

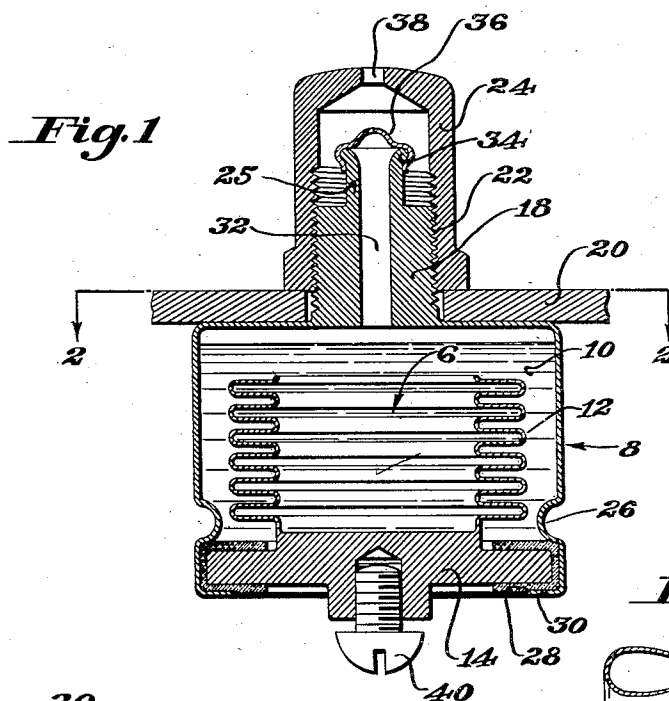
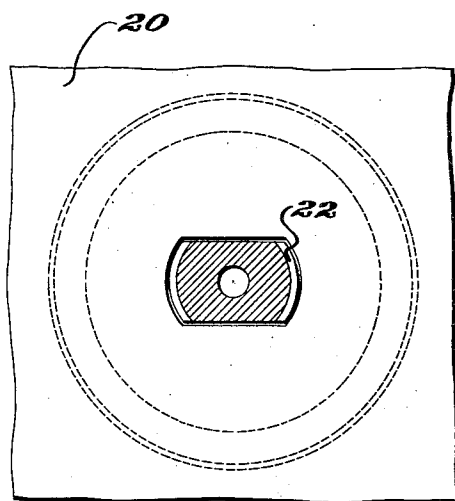
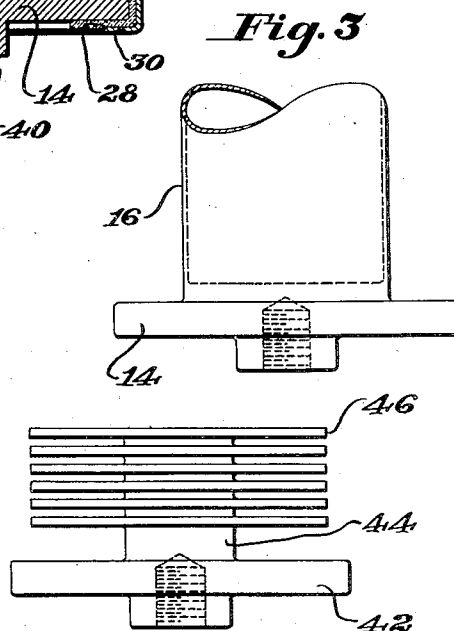
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ELECTROLYTIC CONDENSER

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ELECTROLYTIC CONDENSER

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The present invention relates to electrolytic condensers.

The object of the present invention is to provide a simple, compact and inexpensive electrolytic condenser of particular value in the small capacity sizes used as by-pass condensers in radio receivers.

With this object in view, the present invention consists of the electrolytic condenser hereinafter described and particularly defined in the claims.

In the accompanying drawing,

Fig. 1 is a sectional elevation of what is now considered the preferred form of the invention;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is an elevation of the preferred form of anode member prior to formation of the extended surface; and

Fig. 4 is an elevation of a machined type of anode.

The illustrated embodiment of the invention is a small size condenser adapted for use in radio with a capacity of about two microfarads when formed at 400 volts. The drawing is on a considerably enlarged scale, the actual size of the condenser being smaller than a paper condenser of equal capacity. As in all electrolytic condensers, the capacity depends upon the forming voltage, and if the condenser is to be used in low voltage circuits, the capacity may be enormously increased by reduction of the forming voltage.

The condenser comprises a filming anode, indicated generally at 6, a cathode 8 which serves as a container, and an electrolyte 10 in which the anode is completely immersed. The anode is of filming material, such as aluminum, the electrolyte is preferably a mixture of borax and boric acid, and the cathode is of any conducting material, preferably a non-filming material, such as copper.

The anode shown in Fig. 1 comprises a bellows having a generally cylindrical external contour formed with radially extended spaced co-axial folds or flanges 12. The folds are formed by any suitable method, preferably hydraulically. The anode is made integral with a support or base 14 which forms a bottom cover for the container.

In manufacture of the anode, the base 14 and the tube 16 are constructed integrally, as shown in Fig. 3, the tube being extruded from the material of the support 14. The tube 16 is originally of sufficient length to form the bellows folds, indicated in Fig. 1. The anode thus formed has a considerable filming surface (both internal and external) by virtue of the extended flange portions of the folds. The inside bottom surface of

the support 14 also contributes to the area of the anode.

The cathode or container 8 is formed as a single integral member by extrusion or drawing. The cathode comprises the container with an integral upstanding boss 18 which, as shown in Fig. 2, is flat on two sides to be received in an opening of similar shape in the metal panel 20 of a radio receiver. The boss is threaded at 22 to receive a nut 24 by which the condenser is secured to the panel. The boss 18 is surmounted by a tubular neck portion 25 of smaller diameter. The container at the bottom is spun with a groove 26 for positioning the base 14 in the anode. The anode is insulated from the container by means of a flexible rubber gasket 28, the bottom of the container having a spun flange 30 engaging tightly against the gasket.

The boss 18 and the neck 25 are formed with a vent passage 32, and the neck has a flared upper portion 34 to receive an elastic vent diaphragm 36. The passage 32 and the flared portion are formed simultaneously by a drill having a conical shoulder to spin the upper end of the tube. The diaphragm has a small vent opening which enlarges upon expansion of the diaphragm, due to liberation of gases in the condenser. The cap 24 has a small opening 38 through which the gases are vented to the atmosphere. The cap, therefore, serves the double purpose of securing the condenser to the panel and of protecting the diaphragm against damage.

The attachment of the container to the metal panel 20 itself forms the grounded connection. The connection of the anode is made by a terminal screw 40 threaded into the bottom of the support 14.

A modified form of anode is shown in Fig. 4. This comprises a machined element having a support 42 similar in form to the support 14, and a central cylindrical upstanding member 44 from which a plurality of extended coaxial flanges 46 radiate. The entire anode is milled or turned from a solid piece of aluminum. The machined anode of Fig. 4 is mounted in the container in exactly the same manner as the bellows type previously described. This type of anode also has a large surface. Although the surface is entirely external, the loss of external surface as compared with the anode of Fig. 1, is partly compensated by the fact that the annular spaces between the flanges 46 can be made much deeper than the bellows folds. The bellows type, however, is ordinarily to be preferred because of its cheapness

which follows from the fact that a large surface is obtained with a minimum of material.

It will be seen that the present invention provides a condenser of small size and of extremely cheap construction comparable in price and compactness to the ordinary paper condenser and far superior to it in its greater capacity, low losses, long life, and self-healing qualities. The condenser, as shown, provides for simple attachment to any radio receiver or similar apparatus with the necessity of making only one connection. The condenser is particularly adaptable to quantity production methods because it comprises only two major parts, namely, the cathode which is in itself the container, and the anode which also forms the cover for the container. It will be noted that all filming surfaces are completely immersed in the electrolyte and that at no point does any filming surface protrude through the level of the electrolyte to give rise to objectionable non-uniformities of operation.

What is claimed is:

1. An electrolytic condenser comprising a filming anode, a container forming a cathode, means for supporting the anode within the container, an upstanding boss adapted to project through a panel and having a vent, and securing means engaging with the boss for attaching the condenser to the panel and protecting the vent.

2. An electrolytic condenser comprising a filming anode having an integral base, a container forming a cathode and enclosed by the base of the anode, a boss upstanding from the container and having a vent passage, a vent diaphragm, and securing means engaging with the boss and enclosing the diaphragm.

3. An electrolytic condenser comprising a base of filming material, a hollow and generally cylindrical anode having circumferential corrugations formed integral with the base, a circular container having a reduced neck portion provided with a vent opening and sealed to the base at its lower end with the anode centrally disposed therein, and a liquid electrolyte within the container completely submerging the anode.

4. An electrolytic condenser comprising a base of filming material, a hollow and generally cylindrical anode having circumferential corrugations formed integral with the base, a circular container having a reduced neck portion provided with a vent opening and sealed to the base at its lower end with the anode centrally disposed therein, a liquid electrolyte within the container completely submerging the anode, and means for connecting the condenser to a support through the reduced neck portion.

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