April 13, 1926. 1,580,853

P. L. PENDLETON

COIL MOUNTING

Filed Dec. 27, 1922

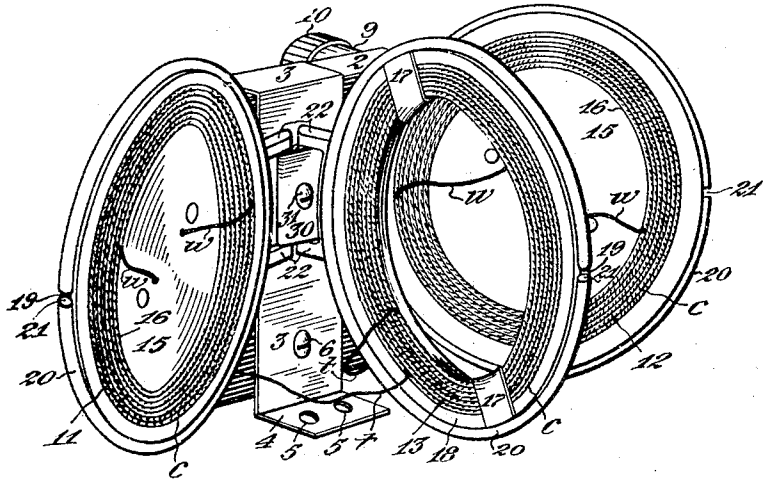
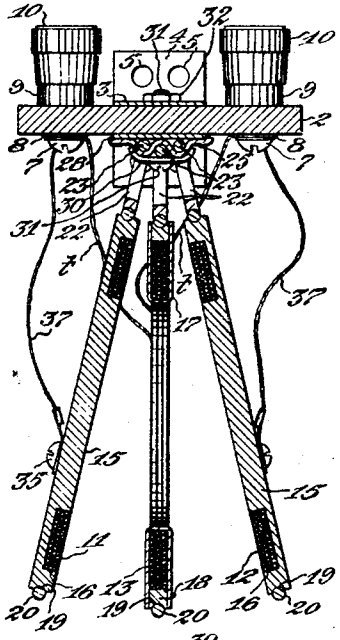


Fig. 1.



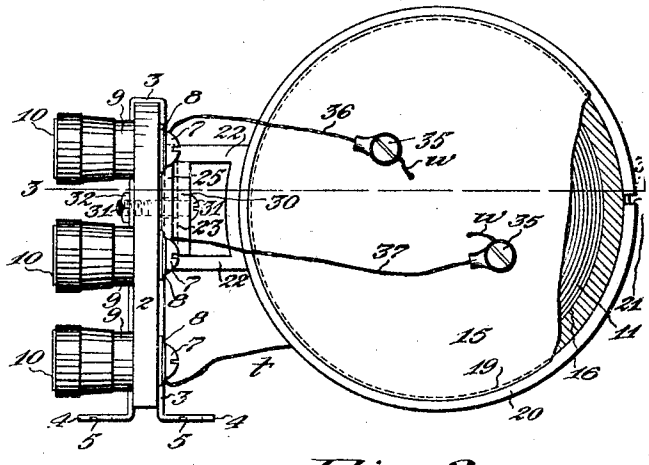


Fig. 2.

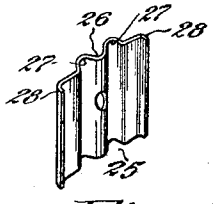


Fig. 4.

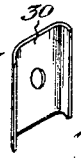


Fig. 5.

Fig. 3.

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UNITED STATES PATENT OFFICE.

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COIL MOUNTING.

Application filed December 27, 1922. Serial No. 609,314.

To all whom it may concern:

Be it known that I, PYAM L. PENDLETON, a citizen of the United States, residing at Providence, in the county of Providence, State of Rhode Island, have invented certain new and useful Improvements in Coil Mountings, of which the following is a specification.

This invention relates to an improved coil assembly for use with electrical apparatus and particularly in radio sets.

The principal object of the invention is to provide an improved mounting for a plurality of inductance coils in which the coils are adapted for adjustment to vary the distance therebetween, or the coupling of the coils in radio circuits; and particularly to provide for the manual adjustment of the coils without causing undue changes in the constants of the inductances under the influence of outside electrical discharges such as from "body capacity".

Other objects of the improvement are set forth in the following specification which describes a preferred embodiment of the invention as illustrated in the accompanying drawings. In the drawings:

Fig. 1 is a view in perspective of my improved mounting showing it adapted for holding three coils, a primary inductance, secondary inductance, and tickler coil;

Fig. 2, an end elevation of the mounting showing one of the coils and its holder in side view;

Fig. 3, a plan view of the mounting shown in section on the line 3—3 of Fig. 2; and

Figs. 4 and 5, detail views in perspective of the clamping-members for the hinge-elements of the coils.

Referring to the drawings, 2 designates a plate or panel of insulating-material, such as vulcanized rubber, fiber, bakelite or the equivalent, which forms the main support for the mounting. Overlying the front and back of the panel 2 is a metal band or strap 3 which is bent into inverted U-shape and provided with outwardly projecting flanges or feet 4 adapted to rest against a base or other support, and to be secured thereto by means of suitable screws inserted through the holes 5 shown in Figs. 1, 2 and 3. The two legs of the strap or band 3 may be clamped against the opposite sides of the panel 2 by any suitable means, such as the screw 6, and the panel may be attached to its support in either vertical or horizontal position as desired. Inserted through holes at the sides of the panel 2 are binding-posts 7 which may consist of suitable screws having washers 8 under their heads, and larger threaded washers or nuts 9 arranged at the back of the panel. In the present embodiment of the invention I have illustrated six binding-posts 7 which are employed for connecting the leads from the several coils with the various electrical circuits of the apparatus with which they are used and each post is provided with a finger-nut 10, of usual construction, for binding the end of the wire thereto.

As herein shown my improved mounting is adapted for supporting three coils, the primary inductance 11, secondary inductance 12, and tickler coil 13; but in some cases only two coils are used, while in other instances a greater number could be held on the mounting without material change in the structure or arrangement of its parts. The three coils 11, 12, and 13 may be of any preferred type of winding as usually employed in the present art and are preferably ring-shaped in contour and relatively thin and flat.

As one feature of my invention the coils are received and supported in holders of insulating-material such as the recessed or cupped disks 15. As shown most clearly in Fig 3, the holders 15 for the two outer or movable coils 11 and 12 consist of flat disks constructed of vulcanized rubber or the like and formed with annular channels or recesses 16 within which the coils are snugly nested as illustrated in Figs. 1 and 2. The coils are wound from suitably insulated conductor *c*, and I have found that by pressing them firmly into the recesses 16 of the holders 15 the inherent expansive tendency of the wire turns will serve to create a binding effect to retain them securely in place thereon. If desired, however, the coils may be permanently fastened to the holders by means of small tabs or gummed strips pasted thereon. Such tabs or binding strips 17 are usually employed for the center or tickler coil 13, see Fig. 1, since the holder 18 for this coil consists of an open ring or annulus without the sides and center portions which form a part of the structure of the movable holders 15. The purpose of constructing the central holder 18 in this form is to expose both

sides of the tickler coil 13 to the faces of the movable coils 11 and 12 which are adapted for adjustment in relation thereto as shown in Fig. 3.

Referring particularly to Figs. 2 and 3, each of the holders 15 and 18 is formed on its periphery with a shallow, circumferential groove 19 adapted to receive a metal ring 20 which serves as the electrical protective element for the coil carried by the holder. The rings 20 are preferably split at 21 so that they may be expanded to adapt them to be slipped on over the rims of the holders in assembling them therewith. The rings 20 as herein illustrated are constructed of round wire, but they may be of any other contour in cross section, and are designed to have sufficient spring tension to cause them to snap into the grooves 19 to bind firmly against the rims of the holders to effect a secure and permanent union therewith.

For mounting the holders on the standard or panel 2 I may employ any convenient means such as an arm extending from each holder and conected with the metal band or strap 3. The arms 22 for the holders may be attached to their sides or, as herein illustrated, may be permanently attached to their circumferential rings 20. As shown most clearly in Fig. 2, each arm 22 is constructed from a metal stamping struck up in substantially rectangular form with one of its sides of arcuate shape and concaved along its edge to adapt it to conform to the periphery of the ring 20. The arm 22 may be soldered, brazed, riveted or otherwise secured to the ring 20 and its vertical side-bar 23 is cylindrical in cross-section to adapt it to serve as a pivot or hinge-pin for the adjustable mounting for the holders.

As shown in Figs. 3 and 4, the hinge structure for the mounting comprises a fluted plate or clip 25 formed of sheet-metal struck up to provide a central depression, or socket 26 on its front face adapted to receive the hinge-pin 23 of the arm 22 for the coil-holder 18; while on its opposite side are two parallel, spaced-apart bearing sockets 27 for the hinge-pins 23 of the arms of the adjustable coil-holders 15. The lateral edges of the hinge-plate 25 are bent inwardly at 28 to adapt them to overlap the edges of the metal strap 3 on the panel 2 to hold the plate from displacement when it is placed thereagainst as shown in Fig. 3. It will be observed by reference to this view of the drawings that the hinge-plate 25 is placed against the front of the metal strap 2 overlying the pivots or hinge-pins 23 of the two outer arms 22 to hold the pivots in the bearing sockets 27, while the pin 23 of the arm 22 on the central holder 18 is seated in the forward groove or depression 26 of the plate. A clamping-plate 30 shown in detail in Fig. 5, is fastened to the front of the hinge-plate 25 by means of a screw or bolt 31 projecting through central holes in both plates and corresponding holes in the opposite sides of the strap 3. The sides of the clamp 30 are bowed or bent inwardly to adapt them to conform to the curved loops or corrugations of the hinge-plate 25, and a nut 32 on the rearward end of the screw 31 serves to draw the parts together to secure them in operative relation. It is to be noted that the hinge-pin 23 of the central arm 22 is cut away to allow the screw 31 to pass through the holes in the strap 3, see dotted lines in Fig. 2. It will also be observed that the clamp-plate 30 bears at two points against the forwardly-projecting corrugations of the hinge-plate 25 so that its central portion is free to yield slightly under the pressure exerted by tightening the screw 31. This arrangement provides for applying pressure on the hinge-pin 23 of the central arm 22 to clamp the pin firmly in its seat 26 so that the arm and its coil-holder 18 are held rigidly to prevent them from swinging. As a further means for holding the central arm 22 from turning, its pin 23 may be soldered or brazed to the socket. The pressure of the clamp 30 on the hinge-pins or pivots 23 of the two outside arms 22 for the holders 15 is resisted by the convexed portions of the hinge-plate 25 so that it acts to hold the pins against the face of the strap 2 with less binding effect. Stated briefly, the clamp 30 exerts only a slight frictional pressure on the hinge-pins 23 of the arms for the two movable coil-holders 15 to prevent them from turning too freely while allowing for their adjustment to swing the two coils 11 and 12 toward and away from the fixed or stationary coil 13. By properly adjusting the clamp-screw 31 the pressure of the hinge-member 25 on the pivots 23 for the movable coils may be regulated to apply just sufficient friction to prevent the coils from being moved out of position under jar or vibration, while the holder 18 for the central coil 13 will always be maintained rigid and immovable.

Referring to Fig. 2, the lead wires *w*, *w* from the adjustable coils 11 and 12 are connected to two binding screws 35 screwed into the back of their holders 15, and from these points suitable flexible conductors 36 and 37 lead to the two upper pairs of binding-posts 7. The lead wires *t* from the tickler coil 13 are connected directly to the two lower binding-posts 7 and in this manner each of the coils may be electrically connected in its respective circuit of the apparatus with which the coils are used.

It will be observed from the foregoing description that my invention provides an extremely simple, neat and inexpensive mounting for a plurality of inductance coils to adapt them for adjustment, one in rela-

tion to another to vary their coupling; and a most important feature of the invention resides in the means for protecting the windings from outside electrical interferences such as the effect of body capacity which is liable to cause changes in the constants of the inductances. The two movable coils 11 and 12 are adjusted with respect to each other or to the tickler-coil 13 by grasping their holders at the rims and swinging them on their pivots. The turning movement of the holders 15 is resisted slightly by the friction of the hinge-plate 25 on the hinge-pivots 23 under the resilient pressure of the clamping plate 30, so that when the coils are once set in proper relation their adjustment will not be disturbed by jar or shock. As the operator grasps the rim of the coil-holder to turn it on its hinge any electrical discharge given off from the hand or fingers, due to "body capacity", will be collected in the protective ring 20 and dissipated therethrough to prevent it from reacting on the windings. It will be noted that the protective conductor-rings 20 are directly connected with the other metal parts of the mounting and, if required, the metal strap 3 may be grounded to carry off the charge. In this way the coils are protected from outside electrical influences liable to cause changes in the constants of the inductances and therefore the coupling may be more accurately adjusted to provide the proper tuning of the instrument with which it is used. Furthermore, the inductive effect of the coupling will remain constant after the operator's hands are withdrawn from proximity with the coils so that a much more accurate and efficient tuning is accomplished without fluctuations under the influence of outside electrical discharges.

Various modifications may be made in the details of the structure and arrangement of the device without departing from the spirit or scope of the invention, and as I believe that I am the first to employ a protective conductive element in combination with an induction coil to prevent electrical interference from outside influences I claim this feature broadly.

I claim:

1. In a device of the type specified, the combination of an inductance coil, means for movably mounting the coil to adapt it to be manually adjusted in position, and a ring of conducting-material surrounding the coil and insulated therefrom to adapted it to collect electrical discharges due to body capacity when the coil is handled in adjusting it whereby to protect the coil from influences liable to cause changes in the constants of the inductance.

2. In a device of the type specified, the combination of an inductance coil, a holder of insulating-material enclosing the coil, means for mounting the holder to adapt it for manual adjustment to regulate the position of the coil, and a ring of conducting-material surrounding the holder and insulated thereby from the coil to adapt it to collect electrical discharges due to body capacity when the coil is manually adjusted whereby to protect the windings from influences liable to cause changes in the constants of the inductance.

3. In a device of the type specified, the combination with an inductance coil, of a holder of insulating-material therefor, means to mount the holder to adapt it for manual adjutment to alter the position of the coil, and an electrical protective element for the coil consisting of a conductor supported from the holder and insulated thereby from the coil to adapt it to collect electrical discharges from the body of the operator to prevent interference with the constants of the inductance when the holder is handled to adjust the coil.

4. In a device of the type specified, the combination of a recessed disk-like holder of insulating-material, an inductance coil contained within the recess on the holder, and an annulus of conducting material on the rim of the holder insulated from the coil to adapt it to protect the windings from outside influence due to stray electrical discharges.

5. In a device of the type specified, the combination with an inductance coil, of a holder of insulating-material surrounding the coil and formed with a peripheral groove, and a ring of conducting-material held in said groove to adapt it to serve as an electrical protective element for the coil to prevent ouside electrical discharges from influencing the inductive effect of the windings.

6. In a device of the type specified, the combination with an inductance coil, of a holder of insulating-material for the coil, an electrical protective ring of conductor supported from the holder and insulated from the coil, an arm extending from the holder, a support, and a hinge-element connecting the arm with the support.

7. In a device of the type specified, the combination of a support, an electrical coil, a disk-shaped holder of insulating-material enclosing the coil, a metal annulus surrounding the rim of the holder, and an arm extending from the holder and pivotally connected to the support.

8. In a device of the type specified, the combination of a standard, an electrical coil, a disk-shaped holder of supporting the coil, a metal ring mounted in a peripheral groove on the holder, an arm extending from the ring and provided at its end with a pivot, and a bearing on the standard for receiving the pivot to hingedly connect the coil-holder therewith.

9. In a device of the type specified, the

combination of a support, a plurality of electrical coils, disk-shaped holders having openings in which the coils are held, arms extending from the holders and provided with hinge-pins at their ends, a hinge-member on the support having sockets adapted to receive the hinge-pins, a resilient clamp overlying the hinge-member, and means for tightening the clamp against the hinge-member to cause a slight frictional resistance to the swinging movement of the holders on their hinges.

10. In a device of the type specified, the combination of a standard, a plurality of electrical coils, holders of insulating-material for supporting the coils, arms on the holders having pivots at their ends, a hinge-member formed with opposite sockets for receiving the pivots on the arms, and a clamping-member overlying the hinge-member to hold the pivots in place in the sockets.

In testimony whereof I affix my signature.

PYAM L. PENDLETON.