

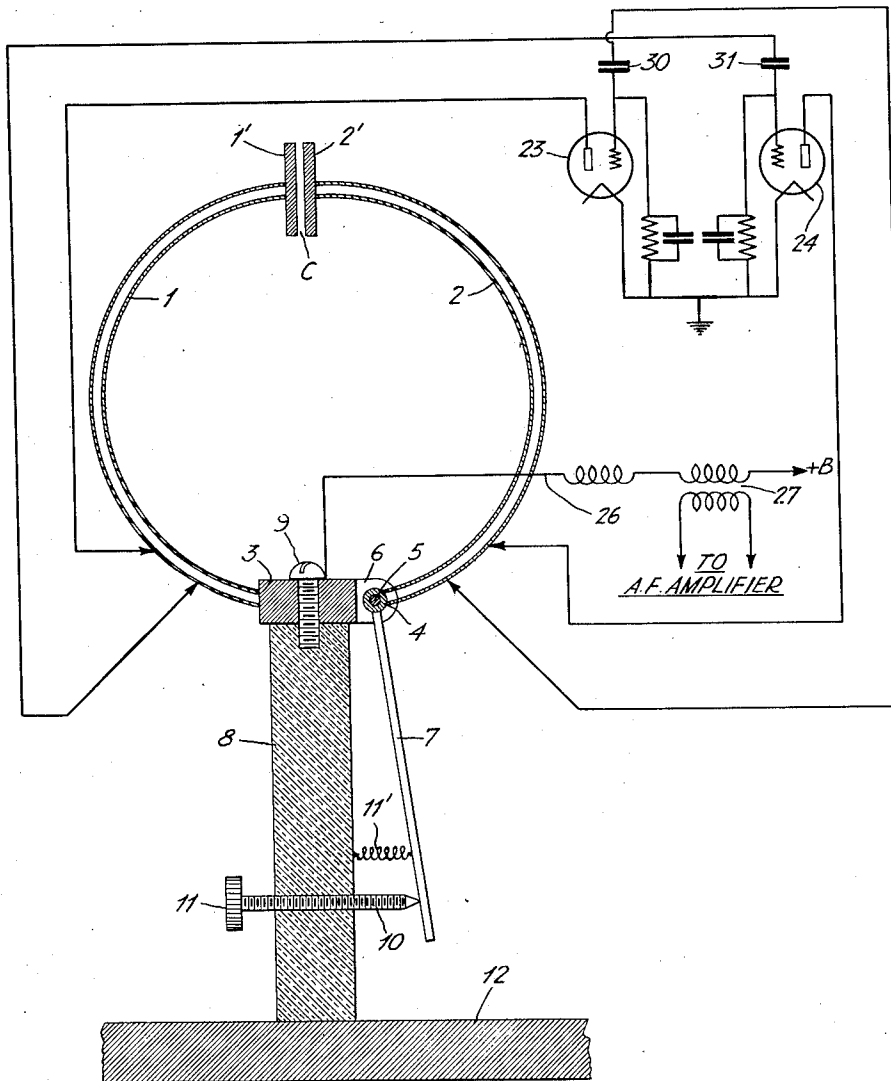
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SHORT WAVE TUNER

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SHORT WAVE TUNER

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My present invention relates to short wave tuners, and especially to a novel arrangement, simple in construction and operation, for tuning a short wave receiving, or radiating, system.

One of the main objects of the invention is to provide a resonator for a short wave signalling system, the capacity of the resonator being adjustable by a single device, and the adjustment being made in a simple manner through the agency of the inductance element of the resonator.

Another important object of the invention is to provide a tuner for a short wave signalling network, the tuner including an inductance element, a capacity element, and a single means for adjusting the magnitude of the capacity element, the inductance element being so arranged, with respect to the capacity element and adjusting means, that the inductance element additionally functions as a part of the adjusting means without any substantial change in the effective inductance value of the tuner.

Other objects of the invention are generally to improve the simplicity and efficiency of tuners for short wave systems, and more particularly to provide an ultra-short wave tuner which is not only reliable and durable in operation, but economically manufactured and assembled in a short wave circuit.

The novel features which I believe to be characteristic of my invention are set forth in particularity in the appended claims, the invention itself, however, as to both its organization and method of operation will best be understood by reference to the following description taken in connection with the drawing in which I have indicated diagrammatically a construction whereby my invention may be carried into effect.

In the drawing,

The figure shows, in partial section, the tuner embodying the invention, as well as a circuit associated therewith.

Referring now to the accompanying drawing attention is directed to the mechanical construction of the tuner, or resonator. There are three essential parts in the device: the inductance element, the capacity element, and the capacity adjusting means. The first element is arranged so that it performs a double function, to wit: an electrical one and a mechanical one. Yet, the performance of the latter function has substantially little effect on the electrical function.

The inductance element consists of a pair of copper tubes 1, 2 each tube being bent into an arc. Both tubes provide an inductance whose

configuration is substantially circular. One end of tube 1 is affixed to the metal boss 3, as by soldering, while one end of tube 2 is affixed to collar 4. The latter is rotatably mounted on pin 5; and the projecting ears 6 of the lug 5 support between them the pin 5.

The tube 2 is moved by means of the elongated metallic arm, or lever, 7, the latter being affixed at its upper end to the collar 4. The lever 7, if desired, may be composed of a phenol condensation product. In other words, the tube 2 is pivoted at one end thereof so that its position with respect to the fixed tube 1 may be varied. It is to be understood that the boss 3 and its associated parts are sectioned because these parts are symmetrically disposed with respect to the section plane therethrough.

The free ends of the inductance arcs are provided with circular metallic discs 1', 2'. Each disc is affixed to its inductance arc substantially at the center of the disc; the latter are disposed in parallel relation, and have a common central axis. Obviously when the arc 2 is moved away from arc 1, the plates, or discs, 1', 2' are separated and the magnitude of the capacity between plates 1' and 2' is increased.

The boss 3, and its entire assembly, is rigidly secured to the support, or pillar, 8. The latter is composed of an insulation material, such as a phenol condensation product, and a screw 9 is used to secure the boss 3 to the pillar 8. The manually operable capacity adjusting device comprises a threaded pin 10, disposed in a threaded horizontal bore in the pillar 8, the pin being provided with a head, or knob 11.

The spring 11' pulls the lever 7 normally toward the tip of screw 10. Hence, when the head 11 may be adjusted to vary the spacing between discs 1' and 2' the pillar 8 may be secured, in any desired manner, to a base 12.

In operation, rotation of the knob 11 results in reciprocation of the pin 10, and this in turn produces angular movement of the arc 2 and plate 2' with respect to the pivot point 5. The threading of the pin 10 is such that the variation of the capacity value of the condenser C covers a range sufficient to conveniently tune the system over a desired frequency range. The movement of arc 2 to accomplish this variation need not be sufficient to result in any appreciable change in the effective inductance value of the tuned circuit unless it be desired to cover a relatively small range of frequencies and with non-critical operation. In such case it is desirable that the in-

ductance goes up, although at a much slower rate than the capacity decreases.

In other words, with the maximum spacing between plates 1', 2' the area bounded by arcs 1, 2 is not to be appreciably varied; this area determining the effective inductance value of the system. The capacity variation law of condenser C depends on the threading of pin 10, and such law may follow a linear capacity, wave length, or frequency relation.

In the drawing is schematically shown a circuit adapted to be used with the resonator construction. The common anode potential lead 26 from the source of positive anode potential B+ (not shown) includes a radio frequency choke coil 27, and the grids of tubes 23, 24 are connected through the condensers 30, 31 to the arcs 1, 2. The cathodes of tubes 23, 24 are, of course, grounded. As illustrated in the drawing, tubes 23 and 24 are regeneratively connected in push-pull fashion to the tuner system. It is to be noted that point 9 of the tuned circuit 1, 2, C is a voltage nodal point. The grid of tube 24 is connected to one side of this voltage nodal point which is of opposite instantaneous polarity with reference to the instantaneous polarity or alternating current potential on the plate of tube 24. Similarly, the grid and plate of tube 23 are connected to points on the tuner system 1, 2, C which are of opposite instantaneous alternating current potentials. As a consequence of this construction, regenerative action takes place, causing the setting up of oscillations at a high frequency determined in frequency, by the adjustment of the tuner circuit 1, 2, C. The oscillations set up may be modulated by variation of plate voltage, in which case audio frequency currents are fed into the audio frequency transformer 27, the modulated high frequency waves being utilized in any desired way. For reception, for example, for reception on intermittent continuous waves, the tubes 23, 24 through adjustment of the tuner circuit 1, 2, C should be made to produce oscillations differing by an audio frequency from the incoming waves which may be, if desired, picked up by the tuner loop circuit 1, 2, C. The resulting beat frequency may be picked off from transformer 27 and then fed to any suitable amplifiers,

if desired, and still later utilized for the reproduction of the transmitted code signal. The amplifier (not shown) may be the modulator amplifier of a transmitter, or the amplifier of a receiver.

The tuner shown in the figure is especially adapted for use in the wave length region below 10 meters. The device may be utilized as a radiator, or a collector, in short wave reception; or, an antenna may be coupled to the inductance turn 1, 2. It is to be fully understood that it may be used with a receiver of ultra-short waves, i. e., in the region between 1 and 10 meters.

While I have indicated and described one system for carrying my invention into effect, it will be apparent to one skilled in the art that my invention is by no means limited to the particular organization, shown and described, but that many modifications may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim is:

1. An arrangement, adapted for use in a high frequency signalling system, including in combination, a support element, an arcuate metallic conductor affixed to the support, a second arcuate metallic conductor, means for pivotally securing one end of the second conductor to said support, a metallic plate secured to the free end of each of said conductors, said plates being positioned to provide a condenser, and said conductors providing an inductance cooperating with said condenser to provide a resonant circuit, and means, mechanically coupled to said pivoted conductor, associated with said support to move the pivoted conductor whereby the capacity value of said condenser is adjusted.

2. An arrangement, as in claim 1, wherein the plates are of such separation that the decrease in capacity is relatively slow causing correspondingly slow increase in frequency, and the change of inductance due to corresponding increase of area of the inductance decreases the frequency at a rate which makes the tuning of the whole system non-critical, and not especially critical to vibration.

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