April 14, 1942. J. A. KATER 2,279,826

ELECTRICAL CONDENSER

Filed Dec. 20, 1938

FIG. 1

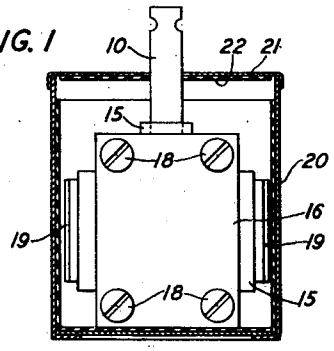


FIG. 2

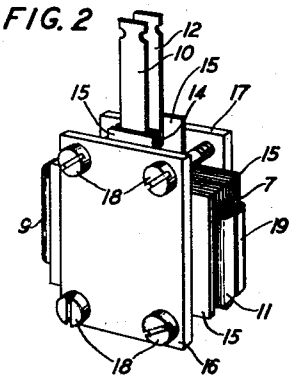


FIG. 3

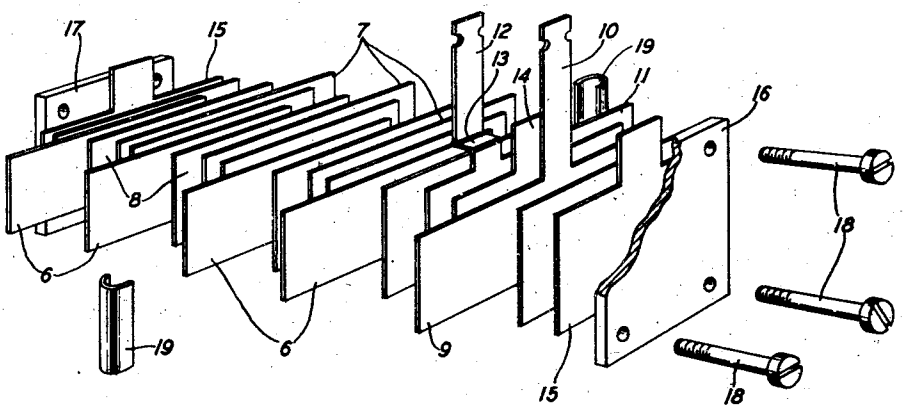


FIG. 4

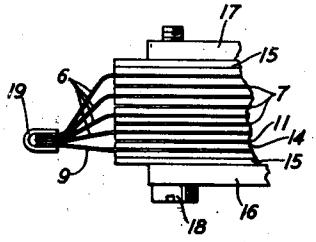
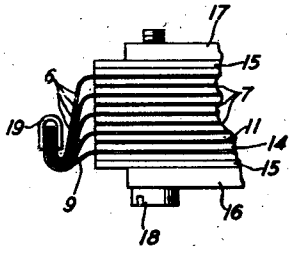


FIG. 5



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ELECTRICAL CONDENSER

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2 Claims. (Cl. 175—41)

This invention relates to electrical condensers and particularly to such condensers for use at high frequencies.

In apparatus operating at high frequencies, as for example in television systems where the frequency range may vary from 100 kilocycles to one or more megacycles, one of the problems to be solved is the reduction of the so-called parasitic effects such as the inductance between terminals of condensers in parallel combination with coils. Such inductances, though not appreciable at the lower frequencies, become very troublesome at frequencies of 100 kilocycles or more, and the effective inductance of several hundredths of a microhenry is quite appreciable.

It is therefore an object of the present invention to eliminate so far as possible the parasitic effect of inductance in condensers, particularly those for use in high frequency circuits. In accordance with the features of the present invention this object is attained by reducing to a minimum, for a given size unit, the physical dimensions of the inductive loop formed by the condenser terminals and plates and by positioning the terminal members in close proximity and in a non-inductive relation to each other.

The various features of the invention may be more clearly understood by reference to the accompanying drawing in which:

Fig. 1 discloses a condenser unit embodying the features of the invention encased in a suitable container;

Fig. 2 is a perspective view of the condenser unit of Fig. 1;

Fig. 3 is an exploded view showing the various elements in position to be assembled; and

Figs. 4 and 5 disclose the method of connecting the condenser plates together.

Referring particularly to Figs. 2 and 3 of the drawing the condenser unit disclosed comprises a set of conducting plates 6—6 alternating with a set of similar conducting plates 7—7 and separated from each other by non-conducting plates 8—8 of suitable insulating material such as mica. The plates 6 are so displaced with respect to the insulating plates 8 that they extend away from them at one end, or the left end, as shown in the drawing. The plates 7, on the other hand, are so displaced as to extend on the opposite end of the mica sheets, or at the right on the drawing. One of the plates, plate 9, extending in the same direction as plates 6 is provided with a terminal member 10 which is preferably integral therewith and a corresponding plate 11 alternating with plates 7 is provided with a similar terminal member 12. Since the thickness of the non-conducting plates of mica is of the order of .001 inch this terminal is provided with an offset portion 13 to provide a slight separation between terminal members. An insulating plate provided with an extended portion 14 is positioned between plates 9 and 11 and similar insulating plates 15—15 provided with corresponding extended portions are positioned at the ends of the stack. The conducting and non-conducting plates of the unit are then clamped between clamping plates 16 and 17 by means of screws 18 passing through openings in plate 16 and engaging threaded openings in plate 17. After the unit is clamped to the desired degree, the extended ends of the foil are brought together as shown in Fig. 4 and U-shaped clamping members 19—19 are pressed over the ends of the foil to insure good electrical contact between all foils of a set, or the ends of the foils may be soldered together. The foil is then bent up at right angles as shown more clearly in Fig. 5 and the unit is ready to be placed in a container 20 provided with a suitable cover 21 as shown in Fig. 1. The terminal members extend through suitable slits in a terminal strip 22 which may be of Bakelite or similar material and the cover portion 21 is provided with an enlarged opening to eliminate any danger of short-cricuiting between terminals. When desired the unit may be impregnated or potted in accordance with conventional methods.

With the condenser unit assembled as described, the terminal members 10 and 12 are in alignment and in close proximity to each other over substantially their entire length so that for electrical currents entering and leaving the condenser unit they form a non-inductive arrangement. Furthermore since the plates 9 and 11 are substantially superimposed parallel planes separated from each other only by the thickness of the mica insulation, the loop formed by the terminals and the plates is of minimum physical dimensions thereby largely eliminating any inductive effect. Condensers in accordance with this invention have been found to operate satisfactorily on high frequency circuits and they show a reduction in inductance of from 60 to 80 per cent and no measurable difference in other electrical characteristics as compared with conventional type condensers. Although any conventional material may be used for the condenser plates, terminals, clamping members, container and cover, it is preferable that all metals used in the construction be non-magnetic.

What is claimed is:

1. An electrical condenser comprising a set of rectangular conducting plates electrically connected together, a second set of rectangular conducting plates electrically connected together, and alternating with the plates of said first set, dielectric members interposed between plates of said first set and plates of said second set, a terminal member extending from the middle edge portion of a plate of said first set, and a second terminal member extending in the same direction from an identical portion of an adjacent plate of said second set, said terminal members being in parallel relation and in such close proximity to each other as to render them substantially non-inductive.

2. An electrical condenser comprising a set of conducting plates of one polarity electrically joined together, a second set of conducting plates of opposite polarity to said first set electrically joined together and alternating with the plates of said first set, a dielectric medium separating the plates of said first set from the plates of said second set, one plate of said first set having a centrally positioned extension forming the terminal for said set, an adjacent plate of said second set having a centrally positioned extension extending in the same direction and in alignment with said first extension and forming the terminal for said second set, said terminals being maintained in such close proximity as to reduce substantially the inductance between said terminals and plates.

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