May 2, 1939. F. S. COE 2,156,677

RADIO TUNING DEVICE

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Fig. 1.

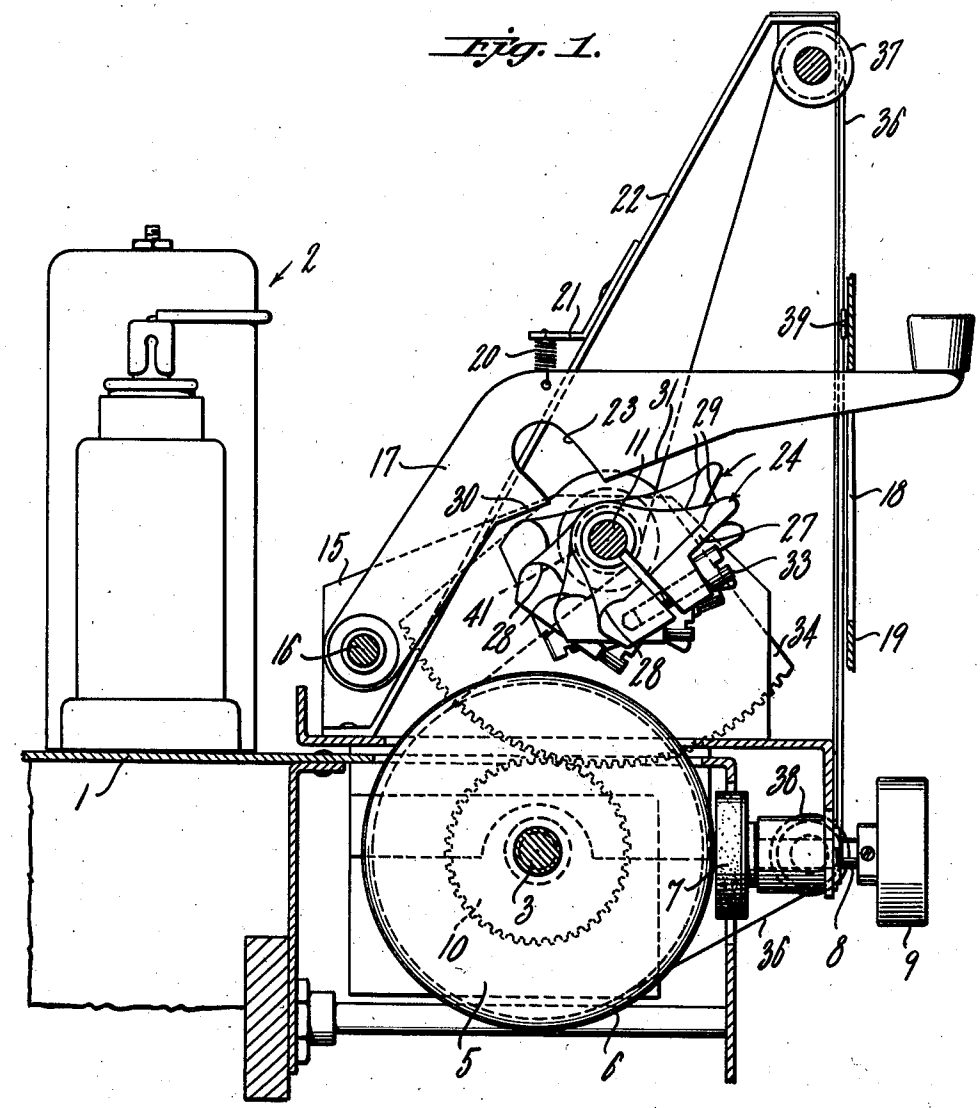
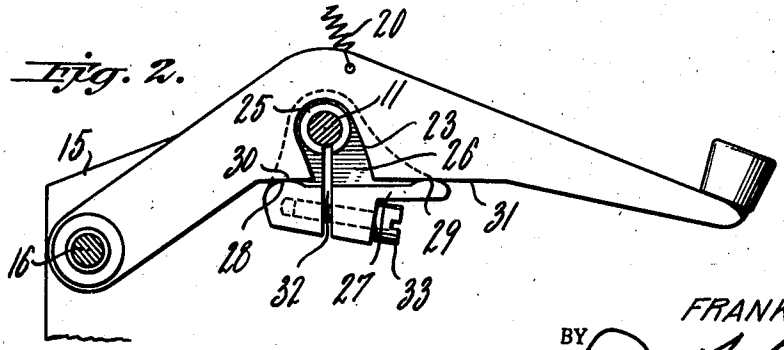


Fig. 2.



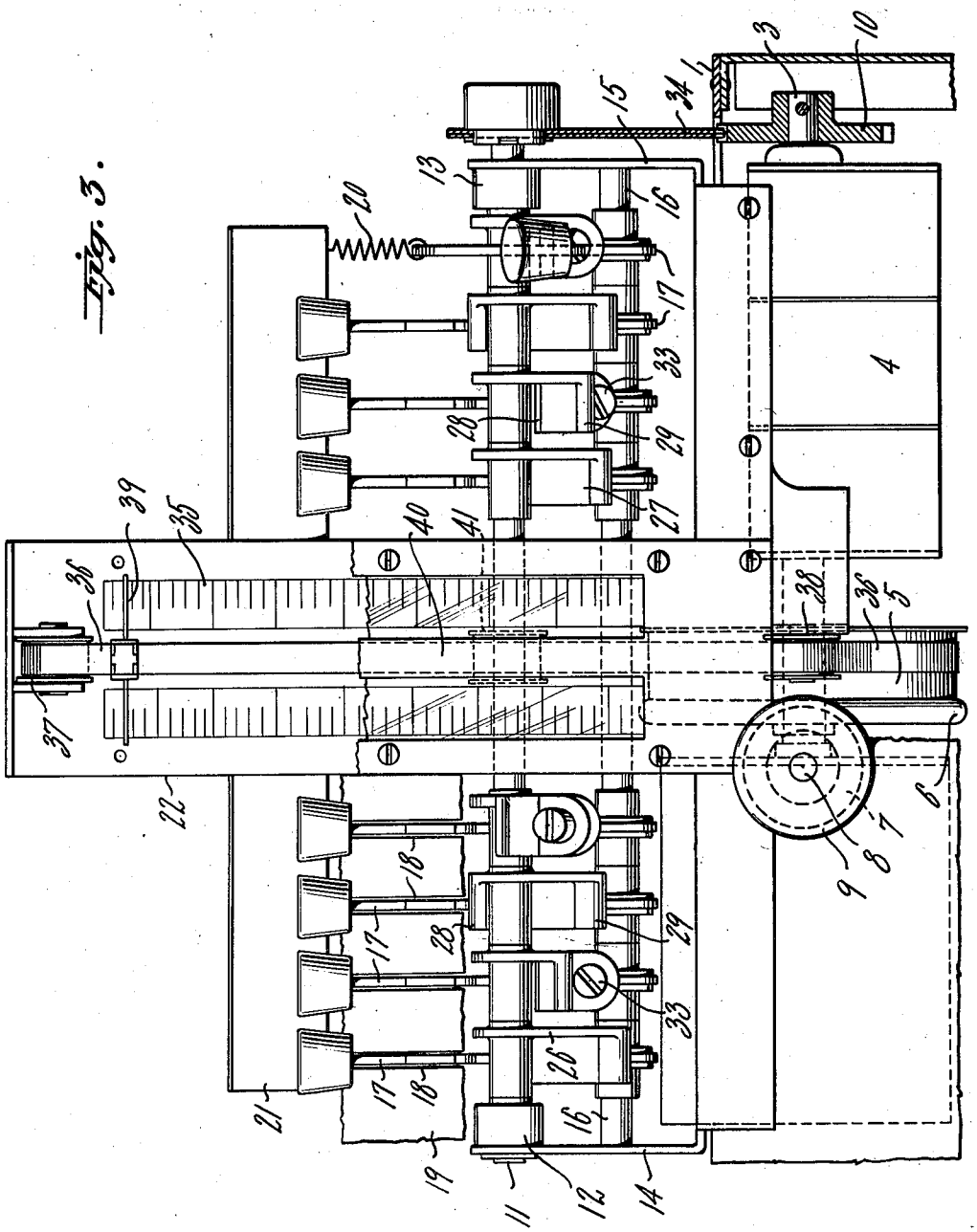
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Fig. 3.



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RADIO TUNING DEVICE

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4 Claims. (Cl. 74—10)

This invention relates to improvements in radio tuning devices of the type in which a conventional knob is provided for manually tuning a receiver to any station within the range thereof, and in which separate means are provided for selectively tuning the receiver to a limited number of desired stations.

It is among the objects of this invention to provide a structure in which the driving connection between the knob and the tuning shaft is automatically disengaged upon release of the knob, and in which the selective tuning means is likewise disengaged when not in use.

In radio tuners, it is common practice to provide a manually movable member, such as a lever which is adapted to coact with a cam, to rotate to a predetermined angular position a control shaft operably connected with the tuning shaft. The cam is usually adjustable on the control shaft to permit any desired angular relation thereof with respect to the shaft, and therefore any desired angular position of the tuning shaft corresponding to any desired broadcasting station may be obtained. In such structures, it may happen that the angular position of the cam upon the shaft is such that when the lever is depressed, it bears upon a surface of the cam closely adjacent to or upon a line extending through the center of the shaft. Under such conditions, which may occur during the early portion of the movement of the lever or toward the end thereof, there is little leverage available and the depression of the lever may be difficult to effect.

It is among the objects of this invention to overcome the above mentioned defect and provide a structure of this type in which the operation of the lever does not meet material opposition until the shafts have been rotated to the desired angular positions, at which time the lever reaches its full stop position.

Still another object of the invention is to provide a simple and compact arrangement of parts, such that the tuning device is readily adapted for use in various types of cabinets. To this end the control shaft is mounted parallel to the tuning shaft and operatively connected thereto by gearing. The two shafts may be supported above and below the same base plate thus placing all tuning control parts adjacent a small panel with which dial mechanisms of many suitable forms may be associated, and also adjacent the radio parts mounted on the top and bottom of the base plates.

It is a further object of the invention to provide a structure of this type in which the manually actuated lever requires but a small angular movement to effect the desired movement of the tuning shaft.

The above and other objects and features of this invention will be more apparent to those skilled in the art from a consideration of the following detailed description taken in conjunction with the accompanying drawings, in which:

Fig. 1 shows a portion of a radio receiving set in side elevation with parts removed to show its internal construction; Fig. 2 shows a detail of the lever tuning mechanism; and Fig. 3 shows a front view of the device with parts removed to show its internal structure.

In the drawings reference numeral 1 indicates a base plate forming a portion of the chassis of a radio receiving set having the usual tubes, coils, transformers, etc., indicated generally at 2. A tuning shaft 3 mounted below and supported from the base plate 1 is provided with the usual condenser gang 4 or other variable tuning means of the receiver. A drum 5 mounted upon the shaft 3, preferably at the end thereof, is provided with an annular rim 6 adapted for engagement with a friction wheel 7, preferably of soft rubber, mounted upon a short shaft 8. The opposite end of the shaft 8 is provided with a knob 9 forming the manual tuning knob of the receiver. The shaft 8 is mounted for both angular and longitudinal movement so that upon slight manual pressure against the knob 9 the friction wheel 7 will engage the annular rim 6 of the drum 5 and thus rotate the drum upon rotation of the knob 9. The end of the tuning shaft 3 remote from the drum 5 is provided with a gear 10.

A control shaft 11 is mounted above the base plate 1 in journals 12 and 13 supported by brackets 14 and 15, so that it extends substantially parallel with the tuning shaft 3. A lever shaft 16 is also supported in the brackets 14 and 15, behind and below the shaft 11. A plurality of levers 17 are pivotally mounted upon the lever shaft 16 and are so formed that they extend upwardly over the shaft 11 and outwardly through slots 18 provided in the panel 19. Tension springs 20 supported by spring bracket 21, mounted upon a panel support 22, normally hold the levers 17 in an upward position free from the shaft 11. The levers 17, which are preferably formed of metal stampings, are of substantially greater breadth at their central portions than toward the ends thereof, and in this central portion each is provided with a notch 23 positioned to register with the shaft 11 upon depression of the lever. A plurality of adjustable crank members 24, cor-

responding in number to the number of levers 17, are mounted upon the shaft 11. These cranks are identical each having a collar 25 for rigidly clamping the member upon the shaft 11, and an arm 26 integral with the collar 25 extending in a plane normal to the axis of the shaft 11. The arm 26 is provided at its end remote from the shaft 11 with a projecting portion 27 forming a crank pin extending at right angles to its surface which projecting portion provides a pair of spaced heels 28 and 29. The lower edge of each lever 17 is provided with smooth straight portions 30 and 31 extending on both sides of the notch 23 which straight portions are adapted to contact with the heels 28 and 29 upon the depression of the corresponding lever 17 to actuate the shaft 11 in a manner hereinafter more particularly described. Each crank 24 is split through the arm 26 and the collar 25, as indicated at 32, and an adjusting screw 33 is provided in an enlargement of the projecting portion 27 adapted to clamp the crank in a desired angular position upon the shaft 11. A segmental gear 34 on the end of the shaft 11 adjacent the journal 13 meshes with the gear 10.

A dial scale 35, which in the form shown is of the vertical type, is secured to the panel 19 and a flat tape 36, which extends around the flat surface of the drum 5 and is guided by guide pulleys 37 and 38 positioned adjacent the top and bottom of the dial. This tape carries the dial scale pointer 39. Thus rotational movement of the drum 5 is translated into upward or downward movement of the pointer 39 over the face of the scale 35. A protecting strip of metal 40 is provided for the sake of appearance and also for protecting the exposed surface of the tape 36 in front of the scale. A third guide pulley 41, free to rotate upon the shaft 11, may be utilized for further guiding and tensioning the tape 36.

In the operation of the above device as above described, normal manual tuning of the receiver set is obtained by pressing the knob 9 inwardly so that the friction wheel 7 contacts the annular rim 6 upon the drum 5. Rotation of the knob thereupon rotates the drum and accordingly the tuning shaft 3 to alter the setting of the condenser 4. The scale 35 being calibrated in the usual manner any particular setting of the condenser will be visibly apparent to the operator from the positioning of the pointer 39 on the scale. Since pressure is required to engage the friction wheel with the annular rim upon the drum, the moment the pressure upon the knob is relieved the driving connection between the knob and the drum will be automatically disengaged.

In order to adjust one of the cranks 24 for selective tuning of the receiver to a particular station, the corresponding one of the levers 17 is depressed. In this position the lever will engage a crank 24 in the manner shown in Fig. 2, and further downward movement of the lever or any movement of the crank 24 relative thereto is impossible. However, the shaft 11 may be rotated within the collar 25, assuming that the screw 33 is loosened by a screw driver inserted through an opening in the front panel, and thus upon rotation of the drum 5 manually by means of the knob 9 the receiver may be tuned to any desired station indicated by the dial pointer. Thereafter, upon tightening the screw 33, the crank 24 will become fixed upon the shaft 11 at the position thereof corresponding to the dial setting and thereafter upon depression of this particular lever the shaft 11 will always be rotated to the same position. The other cranks 24 can be similarly adjusted to other desired broadcasting stations. Since the control shaft 11 is geared to the tuning shaft 3, the latter will likewise be moved to the position corresponding to the station for which it was set at that time. The finger keys on the ends of the levers may be labeled with the letters of the respective broadcasting stations.

It will be noted that rotation of the tuning shaft 8 will occur regardless of the position of the control shaft 11, within its angular range, before the lever is depressed. Thus if the shaft 11 is in such angular position that the heel 28 extends upwardly, the straight portion 30 of the lever 17 will contact this heel to rotate the shaft in a counter-clockwise direction. On the other hand, if the shaft 11 is in such angular position that the heel 29 is uppermost, then the straight portion 31 of the lever 17 will contact with heel 29 upon depression of the lever to rotate the shaft 11 in a clockwise direction. Regardless of which heel is first contacted upon downward movement of the lever 17, at the end of such movement the shaft 11 will come to rest with both of the heels contacting the lever as shown in Fig. 2, and this position will of course be the same at which the crank 24 was adjusted upon the shaft 11.

The ratio of the gearing between the shafts 11 and 3 is preferably 180 to 70. Thus a relatively small rotation of the shaft 11 is sufficient to effect rotation of the shaft 3 throughout the full range, substantially 180°, of the condenser gang. Such a gear ratio permits the setting of the cranks 24 upon the shaft 11 to various predetermined positions corresponding to any selected station within the range of the dial, and within such range none of the contacting heels 28 and 29 will ever assume such positions that the direction of the force applied by the lever will pass through or close to the center of the shaft 11. Thus no position of a crank relative to its lever will correspond to a dead center or an approximate dead center position which would require considerable effort to depress the lever, and material resistance to the manual actuation of the lever is obtained when and only when the lever reaches its full stop position with the heel 28 contacting the portion 30 and the heel 29 contacting the portion 31 as shown in Fig. 2. The ease with which the lever may be actuated is further augmented by the fact that during the moment when the lever tuning is being utilized, the knob shaft 8 is not in driving connection with the drum 5. The elimination of toothed gearing or other fixed driving connection between the knob shaft 8 and the tuning shaft 3 thus not only prevents rotation of the knob when the lever tuning is being utilized but also eliminates this additional source of frictional resistance.

Although there is herein described but a single embodiment of the invention, other embodiments within the scope of the appended claims will be obvious to those skilled in the art from a consideration of the above disclosures of the preferred form of the invention.

Having thus described my invention, what I claim is:

1. A radio tuning device including, in combination, a tuning shaft; a second shaft; a gearing connecting said shafts; a member adjustably mounted upon said second shaft and comprising a collar surrounding said second shaft, an arm integral with said collar and extending in a plane normal to the axis of said second shaft; and a

lever operable in a plane normal to the axis of said second shaft and having a notched portion adapted to embrace said second shaft upon actuation of said lever; said arm having a projecting portion extending at right angles to its surface at the extremity thereof remote from said collar; said lever having portions adjacent each side of said notched portion for contacting said projecting portion of said arm, said projecting portion lying in the path of said lever whereby the edge of said lever adjacent both sides of said notched portion contacts said projecting portion to rotate said second shaft to a predetermined position.

2. A radio tuning device including, in combination, a tuning shaft, a second shaft, gearing operatively connecting said shafts, a crank mounted on said second shaft, and a lever operable in a plane normal to said shaft having a notched portion registering with said second shaft upon depression of said lever whereby when depressed the lower edge of said lever projects below the horizontal plane of said shaft, said lever having portions adjacent said notched portion for contacting said crank to rotate said shafts.

3. In a mechanism for angularly positioning a control element of a radio device; a member adjustably mounted upon a rotatable shaft and comprising an arm extending in a plane normal to the axis of said shaft and having one end adjustably attached to said shaft and carrying at its other end a lug extending perpendicularly to the plane of said arm; and an operating lever adapted to directly engage said lug at spaced points positioned upon one side of a longitudinal plane through the axis of said shaft and thereby rotate said shaft to an angular position determined by the adjustment of said arm.

4. In a mechanism for angularly positioning a control element of a radio device, a rotatable shaft, an arm attached at one end to said shaft and extending in a plane normal to the axis thereof, a lever operable in a plane normal to the axis of said shaft and having a notched portion adapted to embrace said shaft upon actuation of said lever and also having a portion on each side of said notch adapted to contact a portion of said arm and rotate said shaft to a predetermined position.

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