March 30, 1926. 1,579,168

C. E. VAWTER

ELECTRIC CONDENSER

Filed April 28, 1923

Fig. 1.

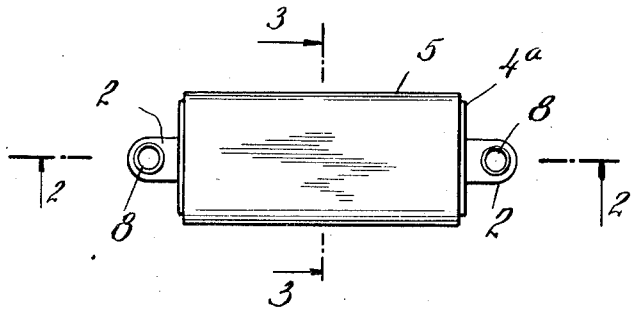


Fig. 2.

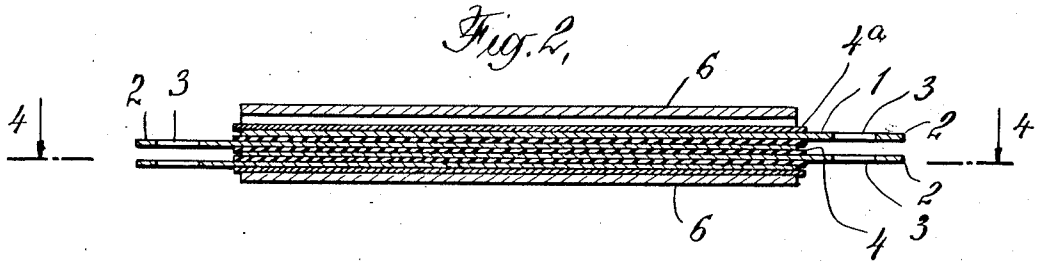


Fig. 3.

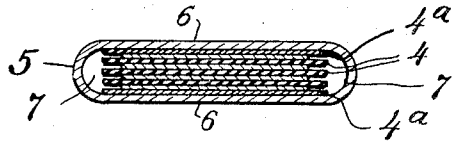
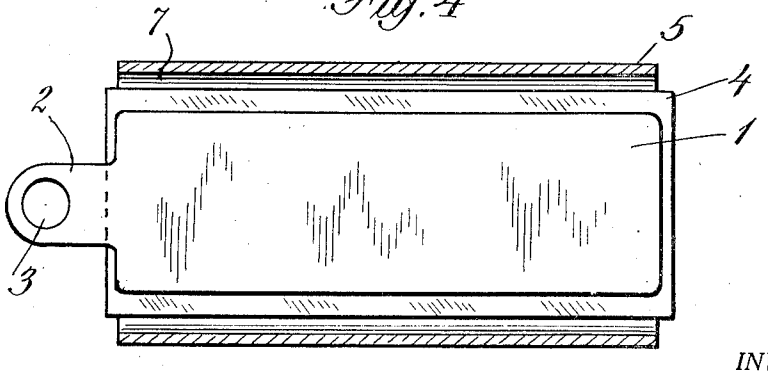


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES E. VAWTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO DUBILIER CONDENSER & RADIO CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

ELECTRIC CONDENSER.

Application filed April 28, 1923. Serial No. 635,210.

To all whom it may concern:

Be it known that I, CHARLES E. VAWTER, a citizen of the United States, residing at 6700 Gresheim Road, Philadelphia, in the county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Electric Condensers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to electric condensers, and more particularly to that type of small fixed condenser which consists of alternate flat layers or plates of dielectric material and conducting medium.

Parallel plate condensers of this type consist of metallic strips or armatures separated from each other by strips of dielectric material such as mica, paraffin paper and glass. Alternate armatures are connected together to form one terminal of the condenser and the remaining armatures are interconnected to form the other terminal. A condenser of this type may be considered as a combination of a number of two-plate condensers connected in parallel, the capacity being proportional to the number of these two-plate condensers.

In designing condensers of this type it is necessary to select the proper combination of elements to give the capacity desired. The capacity depends upon the kind of dielectric employed, the size of the armatures, the distance between consecutive armatures, and the number of armatures used. In practice it is necessary to so proportion the various parts that the overall dimensions of condensers of different capacity are substantially different. Accordingly it is necessary to use different sized condenser casings for condensers of different capacity, and this, of course, increases the manufacturing cost.

Another practical difficulty encountered in the manufacture of parallel plate condensers consists in pressing the armatures and dielectric together in such a manner that all air will be excluded from the contacting surfaces. Small air pockets greatly reduce the dielectric strength and any moisture which the air contains augments this detrimental effect. It is common practice to subject condensers to a high vacuum to remove the air and then seal the exposed surfaces with paraffin or wax.

One object of the present invention is to provide a method of making condensers of the type above described, by means of which condensers of different capacity may be made from standard parts, the same size casing being used for condensers of different capacity.

A further object is to provide a condenser in which the armatures and dielectric are clamped together so tightly that substantially all of the air is excluded from the contacting surfaces.

A further object of the invention is to provide a condenser in which the armatures and dielectric sheets are maintained in intimate contact throughout their entire surfaces, notwithstanding slight irregularities in the surface and thickness of the parts.

In the accompanying drawings there is shown a preferred embodiment of the invention, and in the said drawings—

Figure 1 represents a plan view of the improved condenser;

Fig. 2 represents a sectional view taken on line 2—2 of Fig. 1, showing the armatures and dielectric strips in position before the sides of the casing are pressed together;

Fig. 3 represents a sectional view taken on line 3—3 of Fig. 1, showing the finished condenser; and

Fig. 4 represents a sectional view taken on line 4—4 of Fig. 2.

As shown in the drawing, each armature 1 consists of a thin strip of metal, such as copper. Each armature 1 is provided at one end with a tab 2, this tab being preferably integral with the armature. The tabs 2 are each provided with a hole 3 by means of which adjacent tabs may be conveniently connected together as by inserting a wire through the holes and soldering the wire in this position.

The dielectric material consists of thin rectangular strips or sheets 4 and 4^a, these strips being substantially wider and longer

than the armatures 1. The dielectric strips 4 between the armatures are preferably made of mica, whereas the dielectric strips 4ª between the outside armatures and the casing are preferably made of oiled linen or of oiled paper, for reasons which will be later set forth.

The condenser casing 5 consists of a piece of metal tubing, the shape of this tubing in the finished condenser being shown in Fig. 3. Before the condenser is finished, the sides 6 of the casing 5 are substantially further apart, as shown in Fig. 2. The tubing may be drawn in the form shown in Fig. 2, or it may be made from ordinary round tubing by pressing it together the proper amount.

The armatures 1 are assembled within the casing 5 as shown in Fig. 2, the tabs of adjacent armatures projecting from opposite ends of the casing. The casing 5 is of substantially the same length as the armatures 1 and the ends of the dielectric strips 4 and 4ª project beyond the ends of the casing. As appears in Fig. 3, the sides of the dielectric strips 4 project beyond the sides of the armatures 1, the edges of the dielectric strips nearly touching the casing 5. When the several parts have been thus assembled, the sides 6 of the casing 5 are pressed together to clamp the armatures tightly against the intervening strips of dielectric material. The tension in the casing holds the armatures in this clamped position after the pressure has been removed from the sides 6, thus providing a moisture proof condenser. The tabs 2 projecting from one end of the casing may be connected together to form one terminal of the condenser, and the tabs at the other end may be connected in a similar manner to form the other terminal. If it is so desired, the ends of the condenser may be dipped in hot paraffin or wax to seal the exposed parts, and the spaces 7 inside the casing may also be filled with a suitable sealing material. For holding the tabs 2 together, an ordinary eyelet 8 is simple and entirely satisfactory.

Several advantages result from using oiled linen or paper for the outside dielectrics in lieu of the mica. The paper or linen is much cheaper than the mica and possesses a much higher degree of elasticity, so that when the casing is clamped on to the assembled armatures and dielectrics the paper or linen will be compressed and will hold the laminations firmly together and in contact throughout their entire surfaces. As the sheets of paper or linen are outside the dielectric field, they do not affect the characteristics of the condenser which electrically is no different from a condenser having all mica sheets. Furthermore, the use of the paper or linen sheets between the casing and the assembled copper and mica sheets serves to cushion the impact when the casing is compressed upon the sheets, and thereby prevents rupturing the mica sheets which is liable to take place when all the dielectric sheets are of mica.

From the above description, it is apparent that this invention comprises a condenser which may be made at very low cost. The armatures, consisting of identical pieces of thin sheet metal, may be stamped in large quantities by an ordinary metal stamping machine of simple construction. Likewise large numbers of identical dielectric strips may be cut or stamped in a very inexpensive manner. The casings may also be made in large numbers at low cost, since the same size casing may be used for condensers of different capacities. The operations of pressing ordinary round tubing to form flat tubing, and of cutting flat tubing into short lengths are obviously very simple.

In addition to the fact that the various parts of the condenser may be made at low cost, the parts may be assembled very cheaply. To assemble the parts, it is merely necessary to insert the proper number of armatures and dielectric strips into the casing and to press the sides of the casing firmly together.

The present invention not only provides a very inexpensive condenser, but also provides a condenser possessing superior electrical and mechanical qualities. The improved condenser is substantially air-tight and water proof, due to the fact that the several elements are clamped tightly together. Furthermore the construction of the condenser is very rugged. The casing possesses sufficient strength so that the condensers may be shipped without taking more than ordinary precaution to insure the condensers against injury. Furthermore, the improved condenser will stand considerable abuse by the consumer without impairing in any way the electrical characteristics.

It is to be understood that the proportion, size and shape of the various parts may be varied without departing from the spirit of the invention which is not confined to the particular embodiments shown and described, but is intended to cover such modifications thereof as are included within the scope of the appended claims.

I claim:

1. An electric condenser comprising a plurality of armatures of electrically conductive material, a plurality of sheets of mica interposed between the armatures, a casing clamping said armatures and strips of mica together, and sheets of material more compressible and less brittle than mica interposed between the casing and the opposite surfaces of the assembled armatures and mica sheets, whereby when the casing is

compressed, the armatures and mica will be held firmly together without impairment of the mica.

2. An electric condenser comprising a plurality of armatures, a plurality of strips of mica interposed between said armatures, a casing clamping said armatures and said strips of mica together, and strips of oiled fabric interposed between the outer surfaces of the assembled armature and mica strips and the casing.

In testimony whereof I affix my signature.

CHARLES E. VAWTER.