May 19, 1970 P. BOYER ET AL 3,513,368

ELECTRIC CONDENSER WITH RESISTANCE INCORPORATED THEREIN

Filed June 7, 1968

FIG 1a PRIOR ART

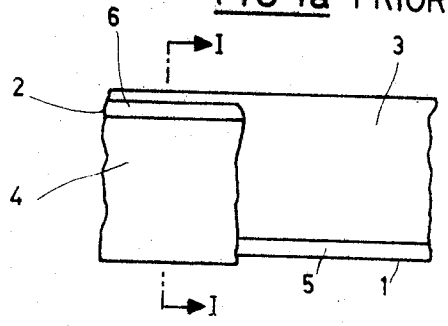


FIG. 1b PRIOR ART

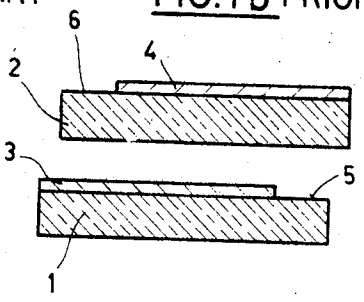


FIG. 3

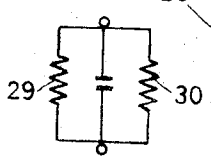


FIG. 2a

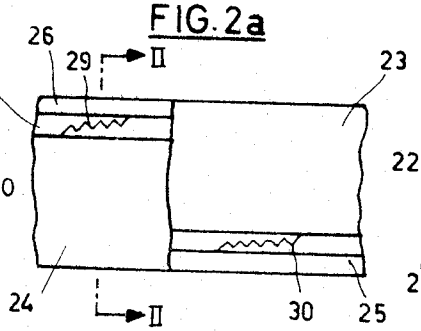


FIG 2b

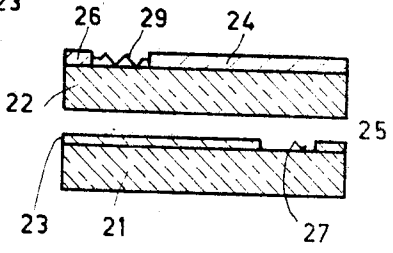


FIG. 5

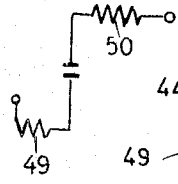


FIG. 4a

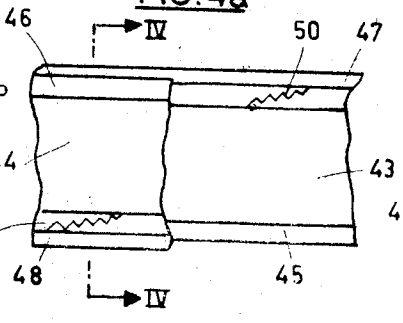


FIG. 4b

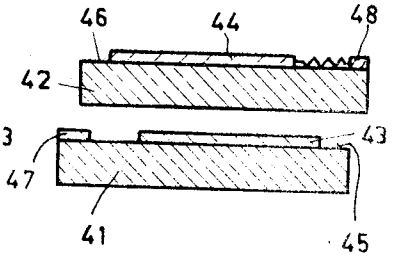
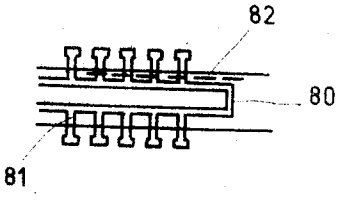


FIG. 6



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United States Patent Office 3,513,368 Patented May 19, 1970

3,513,368

ELECTRIC CONDENSER WITH RESISTANCE INCORPORATED THEREIN

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Filed June 7, 1968, Ser. No. 735,387
Claims priority, application Switzerland, June 9, 1967, 8,222/67
Int. Cl. H01g 1/00, 1/16
U.S. Cl. 317—256
4 Claims

ABSTRACT OF THE DISCLOSURE

An electric condenser constituted by at least two superimposed strips of insulating material at least one of which is metallized, the metallized strip having at least two distinct metallized zones on one side thereof and connected by at least one resistance.

In the field of electrotechnique, it is sometimes advantageous to connect condensers and resistances in series or in parallel. For example, circuits known as spark arresters, used to protect electric contacts and relays, are constituted by the series connection of a condenser and of a resistance. It is also recommended to place a discharge resistance in parallel with the antistatic condenser in order to avoid the danger of an electric shock to persons called upon to manipulate the apparatus.

The ever increasing necessity to reduce the volume and the cost price while increasing the fidelity of assemblies and of their constituent parts is one of the fundamental reasons for the developments undertaken in order to combine in a single constituent a condenser and a resistance.

It has already been proposed to take advantage of the series resistance of the plates of a condenser. The rating and the power of the resistances combined with a capacity of a given rating are however narrowly limited if the processes heretofore proposed are utilized. In effect, the characteristics of the resistance are more or less dependent upon the rating of the capacity. In addition, if the plates of the condenser are constituted by a metallic deposit, obtained for example by evaporation under vacuum, and the thickness of which does not exceed 0.1 micron, their contact point with a connecting element the thickness of which can attain several tenths of microns, is frequently the situs of erosion under the effect of repeated electrical impulses.

The purpose of the invention is precisely to avoid the above-mentioned disadvantages.

The invention has for its object an electric condenser constituted by at least two superimposed strips of insulating material, at least one of which is metallized, and characterized by the fact that the metallized band has at least two distinct metallized zones on the same side of the strip connected by at least one electrical resistance.

The accompanying drawing represents by way of example embodiments of the object of the invention.

FIGS. 1*a* and 1*b* show respectively a plan view and a cross section of a condenser of usual construction.

FIGS. 2*a* and 2*b* show respectively a plan view and a cross sectional view of a condenser with resistances incorporated in parallel.

FIG. 3 shows the electrical circuit of the condenser of FIG. 2*a*

FIGS. 4*a* and 4*b* show respectively a plan view and a cross section of a condenser with the resistances incorporated in series.

FIG. 5 shows schematically the electrical circuit of the condenser according to FIG. 4.

FIG. 6 shows a particular configuration of resistance element which may be incorporated in the condenser.

FIGS. 1*a* and 1*b* show schematically the construction of a condenser of conventional construction. Such a condenser can comprise a dielectric formed of one or several insulating layers wound or not upon one another. The condensers shown comprises two strip of insulating material **1** and **2** constituting the dielectric of the condenser, each of these bands carrying plates **3**, **4**, respectively, obtained for example by metallic deposition by means of a vacuum evaporation process. Strips **1** and **2** are laterally shifted one relative to the other in such a way that the metallized zone of one of the strips overlaps the other strip whose off-set part offers a marginal zone which is non metallized or demetallized, **5**, **6** respectively, in order to avoid all short-circuits between zones **3** and **4** of the two strips.

Such a construction is advantageously poorly inductive for the off-set zones are connected after winding the condenser by a metallizing process ensuring excellent contact between the flank of the coil of the condenser and the connecting wire which is later soldered thereon.

The condenser shown in FIGS. 2*a* and 2*b* comprises two resistances incorporated in parallel. FIG. 3 shows the schematic circuit of this condenser.

This condenser is made according to the same constructive principles as the condenser shown in FIGS 1*a* and 1*b*. It comprises two insulated strips **21** and **22** carrying plates **23** and **24** respectively obtained by a suitable metallizing process. Strips **21** and **22** however are no longer laterally shifted one relative to the other but juxtaposed edge to edge.

The insulating strips carry also a metallized marginal strip **25**, **26** respectively, separated from the main metallized zone by a non metallized zone **27**, **28** respectively. During winding, the plate linkage, zone **25** will thus be electrically connected with zone **24** while zone **26** will be connected to zone **23**. It suffices then to connect the two metallized zones of a same strip by resistance elements such as **29** and **30** to obtain a condenser with two resistances incorporated in parallel with the condenser in accordance with the circuit diagram in FIG. 3.

Resistance elements **29** and **30** can be obtained either by metallic deposition or by removal of metal according to known processes.

FIGS. 4*a* and 4*b* show schematically the way in which it is possible to make a condenser with two resistances incorporated in series corresponding to the circuit diagram represented in FIG. 5. The condenser again comprises two insulating strips **41** and **42** carrying a metallized zone, **43** and **44** respectively, whose two lateral edges are located at a certain distance from the edges of the insulating strips. The opposed edges of the insulating strips carry on the one side a non metallized zone **45**, **46** respectively, and on the other side a metallized zone **47**, **48** respectively, zones **47** and **48** being separated from the main metallized zone by a non metallized zone. The insulating strips are again laterally shifted one relative to the other. As in the condenser shown in FIGS. 2*a* and 2*b*, the two metallized zones of a same strip are connected by resistance elements **49**, **50** respectively.

The condenser being wound and terminated in the same manner as the condenser described with respect to FIGS. 1*a* and 1*b*, it is noted that the connecting wires of the condenser are no longer directly connected to plates **43** and **44** but to marginal metallized zones **47** and **48** in such a way that there is obtained a condenser comprising two resistances in series in conformity with the circuit diagram of FIG. 5.

The resistance element shown in FIG. 6 comprises a rectangular loop **80** connected by a certain number of arms **81** to each of the metallized zones. It is thus possible to adjust the resistance to the given rating by cutting one or several arms **81** along dotted line **82**.

The insulating strips can be of paper which is lacquered or not, or constituted by synthetic films made of thermoplastic material based for example on polystyrene, polypropylene, polycarbonate, terephthalate, polyethylene or polytetrafluorethylene.

The metallized zones can be obtained by a vacuum evaporation process of one of the following metals: Ag, Al, Bi, Cd, Cu, Ni, Pb, Sb, Sn, Zn or of alloys of these metals.

The thickness of these metallized zones will vary according to the cases and the applications between 0.001 and 1.5 micron.

The invention is applicable to wound condensers as well as to condensers which are not wound.

It is possible also to use only a single insulating strip metallized on the two sides, the second insulating strip carrying no metallized layer.

What is claimed is:

1. A capacitor comprising, two superposed strips of insulating material wound one upon the other and of equal width, each strip having two distinct metallized zones on one side thereof and a resistance zone intermediate said two zones, each of said two zones on a strip having a width corresponding to a width less than the width of their strip and at least one of the zones

extending to the edges of the strip, and one of said two zones having greater width than the other zone.

2. A capacitor according to claim **1**, in which said strips, in which said one zone extending to the edge comprises a narrower one of the two zones.

3. A capacitor according to claim **2**, in which said metallized ones are disposed with the insulating material of one of the strips being disposed overlying the metallized zones of the other, and the narrower zone of each strip being at an edge of its strip opposite to the edge of the other strip.

4. A capacitor according to claim **3**, in which a wider one of said two zones on each strip does not extend to the edges of said strip.

References Cited

UNITED STATES PATENTS

2,940,035	6/1960	Lefkowitz	317—256 X
3,266,121	8/1966	Rayburn	317—256 X
3,275,914	9/1966	Hoffman	317—260
3,419,770	12/1968	Tomago	317—260 X

FOREIGN PATENTS

568,847	11/1957	Italy.
523,936	1/1930	Germany.

ELLIOT A. GOLDBERG, Primary Examiner

U.S. Cl. X.R.

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