

Sept. 9, 1924.

1,508,167

J. W. CUSHING

MOUNTING FOR TUNING RADIOCIRCUITS

Filed March 27, 1923

2 Sheets-Sheet 1

Fig. 1.

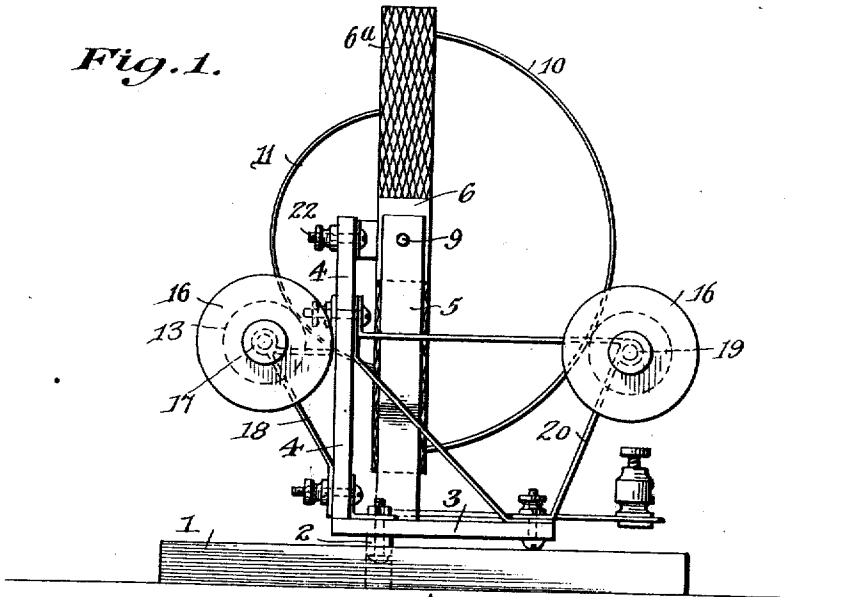
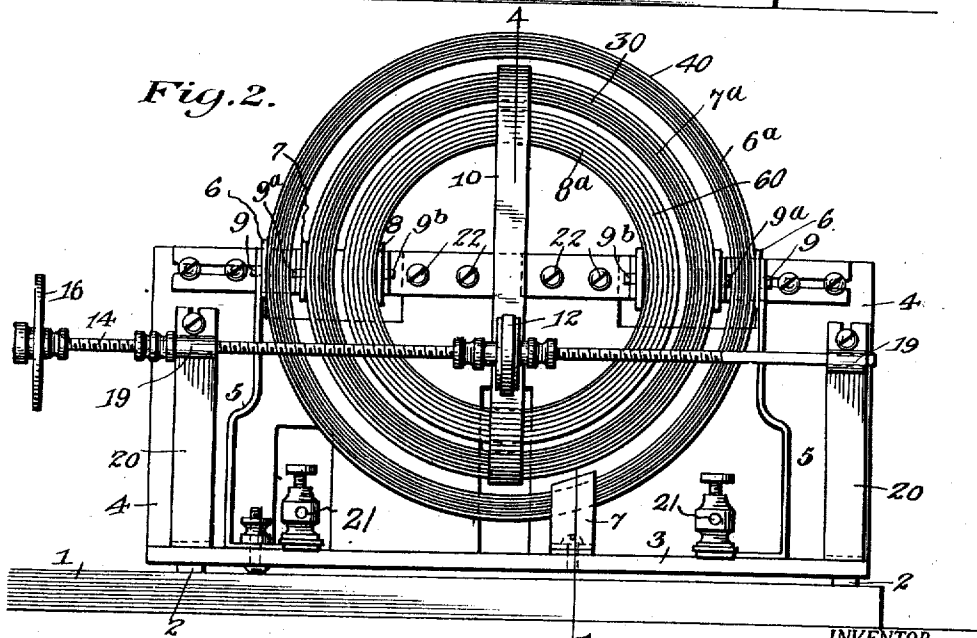


Fig. 2.



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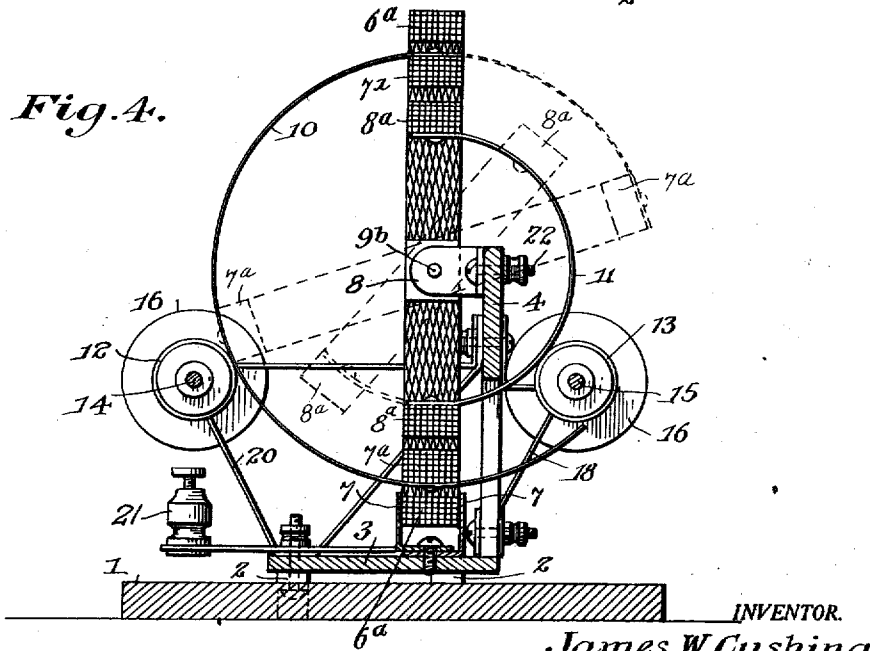
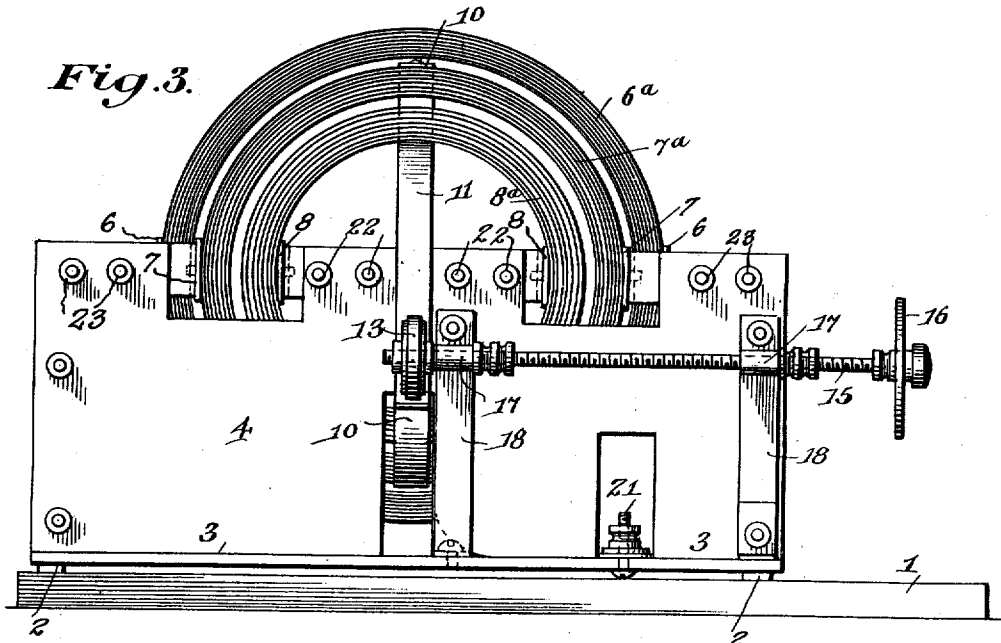
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# UNITED STATES PATENT OFFICE.

JAMES W. CUSHING, OF IONIA, MICHIGAN.

MOUNTING FOR TUNING RADIOCIRCUITS.

Application filed March 27, 1923. Serial No. 628,005.

*To all whom it may concern:*

Be it known that I, JAMES W. CUSHING, a citizen of the United States, residing at Ionia, in the county of Ionia and State of Michigan, have invented certain new and useful Improvements in Mountings for Tuning Radiocircuits, of which the following is a specification.

This invention has reference to mountings for tuning radio circuits in which the circuits are arranged in telescoping coils with one coil arranged fixed in space and the companion coils adjustable at will, whereby there is obtained an improved, clearer, more distinct and louder effect than has heretofore been the case and the device is useful to replace the present day tuners that are on the market and are used in connection with radio phone sets.

The three-circuit telescope coil mounting is to provide a means whereby three inductive coils may be mounted in a position which allows the two center coils to be rotated to vary their position relative to each other and also to the third coil, said coils telescoping.

The three-circuit telescope coil mounting is constructed to comprise one unit detachable from the panel, base, and back of any cabinet in which the circuit may be mounted, or from any surface on which it may be mounted, without moving any part of the unit circuit other than the connections to other units, and any knobs, dials or rotary indicators on the panel face of any cabinet should the same be used.

The three circuit telescope coil mounting may be constructed to accommodate any coil which may be self supporting or wound on thin cylinder tubes either single layer or multi layer, or bank-wound, or honeycomb wound, the last type of winding being the one illustrated in the drawings, or any other design of inductive winding provided.

A feature of the three circuit telescope coil mounting is that there are provided three separate coil units mounted as one unit, at the same time two being variable, which provides a variable coupling between primary and secondary; and also provides a variable coupling between the secondary and the tickler, which means greater selectivity and clearness of audibility. This three-circuit telescope coil mounting also takes the place of two instruments that are used at the present time in radio-phone out-

fits, and this is, it takes the place of a variometer and variocoupler.

The three coils, the outer, the intermediate and the inner, may be of optional construction and be wound of any number of turns, to obtain the desired amount of inductance, or the desired wave length. The coils are constructed to provide means for obtaining a universal wave length, and means of obtaining a greater or lesser wave length may be obtained outside of the instrument.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding that the invention is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:—

Figure 1 is an end elevation of a three-circuit-variable-telescope-coil mounting embodying the invention.

Fig. 2 is a face view of the structure shown in Fig. 1.

Fig. 3 is a view similar to Fig. 2, but taken from the opposite side of the instrument.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Referring to the drawings, there is shown a base 1 which may be considered as varying in size in accordance with the instrument and may be made of any suitable material for the purpose.

The base 1 supports legs or feet 2 attached to the undersurface of a secondary base 3 which may be conveniently made of some suitable insulating material such as hard rubber, although such particular material is not at all mandatory.

Erected on and fast to the base 3 is an upright elongated plate 4 serving as a support for various instrumentalities, the base 3 and upright 4 being connected in any appropriate manner to constitute a rigid support for the parts carried thereby.

Erected on the base 3 near opposite sides thereof, are two spaced posts 5 secured to diametrically opposite sides of a coil 6, holding this coil firmly in position on the base 3 with the opposite ends of the wires

of the coil connected to plates 6 secured to the opposite sides of the coil, the plates being connected by means of trunnions 9, to the posts 5 and electrically joined thereto.

5 While the coil 6<sup>a</sup> may be of various types, it is indicated in the drawings as of the honeycomb type, without being restricted to such specific form of coil, while the coil 6<sup>a</sup> is held against movement by an anchoring yoke 7 fast to and rising from the base 3.

10 In the honeycomb type of coil, the turns of the wire waver from side to side and progress about the axis of the coil from end to end, whereby there is set up a large inductance action between the several coils making up the instrument.

15 In the particular structure chosen, there are provided three coils, one inside of the other and inductively arranged with respect to each other.

20 In the particular arrangement illustrated in the drawings, there are three nested coils 6<sup>a</sup>, 7<sup>a</sup> and 8<sup>a</sup>, all of these coils being mounted to revolve about a common axis but means is provided whereby the outer coil may be secured against rotation, as disclosed further on so that the coils 7<sup>a</sup> and 8<sup>a</sup> may rock on an axis in alinement with the axis of the coil 6<sup>a</sup> which coil is held stationary in said axis.

25 Connected at diametrically opposite points of the coils 7<sup>a</sup> and 8<sup>a</sup> are semi-circular tracks 10 and 11 which may be conveniently formed of flattened strips of metal, preferably copper, although other metals will answer, and these tracks 10 and 11 are frictionally engaged by actuating wheels 12 and 13 by means of which the respective coils are caused to move about its axis to the desired extent.

30 The coil 6<sup>a</sup> is stationary upon the trunnions 9 while the coils 7<sup>a</sup> and 8<sup>a</sup> are adapted to revolve upon their respective trunnions 9<sup>a</sup> and 9<sup>b</sup> which are in alinement with the trunnions 9 of the coil 7<sup>a</sup>. Thus each coil carries its respective trunnions upon which it is supported and might revolve and each trunnion of each separate coil is carried by and connected to that coil by means of a terminal plate 6, 7 and 8, the ends of the wires of the coil being connected to these plates and the current transmitted through the trunnions to the respective supporting bracket and to the binding posts. As clearly shown, the plates and trunnions 8 and 9<sup>a</sup> are upon the inner side of the inner coil 8<sup>a</sup>.

35 Since the coil 6<sup>a</sup> is held against moving with respect to the other coils, by means of a yoke or clip 7, this coil remains stationary in space, but the other two coils 7<sup>a</sup> and 8<sup>a</sup> may be rocked about the respective axes 9<sup>a</sup> and 9<sup>b</sup> and change their relation to each other as well as to the coil 6<sup>a</sup>.

40 In order to provide for this varying rela-

tion, the tracks 10 and 11 are utilized and are frictionally engaged by the rollers 12 and 13, respectively, which rollers are mounted on respective shafts 14 and 15.

45 The roller 13 is mounted on the shaft 15 and is actuated by an impelling wheel or knob 16. The shaft 15 is mounted in journal supports 17 extending between posts 18 carried by the base 3 in such position that the roller or wheel 12 engages the track 10 to urge the coil 7<sup>a</sup> to rock in one direction or the other.

50 The roller 12 is mounted on the shaft 14 in engagement with the track 10 and is mounted in journal bearings 19 carried by posts 20 fast to the base 3, the arrangement of the wheels 12 and 13 with respect to the tracks 10 and 11 being such that upon rotating the wheels 12 and 13 the tracks 10 and 11 will cause the respective coils 7<sup>a</sup> and 8<sup>a</sup> to rock in their journal bearings, while these parts fit closely enough so that the coils may be displaced as desired and will hold their displaced positions.

55 The posts 20 carrying the journal bearings 19 are made fast to the base 3 while the posts 18 carrying the journal bearings 17 are made fast to the uprights 4 so that these several parts are all connected and serve to hold the parts sustained thereby in proper relation.

60 Binding posts 21 serve for the coupling of electric conductors to the coil 6<sup>a</sup> while other binding posts 22 serve for connection with the coil 8<sup>a</sup> and the posts 23 form connection with the coil 7<sup>a</sup>.

65 What is claimed is:—

1. A variocoupler unit comprising a plurality of nested coils, means for pivotally supporting the inner one of said coils, a semi-circular track fixed to said inner coil, and means engaging said track for shifting the same thereby positioning said inner coil in angular relation with respect to an adjacent coil.

2. A variocoupler unit comprising a plurality of nested coils, means for pivotally supporting the inner one of said coils, a semi-circular track secured to said inner coil at diametrically opposed points, and means engaging said tracks for shifting the same thereby positioning said inner coil in angular relation with respect to an adjacent coil.

3. A variocoupler unit comprising a plurality of nested coils, means for retaining the outer of the said coils stationary, means for pivotally supporting each of the inner coils independently of each other, a semi-circular track fixed to each of said inner coils, and means engaging said tracks for shifting the same thereby positioning said inner coils in angular relation to one another and to said stationary coils.

4. A variocoupler unit comprising a series

of nested coils, separate combined pivot and supporting means for each coil, means for fixing the outer coil against movement, a semi-circular track carried by each of the other coils, and independent means frictionally engaging each of said tracks for effecting the actuation of each track carrying coil.

5 5. A variocoupler unit comprising a series of nested coils, separate combined pivot and supporting means for each coil, means for fixing the outer coil against movement, a semi-circular track carried by each of the other coils, and independent means frictionally engaging each of said tracks for effecting the actuation of each track carrying coil, said combined pivot and supporting means of each coil being alined for rotation about a common axis.

10 6. A variocoupler unit comprising a series of nested coils, diametrically oppositely positioned plates secured to each coil and providing terminals for the wire ends of

that coil, trunnions secured to each of said plates for supporting the coil independently, means for fixing the outer of said coils against movement, semi-circular tracks fixed to each of the inner coils, and independent means contacting with said tracks for effecting the actuation of the said inner coils.

7. A variocoupler unit comprising a series of nested coils, with the outer one fixed in space, and the inner one separately rockable about an axis common to all of the coils, and rotatable trunnions connected to the rockable coils for effecting the rocking of each coil independently of the other, the trunnions being arranged on opposite sides of a mid-plane of said coils, each of the rockable coils carrying tracks fixed thereto, and a driving wheel or roller engaging each track to rotate its respective coil.

In testimony whereof, I affix my signature hereto.

JAMES W. CUSHING.