tuning indicator 20 and the driving cord member 66 in their same relationship as existed prior to their uncoupling, the exterior surfaces 76 of connector member 70 on both sides of annular slot 74 are formed in a generally conical shape, decreasing in diameter away from annular slot 74. The conical surfaces 76 thus act as cam surfaces which, when the chassis is inserted in the cabinet 4 and the manual control shaft 52 is rotated, will move into engagement with the projecting pin portion 32 of tuning indicator 20 and cam such pin portion into engagement with the annular slot 74. It should be noted that such caming action will occur irrespective of which direction the connector member 70 approaches the pin portion 32 due to the fact that identical cam surfaces 76 are provided on each side of the annular slot 74 in connector member 70.

From the foregoing description it is obvious that when the tuning and indicating mechanism is once properly assembled and aligned so that the tuning indicator 20 moves across the scale 14 in proper synchronized relationship to the graduations 16 thereon, as determined by the corresponding movement of the tuning mechanism 34, then upon later removal of the chassis 6 from the cabinet 4 for servicing purposes, it will not be necessary to disturb the relationship of the cord drive with respect to the tuning mechanism and furthermore the driving connection between the cord drive and the tuning indicator is reestablished automatically in the identical relation which existed prior to removal of the chassis from the receiver.

It should be further noted that a construction embodying this invention has completely eliminated the large size pulleys heretofore utilized in connection with a cord drive to secure the desired speed ratio between the movement of the tuning mechanism and the movement of the tuning indicator. Any desired speed ratio may be conveniently obtained in a construction embodying this invention by suitable proportioning of the cooperating gears which connect the manual control shaft 52 to the tuning mechanism 34 or selection of the size of drum 62. Finally it should be noted that the direct gear drive connection between the manual control shaft 52 and the tuning mechanism 34 eliminates the driving of the tuning mechanism through the continuous cord and accordingly the continuous cord need only drive the relatively light tuning indicator. Thus the possibility of slippage between the cord and driving drum and the resulting misalignment of the tuning indicator with the tuning mechanism is completely eliminated.

Accordingly a tuning and indicating mechanism embodying this invention provides a greatly improved construction over similar devices heretofore known by reducing the space required to accommodate the elements of the mechanism, improving the performance and reliability of the mechanism, and providing an automatically operable detachable connection between the tuning mechanism in the radio chassis and the indicating mechanism of the radio cabinet, thus permitting the chassis to be conveniently removed from the cabinet for servicing.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention, and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. In a radio receiver or the like having a cabinet and a chassis supported in the cabinet, the improvements of a tuning mechanism movably mounted on the chassis, a tuning indicator movably mounted on said cabinet, a driving member movable in correlation with said tuning mechanism, said driving member being mounted on said chassis for movement parallel to the movement of said tuning indicator, a drive connection between said tuning indicator and said driving member, said drive connection including interengaging members automatically detachable upon removal of the chassis from the cabinet, one of said members including a cam surface for automatically shifting the other member to interengaging position by operation of said driving member following reinsertion of said chassis in the cabinet.

2. In a radio receiver or the like having a cabinet and a chassis supported in the cabinet, the improvements of a tuning mechanism movably mounted on the chassis, a tuning indicator movably mounted on the cabinet, a driving member movable in correlation with said tuning mechanism, said driving member being mounted on said chassis for movement parallel to the movement of said tuning indicator, a projection on said tuning indicator extending toward said chassis, and a connection member on said driving member having a slot for receiving said projection to effect a driving connection between said tuning indicator and said driving member automatically detachable upon removal of the chassis from the cabinet.

3. In a radio receiver or the like having a cabinet and a chassis supported in the cabinet, the improvements of a tuning mechanism movably mounted on the chassis, a tuning indicator movably mounted on the cabinet, a driving member movable in correlation with said tuning mechanism, said driving member being mounted on said chassis for movement parallel to the movement of said tuning indicator, a projection on said tuning indicator extending toward said chassis, a connection member on said driving member having a slot for receiving said projection to effect a driving connection between said tuning indicator and said driving member automatically detachable upon removal of the chassis from the cabinet, and cam surfaces on said connection member disposed respectively on each side of said slot, said cam surfaces being constructed and arranged to direct said projection

into said slot by movement of said driving member relative to said tuning indicator.

4. In a radio receiver or the like having a movable tuning mechanism, a cord-like member linearly movable in fixed correlation with the movable tuning mechanism, a linearly movable tuning indicator, a projection on said indicator extending adjacent the path of said cord-like member, a connection member on said cord-like member having a slot for receiving said projection to effect a detachable driving connection between said tuning indicator and said cord-like member.

5. In a radio receiver or the like having a movable tuning mechanism, a cord-like member linearly movable in fixed correlation with the movable tuning mechanism, a linearly movable tuning indicator, a projection on said tuning indicator extending adjacent the path of said cord-like member, a connection member on said cord-like member having a slot for receiving said projection to effect a detachable driving connection between said tuning indicator and said cord-like member, and cam surfaces on said connection member disposed respectively on each side of said slot, said cam surfaces being constructed and arranged to direct said projection into said slot by movement of said cord-like member relative to said tuning indicator.

6. In a radio receiver or the like having a cabinet and a chassis supported in the cabinet, the improvements of a tuning mechanism movably mounted on the chassis, a cord-like driving member linearly movable relative to said chassis in fixed correlation with the movement of said tuning mechanism, a tuning indicator mounted on said cabinet for linear movement parallel to the path of movement of said cord-like member, a projection on said tuning indicator extending adjacent said chassis, a connection member secured to said cord-like member in surrounding, concentric relation thereto, said connection member having a central annular slot therein for receiving said projection to effect a driving connection between said tuning indicator and said cord-like member automatically detachable upon removal of the chassis from the cabinet, said connection member also having generally conical cam surfaces on each side of said annular slot constructed and arranged to direct said projection into said slot by movement of said cord-like member relative to said tuning indicator.

7. In a radio receiver or the like having a cabinet and a chassis supported in the cabinet, the improvements of a tuning mechanism movably mounted on the chassis, a cord-like driving member linearly movable relative to said chassis in fixed correlation with the movement of said tuning mechanism, a linear track member mounted on said cabinet in a position adjacent and parallel to the path of said cord-like driving member, a tuning indicator mounted for sliding movement on said track member, a projection on said tuning indicator extending adjacent said chassis, a connection member secured to said cord-like member in surrounding, concentric relation thereto, said connection member having a central annular slot therein for receiving said projection to effect a driving connection between said tuning indicator and said cord-like member automatically detachable upon removal of the chassis from the cabinet, said connection member also having generally conical cam surfaces on each side of said annular slot constructed and arranged to direct said projection into said slot by movement of said cord-like member relative to said tuning indicator.

8. In a radio receiver, a rotatable tuning mechanism, a manually rotatable shaft, gearing means interconnecting said shaft and said tuning mechanism, a drum rotatable by said shaft, a continuous cord driven by said drum, means for guiding said cord along a substantially linear path, a tuning indicator mounted for linear movement parallel and adjacent to said linear path, a projection on said tuning member extending adjacent said linear path, a connection member secured to said cord, said connection member having a slot therein for receiving said projection to effect a detachable driving connection between said manually rotatable shaft and said tuning indicator.

9. In a radio receiver or the like having a cabinet and a chassis supported in the cabinet, the improvements of a tuning mechanism rotatably mounted on the chassis, a manually rotatable shaft, gearing means interconnecting said shaft to said mechanism, a drum rotatable by said shaft, a continuous cord driven by said drum, means for guiding said cord along a substantially linear path, a tuning indicator mounted for linear movement parallel and adjacent to said linear path, a projection on said tuning indicator extending adjacent said linear path, a connection member secured to said cord in surrounding, concentric relation thereto, said connection member having a central annular slot therein for receiving said projection to effect a driving connection between said tuning indicator and said cord automatically detachable upon removal of the chassis from the cabinet, said connection member also having generally conical cam surfaces on each side of said annular slot constructed and arranged to direct said projection into said slot by movement of said cord relative to said tuning indicator.

10. In a radio receiver or the like having a cabinet and a chassis supported in the cabinet, the improvements of a tuning mechanism rotatably mounted on the chassis, a manually rotatable shaft, gearing means interconnecting said shaft and said tuning mechanism, a drum rotatable by said shaft, a continuous cord driven by said drum, a tuning indicator mounted on said cabinet for movement parallel and adjacent to the path of said cord, a projection on said tuning member extending adjacent said cord, a connection member secured to said cord in surrounding, concentric relation thereto, said connection member having a central annular slot therein for receiving said projection to effect a driving connection between said tuning indicator and said cord automatically detachable upon removal of the chassis from the cabinet, said connection member also having generally conical cam surfaces at each side of said annular slot constructed and arranged to direct said projection into said slot by movement of said cord relative to said tuning indicator.

11. In a radio cabinet having a speaker opening in a wall thereof, a grille coextensive with said speaker opening and supported within said cabinet with a portion of one edge thereof spaced from the walls of the cabinet, a tuning dial comprising a plate-like member disposed generally parallel to said grille and spaced forwardly thereof, a tuning indicator comprising a generally U-shaped member disposed in surrounding relation to said edge portion of the grille, one arm of said tuning indicator being disposed between said

grille and said dial and cooperating with said dial as a pointer, the other arm of said tuning indicator being disposed behind said grille, and means engageable by said other arm to support said tuning indicator for movement along said dial.

12. In a radio receiver or the like having a cabinet and a chassis supported in the cabinet, the improvements of a tuning mechanism movably mounted on the chassis, a tuning indicator element movably mounted on the cabinet, a driving element movable in correlation with said tuning mechanism, said driving element being mounted on said chassis for movement parallel to the movement of said tuning indicator element, a projection on one of said elements extending toward the other said element, a connection member on said other element having a slot for receiving said projection to effect a driving connection between said tuning indicator element and said driving element automatically detachable upon removal of the chassis from the cabinet, and cam surfaces on said connection

member disposed respectively on each side of said slot, said cam surfaces being constructed and arranged to direct said projection into said slot by movement of said driving element relative to said tuning indicator element.

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