

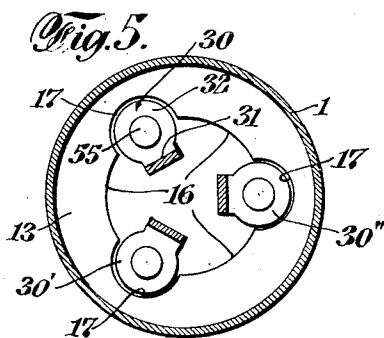
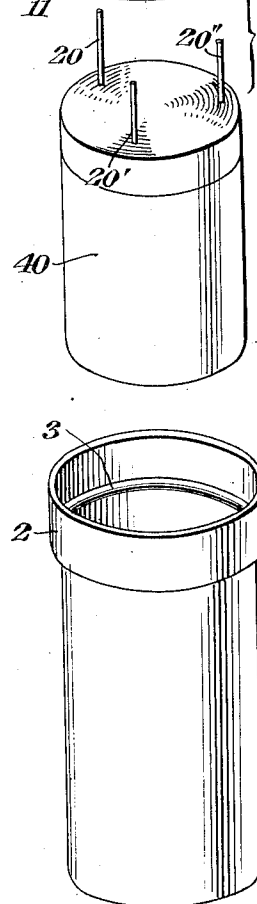
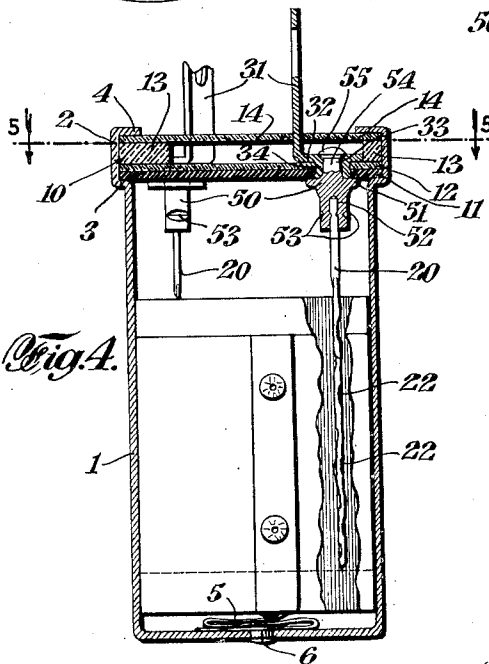
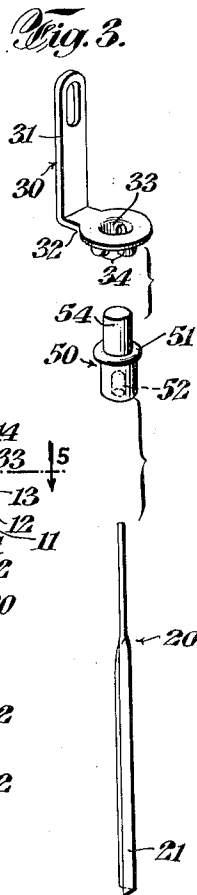
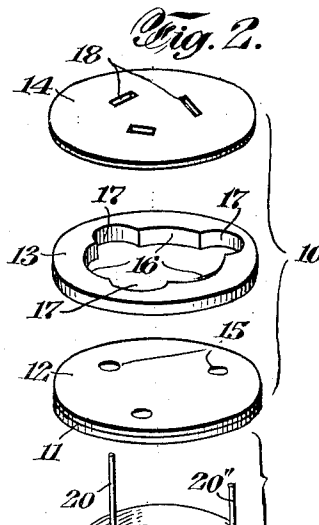
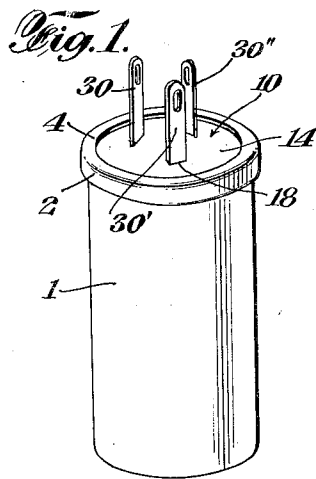
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DRY ELECTROLYTIC CONDENSER

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DRY ELECTROLYTIC CONDENSER

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4 Claims. (Cl. 175—315)

This invention relates to dry electrolytic condensers, and more particularly, to novel and improved structural arrangements and connecting parts thereof. One object of the invention is to provide an improved terminal connection to the plate section, i. e., to the edge of one end thereof, and an improved method of constructing the same. This terminal connection is in the form of a wire, preferably of the same material—aluminum—as the plates, vertically suspended from the (top) cover of the condenser. Other objects of the invention are: an improved manner of connection between the protruding end of the said terminal wire—which may for convenience be termed the “plate wire”—and the condenser cover and the exterior binding post; an improved terminal construction between the plate wire, the condenser cover and the binding post which will securely hold both the plate wire and the binding post in place on the condenser cover, which will afford good electrical insulation of the parts, which will be liquid tight and leak-proof especially where the connections pass through the cover, and moreover, a construction which will be economical and lend itself to speedy production; an improved construction in which all the connecting parts including the plate wire, the part passed through the condenser cover (more fully described subsequently) and the exterior binding post are made of aluminum, the same material of which the plate sections are constructed; an improved terminal arrangement which will occupy very little space and will make for compactness, which is especially of importance in condensers having three or more terminals and in condensers of small size.

For the attainment of these and such other objects as may hereinafter appear or be pointed out I have shown a preferred embodiment of my invention in the accompanying drawing, in which:

Fig. 1 is a perspective view of the complete condenser;

Fig. 2 is an exploded view of certain of the condenser parts, such as the container, the plate sections and the cover elements;

Fig. 3 is an exploded view of the other parts, such as the plate wire and exterior binding post, which together with the parts of Fig. 2 constitute the complete condenser;

Fig. 4 is a sectional elevational view of the complete condenser;

Fig. 5 is a sectional view on the line 5—5 of Fig. 4; and

Figs. 6 and 7 illustrate the manner of attaching

a plate to the plate wire, Fig. 6 showing the parts in the first stage, and Fig. 7 represents the parts in final securement.

The condenser parts are enclosed in a container 1, usually made of aluminum, open at one end, at which end the container is provided with a flared mouth 2, as shown in Fig. 2, into which the condenser parts including the cover to which the other parts are secured, are inserted. The flared container mouth 2 results in a shoulder 3, upon which the condenser cover (designated generally 10) rests. After the parts have been assembled in the container, with cover 10 resting on shoulder 3, the flared container mouth 2 is flanged over (4) as by a spinning operation, to securely lock the cover in place to seal the condenser. As is customary in condensers, the cathode plate section is connected electrically to the container by a wire or strap 5, Fig. 4, the end of which is attached to the bottom of the container, as by an aluminum rivet 6.

The novel improvements of this invention may be applied to a condenser having one or more terminals. For convenience, a three-terminal condenser is illustrated; a three-terminal condenser has been selected instead of the commoner two-terminal one, to bring out one of the important features of this invention in affording a compact terminal arrangement; which is of course of greater importance in multiple-terminal condensers. In the three-terminal condenser illustrated in the drawing, there are consequently three plate sections, the ends of the plates being secured to one of three plate wires 20, 20' and 20'', Fig. 2, which in turn is connected to one of three exterior binding posts 30, 30' and 30''.

Each plate wire, such as 20, Fig. 3, is formed from aluminum wire. The plate wire, which is entirely within the condenser container and hence in contact with the electrolyte, is required to be of the same material—aluminum—as that of the plates and other parts of the condenser, in as much as the presence of a different metal in contact with the electrolyte would result in corrosion and also ineffective electrical contact. Considerable difficulty has been encountered in the past in making a suitable connection between the end of the aluminum foil forming a plate section, and an aluminum terminal wire; the foil is very frail and itself requires extra support. Such connections as have been attempted or suggested in the past have been cumbersome and expensive from a production standpoint.

The novel and improved connection of my invention between the wire terminal 20 and its plate

section (designated generally 40), or rather, its edge 41, Figs. 6 and 7, consists in first forming a more or less V-shaped groove 21 in the wire 20, Figs. 3 and 6, of a length, see Fig. 3, corresponding to, or preferably somewhat longer than, the width of the plate or foil. The edge 41 of the foil 40, see Fig. 6, is inserted between the legs of the V-groove, and the two legs squeezed together to firmly clamp the plate foil therebetween, Fig. 7. In this manner a sturdy anchorage is provided for the plate section, which will securely hold the plate in place and afford a permanent connection between the foil and the wire. To further assure good electrical contact between the plate section and the plate wire, the wire with the plate securely held between its clamped V-groove (as in Fig. 7) is subjected to a punching operation which deforms both the wire and the plate end to the somewhat undulated appearance shown in Fig. 4 presenting a plurality of pinched points 22, whereat intimate electrical contact is assured.

A further aspect of my invention contemplates a novel and improved connection between the plate wire 20 and the terminal binding post 30 and a novel and improved securement of the plate wire 20 in the condenser cover 10. The condenser cover 10, in one form of my invention, comprises a gasket (rubber) disc 11, a Bakelite or fibre disc 12, a Bakelite or fibre washer or spacer 13 and a second Bakelite or fibre disc 14. Preferably and as shown in Fig. 2, the rubber gasket 11 and Bakelite disc 12 are formed as a composite disc, one face (11) being the rubber gasket and the other face, the Bakelite or fibre disc (12); that is, part 11-12 comes to the assembly point as a unit.

For the purpose of connecting the plate wire 20, Fig. 3, to the binding post 30 and for securing these parts to the condenser cover 10 (see Fig. 2), I provide a stud member 50, preferably formed of aluminum, Fig. 3. Substantially at its center, stud 50 is provided with a ring or flange 51, for a purpose soon apparent. The lower portion of the stud is provided with a cavity 52 in which is receivable the upper end of the plate wire 20. Preferably and as shown in the figures, the wire 20 is of round section; hence the cavity 52 of the stud is likewise of circular bore. After the top end of wire 20 is inserted in cavity 52 of the stud, the lower portion of the stud is pinched, crimped or otherwise forced together (53) to securely anchor the wire in the stud.

The upper part of the stud member above its flange 51 is formed as a short cylindrical pin 54 which cooperates with the binding post 30 for the purposes of (a) completing the electrical connection between plate wire 20 and the binding post, and (b) securing both the plate wire and the binding post to the cover 10. Binding post 30 is in the form of an L having a vertical leg 31 and a horizontal leg 32. A hole 33 is punched out of the material of the horizontal leg 32 in a manner to also provide a plurality—preferably three—of downwardly directed teeth 34. A binding post and a stud member are then positioned relatively to the composite gasket-fibre disc 11-12 with the horizontal leg 32 of the binding post overlying the top (fibre) face of the composite disc and with the pin 54 of the stud member 50 underlying the same and in axial alignment with the hole 33 of the binding post. The two parts are forced together, with the composite disc therebetween and the pin 54 fitting in hole 33 (see Fig. 4); this operation causes a hole to be ruptured in the composite disc, through which

pass the depending teeth 34 of the binding post and pin 54 of the stud member. The piercing of the disc material by the said teeth and pin may be facilitated by provided small holes 15, see Fig. 2, through the composite disc 11-12, which holes also serve to spot the position of the binding posts and studs. The teeth 34, which pierce through the material of the disc 11-12, also serve to hold the binding post (and also the plate wire) against rotation. The end of pin 54 extending beyond the horizontal leg 32 of the binding post is riveted over (55) to lock the stud and the binding post together in position on the cover of the container.

After the stud member 50 is riveted to the binding posts 30 with the composite gasket-fibre disc 11-12 between the two, as just described, the Bakelite or fibre spacer or washer 13, Figs. 2 and 4, is placed on the composite disc 11-12. As best seen in Figs. 2 and 5, spacer 13 is in the form of a ring or washer having, in addition to the circular bore 16, three symmetrically (i. e., angularly) spaced recesses 17, one for each of the three binding posts. As best seen in Fig. 4, the spacer 13 is somewhat thicker than the thickness of the horizontal leg 32 of the binding post plus the thickness of the rivet head 55. Resting on the ring-like spacer 13 is the top Bakelite or fibre disc 14, which is provided with slots 18 for the vertical legs 31 (Fig. 3) of the three binding posts. Thereafter, the flared mouth 2 (see Fig. 2) of the container is flanged over the cover, more particularly, the top disc 14, to form the retaining flange 4, see Fig. 4. It will be seen, best from Fig. 4, that by the provision of the spacer 13, the force exerted by the flanging over and squeezing of the flared mouth of the container is transmitted directly to the border of the rubber gasket disc 11 which is in abutment with the shoulder 3 of the container and results in a water tight joint at this point.

I claim:

1. In a dry electrolytic condenser having plate sections, and binding posts of pre-determined thickness, and a container formed with a flared mouth and a shoulder, the combination of a disc, a stud member passing through the said disc from which the plate sections are suspended in the container, a resilient gasket underlying the said disc and interposed between the container shoulder and the said disc, the said stud passing through the said binding post positioned on the top surface of the disc and riveted thereover, and a washer positioned on the said disc and of a thickness greater than the combined thickness of the binding post and the said rivet head, the said flared mouth of the container being flanged over the said washer and the parts squeezed together whereby pressure is exerted through the said washer to the borders of the gasket resting on the said container shoulder.

2. In a dry electrolytic condenser having plate sections, binding posts, and a container formed with a flared mouth and a shoulder, the combination of a disc from which the plate sections are suspended in the container, a resilient gasket underlying the said disc interposed between the container shoulder and the said disc, the connection by which the plate sections are suspended from the said disc and the binding posts secured to the top surface thereof extending a pre-determined amount above the top surface of the said disc, and a washer positioned on the said disc and of a thickness greater than the said pre-determined amount, the central opening of the washer being

sufficient to clear the said connection, the said flared mouth of the container being flanged over the said washer and the parts squeezed together whereby pressure is exerted through the said washer to the borders of the gasket resting on the said container shoulder.

3. In a dry electrolytic condenser having plate sections and a container formed with a flared mouth and a shoulder, the combination of a disc from which the plate sections are suspended in the container, a resilient gasket underlying the said disc and interposed between the container shoulder and the said disc, the connection by which the plate sections are suspended from the said disc extending a pre-determined amount above the top surface of the said disc, and a washer positioned on the said disc and of a thick-

ness greater than the said pre-determined amount, the central opening of the washer being sufficient to clear the said connection, the said flared mouth of the container being flanged over the said washer and the parts squeezed together whereby pressure is exerted through the said washer to the borders of the gasket resting on the said container shoulder.

4. The process of securing one end of a plate section of a dry electrolytic condenser to a terminal wire comprising the steps of forming a V-groove in the wire, inserting one end of the plate section in the said groove, forcing the groove closed to clamp the plate section therebetween, and crimping the wire and the clamped plate at a plurality of spaced points.

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