March 24, 1931. P. J. RUDDY 1,797,696

POCKET TELEGRAPH RECEPTOR

Filed Oct. 3, 1927 2 Sheets-Sheet 1

FIG. 1.

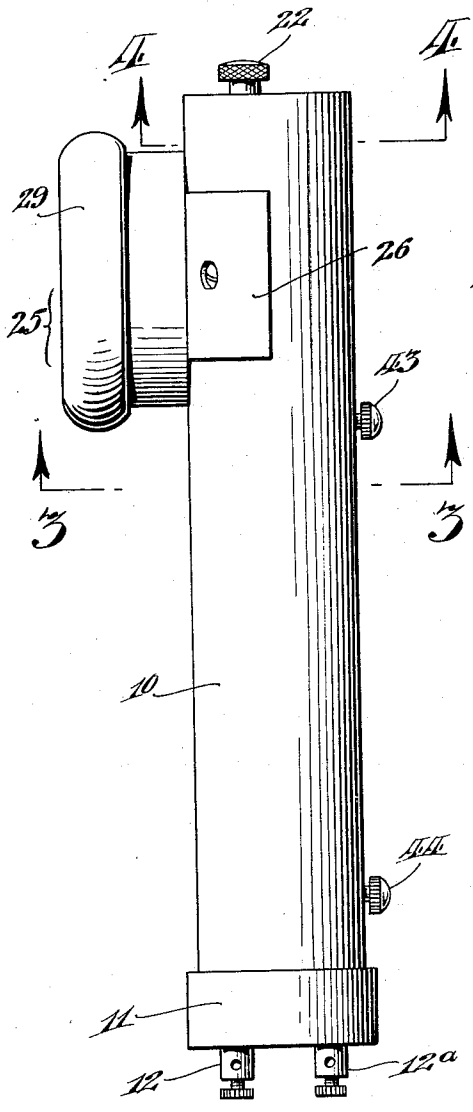
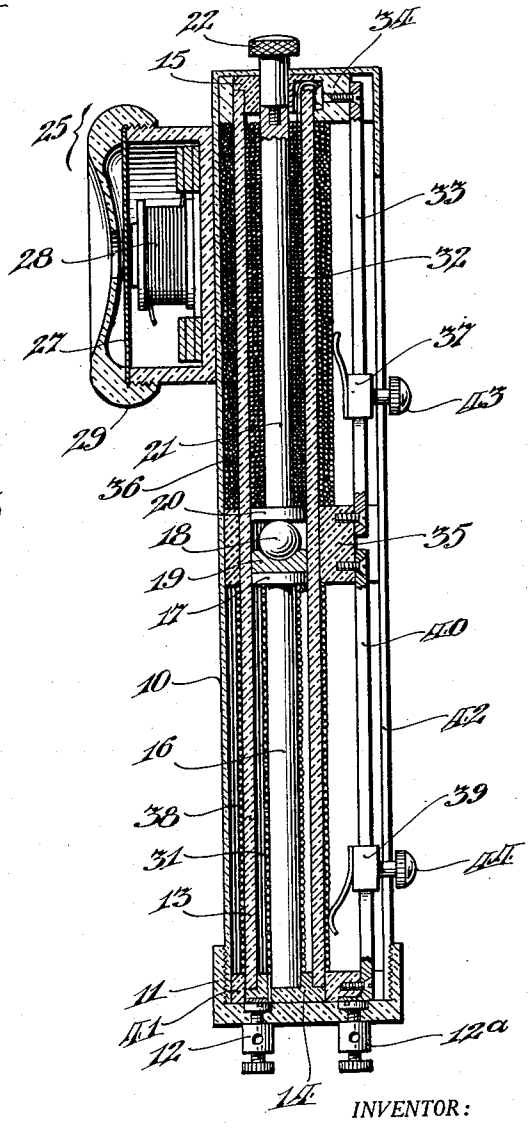


FIG. 2.



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FIG. 3.

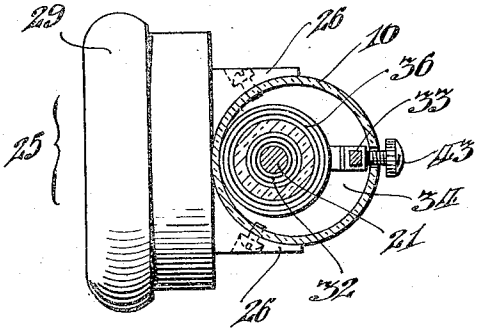


FIG. 4.

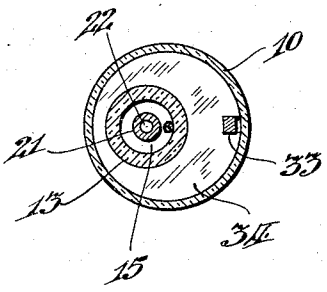
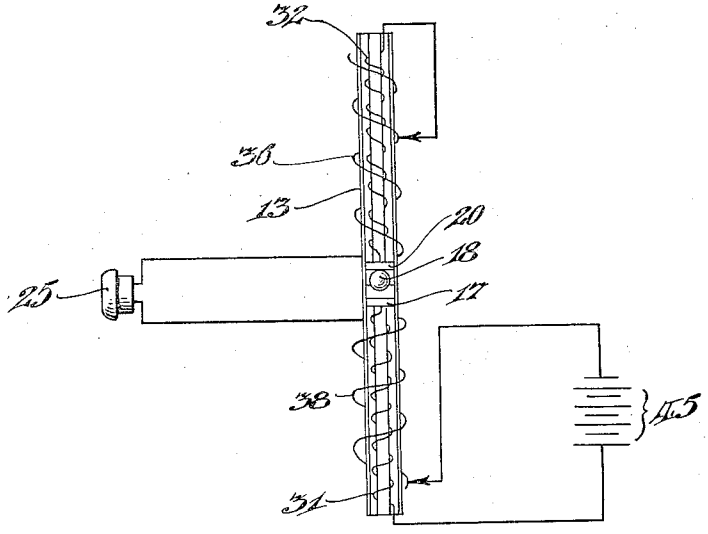


FIG. 5.



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UNITED STATES PATENT OFFICE

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POCKET TELEGRAPH RECEPTOR

Application filed October 3, 1927. Serial No. 223,594.

My invention relates to wireless receivers, and has for its principal object to provide a receptor which requires neither ground nor aerial and which is adapted to pick up signals with distinctness and accuracy.

Another object of my invention is to provide a small, compact receptor which may be readily carried in a pocket.

Still another object of my invention is to provide an instrument of the character mentioned equipped with simple means for tuning to different frequencies and of such construction as to provide a simple adjustment for regulating the tone and volume.

The invention comprises a pair of cores for induction coils, one of which is adjustable toward the other and between which a contact is made by means of a contactor yieldably supported therebetween, the adjustable core being adapted to exert varying pressure on the contactor in the tuning of the instrument.

In the drawings:—

Figure 1 is a side view of a pocket receptor embodying my invention, and

Figure 2 a central vertical sectional view therethrough, certain parts being broken away.

Figure 3 is a transverse sectional view, taken on line 3—3 on Figure 1,

Figure 4 a transverse sectional view taken on line 4—4 on Figure 1, and

Figure 5 a wiring diagram.

The invention consists primarily of two induction coils of unequal strength, each of which has a magnetic core, a contactor floating between the ends of the two cores, and a phone or other receiver connected between the secondaries of the induction coils.

The embodiment shown in the drawings has a casing 10, preferably made of insulating material and closed by a cap 11 carrying binding posts 12 and 12ª to which wires from a battery or other source of energy may be attached. A tube 13 is closed at its lower end by a plug 14 and at its top by a bushing 15 which abut cap 11 and the top of casing 10, respectively, and hold the tube against longitudinal movement. These parts should be made of insulating material and tube 13 should be made of material which will allow free passage of magnetic flux.

The receptor shown in the drawings is designed to be held in an approximately upright position and the stronger induction coil is placed in the upper part of casing 10. The lower and weaker coil has a core 16 of magnetic material centrally disposed in the lower part of tube 13 and provided at its upper end with a head 17 on which a metallic contactor 18 is floated in a conducting liquid. Head 17 should fit snugly or be sealed in tube 13 so that the liquid may not leak past. Contactor 18 is preferably spherical in form and has been shown as a solid ball floating in a bed of mercury 19 but it is believed that variations may be made in this arrangement.

I use a steel ball as the contactor, but the requirement is believed to be that it be of some element which, in contact with mercury, will allow electricity to flow in one direction but not in the other, or to allow it to flow more readily in one direction than in the other.

The head 20 of a plunger 21, forming the core of the upper coil, is disposed immediately above contactor 18 and adapted to be brought into and out of contact therewith by means of a knob 22 threaded into plunger 21 and extending through bushing 15 and the upper end of casing 10. Head 20 should be in contact with contactor 18 at all times and the tone and volume of the instrument is regulated by the pressure, exerted by mercury 19, of contactor 18 against head 20. The pressure is primarily adjusted by moving plunger 21 inwardly or outwardly; and thereafter a more delicate adjustment is effected by tilting the instrument more or less from the vertical to obtain the best relation between the contactor 18 and the head 20. However, the instrument should not be tilted sufficiently to bring the mercury into contact with the plunger head.

An ear phone 25 is connected between the secondaries of the induction coils and secured to casing 10 in any suitable manner, as by means of lugs 26 secured to the back of the ear phone and bolted to casing 10, and may be of the usual construction which consists

primarily of a diaphragm 27 disposed in close proximity to magnets 28 and held in position by a cap 29.

The primary 31 of the lower induction coil is formed by winding core 16 with wire and connecting one end to binding post 12 and the other end to head 17. The primary 32 of the upper induction coil is formed by winding plunger 21 with wire and connecting one end with head 20 and the other end to a bar 33; thus putting the two primaries in series with contactor 18 and mercury 19. Bar 33 has its ends secured in suitable notches formed in insulators 34 and 35 conforming in outline to the interior of casing 10 and encircling the top and center, respectively, of tube 13 and holding same against transverse movement.

The secondary 36 of the upper induction coil is formed by winding the outside of the upper part of tube 13 with a wire having one end connected to one of the terminals of phone 25 and the turns near its other end engaged by a sliding contact 37 mounted on bar 33. The secondary 38 of the lower induction coil is formed by winding the lower part of tube 13 with a wire having one end connected to the other terminal of phone 25 and the turns near its other end engaged by a sliding contact 39 mounted on a bar 40 having one end secured in a notch in insulator 35 and its lower end in a notch formed in an insulator 41 encircling the lower end of tube 13 and conforming in outline to the interior of casing 10.

A slot 42 extends longitudinally of casing 10 in alignment with bars 33 and 40 so that contacts 37 and 39 may be slid along the bars by means of buttons 43 and 44 extending through the slot and secured to contacts 37 and 39, respectively.

One end of bar 40 is electrically connected to binding post 12^a so that, if the binding posts are connected to a suitable source of energy as indicated by battery 45 in Figure 5, current may flow from binding post 12 through primary 31, head 17, mercury 19, contactor 18, head 20, primary 32, bar 33, contact 37, secondary 36, phone 25, secondary 38, contact 39, bar 40 and binding post 12^a back to battery 45.

The wire composing secondary 36 may be wound in the same direction as the wire composing secondary 38 but I find that the instrument is more sensitive and functions more efficiently if these two coils are wound in opposite directions. By winding primary 31 around core 16 and primary 32 around plunger 21, electromagnets are formed which tend to work against one another. Primary 32 should have more turns than primary 31 and the ratio may be varied considerably but I find excellent results are obtained when primary 32 is provided with three times as many turns as primary 31. The ratio between the primary and secondary of each induction coil may vary considerably also. For a receptor as shown in the drawings, I find that a ratio of 1:8 is ample for ordinary reception. Secondary coils 36 and 38 are wound opposite to one another and preferably have turns in the same proportion as primaries 31 and 32 so that plunger 21 forms the core of a considerably stronger magnet than does core 16. The coils therefore function as electromagnets and induction coils and, as their windings are electrically connected to one another, the entire length of wire is adapted to absorb electrical impulses and to serve as an aerial.

My invention is primarily designed for receiving wireless telegraphy signals and, when used for this purpose, the windings of the several coils should be of sufficient length to bring the range of the receptor within the band used in wireless telegraphy. The tuning of the instrument is accomplished by sliding contacts 37 and 39 on bars 33 and 40 so as to cut in or cut out sufficient turns of the secondary coils to tune the instrument to the wave length desired.

In using the device, knob 22 is moved until head 20 comes substantially into contact with contactor 18 and adjusted until a signal may be heard in the ear phone. After the signal is heard, the pressure on contactor 18 is regulated until signal strength is obtained. Then, a fine adjustment to regulate the tone and volume of the signal is obtained by slightly tilting the device to get the proper relation between the member 20 and the floating contact 18. The impulses created by the signals being received augments the magnetic effect of the coils of the member 18, causing a slight but distinct vibratory movement of the float member 18 against contact 20, thereby varying the impulses to the phone magnet 28. The power required to operate the receptor is very slight and I find that two batteries such as are used for ordinary flashlights, are sufficient for this purpose and last for a considerable length of time. The device as illustrated is compact and need be no larger than a two-cell flashlight with the exception of ear phone 25. The batteries may be carried in a separate case and connected to the instrument by means of binding posts 12 and 12^a or they may be incorporated directly into the device and carried in casing 10.

The principles involved in this invention are new and I therefore do not wish to limit myself to the application of the invention described or the embodiment shown but consider that I am at liberty to incorporate my invention into such structures as fairly come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. An instrument of the character de-

scribed including upper and lower induction coils having magnetic cores, a bed of mercury on the lower core, a contactor floating in the mercury and engaging the upper core, a telephone connected in series with the coils and means for regulating the pressure between the contactor and the upper core.

2. An instrument of the character described including upper and lower induction coils having magnetic cores, a bed of mercury on the lower core, a contactor floating in the mercury and having contact with the upper core; the upper coil being considerably stronger than the lower coil and a telephone in series with the coils.

3. An instrument of the character described including upper and lower induction coils each consisting of primary and secondary windings and having magnetic cores, a bed of mercury on the lower core, a contactor floating in the mercury and engaging the upper core, means for regulating the pressure between the contactor and the upper core, tuning brushes connected to the primaries and slidably engaging the secondaries of the coils, and a telephone connected between and in series with the secondaries of the coils.

4. An instrument of the character described including a tube, a core in one end of the tube, a primary winding on the core, a secondary winding on the tube over the primary, a plunger in the tube, a primary winding on the plunger, a secondary winding on the tube over the plunger, a bed of mercury between the core and plunger and in electric contact with the former, a contactor floating in the mercury and having contact with the plunger, and a telephone connected between and in series with the secondary windings.

5. In a device of the class described a pair of induction coils each consisting of a primary and a secondary winding, a floating contactor in permanent connection with the end of the primary of one of said coils, a terminal member for the end of the primary of the other coil and in adjustable contact with said floating contactor, and the device being adapted to be manually supported when in use and tiltable to vary the pressure of the floating contactor on the adjacent terminal substantially as described.

6. A device as set forth in claim 5, in which the coils are in axial alinement and are wound in opposite directions.

7. In a device of the class described a casing adapted to be manually supported and containing a pair of induction coils of lesser and greater inductivity, respectively, a floating contactor in permanent connection with the end of the primary of the coil of lesser inductivity, a terminal member for the end of the primary of the coil of greater inductivity, and means for adjusting said terminal to vary the contact with the floating contactor, and said contact being further regulated by tilting said casing substantially as described.

8. A device as set forth in claim 7 in which the coils are in an axial alinement and are wound in opposite directions, substantially as described.

9. A pocket radio receptor comprising a casing adapted to be manually supported, a pair of induction coils in said casing and each having a core; a bed of conducting liquid electrically connected with one of the cores, a contactor floating in said liquid and engaging an end of the other core, the pressure of the floating contactor on said core being varied by tilting the device, a tuning slide associated with said coils and a phone in series with the coils, substantially as described.

In testimony whereof I have signed my name to this specification.

PATRICK J. RUDDY.