Dec. 21, 1926. 1,611,151

R. W. AUGUSTINE

TUNING COUPLER

Filed May 10, 1922 2 Sheets-Sheet 1

Fig. 1.

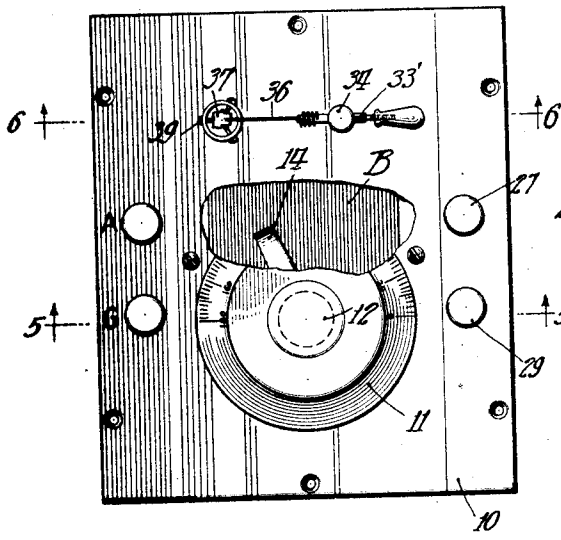


Fig. 2.

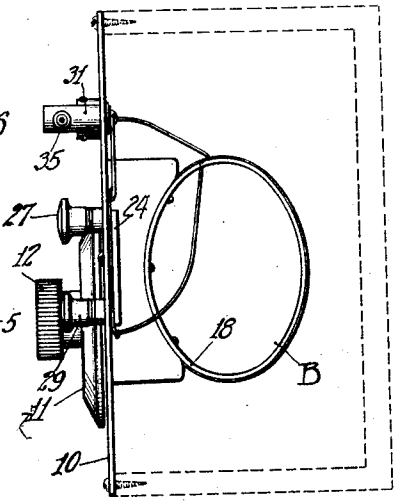


Fig. 3

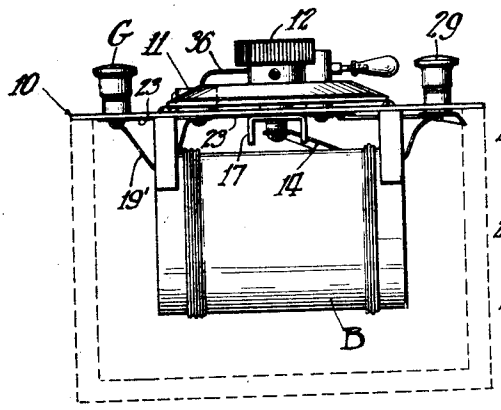
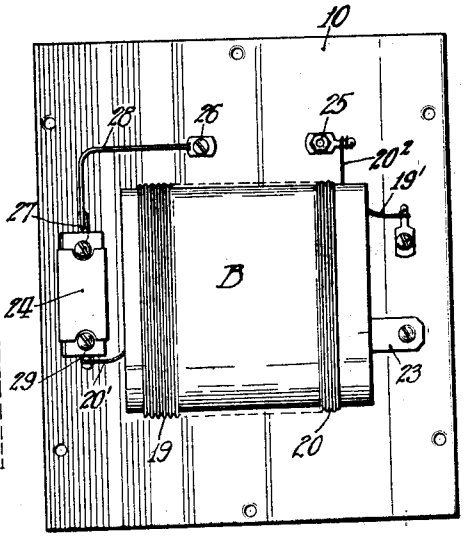


Fig 4.



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Fig. 5

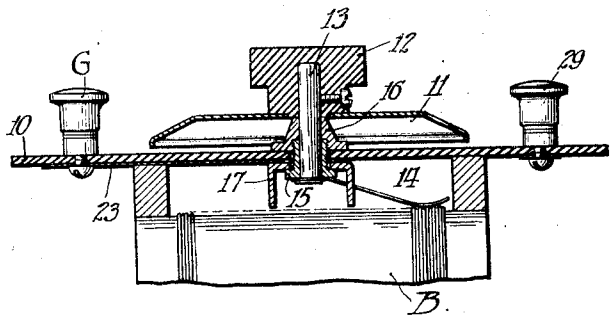


Fig. 6.

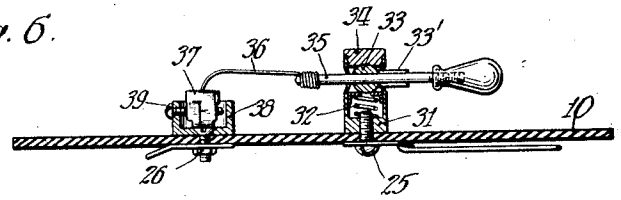
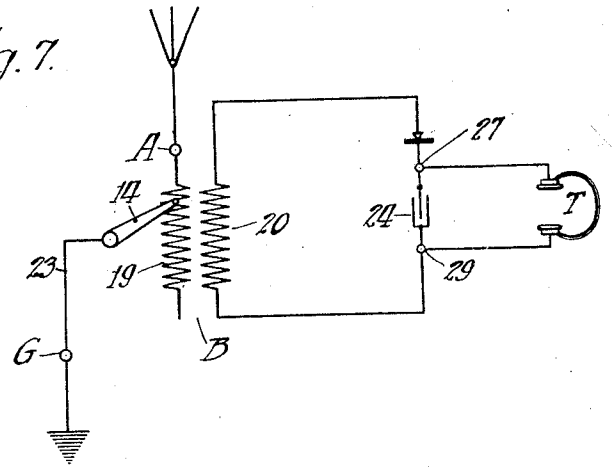


Fig. 7.



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Patented Dec. 21, 1926. 1,611,151

UNITED STATES PATENT OFFICE.

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TUNING COUPLER.

Application filed May 10, 1922. Serial No. 559,825.

My invention relates to crystal receiving apparatus and has to do more particularly with apparatus of this character used for radio communication for receiving telephonic speech transmission and telegraph signals.

An object of my invention is to provide an improved and simplified receiving set more particularly of the portable type, the various features of which will be more particularly pointed out in the ensuing specification and appended claims.

In the accompanying drawings I have illustrated the preferred form of my invention in which—

Fig. 1 is a face view of the device;

Fig. 2 is a side elevation of the cover and apparatus mounted thereon with the enclosing box shown in dotted lines;

Fig. 3 is a bottom view of Fig. 1;

Fig. 4 is a rear view of Fig. 1;

Fig. 5 is a transverse sectional view along the line 5—5 of Fig. 1;

Fig. 6 is a sectional view along the line 6—6 of Fig. 1, and

Fig. 7 illustrates diagrammatically the preferred circuit arrangement.

Referring now more in detail to the device as illustrated, it comprises a face or mounting plate 10 which also acts as a cover for the enclosing box, having a coupler B mounted on the rear with a graduated dial 11 on the face. Said dial 11 and knob 12 are secured to a shaft 13 carrying a wiper 14 staked to the lower end thereof. The dial shaft is supported in a bearing comprising a flanged sleeve 15 held by a nut 16 which also acts to clamp the wiper stop 17 to the rear of the face plate 10.

The coupler is constructed in an improved and simplified manner, consisting of two windings, the primary winding is directly engaged by the rotatable wiper and to this end is preferably of an elliptic shape so as to present a surface more readily co-operable with the rotatable wiper, while providing a coil of less transverse area. Also, by using a curved support for the wires such as the elliptic shape specified, the windings are maintained more taut than on a square tube. In building up the coupler I preferably use an oval tube 18 made up of insulating material, preferably of rolled Bedford paper dipped in a suitable insulating and holding substance such as shellac. I then wind the primary and secondary windings of the coupler on this tube preferably in so-called Varley fashion, that is using alternate convolutions of bare and insulated wire, the bare wire being the primary winding 19 and the secondary, the insulated wire 20. The primary winding being preferably directly engaged by the tuning wiper to the exclusion of the secondary winding I have the primary winding project above the secondary winding so that the wiper engages the primary only. To this end I preferably employ a larger gauge for the primary winding so that it stands higher than the secondary.

Although I use alternate convolutions of bare and insulated wire, this is the preferred construction because I thus use the minimum space although it will be apparent that the coils may be wound in other ways and still secure the spacing of the windings so that one only will be engaged by the wiper and also secure the necessary insulation. For example, I also use an enameled insulated winding for the contacting coil and scrape the insulation off along where the wiper engages.

In adjusting the wiper 14 so as to cut in or out the desired number of convolutions of the primary, the movement thereof is limited by the downwardly extending stop arms 17. Also the spring action of the wiper 14 is such as to assist in giving a frictional action to the bearing of the wiper shaft 13 so that the wiper will be more positively maintained in its adjusted position.

As to the windings of the coupler B one end of the primary winding is left disconnected, that is open, and the other end, that is the connecting end 19′ terminates in a binding post A to which the antenna or the aerial is connected. The tuning wiper 14 is connected to the ground binding post G by means of the bus bar 23 which is clamped between the face plate 10 and the stop 17 so that it is in electrical connection with the wiper 14 through the various elements as more clearly shown in Fig. 5.

The secondary winding 20 of the coupler and which is the insulated winding has its end 20′ connected to one terminal of the usual condenser 24, while the other end 20^2 of the secondary is connected to the crystal spring contact post at 25. The other terminal of the crystal detector, that is terminal

26 is connected to the other terminal, that is terminal 27 by a heavy conductor 28.

Thus the secondary winding 20, condenser 24 and the detector are in series with the binding posts 27—29 interposed therein and to which the usual receiver is connected as shown in the diagram Fig. 7.

Now as to the crystal detector, I have provided an improved and simplified spring contact carrying device comprising a post 31 carrying a spring pressed slidable bearing 32 resting against the ball of the universally movable holder 33 held in place by a cap 34. The holder 33 carries a spring contact holder rod 35 slidable in the member 33. This member 33 is slotted at 33′ so as to yieldingly engage the rod 35 whereby this rod is held in its longitudinally adjusted position. The spring contact 36 is thus adapted to be adjusted universally into engagement with any point on the face of the crystal 37. A crystal holder 38 is provided being a cup-shaped member having a plurality of set screws 39 adapted to engage and hold the crystal 37 in place.

In the operation of the apparatus the terminal A is connected to a suitable antenna or aerial and terminal G to ground. A suitable high resistance telephone receiver T is connected across terminals 27—29. The device is now tuned by adjusting the wiper 14 moving it across the turns of the primary 19 until properly adjusted to the wave length to be received, also, of course, securing proper adjustment of the crystal contact.

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

1. In radio apparatus of the character described, a mounting plate, a longitudinal elliptic coil mounted on the rear thereof, a rotatable dial mounted on the face thereof, a shaft extending through the plate, and a wiper carried by said shaft for successive contact engagement with the convolutions of said coil.

2. In radio apparatus of the character described, a mounting plate, a longitudinal transversely curved surface coil mounted on the rear thereof, a rotatable dial mounted on the face thereof, a shaft extending through the plate, and a wiper carried by said shaft for successive contact engagement with the convolutions of said coil.

3. In radio apparatus of the character described, a tuning coupler having primary and secondary windings, the wire of one winding being of larger diameter than the other, said windings comprising a single layer placed upon a suitable longitudinally straight faced core with the primary and secondary convolutions alternately positioned along the face of the core each in intimate contact therewith.

4. In radio apparatus of the character described, a mounting plate, a longitudinal coil mounted on the rear thereof having a layer consisting of two windings, a rotatable dial mounted on the face thereof, a shaft extending through the plate, and a wiper carried by said shaft for successive contact engagement with the convolutions of said coil, said coil being elliptic in cross-section and said wiper shaft axis being perpendicular to the major axis of the ellipse, one winding having a contacting surface of the convolutions above the other winding.

5. In radio apparatus of the character described, a mounting plate, a longitudinal coil mounted on the rear thereof having a layer consisting of two windings, a rotatable dial mounted on the face thereof, a shaft extending through the plate, said coil being elliptic in cross-section and said shaft axis being perpendicular to the major axis of the ellipse, one winding having a contacting surface of the convolutions above the other winding, and a wiper mounted to be moved across the face of the coil windings by rotation of the dial and shaft so as to electrically engage the latter one of said windings only.

6. In radio apparatus of the character described, a tuning coupler comprising a primary winding and a secondary winding, the two windings consisting of alternate convolutions of bare and insulated wire, the convolutions of one winding being bare and the convolutions of the other winding being insulated, whereby the bare convolutions may be directly electrically engaged for cutting in and out the desired number of convolutions, and a wiper movable across the coil for engagement with the bare convolutions.

7. In a device of the kind described, a casing, a cover for said casing, a tuning coil element, means for supporting said tuning coil element within said casing from the under side of said cover but spaced downwardly from the latter, a vertical spindle journaled in said cover, a knob on the exterior of said spindle for turning the same, a laterally projecting switch contact arm on the interior end of said spindle having its free end portion tensionally bearing on the upper surface of the windings of said tuning coil and adjustably movable from end to end of the latter when said spindle is turned, and means for connecting said spindle and switch contact arm with ground.

In witness whereof, I hereunto subscribe my name this 21st day of April, A. D., 1922.

ROY W. AUGUSTINE.