

May 26, 1936.

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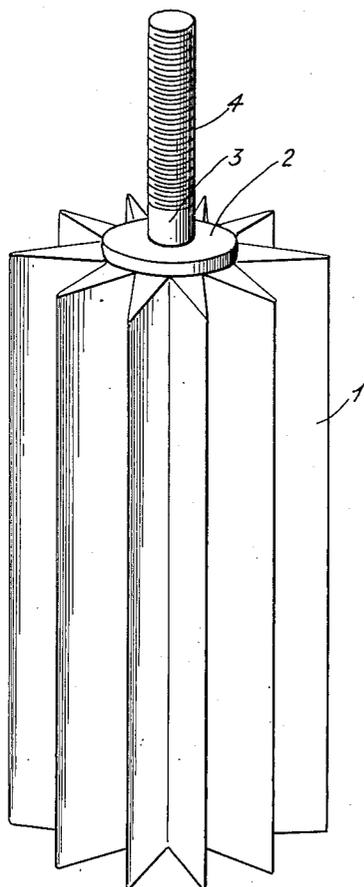
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ELECTROLYTIC CONDENSER

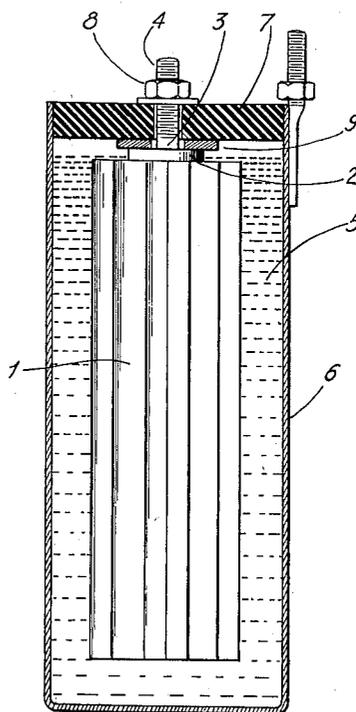
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2 Sheets-Sheet 1

*Fig. 1*



*Fig. 2*



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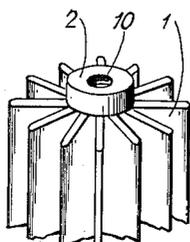
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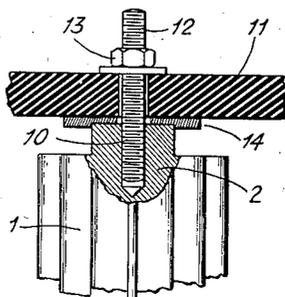
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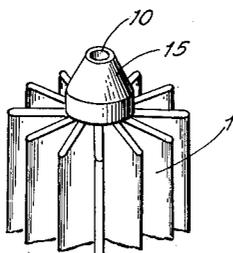
*Fig. 3*



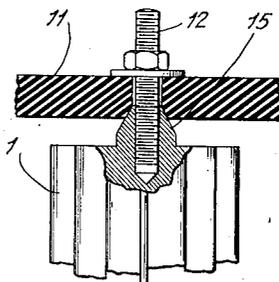
*Fig. 4*



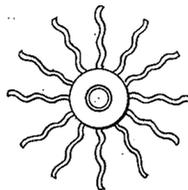
*Fig. 5*



*Fig. 6*



*Fig. 7*



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# UNITED STATES PATENT OFFICE

2,042,283

## ELECTROLYTIC CONDENSER

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Application March 22, 1933, Serial No. 662,114  
In Germany March 9, 1932

3 Claims. (Cl. 175—315)

This invention relates to improvements in an electrolytic condenser. Such a condenser comprises an electrode consisting of a metal which is coated with a layer consisting of a compound of the metal, in general, an oxide, this layer constituting the dielectric. The other electrode is constituted by the electrolyte which is provided with a supply conductor for which may serve the wall of the vessel containing the condenser if this vessel consists of a metal. If the condenser is not only used for smoothening direct current, but also for alternating current, two electrodes furnished with an oxide layer must be immersed into the electrolyte.

The present invention has for its purpose to lodge a condenser surface which is as large as possible in a small volume and to use in spite thereof an electrode-form which may be obtained in a simple manner.

This is realized owing to the fact that at least one electrode is constituted by a rod which is provided with a profile extending in a longitudinal direction of the rod.

In order to lodge a large surface in a small volume it has already been proposed to turn grooves in a cylinder, which grooves extend practically at right angles to the longitudinal direction of the cylinder. However, the manufacture of such an electrode is very expensive. Furthermore, it has already been suggested to compress a cylinder, thus forming folds extending in a transverse direction. This has the drawback, however, that the arrangement of the electrode is attended with difficulties.

The electrode according to the invention on the contrary may be established very cheaply by mass production. For this purpose the electrode is so shaped that the cross section at right angles to the longitudinal direction is equal throughout, so that it is possible to establish the electrode by squirting (pressing) or drawing.

It is not necessary to connect such a rod to the fastening parts by riveting, welding or in some other way, since in a suitable form of construction the profile may be removed, preferably by turning, from part of the electrode, thus obtaining a smooth surface, and this part may be passed through the cover of the condenser.

In this manner a very simple arrangement is obtained. Moreover, it is very advantageous for the working of the condenser that the electrode is made in one piece and is not provided with riveted joints, since such joints give rise frequently to breakdowns.

The invention will be more clearly understood by reference to the accompanying drawings, representing, by way of example, some forms of construction thereof.

Fig. 1 shows a form of construction of an electrode according to the invention.

Fig. 2 is a section of a condenser comprising such an electrode.

Figs. 3-6 are detail views of forms of construction in which separate fastening or terminal parts of the electrodes are provided, and in which the point of attachment is separated from the interior of the vessel containing the condenser.

Fig. 7 is a cross section of an electrode having a different profile.

Fig. 1 shows that the electrode 1 has a star-shaped cross section, thus obtaining a very rigid electrode having a large surface. The upper part of the electrode is turned off, thus obtaining at this point a disc shaped part 2 and a terminal stud 3, which latter is provided with a screw thread 4.

In Fig. 2 the electrode 1 is immersed into an electrolyte 5 contained in the condenser vessel 6. The pin 3 is taken through the cover 7 of the condenser and is pressed against the screwed part 4 by means of a nut 8. With the aid of the rubber ring 9 provided between the disc-shaped part 2 and the cover 7 a perfect obturation is ensured. Though in this form of construction the electrode passes through the upper part of the vessel, such condensers are usually arranged upside down so that the cover 4 is positioned in the bottom of the container. In this case the electrode 1 is completely immersed into the electrolyte.

Fig. 3 shows a part of an electrode which is equipped with a large number of "fins". Also in this case the upper part is turned off so as to form a disc 2. At the middle is provided a screw threaded bore 10 as appears from the corresponding section of Fig. 4, in which a special manner of attachment to the cover 11 is indicated. Into the aperture 10 is screwed a terminal stud 12 passing through an aperture in the cover 11 and being provided with a nut 13. By means of the nut the upper surface of the disc 2 is pressed against a rubber ring 14 forming the obturation between the disc 2 and the cover 11. If the condenser, which is partly shown in Fig. 4, is placed upside down and a sufficient quantity of some electrolyte is introduced into the vessel, the whole electrode together with the disc 2 is immersed into the electrolyte. However, the joint between the electrode 1 and the stud bolt does not contact with the electrolyte.

Figs. 5 and 6 show diagrammatically and in section respectively a detail of a form of construction with which the same result is obtained. The electrode has a conical upper end 15 and is drawn in a corresponding bore of the cover 14 by means of the stud bolt 12 and the nut 13, the cone 15 per se constituting a sufficient obturation.

Fig. 7 is a section of an electrode whose fins are corrugated so as to increase the surface.

It will be appreciated that the profiles illustrated constitute forms of construction which may be obtained by drawing or by squirting (pressing) a material through an aperture having such a profile.

Many other profiles are possible and the grooves need not exactly extend in the longitudinal direction of the rod, since they may also form a weak wave line or a screw having a very large pitch.

Furthermore, the fins of the profile shown in the drawing may be provided with special profiles also extending in a longitudinal direction.

In certain circumstances the rod may also be bent.

We claim:—

1. An electrolytic condenser comprising a metallic container which serves also as one electrode, an insulated cover for said container, a central aperture in said cover, a one piece central electrode having a plurality of corrugated radial fins extending out from the central portion of said electrode, a threaded aperture in said central electrode, an upward extending terminal stud se-

cured in the aperture of said central electrode and passing through the aperture in said cover and mechanically secured thereto.

2. An electrolytic condenser comprising a metallic container which serves also as one electrode, an insulated cover for said container, an electrolyte partly filling said container, a central aperture in said cover, a one piece central electrode having a plurality of corrugated radial fins extending out from the central portion of said electrode, a threaded aperture in said central electrode, an upward extending terminal stud secured in the aperture of said central electrode, the junction point of said terminal stud and said electrode being located above the top level of said electrolyte.

3. An electrolytic condenser comprising a metallic container which serves also as one electrode, an insulated cover for said container, an electrolyte partly filling said container, a central aperture in said cover, a one piece central electrode having a plurality of corrugated radial fins extending out from the central portion of said electrode, a threaded aperture in said central electrode, an upward extending terminal stud secured in the aperture of said central electrode and passing through the aperture in said cover and mechanically secured thereto, the junction point of said terminal stud being located above the top level of said electrolyte.

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