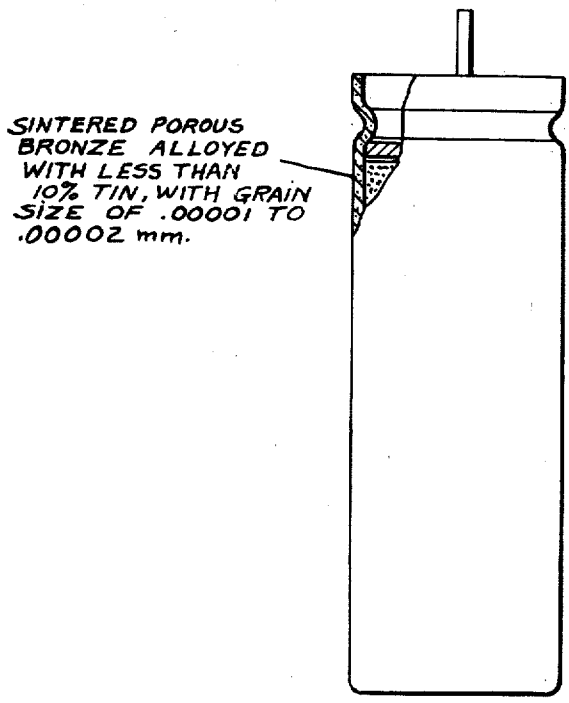
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ELECTROLYTIC CONDENSERS

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ELECTROLYTIC CONDENSERS

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1 Claim. (Cl. 317—230)

This invention relates to condensers and particularly to electrolytic condensers.

While electrolytic condensers are in use, frequently the electrolyte decomposes as a result of the continuously flowing residual current and a gas is thereby created. Since the condenser is completely sealed, this gas causes a rise in pressure within the condenser which may be harmful. The gas is usually created when the condenser is forced to operate under conditions for which it was not designed. For example, when a condenser is not properly connected, or when the condenser is subjected to a voltage substantially higher than its operating voltage, or when a polarized condenser is connected to an A. C. source, the residual current may reach a thousand times the normal value under normal operating conditions. Thus, the gas created, and the resulting pressure rise very often cause mechanical destruction of the condenser. In some cases where the evolution of gas is particularly high, a flash over inside the condenser may ignite this gas mixture (which consists of oxygen and hydrogen and is therefore explosive) and the resulting explosion may completely destroy the condenser.

According to the prior art, the gas pressure may be relieved by employing a mechanical valve or a fusible plug in the condenser. The fusible plug is made of a material which melts, when a given temperature is exceeded to relieve the gas pressure. The mechanical valves were found to be very costly and therefore seldom used. The fusible plug melted from the heat developed by the large residual current in the condenser; therefore this safety feature operated after the high residual current had already passed. Thus the possibility of an explosion in this type condenser was not precluded.

Accordingly, it is an object of this invention to provide in an electrolytic condenser, a casing made of a semi-permeable material which is pervious to the gas evolved within the condenser but impervious to the liquid electrolyte.

The invention is illustrated in the single figure which is an elevation of an electrolytic condenser partly broken away to show the casing.

In accordance with the invention there is provided in an electrolytic condenser a casing made of a porous material, preferably a sintered metal, although plastic may be satisfactorily used, which is pervious to the gas evolved within the condenser but impervious to the electrolyte. Thus, excessive pressures are prevented from

developing within the condenser and the liquid electrolyte can not escape; nor can moisture from the outside enter the condenser. The porosity or grain size of the metal or plastic is not an absolute value but may be varied as a function of the viscosity of the electrolyte employed. Obviously a less viscous electrolyte requires that the grain size of the casing be finer than a more viscous electrolyte. Also, the grain size of the semi-permeable body is dependent upon the over pressure to be expected which is a function of the volume of the capacitor roll and the free air space of the interior. The chemical composition of the electrolyte is of course, also important in determining the grain size. Since these factors which determine the grain size are variable and depend upon the design of a particular condenser, it is not possible to give all possible examples. However by way of example a condenser, 30 mm. in diameter and 95 mm. long, having a capacitance of 32 mf. was constructed. The casing was made of sintered porous bronze alloyed with less than 10% tin, and the grain size was in the range of 100–200 thousandth of a millimeter. The air space in the interior of the casing was small. The condenser was tested by feeding a voltage of 350 v. of inverse direction with respect to the operating voltage and at the end of a period of 5 minutes no change was noted in the condenser. However, this same voltage was applied to another condenser of equal rating but not equipped with the novel casing of this invention and at the end of 5 minutes the sealing compound melted and the cover was lifted as a result of the excessive pressure.

If highly hygroscopic electrolytes are used in the condenser, the surface of the semi-permeable part of the casing may be treated with a chemically inactive material such as a paraffin oil, applied under pressure if necessary. If excessive pressures are developed in the condenser, the chemically inactive material is forced away from the surface and the semi-permeable material will permit the gas to escape.

While I have described above the principles of my invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation to the scope of my invention as set forth in the objects thereof and in the accompanying claim.

What is claimed is:

An electrolytic condenser comprising a casing of sintered porous bronze alloyed with less than 10% of tin and having a grain sized in the range of .00001 to .00002 of a millimeter, whereby the casing is pervious to the electrolyte contained therein but impervious to the gases evolved by said electrolyte.

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