

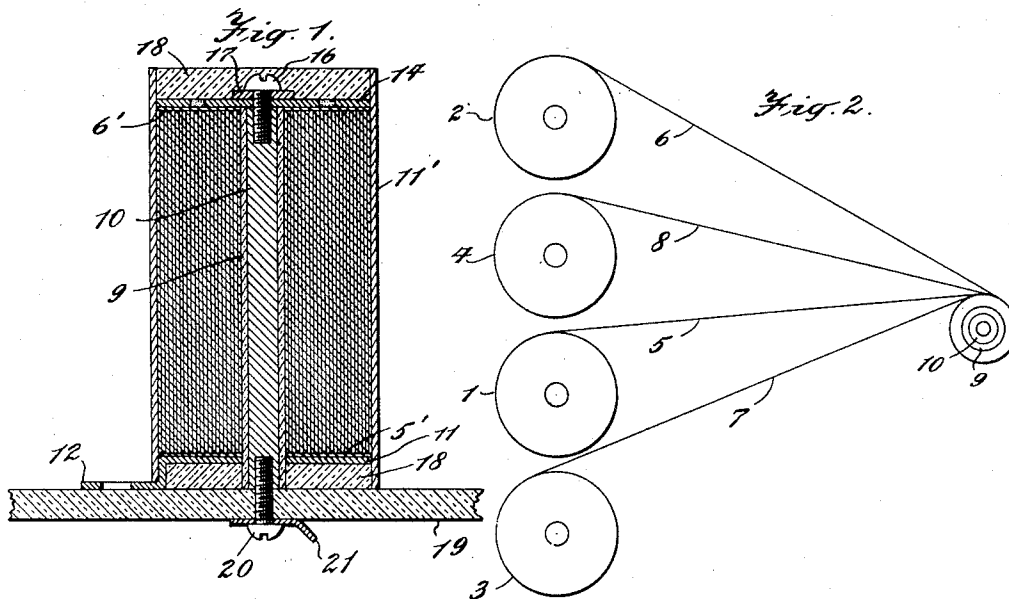
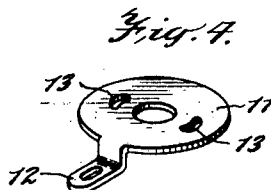
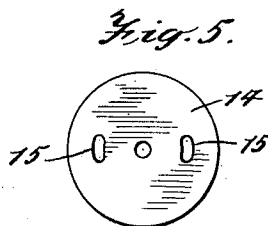
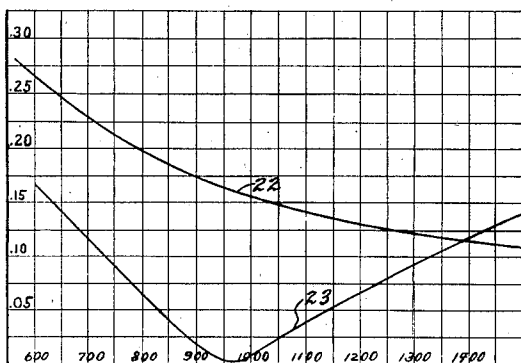
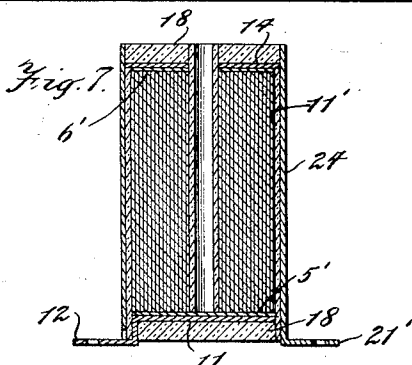
Jan. 2, 1934.

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1,942,153

ELECTRICAL CONDENSER

Filed Feb. 11, 1930



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1,942,153

ELECTRICAL CONDENSER

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Application February 11, 1930. Serial No. 427,448

4 Claims. (Cl. 250—16)

This invention relates to condensers for use in electrical circuits and particularly in such circuits where radio frequency currents are to be by-passed around devices to be actuated by direct current or currents of low frequency.

One object of the invention is to produce a by-pass or similar condenser with negligible impedance to a given radio frequency band and infinite impedance to direct current.

Another object is to construct a condenser so that it may be readily attached and firmly held to a supporting panel by a central terminal rod of the condenser.

Another object is to construct a condenser with a predetermined value of capacitative reactance in a predetermined frequency range so that it will be substantially equal and opposite to the inductive reactance of a terminal conductor of the condenser.

Other objects will appear in the appended description, reference being had to the drawing, in which:

Fig. 1 is a section of the completed condenser mounted on a supporting panel, the interleaved tinfoil and insulation paper not being shown in individual sections.

Fig. 2 is a diagrammatic illustration of the method of winding the sheets of tinfoil and insulation sheets of paraffin paper or other material.

Fig. 3 is an exaggerated section of a portion of the paper and foil wound on the condenser so as to illustrate the relation of the strips of foil to each other and to the strips of paper.

Fig. 4 is a perspective view of one terminal washer.

Fig. 5 is a plan view of the other terminal washer.

Fig. 6 shows a set of curves illustrating the action of my improved condenser compared to the usual type of condenser.

Fig. 7 is a view of a modified form of condenser.

Referring to Fig. 2, reference characters 1 and 2 indicate rolls of tinfoil and reference characters 3 and 4 indicate rolls of paraffin paper or a plurality of strips of paper or of other insulating material. The foil is designated by reference characters 5 and 6 and the paper by reference characters 7 and 8. The strips of foil and paper are wound on a fibre or other insulating tube 9 which contains a brass or other good conducting post 10 which will serve as a central terminal rod of the condenser when it is completed. The rod 10 and fibre sheet 9 are rotated by any spindle

mechanism so as to roll the sheets of paper and fibre tightly around the insulating tube 9 until a condenser of the appropriate size is built up.

The arrangement of foil and insulating paper from a portion of the condenser is shown in Fig. 3, the thickness of the foil and paper being exaggerated so as to clearly show the relation of the parts.

It will be seen by referring to Fig. 3 that the paper strips 7 and 8 are wound on the insulation tube 9 so that their adjacent edges are in substantially the same vertical line. This, however, is not an essential feature as the edges could be displaced with relation to each other so long as they do not extend past the strips of foil. Foil strips on the other hand are displaced one to one side and one to the other so that the foil 5, for example, extends to the left in Fig. 3 and the foil 6 to the right. After the condenser roll is completed the protruding edges of the foil 6 and the paper strip 7 are flattened down the paper strip 7 will extend over the adjacent edges of the other foil 5 and properly insulate foil 6 therefrom.

The protruding edges of the foil 6 when pressed inward towards the center of the roll will form a continuous washer 6' of conducting material. The other edge of the roll is compressed inward towards the center so that the paper strips 8 overlie the adjacent edges of the foil 6 to prevent contact with foil 5 and the protruding ends of coil 5 are formed into a conducting disc 5'. Conducting washer 11 having a terminal connection 12 is then placed over the fibre tube and rod 10 and pressed against the foil disc 5' and solder is placed on the washer 11 so that it will extend through the holes 13 therein and solder the foil disc to the washer thus forming a good electrical contact.

A washer 14 is placed against the foil disc 6' at the other end of the roll. The fibre tube 9 is flushed with the end of the rod 10 and the washer 14 abuts against this rod. The holes 15 in the washer 14 are filled with solder to firmly unite the disc 6' with the washer to make a good electrical contact. Screw 16 and washer 17 firmly clamp washer 14 against the end of rod 10. The rod 10 is thus placed in good electrical contact with the edges of the foil strips 6 and the washer 11 is placed in good electrical contact with the edges of the foil strip 5.

Pitch, sealing wax or other insulating sealing compound 18 is poured in each end of the tube 11' to completely enclose and protect the ends of the condenser roll.

The complete condenser may then be attached to a supporting panel 19 by a screw 20 passing through a terminal clip 21 and threaded into the rod 10. This screw firmly holds the condenser in place on the panel board and in addition places the terminal clip 21 in good electrical contact with the central post 10. Reference characters 12 and 21 therefore indicate the terminals of the condenser and the connecting wires are soldered or otherwise attached thereto.

By making central rod 10 a terminal extension to the foil 7 of the condenser a definite amount of inductance, though small, is added to the condenser. This inductance furnishes an impedance within a predetermined frequency range that balances the impedance of the condenser proper. Within a predetermined frequency range there is a substantial tuning effect that produces substantially zero or negligible impedance. This will be seen by referring to Fig. 6. In this figure the ordinates indicate ohms of impedance and the abscissæ indicates frequency in kilocycles. Reference character 22 indicates the impedance curve of the condenser taken directly between the foils 5 and 7 with no current passing through the central rod 10. Curve 23 indicates the impedance of the complete condenser between the terminals 21 and 12, that is, with the current passing through the rod 10. It thus will be seen that between 800 and 1150 kilocycles there is a range where the impedance of the condenser is more or less negligible because of the tuning effect brought about by the combination of the inductance of the rod with the capacity of the foil. In this range the radio frequency is therefore readily by-passed through the condenser and there is substantially no radio frequency drop across the terminals of the condenser. Direct current, however, cannot pass through the condenser as it furnishes an infinite resistance.

This form of condenser has been found especially useful in radio sets of high amplification where the radio frequency drop around the by-pass condenser will cause oscillations if the old form of by-pass condenser had been used. With the new form of condenser, however, the radio frequency drop is practically negligible and oscillations are prevented.

The new form of condenser also may be readily handled by workmen without danger of damage during the assembly operation and it can be quickly fastened to the supporting panel-board and when once fastened it is rigidly held in place by the central binding post and attaching screw.

In Fig. 7 I have illustrated a modification. In

this form the central conducting rod 10 is dispensed with and the insulating tube 11' is surrounded by conducting tube 24. The conducting tube is notched to permit the terminal 12 to pass through without contact therewith. Terminal 21' which is the other terminal of the condenser may be formed from the conducting tube itself, as shown in Fig. 7, or it may be soldered or otherwise attached thereto. One foil disc 5' is connected through the washer 11 to the terminal 12 and the other foil 6' is connected to washer 14. Washer 14 may then be soldered not only to the disc 6' but also to the surrounding tube 24.

Other modifications may be devised without departing from the spirit of the invention.

Having described my invention, what I claim is:

1. A by-pass unit for radio sets consisting of two spiral conducting foils, a layer of insulation therebetween and a conductor joined to and supporting said foils, said conductor having an inductive reactance equal to the capacity reactance of said conducting foils at a desired signal frequency.
2. A by-pass unit for radio sets consisting of two spiral conducting foils, a layer of insulation therebetween, and a conductor extending through the center of said foils and connected to one of said foils and having an inductive reactance equal to the capacity reactance of said conducting foils at a desired signal frequency.
3. A by-pass unit for radio sets consisting of two spiral conducting foils, a layer of insulation therebetween, a terminal washer connected to the spiral edge of one of said foils and a terminal conductor extending through the center of said spirals and connected to the other of said foils and having an inductive reactance equal to the capacity reactance of said conducting foils at a desired signal frequency.
4. A by-pass unit for radio sets consisting of a conducting rod, an insulation tube around said rod, two conducting foils extending spirally around said tube, a layer of insulation between said foils, a washer connected to the spiral edge of one of said foils, and a washer joining the spiral edge of the other of said foils to one end of said rod, the electrical characteristics of said unit being such that the capacity reactance between said washers being equal to the inductive reactance of said rod at a desired signal frequency.

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