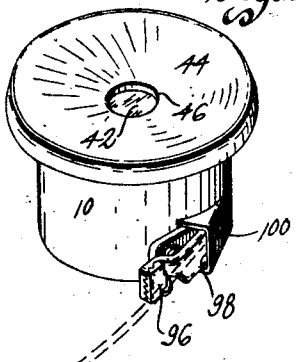
Oct. 9, 1928. 1,687,371

J. C. LEEPER

RADIO RECEPTION INSTRUMENT

Filed June 13, 1927

Fig. 1.



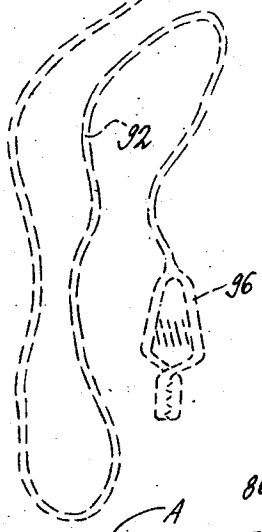


Fig. 2.

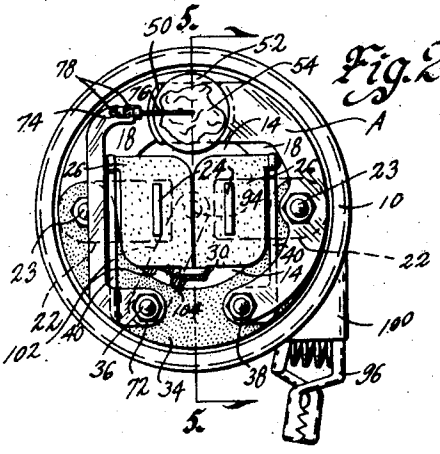
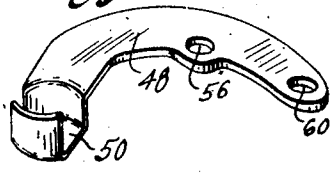


Fig. 3.



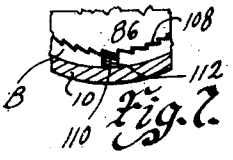


Fig. 7.

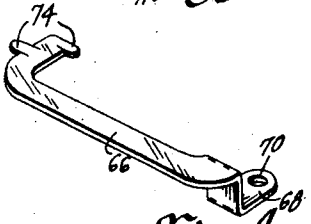


Fig. 4.

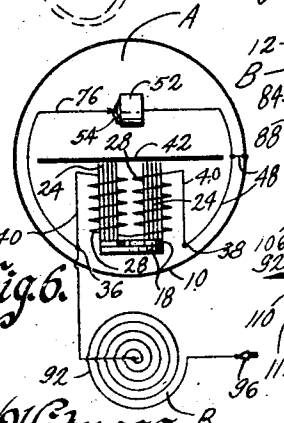


Fig. 6.

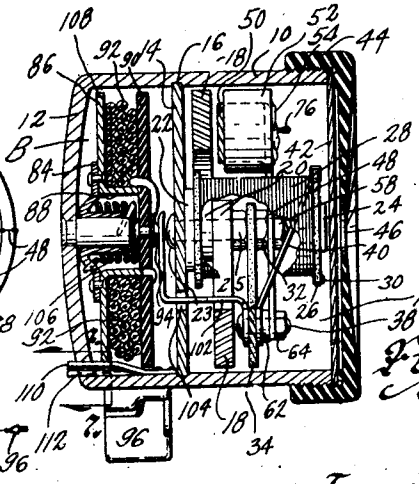


Fig. 5.

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Patented Oct. 9, 1928. 1,687,371

UNITED STATES PATENT OFFICE.

JESSE C. LEEPER, OF DES MOINES, IOWA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF FORTY-FIVE ONE-HUNDREDTHS TO GRANT E. BRAYTON AND TEN ONE-HUNDREDTHS TO CLARENCE R. TOWNSAN, BOTH OF DES MOINES, IOWA.

RADIO RECEPTION INSTRUMENT.

Application filed June 13, 1927. Serial No. 198,433.

The object of my invention is to provide what may be termed a "vest pocket" radio receiving set, the parts being simple, durable and very inexpensive.

More particularly it is my object to provide a complete radio receiving instrument of very small dimensions wherein it may be carried in a vest pocket and which is provided with a clip or connector whereby the instrument may be grounded or attached to a body of metal for detecting radio signals.

Still a further object is to provide a casing having electro-magnets therein and having a crystal detector holder formed therein for receiving a crystal and for retaining a cat whisker in contact with the crystal together with a sound reproducing diaphragm in connection with said magnets.

Still another object is to divide the casing of the instrument into two compartments, one for containing the radio reception instruments and the other for retaining a drum whereby a lead wire of considerable length may be wound upon the drum by spring actuation thereof when the device is not being used.

Still another object is to arrange one side of the reception circuit so that when the instrument is retained in the hand and held adjacent the ear of the user, the body of the user serves as an antenna and the body itself is part of the reception circuit.

Still another object is to provide a metal stamping which receives the crystal cup and at the same time when mounted in position within the casing, serves to ground the crystal which is one side of the reception circuit, to the casing so that the hand of the user when holding the instrument serves to electrically connect the instrument to the body of the user. The body of the user thereby serves as a conductor for conveying the electrical energy from the air to the combined telephone and detector circuit in said casing.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings in which:

Figure 1 is a perspective view of my radio reception instrument.

Figure 2 is a plan view of the same with the receiver cap and diaphragm removed.

Figure 3 is a perspective view of a stamping used in my instrument to hold a crystal detector cup.

Figure 4 is a perspective view of another stamping used to hold the "cat whisker."

Figure 5 is a sectional view taken on the line 5—5 of Figure 2 to illustrate the internal construction of my instrument.

Figure 6 is an electrical diagrammatical view of my instrument; and

Figure 7 is a detail sectional view taken on the line 7—7 of Figure 5.

In one of the embodiments of my invention as shown in the accompanying drawing I have used the reference numeral 10 to indicate the casing of my reception instrument. The casing may be formed of suitable electrically conductive metal preferably non-magnetic, and is provided with a back member 12. Positioned adjacent the central portion of the casing 10 is a supporting partition plate 14. The plate 14 is received in a groove 16 formed in the casing 10 or otherwise supported relative thereto. The partition plate 14 divides the casing 10 into two compartments A and B.

Mounted upon the supporting plate 14 and on the front side thereof is a pair of permanent magnets 18, the poles of which terminate as at 20 adjacent each other. The pair of magnets 18 may be referred to as a front magnet and as a back magnet. The magnets 18 are thus located in the compartment A.

The poles 20 of the magnets 18 are connected by bridge members 22 to cores 24. The poles 20 and the bridge members 22 are secured together and held assembled on the plate 14 by bolts 23. Nuts 25 are positioned on the bolts 23 resting against the front surface of the front magnet 18.

Mounted on each core 24 is a pair of spool ends 26 preferably formed of insulating material. Between each pair of spool ends 26 is wound a coil of fine current conducting wire 28. The fine wire 28 when wound form

coils. The coils or wires 28 are connected together at one end by a lead wire 30.

Supported on the bolts 23 and held thereon by nuts 32 is a horseshoe shaped supporting member 34 of non-conducting material. Extending through the supporting member 34 are terminal bolts 36 and 38. Each of these terminal bolts is connected to the free end of each coil 28 by leads 40 which are formed of sheet metal.

Contacting with the outer peripheral rim of the casing 10 is a sound reproducing diaphragm 42. The diaphragm 42 is held in position by a cap 44. The cap 44 as shown in the drawings is of insulating material and is provided with an opening 46 at its center.

The foregoing description discloses a receiver made very similar to one of those of a head set used in connection with radio receiving sets. The variable current in the coils 28 will vibrate the diaphragm 42 for reproducing signals imparted to the coils 28 in the form of radio waves.

A crystal cup holding member 48 is provided in my instrument and consists of a stamping having a depressed portion for forming a socket 50 to receive a crystal cup. A crystal cup 52 is adapted to be frictionally held within the socket 50. The crystal cup 52 comprises a rectifying crystal 54 embedded in lead or an equivalent soft metal. The holding member or stamping 48 is provided with an opening 56 adapted to receive one of the bolts 23. A nut 58 is screwed on to the bolt 23 above the stamping 48 for supporting it in position. Another opening 60 is formed in the member 48 and is adapted to receive the terminal bolt 38. A spacer 62 is positioned between the member 48 and the lead 40 on the bolt 38 and a nut 64 is screwed onto the bolt 38 against the member 48 for holding it on the bolt.

From the construction of the parts just described, it will be evident that the lead 40 and the crystal cup 52 are connected through the member 48 to the bolt 23 which is in contact with the metallic supporting partition plate 14. This affords a connection through the supporting plate 14 to the metallic casing 10, the metallic casing affording one terminal for the combined telephone and detector circuit.

A cat whisker holding member 66 is provided with a downwardly and inwardly extending foot 68. The foot 68 is provided with an opening 70 adapted to receive the bolt 36 whereby the foot 68 is positioned over the lead 40 thereon and may be retained in this position by a nut 72. The member 66 is in the form of a metal stamping. The free end of the member 66 is provided with a pair of ears 74 adapted to be bent over a cat whisker 76 as illustrated in Figure 2.

Figure 4 shows the ears 74 before being bent over the cat whisker 76. The cat whisker 76 may be securely held in position by drops of solder 78. The free end of the cat whisker 76 is adapted to contact with the crystal 54.

Secured to the back 12 of the casing 10 and within the compartment B is a stub shaft 80. A sleeve 82 is rotatably mounted on the shaft 80 and has a flange portion 84. A drum head 86 is riveted to the flange 84 of the sleeve 82 and is provided with a drum hub 88. A second drum head 90 is secured to the drum hub 88. The drum head 90 is made of insulating material.

A flexible insulated cable 92 is wound on the drum hub 88 between the heads 86 and 90 thereof and has its inner end extending through the drum head 90 and connected to a rivet 94. The free end of the cable 92 extends through an opening 98 in the casing 10 and is connected preferably to a grounding clamp 96. The casing 10 is formed with a pocket 100 adjacent the opening 98 to receive a portion of the clamp 96.

Secured to the terminal bolt 36 is a resilient strip of metal 102 extending through an opening 104 in the supporting member 14 affording the other or opposite terminal of the combined telephone and detector circuit and adapted to rest in contact with the rivet 94 whereby an electrical connection is made between the terminal bolt 36 and the cable 92. This connection continues regardless of the rotation of the drum in the compartment B.

Surrounding the sleeve 82 is a winding spring 106 for the cable drum. The spring 106 has one end extending through the flange 84 of the sleeve 82 and the other end fixed to the stub shaft 80. The arrangement just described will allow pulling the clamp 96 from the pocket 100 for unwinding the cable 92 against the tension of the spring 106.

To prevent the return of the clamp to the pocket, the drum head 86 is provided with ratchet teeth 108. A pawl 110 is adapted to coact with the teeth 108. The pawl 110 extends through an opening 112 formed in the back 12 of the casing 10 and the portion extending through the back can be depressed as illustrated in dotted lines in Figures 5 and 7 for releasing the drum and allowing the spring 106 to return the clamp 96 to the pocket 100.

It will be noted that my device forms a complete radio reception set and that it is quite small, convenient and simple to operate and connect up for operation it requiring only a single connection to one or the other of the terminals of the combined receiving and detecting device.

In the actual use of my invention I have observed that the body of the operator or holder of my radio reception instrument, serves as an aerial when the clamp 96 is

attached to a ground connection or conductor.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, and modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. An instrument of the class described, comprising a metallic casing adapted to be in contact with the user of the instrument, a telephone receiver mounted in said casing, a pair of terminal posts for said receiver, a detector crystal supported on one of said posts and a cat-whisker supported on the other of said posts to coact with the crystal, both of said posts being included in a radiant energy receiving circuit, one of which is connected to the metallic casing.

2. An instrument of the class described, comprising a metallic casing adapted to be in contact with the user of the instrument, a telephone receiver mounted in said casing, a pair of terminal posts for said receiver, a detector crystal supported on one of said posts and a cat-whisker supported on the other one of said posts to coact with the crystal, one of said posts being connected to said casing, and a flexible conducting cable attached to the other of said posts.

Des Moines, Iowa, June 10, 1927.

JESSE C. LEEPER.