March 22, 1938. C. J. VAN LOON 2,111,710

FILTER UNIT

Filed Sept. 22, 1934

Fig. 1

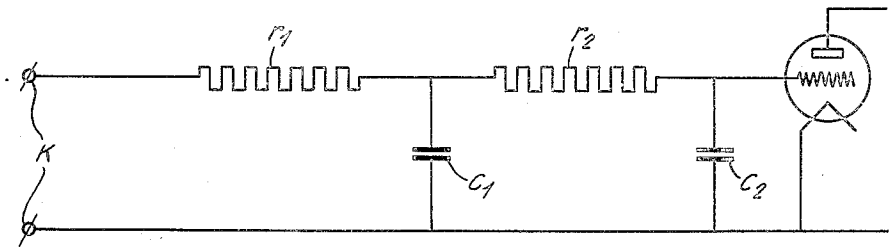


Fig. 2

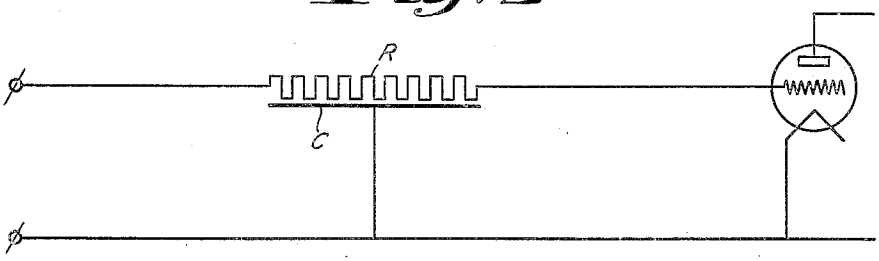


Fig. 3

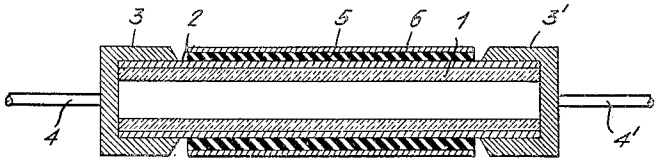


Fig. 4

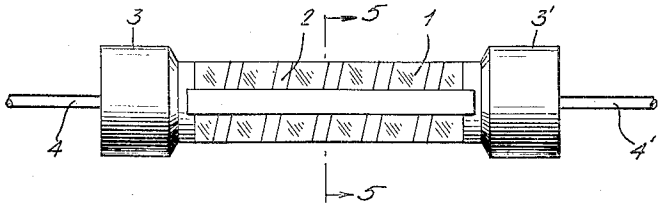
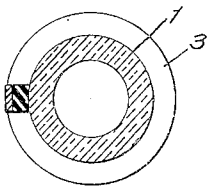


Fig. 5



INVENTOR

CAREL JAN VAN LOON

BY H. S. Brown

ATTORNEY

UNITED STATES PATENT OFFICE

2,111,710

FILTER UNIT

Carel Jan van Loon, Eindhoven, Netherlands, assignor to Radio Corporation of America, a corporation of Delaware

Application September 22, 1934, Serial No. 745,006
In Germany October 30, 1933

2 Claims. (Cl. 178—44)

This invention relates generally to electric filters and more particularly to a high ohmic resistance which is more particularly designed for use in a circuit arrangement for separating direct or alternating current from superposed high frequency alternating currents.

In the accompanying drawing Figure 1 illustrates a common type of filter unit; Fig. 2 illustrates diagrammatically a filter unit constructed in accordance with the present invention; Fig. 3 is a cross-sectional view of one of the units constructed in accordance with the present invention, and Fig. 5 illustrates a sectional view of the device shown in Fig. 4.

Generally filters consist of a number of series resistances and parallel condensers as shown in Fig. 1. The filter sections are constituted here by resistances r_1, r_2 and condensers C_1, C_2. The arrangement shown in the drawing may serve, for instance, as a coupling between the output circuit of a detector tube and the input circuit of an amplifying tube in a radio receiving set, in which it is of particular importance that the high frequency oscillations do not reach the low frequency amplifier part.

The present invention provides a resistance construction in which the resistances and condensers form an assembly.

According to the invention a high resistance consisting of an insulating support and of a thin resistance layer applied thereon, is entirely or partly coated with a conductive layer that is separated from the resistance layer by a thin insulating layer. The resistance layer is to be considered as a condenser plate, whereas the other plate is constituted by the conductive layer which preferably consists of metal squirted thereon. As a dielectric an extremely thin lacquer layer may be used. The assembly may be arranged in the manner shown in Fig. 2, in which R denotes the resistance and C the conductive layer. Consequently, the resistance according to the invention constitutes a filter having a uniformly divided resistance and capacity. This has the advantage that the condensers may be dispensed with. It has been found that the resistance according to the invention affords an excellent filter working.

The invention is particularly adapted for use with a cylindrical high ohmic resistance.

In Figure 3 the preferably tubular resistance support is denoted by 1. As a material for this support porcelain or another suitable insulating material may be used, 2 being the resistance support that may be provided by means of a suitable known method. Numerals 3 and 3' are the metal junction caps engaging the resistance layer and being connected to the connecting wires 4 and 4'. The resistance layer is coated with an insulating layer 5 on to which the good conducting layer 6 is applied to which a conductor is connected. It has turned out that the capacity available between the layers 2 and 6 is completely sufficient for realizing the filter working necessary for high frequency currents.

An excellent filter working may be ensured by providing the resistance layer and the conductive layer in such a manner that there are several surfaces which are separated from each other and at which the resistance layer and the conductive layer cover each other. In this manner a number of condensers is produced in which the corresponding plates are mutually connected by resistance or conductive material. This may be realized inter alia by squirting the resistance only locally with metal at a number of points and by interconnecting the conductive surfaces by separate conductors.

A very simple form of construction of such a resistance is obtained when using a resistance element having a helical resistance layer according to Figure 4. The metal coating may be provided as a strip parallel with the axis of the cylinder. Now the assembly is no longer a filter having a uniform capacity and resistance, but it constitutes a filter circuit with a large number of cells that may have such a size that the best filter working is ensured. It goes without saying that the conductive layer need not be provided according to a generatrix, but that it may also extend helically, for instance, along the circumference of the cylinder.

I claim:

1. An electric filter connected in the line between a source of energy and a utilizing circuit comprising an insulating support having applied to it a thin layer of high ohmic resistance material around one of the surfaces thereof, said layer of resistance material forming a resistance element, a layer of insulating material applied to the outer surface of the layer of resistance material, a condenser element, said layer of resistance material forming one plate of the condenser element, the other plate of the condenser element comprising a thin layer of conducting material formed around at least a portion of the outer surface of the layer of insulating material, said resistance element being connected in series with the line and said capacitive element being connected in shunt with the line.

2. A filter unit comprising an insulating support having spirally arranged around one surface thereof a thin ribbon of resistance material, a layer of insulating material applied to the outer surface of the ribbon of resistance material, a condenser element, said ribbon of resistance material forming one plate of the condenser element, the other plate of the condenser element comprising a thin layer of conducting material formed around at least a portion of the outer surface of the layer of insulating material, an input terminal, an output terminal and a common terminal, means for connecting one end of said ribbon of resistance material to the input terminal, means for connecting the output terminal to the other end of the ribbon of resistance material, and means for connecting the common terminal to the last named plate of the condenser.

CAREL JAN VAN LOON.