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W. HAASE

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NONINDUCTIVE CONDENSER

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Fig. 1

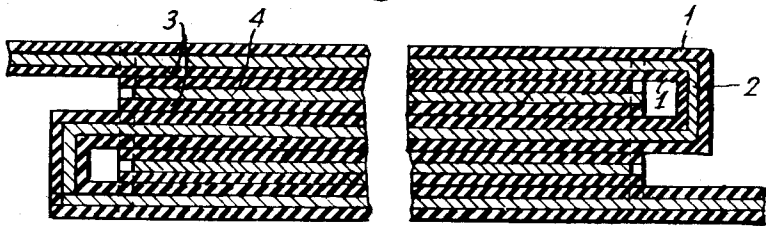


Fig. 2

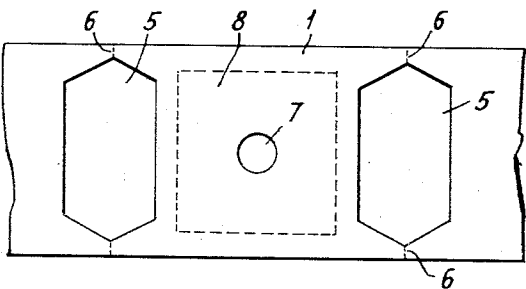


Fig. 3

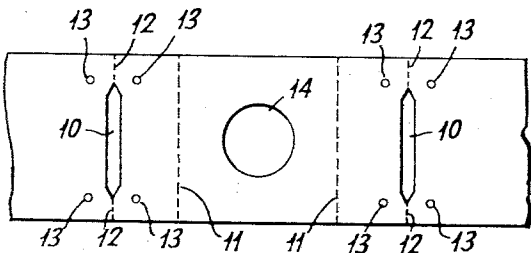


Fig. 4

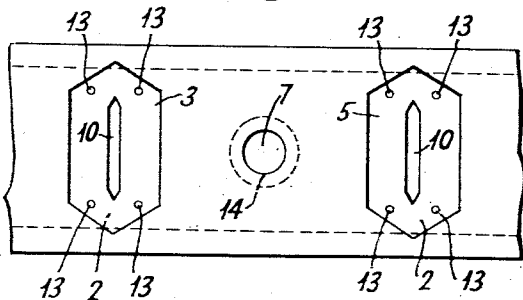
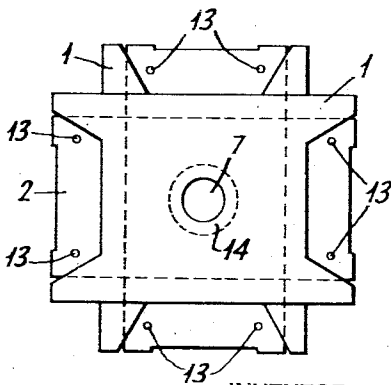


Fig. 5



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NONINDUCTIVE CONDENSER

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3 Claims. (Cl. 175-41)

This invention relates to a new and noninductive electrical condenser.

The prior art condensers used in the communication technique are almost exclusively of the rolled type. Such rolled type condensers have the disadvantage of possessing a relatively large inductive effect when made for large capacities.

Another known method is to build condensers from alternate layers of mica and tinfoil, whereby rectangular pieces of tinfoil are piled alternately upon rectangular pieces of mica and are clamped or bolted together so tightly that practically no air can pass between the layers. The construction of such condensers is somewhat cumbersome, so that this arrangement notwithstanding its otherwise good electrical properties, does not satisfy the requirements of a cheap and simple construction method under preservation of the other electrical properties that a good condenser must possess.

Another known method of constructing an electrical condenser consists of introducing thin leaves of conducting material in the folds of a ribbon made of insulating material having its folds open alternately on opposite sides, whereby the conducting leaves on one side of the folded insulator ribbon form one plate of the condenser and those on the other side of the insulator ribbon form the other plate. This construction makes for very low inductance, but similar to the rolled type condenser, it has the disadvantage, that its construction is cumbersome inasmuch as a continuous strip of tinfoil can not be used and finally the individual tinfoil leaves must be soldered together, which fact practically excludes the use of metals such as aluminum which resist soldering or can only be soldered with difficulty.

The disadvantages of the aforescribed condenser construction can be overcome on grounds of the invention under consideration by using strips of conducting material such as tinfoil or aluminum foil placed between two strips of insulating material and then folding two ribbons made up in this manner, crosswise, one over the other.

Before folding, a portion of the material is punched out at places where the ribbon is to be folded. This facilitates at the same time, the folding of the ribbon along the edges on each side. To further simplify the construction, it is desirable to punch further holes in the metal strip as well as in the insulating strip for the introduction of pins, which will facilitate the proper alignment of the layers as they are folded

one over the other. After folding, the so-constructed condenser pack is pressed tight from both sides by a clamping arrangement or by a bolt and, if necessary, the ready pack can be subsequently impregnated.

A condenser constructed according to these principles has the advantage that it has practically no induction, assuring its successful application even in short wave circuits. An additional advantage of this construction is the fact that the material from which the condenser is built up can be employed in a continuous ribbon form without the necessity of cutting and aligning of the individual layers, as is, for instance, the case with mica condensers. Nor is it necessary to resort to soldering of the conducting plates together, so that metals that resist soldering or can only be soldered with difficulty, can be employed without trouble in the described condenser construction.

Should it become necessary to use insulating material which can not be made up in a ribbon form, as for instance is the case with mica, then under such circumstances it may suffice to fold the two metal ribbons crosswise in a zigzag fashion and place the insulating plates of suitable size between the metal surfaces.

The accompanying figures illustrate the construction method of a condenser consisting of the sum of two crosswise, one over the other, folded ribbons of three layers each (one insulating layer, one metal layer, one insulating layer).

Fig. 1 is a section of a partial condenser of this invention;

Fig. 2 is a detail of an insulating strip;

Fig. 3 is a detail of a metal foil;

Fig. 4 is an insulating strip and metal band placed one over the other;

Fig. 5 is a plan view of a complete condenser stack.

Fig. 1 illustrates on enlarged scale (actual thickness not being more than about 0.03 to 0.1 mm.) a cross section of the two folded ribbons from which a condenser is built up. The first ribbon, consisting of insulating bands 1 and metal foil 2, is folded over in a zigzag fashion, crosswise over the band consisting of insulating bands 3 and metal foil 4.

Fig. 2 illustrates an example of the insulating strip 1 or 3, which may be made of paper, as it would appear in unrolled and flattened out condition. At equal intervals openings 5 are punched in the paper strip in the shape of an elongated hexagon, so that only the edges indicated by the dotted line 6 are left solid. The

paper strip is folded along these edges. Midway between the hexagonal openings are punched round holes 7 through which a pin can be introduced to facilitate the proper alignment of the layers during the folding process. After the condenser is completely folded, a bolt can be introduced through the central aperture, which by means of two side plates holds the foldings pressed tight together. The dotted square 8 shows the electrically effective surface of the tinfoil or metal between two insulating strips in the completed condenser.

Fig. 3 illustrates a metal foil such as 2 or 4 which can be made of rolled copper for example, as it would appear in unrolled and flattened out condition. This metal foil also has hexagonal openings 10 punched in its body, which are much narrower, however, than the corresponding openings on the paper strip, so that after the folding of the metal foil, its edges protrude on both sides of the paper strip. The square formed by the two sides of the metal foil 2 and the two dotted lines 11 again illustrate the electrically effective surface 8 of Fig. 2. The folding of the metal foil is accomplished along the hinges likewise marked by dotted lines 12. In order to assure a properly aligned folding of the two ribbons, additional guide holes 13 are provided which just fit over the pins passing through them during the construction. The central opening 14 punched in the metal foil between the hexagonal punchings 10, has somewhat larger diameter than the corresponding center hole 7 of the insulator ribbon in Fig. 2, thus permitting a bolt to be passed through the condenser pack at the center, which by means of two clamping plates on the sides, holds the folded layers pressed tightly together without the bolt coming in contact with the metal foil at any place. Finally, Fig. 4 illustrates an insulator and a metal strip placed one over the other. The reference numbers of this figure apply to the corresponding parts of Figs. 2 and 3. Fig. 5 illustrates, with same reference numbers as apply to the previous figures, how the condenser is built up from alternately crosswise one over the other folded layers of the two bands.

In the herein illustrated example, the two bands used in the construction of the condenser, consist of separate individual strips of insulator and metal foils. It is possible, of course, to first manufacture the bands in any length consisting of a metal foil placed between two insulator foils and then proceed with the construction of the condensers from such bands. Naturally, a possibility must be provided for the attaching of terminal clips. In the foregoing example, openings were punched in the metal foil to make for small readily flexible hinges, but the same can be accomplished by simply perforating the metal foil at the corresponding bending places.

What is claimed is:

1. A noninductive electrical condenser comprising two groups of two insulating strips with a metallic strip interposed therebetween, said insulating and metallic strips each having a plurality of circular and hexagonal apertures, said circular apertures being alternately arranged with respect to said hexagonal apertures, the circular

apertures in said metallic strip being substantially larger than the circular apertures in said insulating strip, and the hexagonal apertures in said metallic strip being substantially smaller than the hexagonal apertures in said insulating strip, the metallic strips of each group positioned within two of said insulating strips with the large circular aperture located on the same center line as the small circular aperture in said insulating strips, said groups being folded at the centers of the hexagonal apertures in the insulating and metallic strips alternately in zig-zag fashion so that one group is at right angles to the other group, and binding means passing through the circular apertures to bind the folded groups together.

2. A noninductive electrical condenser comprising two groups of two insulating strips with a metallic strip interposed therebetween, said insulating and metallic strips each having a plurality of circular and hexagonal apertures, said circular apertures in said insulating strips being small with respect to the circular apertures in said metallic strips and the hexagonal apertures in said insulating strips being large with respect to the hexagonal apertures in said metallic strips, said large hexagonal apertures of each insulating strip being alternately arranged with respect to the small circular apertures, said large circular apertures of each metal strip being alternately arranged with respect to the small hexagonal apertures, the metallic strip of each group being positioned with its circular aperture centrally with the circular aperture in said insulating strips, each one of said groups being folded at the center position of said hexagonal aperture in the insulating strips and arranged alternately in zig-zag fashion so that one group is located at right angles to the other group, and clamping means passing through said circular apertures in the insulating strips for binding the two groups together.

3. A noninductive electrical condenser comprising two groups of two insulating strips with a metallic strip interposed therebetween, said insulating and metallic strips each having a plurality of circular apertures and approximately rectangular slots, the circular apertures in said insulating strips being small with respect to the circular apertures in said metallic strips and the rectangular slots in said insulating strips being large with respect to the rectangular slots in said metallic strips, said large rectangular slots of each insulating strip being alternately arranged with respect to the small circular apertures, said large circular apertures of each metal strip being alternately arranged with respect to the small rectangular slots, the metallic strip on each group being positioned with its circular aperture centrally with the circular aperture in said insulating strips, each one of said groups being folded at the center position of said rectangular slot in the insulating strips and arranged alternately in zig-zag fashion so that one group is located at right angles to the other group, and clamping means passing through the circular apertures in the insulating strips for binding the two groups together.

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