Feb. 11, 1936. W. A. SCHAPER 2,030,271

RADIO APPARATUS

Filed March 6, 1933

FIG. 1

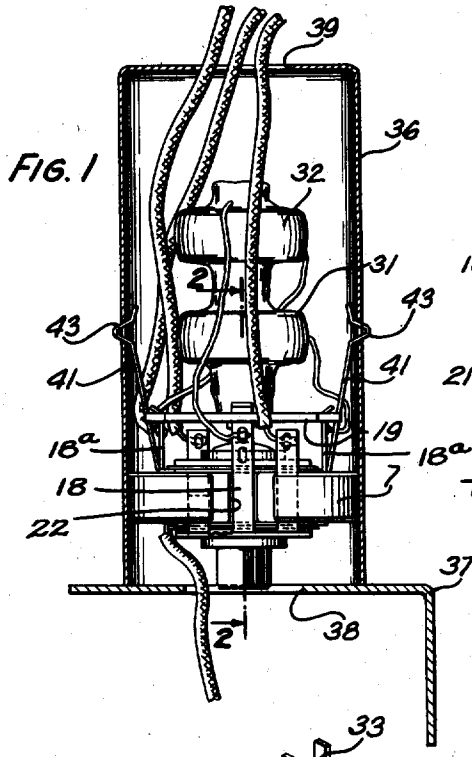


FIG. 2

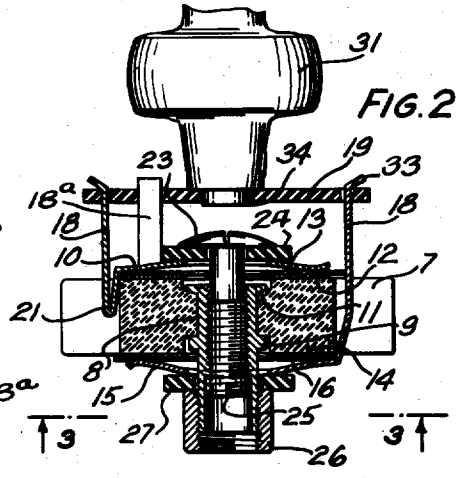


FIG. 3

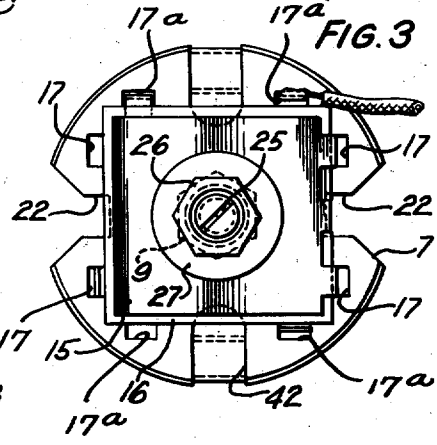


FIG. 4

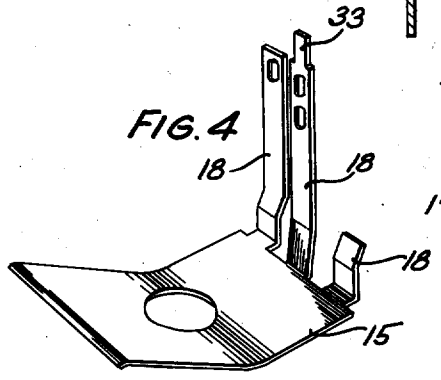


FIG. 5

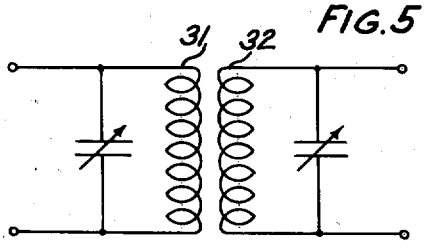
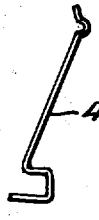


FIG. 6



INVENTOR

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UNITED STATES PATENT OFFICE

2,030,271

RADIO APPARATUS

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Application March 6, 1933, Serial No. 659,710

6 Claims. (Cl. 175—41.5)

My invention relates to a radio unit and more particularly to a multiple condenser of a radio unit.

In recent radio design it has been common practice to mount a radio frequency transformer which has both its primary and secondary windings tuned in a single shielding container with the tuning condensers.

An object of the present invention is to provide a plurality of condensers in such a unit which may be conveniently adjusted to individually vary their capacities.

A further object is to provide a small and compact condenser assembly in which the condenser plates may have substantially the area of a cross section of the shielding container.

Other objects and advantages will appear as the description proceeds.

In accordance with one embodiment of the invention a pair of plate condensers are mounted on opposite sides of a mounting base and adjusting means are provided for individually adjusting the condensers from the same side of the base, the adjusting means also serving to secure the condensers to the base.

A complete understanding of the invention may be had by reference to the following description taken in conjunction with the accompanying drawing in which

Fig. 1 is a side elevation partly in section of a unit embodying the invention,

Fig. 2 is an enlarged fragmentary sectional view of the condenser assembly,

Fig. 3 is a bottom view taken on line 3—3 of Fig. 2,

Fig. 4 is a perspective view of one of the condenser plates,

Fig. 5 is a diagrammatic view of a circuit in which the unit may be used, and

Fig. 6 is a detail view of a strip for securing the assembly in a shielding container.

The coil and condenser unit is mounted on a base 7 of any suitable insulating material. This base has a central countersunk aperture for receiving a tubular stem 8 which has a collar 9 intermediate its length for seating in the countersunk aperture in the base and an end 11 of the stem is crimped over in another countersunk portion of the aperture to securely retain the stem in the base. The stem is internally threaded and a portion of the projecting end of the stem is externally threaded.

A condenser is mounted on each side of the base. The upper condenser has a condenser plate 12 lying flat against the top of the base and a second condenser plate 13 which is transversely arched. These condenser plates are separated by a sheet of dielectric material 10 such as mica. The lower condenser also has a condenser plate 14 lying flat against the base and a second condenser plate 15 which is transversely arched. The condenser plates of the lower condenser are separated by a sheet of dielectric material 16.

All of the condenser plates are preferably square and since the plates forming the two condensers are on opposite sides of the base they may be of substantially the same size as the base. This construction makes it possible to use variable condensers having a large range of capacities with a relatively small base.

The base is provided with a plurality of apertures 17 and 17*a* extending therethrough and arranged in a rectangular pattern around the peripheries of the condenser plates. The outer condenser plates 13 and 15 are provided with a plurality of integral strips such as shown at 18 along one side of the plates which serve as terminals for the condensers and also to position the plates. The central or middle strips 18 of plates 13 and 15 serve as supports for a coil mounting plate 19 and preferably extend into notches or cut-out portions 22 in the periphery of the base. The strips 18 of the lower condenser plate 15 may extend upwardly through the apertures 17, and the strips of the upper condenser plate 13 are provided with portions 21 which are bent downwardly to extend into apertures 17 and then upwardly. The condenser plates 12 and 14 are provided with strips 18*a* which are disposed in the apertures 17*a* in a manner similar to that described in connection with strips 18 in apertures 17 and one of the strips 18*a* of each condenser plate 12 and 14 may extend upwardly through the coil mounting plate 19 to assist in supporting this plate. It will be evident that the number of strips provided on a condenser plate may be varied to suit any particular need. As long as a condenser plate has two strips engaging apertures in the base, it will be held in position and prevented from rotational movement.

In order to adjust the upper condenser, a headed screw 23 provided with a thread is inserted in the stem 8 and an insulating washer 24 is placed under the head of screw 23 to insulate the screw from the condenser plates. It will be seen that the apertures in the condenser plates are of such size that the plates do not contact with the screw. The lower end of the screw 23 is provided with a

slot 25 for receiving a screw driver to adjust the capacity of the upper condenser from beneath the base. The lower condenser is adjusted by means of a nut 26 threaded on the external thread of the stem 8. An insulating washer 27 is interposed between the nut 26 and condenser plate 15. The apertures in condenser plates 14 and 15 are of such size that the plates do not contact with the stem 8 thus making the upper and lower condensers electrically independent.

The condenser plates 13 and 15 are preferably duplicates except that some or all of the strips 18 of the plate 13 are bent back as shown at 21 in Fig. 2.

One of the outstanding advantages of the above described condenser construction is that the base of the unit may be made considerably smaller than in a common type of unit in which the condensers are mounted side by side on one side of the base.

For the purpose of mounting coils 31 and 32 of a radio frequency transformer on the base some of the strips 18 are provided with reduced ends 33 which pass through apertures in the plate 19 and are bent over. The coils are wound on a dowel pin 34 which is supported in an aperture in plate 19. The coils are connected to the condensers as shown diagrammatically in Fig. 5.

A condenser and coil assembly of the type described is usually mounted in a shielding container 36 on a chassis 37. In some cases the coils are mounted above the condensers as illustrated and in other cases the entire assembly is inverted in the container. This invention is applicable to either method. When the assembly is mounted as illustrated the condensers may be adjusted through an opening 38 in the chassis, and when the assembly is inverted the condensers may be adjusted through an opening 39 in the shielding container.

In order to secure the assembly in the container the base 7 is provided with a pair of resilient arms 41 the lower ends of which are U-shaped and are clamped over reduced portions 42 in the base. The upper ends of these arms are provided with bent portions 43 which extend through apertures in the container. A fine wire may be placed around the outside of the container passing through the projecting portions of the bends to firmly secure the assembly in the container. The arms are of such length and the apertures in the container are so located that the assembly will be in the proper position in the container, when the assembly is mounted as illustrated or inverted.

It will be understood that the embodiment of the invention herein described is merely illustrative and that many changes and modifications may be made therein without departing from the spirit and scope of the invention.

I claim:

1. In a radio apparatus, a mounting base, a condenser mounted on each side of said base, each condenser having a plurality of plates, and a coaxial adjusting means for varying the axial distance between said plates to individually adjust said condensers.

2. In a radio apparatus, a mounting base, a condenser mounted on each side thereof, said condensers comprising a plurality of plates, an adjusting member for one of said condensers extending through said base for varying the distance between the planes of said plates, and a second adjusting member concentric therewith and surrounding the first adjusting member for varying the distance between the planes of the plates of the second condenser.

3. In a radio apparatus a base, a condenser mounted on each side of the base and supported solely on the base, and means individual to said condensers for adjusting the condensers from one side of the base, said adjusting means being mounted on the base.

4. A condenser unit comprising a base, a tubular stem mounted therein and projecting therefrom, said stem being internally and externally threaded, a condenser mounted on each side of said base, means engaging the internal threads of the stem for adjusting one of said condensers, and means engaging the external threads for adjusting the other condenser.

5. A condenser unit comprising a base, a condenser mounted on each side of the base, said condensers having a plurality of plates, and coaxial means for individually adjusting the perpendicular distance between the plates of the condensers.

6. A condenser assembly comprising a base, a condenser mounted on each side of the base, said condensers having plates disposed in substantially parallel planes and in superposed relation, and coaxial adjusting means for varying the axial distance between said plates to individually adjust the capacities of said condensers.

WILLIAM A. SCHAPER.