

April 11, 1944.

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2,346,162

WAVE FILTER MOUNTING

Filed Nov. 12, 1941

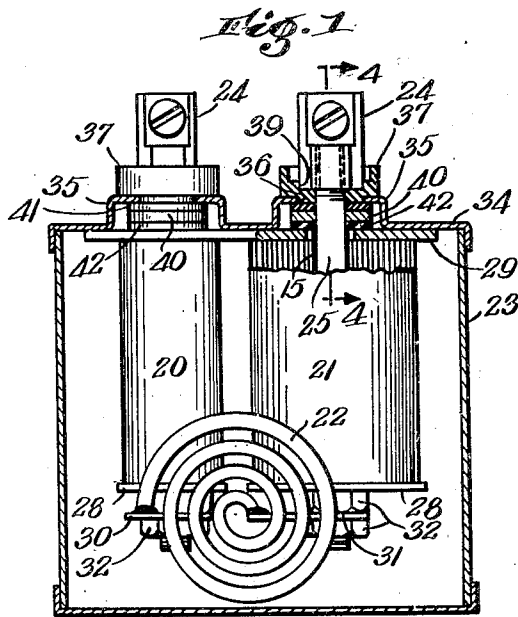
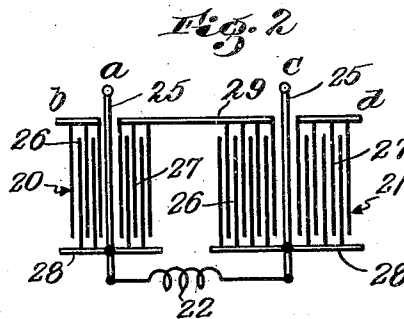
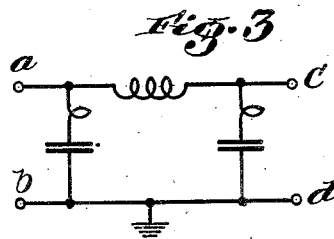
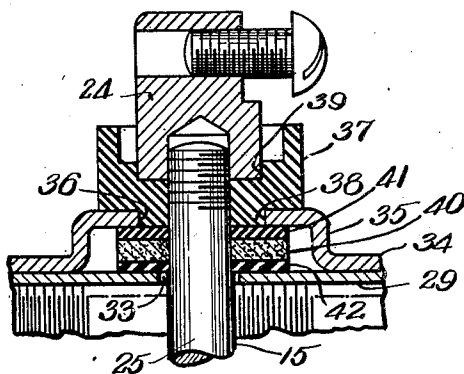
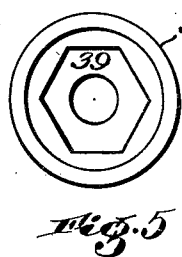
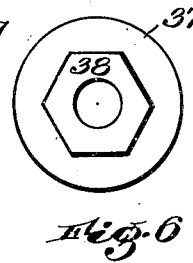


Fig. 4

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UNITED STATES PATENT OFFICE

2,346,162

WAVE FILTER MOUNTING

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Application November 12, 1941, Serial No. 418,714

5 Claims. (Cl. 178-44)

This invention relates to an improvement in electrical condensers, more particularly as employed in filters of the type set forth in the co-pending application Serial No. 409,414, filed September 3, 1941, and in the mounting of such condensers and filters.

One feature of this invention resides in the employment of bolts through the centers of the condensers which bolts have several functions, namely, to provide a conductor from one side of a condenser to the binding post by which it is connected in an electrical circuit, to mount the condenser rigidly so that the setting up of any vibration is prevented and, if desired, to provide electrical connection between condenser and coil.

A further feature of the invention is the provision of bolt locking means whereby the bolt and the binding post carried thereby are insulated from the housing walls, the openings in the housing walls through which the bolt passes are sealed against the passage of liquid through the housing and the binding post is fixed in position upon its bolt.

These and other features of the invention will appear from a consideration of the following description of one embodiment thereof and of the accompanying drawing in which

Fig. 1 is a view in elevation partly in section of a wave filter embodying this invention;

Fig. 2 is a diagrammatical view of such filter;

Fig. 3 is the equivalent circuit of such filter;

Fig. 4 is an enlarged sectional view taken along the line C—C of Fig. 1, illustrating the mounting of the filter; and

Figs. 5 and 6 are top and bottom views of one element of such mounting.

The wave filter incorporating the invention comprises a condenser unit including a pair of condensers 20 and 21, an inductance coil 22, a housing or container 23 which contains oil or the like and within which the condenser unit and coil are mounted, and binding posts 24 by which the filter is connected in an electrical circuit. Through the center of each condenser insulated therefrom by a sleeve 15 and projecting through an opening in the wall of the housing extends a tensioned mechanical connector as for example a bolt 25 which carries on its outer end one of the binding posts 24.

Each condenser 20 and 21 is of the roll or spirally wound type having metal foils 26 and 27 (Fig. 2) separated by a paper dielectric and according to the common practice brought out at the ends of the condenser. One foil 26 is

swaged or soldered to a plate or washer 28 while the other foil is similarly secured to a ground plate 29. The ground plate 29 is of such extent that it serves both condensers.

The bolt 25 of each condenser passes through the plate 28 of that condenser to which it is electrically connected. The coil 22 terminates in lugs 30 and 31 which are clamped between nuts 32 on the bolts 25. The bolts 25 thus connect the coil to the condensers both electrically and structurally. Each bolt 25 passes through an opening 33 in the ground plate 29 and is shielded therefrom by suitable insulation.

In the top wall 34 of the housing 23 are formed suitably spaced bosses 35 having central openings 36 through which the bolts 25 pass. Surrounding each bolt 25 at the opening 36 is an annular bushing disk 37 one face of which rests on the outer surface of the wall. Projecting from that face is a portion 38 which enters and fills the opening 36. In the other face of the disk 37 is formed a depression 39 in which the lower end of the binding post 24 is seated.

The periphery of the projecting portion 38 of the disk 37 is non-circular, being shown in Fig. 3 as hexagonal, and the edge bounding the opening 36 of the housing top is similarly formed so that when the portion 38 is in the opening 36 as shown in Fig. 4 any relative rotation is prevented. The depression 39 (see Fig. 5) and the lower end of the binding post 24 are similarly formed for the same purpose.

On the post 25 within the boss 35, a washer 40 of brass or other metallic or rigid material is swaged, soldered or otherwise rigidly mounted. Washers 41 and 42 of any suitable dielectric material insulate the washer 40 from the housing wall 34 and the ground plate 29. The depth of the portion 38 is approximately equal to the thickness of the housing wall so that the wall around the opening 36 is clamped between the disk 37 and the washer 41 to seal the opening 36 and prevent passage of liquid therethrough. The washers 42 similarly seal the openings 36 in the ground plate 29.

The assembly of the wave filter may be carried out in the following manner. The bushing disk 37 is associated with the top plate 34, which has been separated from the housing 23, the projecting unround portion 38 resting in the similarly unround opening 36, and an unround binding post 24 is analogously associated with the unround depression 39 in the disk. A bolt 25 having the washer 40 which is secured thereto and the washer 41 are passed through the

disk 37 into the post 24 and rotated until the post 24 is seated firmly in the depression and the top wall is clamped between the washer 41 and the bushing 37 with the portion 38 seated in the opening 36. The other bolt is similarly mounted in the top wall 34 and the washers 42 are slipped over the bolts.

The bolts 25 are then inserted, the two condensers 20 and 21 with the plates 23 and 29 and the upper nuts 32 tightened to secure the unit firmly to the wall 34 so that the plate 29 is closely in contact therewith and the washers 42 have sealed the openings 33. The lugs 30 and 31 are passed over the ends of the bolts and secured in place by the lower nuts 32. The housing is then filled with oil to the desired extent and closed by the top wall 34 as shown in Fig. 1. It will be understood that the top wall is secured in place in any desired manner. The filter 15 can now be connected in any circuit as desired and the housing 22 grounded in any suitable manner according to the general practice as indicated in Fig. 3.

It will be apparent from the above description that the condenser unit and coil are firmly mounted in the housing; that the openings in the housing wall are sealed against the passage of oil; that the bolts 25 are insulated from the housing and act both structurally to mount the condenser unit and coil in the housing and also electrically to connect the coil with the condensers and that the binding posts 24 are held firmly in position and any unwarranted loosening thereof is prevented.

While one embodiment of the invention has been shown and described in detail it will be understood that the invention is not limited thereto and that other embodiments of the invention may be made without departing from the spirit and scope thereof as set forth in the following claims.

I claim:

1. A filter comprising a pair of condensers of the roll type with metal foils having solid connecting portions at each end and dielectric means therebetween, an inductance coil, conducting plates separately connected to one end portion of each condenser and to the terminals of said coil, respectively, a housing member contacting the other end portions, connectors passing from said plates and coil terminals through the centers of said condensers to said housing member, and means for insulating said connectors from said housing member and its end portions, said connectors securing said condensers in position on said housing member with said plates and said coil fastened to the housing member with the condensers therebetween and providing conductors leading from said plate end portions and said coil towards said housing member.

2. A filter comprising a pair of condensers, an inductance coil, each condenser being of the roll type with metal sheets having solid connecting portions at each end and dielectric sheets therebetween, conducting washers separately contacting one end portion of each condenser, a conducting plate contacting the other end portions and having two openings, bolts passing from said washers through the centers of said condensers and said conducting plate, means for insulating said bolts from said condensers and said plate, means for conductively connecting one end of

each bolt to a respective washer and a respective terminal of said coil, means at the other ends of said bolts for securing said condensers in position on said plate with said washers clamped thereagainst, and terminal means at said other ends of the bolts.

3. A filter comprising a pair of condensers and an inductance coil, each condenser being of the wound type having metal foils and dielectric separators therebetween, and plates separately joined to said foils, said coil being connected to one of the plates of each condenser and the other plates being conductively connected, a housing in which both condensers and the coil are submerged in oil, one wall of said housing being provided with a pair of central openings, bolts passed through the centers of said condensers and through said central openings by which bolts said condensers are secured in position in said housing with the connected plates clamped against the wall of the housing and sealing washers carried by said bolts at said openings.

4. A filter comprising a pair of condensers and an inductance coil, each condenser being of the wound type having metal foils and dielectric separators therebetween, and plates separately joined to said foils, said coil being connected to one of the plates of each condenser and the other plates being conductively connected, a housing in which both condensers and the coil are submerged in oil, one wall of said housing being provided with a pair of bosses having central openings therethrough, bolts passed through the centers of said condensers and through the openings in the bosses by which bolts said condensers are secured in position in said housing with the connected plates clamped against the wall of the housing provided with bosses, binding posts on the outer ends of said bolts, washers surrounding each bolt within the boss and insulation between each post and the connected plates and between each bolt and the wall of the opening through which it passes, said insulation including an annular disk of dielectric material having on one side a projecting portion which enters said opening and on the other side a depression which receives the lower end of said binding post, the edge bounding said opening in the boss and the periphery of said projecting portion of the disk being non-circular to prevent rotation of the disk in the opening, and said depression in the disk and the lower end of the binding post being also non-circular to prevent rotation of the post in the depression.

5. A filter comprising a pair of condensers of the roll type, each having metal foils with solid connecting portions at each end and dielectric means therebetween, an inductance coil, conducting plates connected to one end portion of each condenser and to the terminals of said inductance coil, a housing member for the condensers and coil, said housing member being in contact with the other end portions of said condensers, connectors passing from said plates through said condensers and housing member, said connectors securing said condensers in position against said housing member and the outer ends of said connector projecting beyond said housing member to provide exterior contacts, and means insulating said connectors from said housing member and said other end portions of said condensers.

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