Dec. 22, 1942. G. CALETTI 2,305,805

KEY ACTUATED TUNING DEVICE FOR RADIO RECEIVERS

Filed June 1, 1940

Fig. 1

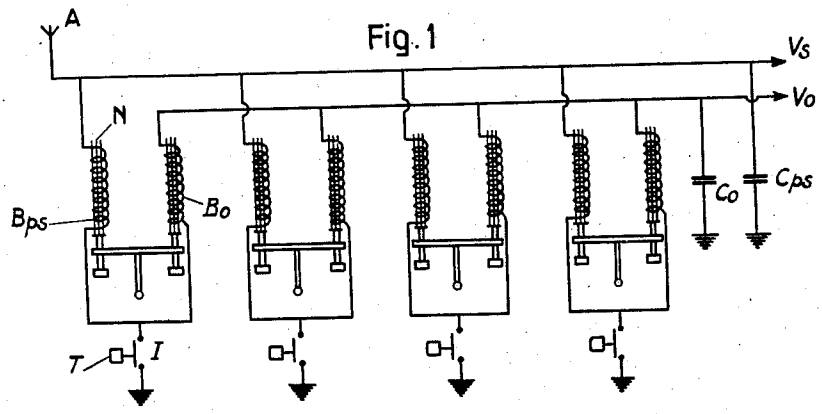


Fig. 2

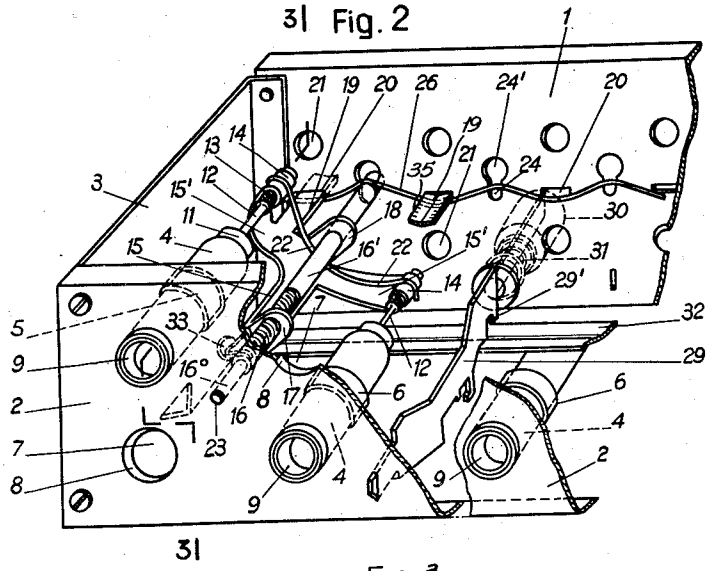


Fig. 3.

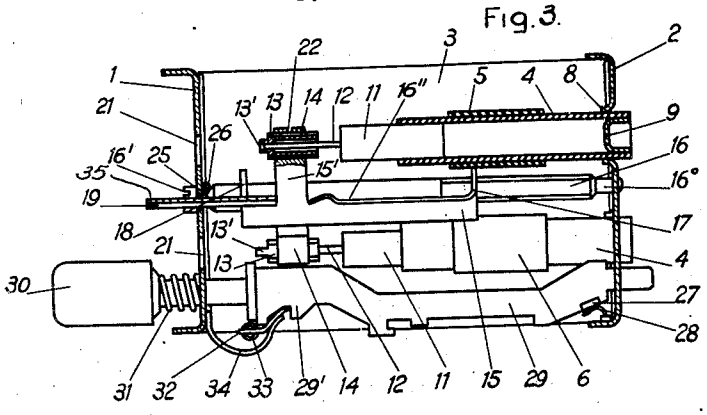
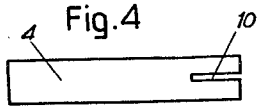


Fig. 4



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KEY ACTUATED TUNING DEVICE FOR RADIO RECEIVERS

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8 Claims. (Cl. 171—242)

This invention relates to key tuning devices for radio-receivers and more particularly it has for its object a device of this class in which the provision of the several parts and their general arrangement develop material advantages in respect of their construction, assembly and adjustment.

An embodiment of the present invention is illustrated in the annexed drawing and

Fig. 1 is a diagram of the tuning circuits of a radio-receiver set having the device of this invention embodied therein;

Fig. 2 is a fragmentary perspective view of the whole device as seen from the back thereof;

Fig. 3 is a transverse section on line 3—3 of Fig. 2 and

Fig. 4 illustrates separately a part of the device of Figs. 2 and 3.

The tuning means to which the present invention refers and which for purpose of description are assumed to be embodied in a superheterodyne receiver which on the other hand is provided with usual hand-operated tuning means, include, as known in the art, sections each devoted to one of the broadcasting stations in respect of which the key-tuning operation is required; each of said sections includes a coil connected in the receiver preselector stage and a coil connected in the oscillator stage, said coils being adapted to be made operative by the manipulation of a key belonging to the respective section.

At the time the operator makes the hand-operated tuning means including the variable condensers of the preselector stage and of the oscillator stage inoperative and the key-operated tuning means operative, both said variable condensers are cut off and two invariable condensers are inserted in the respective stages while the two coils corresponding with the manipulated key are substituted for the two normal coils of the preselector stage and of the oscillator stage; said key-tuning coils in cooperation with said invariable condensers provide for resonance with such frequency as required for receiving the wanted station.

The system above referred to is illustrated in the diagram of Fig. 1 where the antenna A is connected at Vs with a mixer tube and the several preselector coils Bps are shunted on the circuit A—Vs, while the cooperating oscillator coils Bo are connected in parallel with the oscillator tube at Vo; any of the pairs of coils Bps and Bo may be made operative by connecting it with ground by means of the respective switch I actuated by the key T. Co denotes the invariable condenser of the oscillator circuit while Cps denotes the stationary condenser of the preselector circuit.

The several coils Bps and Bo are provided with iron cores N adapted to be adjusted within wide ranges; each of said cores N must be separately adjustable and further both coils of each pair must be jointly adjustable to provide for tuning the circuit corresponding with the respective key on one of the stations which are required to be tunable in by key manipulation having in mind that in each radioreceiver the key tuning means are provided for in respect of a restricted number of stations and said means must be differently preset or calibrated in accordance with the location where the receiver is required to be operated and at the user selection.

The present invention is particularly directed to means by which the required conditions may be secured in respect of the several pairs of coils Bps and Bo and includes features directed to the provision, assembly and control of the several parts.

In the embodiment illustrated in Figs. 2 and 3, the device includes two parallel supporting plates 1 and 2 which are interconnected by side plates 3 to provide a support structure for the device parts.

Tubes 4 intended to carry the circuit coils 5 and 6 are fastened to the plate 2 of said structure and extend inwardly therefrom; said tubes 4 are conveniently of insulating material.

Each of said tubes 4 is supported at a single end in the plate 2 and for such a purpose an end of each tube 4 is inserted in an orifice as 7 of the casing plate 2; each tube 4 is mounted in position by the cooperation of a flange 8 provided in the plate 2 around each orifice 7 and receiving the tube end, and a ferrule 9 which is forced in said tube end; to improve the tube mounting the end thereof is split at 10 as illustrated in Fig. 4 for the purpose of imparting it a certain resiliency the tube end being thus forced in flange 8.

By the described arrangement all the tubes 4 may be fastened in position by a single operation by locating the tubes 4 in the respective flanges 8, inserting the ferrules 9 therein and forcing all said ferrules in the respective tubes by a single operation.

A coil 5 or 6 is located on each tube 4 and a sintered magnetic core 11 is arranged to slide therein. Each core 11 is connected by a resilient stem 12 with a screwthreaded sleeve 13 having a grasping head 13' and screwed in a tapped

collar 14 extending from a slide 15 located on an adjusting screwthreaded spindle 16 this spindle being manipulatable by means of its head 16'.

As shown in Figs. 2 and 3, the slide 15 includes two arms 15' providing at their end the collars 14 for engagement of the cooperating cores 11, as well as a screwthreaded-hole lug 17 which is engaged by the screwthreaded spindle 16; the slide 15 is guided in its motion by means of a further smooth-hole lug 18 which slides on a smooth portion 16'' of the spindle 16, a guiding tail 19 of said slide 15 being further mounted to move through a slot 20 of the plate 1.

The plate 1 has an orifice 21 in register with each sleeve 13 to provide for manipulating the head 13' thereof, for its adjustment.

An arc-shaped spring 22 has the portion thereof intermediate its ends engaged with the spindle 16, 16'' while its ends engage slots 22 of the collars 14 and bear on the sleeves 13 screwed in said collars 14, to develop on said sleeves 13 a pressure adapted to engage them in the desired adjusting position.

The spindles 16 are mounted in position by an end pivot portion 16° located in an orifice 23 of the plate 2 while the opposite end of the spindle 16 fits in a seat 24 extending from an enlarged orifice 24' provided in the plate 1; the spindle 16 has a groove 25 adapted to engage the seat 24 and to receive a spring 26 which extends along the plate 1 in register with the row of spindles 16 and is waved to extend alternately under the tails 19 of the several slides and in the top region of the grooves 25 of the spindles 16, to hold the several parts in position and to force the spindles 16 with their grooves 25 engaged in the seats 24 therefor, the spindles 16 being thus prevented from moving longitudinally when said spring is in position.

A switch intended to control the circuit of the two coils 5, 6 and shown diagrammatically at 27, 28, is operated by means of a rod 29 and a key 30 and is acted on by a restoring spring 31; the rod 29 has a nose 29' adapted to engage a catch bar 32 pivoted at 33 and acted on by a spring 34; as well known the bar 32 engages such particular member 30, 29 as has been operated, while at the time a particular key 30 is operated it releases such member 30, 29 as is in operative position and enables it to move back under the action of the associate spring 31.

The tails 19 of the several slides 15 are provided with a calibration scale 35 in their portions extending beyond the plate 1, said scale being in position to be inspected from outside of the device with reference to the plate 1 through which said tails extend to an extent which is variable with the position of the respective slide 15 and the adjustment imparted thereto by the maipulation of the cooperating screwthreaded spindle 16, the pair of cores 11 connected with the concerned slide 15 being thus adjusted.

The calibration adjustment of the cores 11 is effected singly by operating the respective sleeves 13, 13' through the orifices 21 of the plate 1, while the joint adjustment or calibration of the associate cores of each pair is effected by manipulating the screwthreaded spindle 16, 16' of the slide 15 having the concerned cores 11 engaged therewith.

The cores 11 are held in their required position by the springs 22 which engage the sleeves 13 and by the spring 26 operative on the screw spindles 16 and on the guiding tails 19 of the several slides 15.

Of course an arrangement as above described is provided in respect of each pair of coils 5 and 6 that is in respect of each section Bps and Bo of the tuning device as shown in Fig. 1; consequently said arrangement is duplicated in the tuning device and a set including a slide 15 and a manipulating spindle 16 with other cooperating parts is provided in respect of each pair of coils 5, 6 a single one of said sets being fully shown on the annexed drawing for sake of evidence, while the provision of a second pair is shown diagrammatically by a portion of an orifice 7 and associate flange 8 and by a portion of the tube 4 in Fig. 2.

The tubes 4 are conveniently located in two rows and staggered in said rows to reduce the overall space requirements.

This invention secures a large facility for the provision and assembly of the parts, particularly in respect of the mounting of the coil supporting tubes, and saves material in that said tubes may be made comparatively short.

On general lines the device of this invention permits of embodying all the parts of the key-operated tuning means in a single structure with a minimum overall space requirement and provides for easy adjustment of the parts and tuning manipulations.

What I claim as my invention and desire to secure by United States Letters Patent is:

1. In a tuning device for radio-receivers with variable inductance units mounted in a support structure and each including a pair of spaced and parallel tubes with a coil on each of said tubes and a magnetic core adjustably arranged in each of said tubes, means for adjusting said cores of each unit comprising a screwthreaded spindle rotatable within said structure and parallel with said tubes, a slide connected with said cores and threadedly engaged with said spindle, said slide bearing on said spindle at two separate points thereof, and means guiding said slide in said structure.

2. In a tuning device for radio-receivers with variable inductive units mounted in a support structure and each including a pair of spaced and parallel tubes with a coil on each of said tubes and a magnetic core adjustably arranged in each of said tubes, means for adjusting said cores of each unit comprising a screwthreaded spindle rotatable within said structure and parallel with said tubes, a slide connected with said cores and threadedly engaged with said spindle, said slide bearing on said spindle at two separate points thereof, and a tail fast with said slide and guided to move in a longitudinal path in said structure.

3. In a tuning device for radio-receivers with variable inductance units mounted in a support structure and each including a pair of spaced and parallel tubes with a coil on each of said tubes and a magnetic core adjustably arranged in each of said tubes, means for adjusting said cores of each unit comprising a screwthreaded spindle rotatable within said structure and parallel with said tubes, a slide connected with said cores and threadedly engaged with said spindle, said slide bearing on said spindle at two separate points thereof, and a tail fast with said slide and guided to move in a longitudinal path in said structure, said tail having a calibrating scale thereon and said structure providing a pointer for said scale.

4. In a tuning device for radio-receivers with variable inductance units mounted in a support

structure and each including a pair of spaced and parallel tubes with a coil on each of said tubes and a magnetic core adjustably arranged in each of said tubes, means for adjusting said cores of each unit comprising a spindle rotatable within said structure and parallel with said tubes, said spindle including a screwthreaded section and a smooth section, a slide connected with said cores and extending along said spindle, said slide having a screwthreaded-hole lug adjacent one of its ends and engaged with said screwthreaded section of said spindle and a smooth-hole lug adjacent its opposite end and bearing on said smooth section of said spindle, and means guiding said slide in said structure.

5. In a tuning device for radio-receivers with variable inductance units mounted in a support structure and each including a pair of spaced and parallel tubes with a coil on each of said tubes and a magnetic core adjustably arranged in each of said tubes, means for adjusting said cores of each unit comprising a screwthreaded spindle rotatable within said structure and parallel with said tubes, a slide connected with said cores and threadedly engaged with said spindle bearing on said spindle at two separate points thereof, transverse arms extending from said slide each in front of one of said tubes, screwthreaded collars each on one of said arms in register with said respective tube, screwthreaded thimbles each engaged in one of said thimbles with said core located in said tube registering with said respective collar, and an arc-shaped spring located on said slide and operative on said spindle and thimbles.

6. In a tuning device for radio-receivers with variable inductance units mounted in a support structure and each including a pair of spaced and parallel tubes with a coil on each of said tubes and a magnetic core adjustably arranged in each of said tubes, means for adjusting said cores of each unit comprising a screwthreaded spindle parallel with said tubes and mounted to rotate in said structure, said spindle having a pivot portion at one end and a grooved portion at its opposite end and said structure providing a bearing for said pivot portion and a seat for said grooved portion of said spindle, spring means holding said spindle grooved portion engaged in said structure seat, a slide connected with said cores and threadedly engaged with said spindle, said slide bearing on said spindle at two separate points thereof, and means guiding said slide in said structure.

7. In a tuning device for radio-receivers with variable inductance units mounted in an apertured support structure and each including a pair of spaced and parallel tubes with a coil on each of said tubes and a magnetic core adjustably arranged in each of said tubes, means for adjusting said cores of each unit comprising a screwthreaded spindle rotatable within said structure and parallel with said tubes, said spindle having a grooved portion releasably engaged in an aperture of said structure, a slide connected with said cores and threadedly engaged with said spindle, said slide bearing on said spindle at two separate points thereof, a tail fast on said slide and guided to move in a longitudinal path through an aperture of said structure, and spring means engaging said spindle and slide tail to hold them engaged in the respective structure apertures.

8. In a tuning device for radio-receivers with variable inductance units mounted in an apertured support structure and each including a pair of spaced and parallel tubes with a coil on each of said tubes and a magnetic core adjustably arranged in each of said tubes, means for adjusting said cores of each unit comprising a screwthreaded spindle rotatable within said structure and parallel with said tubes, said spindle having a grooved portion releasably engaged in an aperture of said structure, a slide connected with said cores and threadedly engaged with said spindle said slide bearing on said spindle at two separate points thereof, and a tail fast on said slide and guided to move in a longitudinal path through an aperture of said structure, and a spring member extending across said structure and engaging said spindles and slide tails of all said units therein to hold said spindles and slide tails engaged in the respective structure apertures.

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