Feb. 23, 1926. 1,574,424

H. A. HATCH

CONDENSER

Filed Oct. 16, 1920

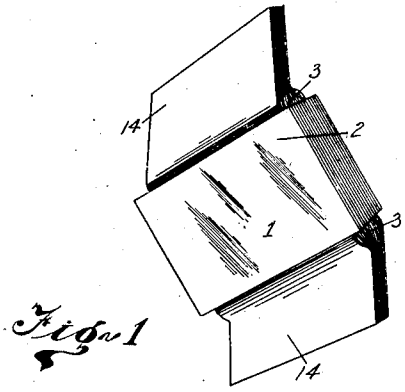


Fig. 1

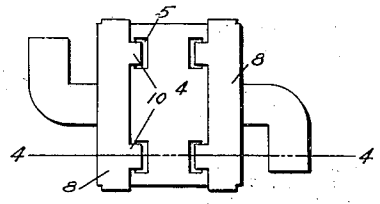


Fig. 2

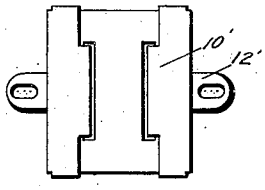


Fig. 6

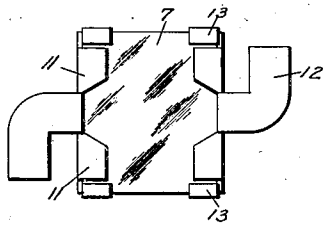


Fig. 3

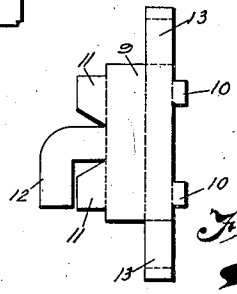
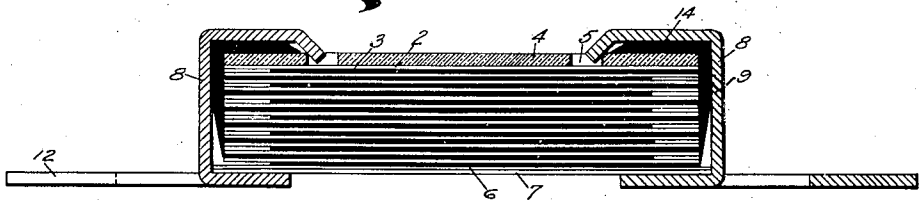


Fig. 5

Fig. 4



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UNITED STATES PATENT OFFICE.

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CONDENSER.

Application filed October 16, 1920. Serial No. 417,347.

To all whom it may concern:

Be it known that I, HARRY A. HATCH, a citizen of the United States, residing at Newark, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Condensers, of which the following is a description, reference being had to the accompanying drawing and to the figures of reference marked thereon.

This invention is an improvement over the type of condenser wherein a pile of alternate layers of mica and tinfoil are clamped together at their edges.

It has been customary in the past to build a certain type of condenser, as for example, the type of condenser disclosed by Van Deventer Patent 1,181,623 issued May 2, 1916, by alternately piling on top of one another thin films of mica and tinfoil. After a certain predetermined number of layers or films have been compiled so as to give the desired capacity as determined by previous tests on a completed condenser, an identifying slip of paper or other material is slipped in between the top layer and a transparent mica covering film. This slip in addition to other information gives the rated capacity of the condenser. Then terminal clamps are slipped over the edges of the pile and the clamps are squeezed under pressure so as to compact the pile and so as to retain the clamps in position on the pile. The whole is then impregnated and baked in an oven under reduced pressure.

It has been found however that due to the differences in thickness of the dielectric, and due to slight differences in pressure between the plates, that the capacity of the condenser is sometimes far from the theoretical and desired capacity. Furthermore in use due to the excessive vibration to which condensers of this character are subject when on motor vehicles, the clamps sometimes slip off from the condenser whereupon the condenser generally is expanded and changes in capacity.

It is an object of this invention to overcome these difficulties and specifically, one object of my invention is to provide a condenser of which the capacity of the completed condenser is known and properly rated.

It is another object of my invention to provide a condenser which is protected at all of its weak exposed points.

A further object of my invention is to provide a terminal clamp for a condenser which cannot be pulled off and thereby destroy the condenser.

Still another object of my invention is to improve the method of building the condenser element.

Other objects of this invention will appear to those skilled in the art after reading the specification and claims.

In the accompanying drawings which disclose several modifications of my invention:

Figure 1 is a perspective view of my condenser element.

Figure 2 is a plan view of one form of a completed condenser.

Figure 3 is a view of the underside thereof.

Figure 4 is a section on an enlarged scale on the line 4—4 of Figure 2.

Figure 5 is a development of one of my clamps, and

Figure 6 is a plan view showing an alternative form of clamp.

In the drawings wherein like reference characters refer to similar parts, 1 denotes a condenser element built up of alternate layers of mica 2 and metalfoil 3, preferably tinfoil, in the following manner: Mica blanks of the proper shape and thickness are passed through a machine which simultaneously coats with varnish both sides of the sheets. This coating also serves to fill the fissures and the pin holes in the blanks. As the films are passed through the machine, the varnish is dried. The element is then built up in an assembling machine by alternately piling mica sheets and tinfoil upon one another. A sufficient number of these being piled up, the whole is placed into a baking form together with other similar piles, suitable unvarnished films being interposed between the various groups. A slight pressure is then exerted to slightly compact the piles. The baking form with its charge is then placed in an oven, preferably an electric oven and a sufficient preheat is applied to soften the varnish on the mica films. The form is then removed from the oven and while still hot pressure is applied to render each element a compact mass. The form is then again placed in the oven and heated until the varnish is baked dry. The element now becomes a hard, compact, coherent mass. The form is removed from the oven and the whole is then per-

mitted to cool off at atmospheric temperature.

The elements as thus constructed are measured as to capacity and stocked in appropriate bins.

When condensers of a definite capacity are desired, the proper elements are selected and an identifying plate 4 of fibre or other suitable material is placed on the element. This plate is provided with apertures 5 for a purpose to be hereinafter described. Underneath the elements are placed a suitable number of mica plates 6, 7, so that the overall thickness of the condenser will be that suitable to the width of the terminal clamps soon to be described. It is of course understood that the plate 4 may also be varied in thickness and that if desired the width of the clamp may be varied at will. These sheets 6, 7 are made slightly wider than the elements 2 so that when the clamps are applied, they will be parallel to one another and perpendicular to the films. The clamps are each made up of sheet metal into an open sided boxlike structure protecting the lateral edges and corners of the element. The sheet from which the clamp is formed comprises a main body portion 9 having lateral ears 10, 10 on one side and ears 11, 11 on the other side, an additional terminal member 12 being also struck out on the same side as the ears 11, 11. Another pair of end ears 13, 13 are also provided.

The clamp is wrapped around the condenser element as is clearly indicated in Figures 2, 3 and 4, the ears 10 being bent into the apertures 5 of the fibre sheet so as to retain the clamps in place.

The tinfoil ends 14 of the element are folded back upon the fibre retaining plate of the element and sufficient pressure is applied to the clamps as they are positioned on the element to mechanically securely hold them in place and to make good electrical contact with the tinfoil sheets without the use of solder.

The element being already a compacted mass, the pressure of the clamps on the element does not alter the distances between the dielectrics and so while the terminal clamps of the element are rigidly held in place no change in the capacity of the condenser is effected.

In Figure 6, I have shown but one ear 10′ instead of two and the form of terminal member 12′ is slightly different.

It is of course apparent that condensers of suitable capacity may be made by combining several elements or by splitting one of my completed condenser elements. Furthermore by using a sheet 4 of different thickness a single clamp 8 may serve for condenser elements of considerable range in thickness. The built up condenser, according to my invention, has the capacity accredited to it by the identifying slip of paper inserted between the last two layers of mica. The connecting of the terminal clamps to the tinfoil without the use of solder, renders the condenser longer lived due to the absence of the soldering flux which because of the acid which is always present therein destroys the tinfoil in time. The element is protected from destruction by blows at its weak points because of the enveloping character of the clamps. Many other advantages of my invention will be apparent to those skilled in the art.

Having thus described my invention, what I claim is:

1. A sheet metal stamping for a condenser element comprising a body portion, ears projecting from the lateral edges of the body portion, a terminal arm projecting from one of the lateral edges and an additional pair of ears projecting from the end edges of the body portion.

2. A condenser comprising a compacted, compiled condenser element having a definite electrical capacity including means comprising at least one plate of stiff insulating material having apertures therethrough and two metallic clamps on opposite sides of the element, said clamps having at least one ear intermediate its ends for entering said apertures to hold the clamps and plate in mechanical interlocking engagement and effect electrical contact of the clamps with the conducting elements of the condenser, said clamps being pressed onto said element substantially with a pressure sufficient to make the electrical contact and to retain the capacity of the condenser.

3. A condenser comprising alternate layers of mica and metal foil extending beyond the mica on two sides, a cover plate of insulating material having on two opposite sides at least one aperture intermediate the other sides, clamping members in electrical engagement with the metal foil embracing the layers of mica and foil and each having at least one ear spaced intermediate its ends and bent into said aperture for the purposes described.

4. A condenser comprising alternate layers of mica and metal foil extending beyond the mica on two sides, clamping members in electrical engagement with the metal foil embracing the layers of mica and foil and means for preventing both said clamping members from being moved in any direction, comprising a plate of stiff insulating material having recesses spaced a substantial distance from two opposite edges and away from the other two edges and at least one ear on each of said clamping members intermediate its ends, said ear or ears being adapted to be forced into said recesses substantially as described.

5. An electrical condenser comprising a

stack of insulating and conducting sheets; a stiff insulating plate overlying at least one face of the stack, clamping members of relatively stiff material extending around the opposite ends of the condenser stack and of substantially the same width as the condenser, with their opposite edges on the opposite faces of said plate separated by a desired space, whereby said clamping members can exert a uniform pressure upon substantially the entire surface of said plate and therethrough over substantially the entire area of the conducting and insulating sheets and securing means attached to each of the clamping members to hold them in all directions in firm engagement with said plate, said clamping members being connected with conducting sheets of opposite polarities in said stack.

6. An electrical condenser comprising a stack of sheets of conducting and dielectric material, means for holding the stack together after it has been formed to give the desired capacity, including at least one plate of stiff insulating material and a pair of metallic terminal clamps extending over and pressed onto the said stack over said plate, said conducting sheets of opposite polarity being brought out at different sides of the stack and bent over so as to be engaged by said terminal clamps, said insulating plate having means to receive gripping devices and gripping devices on the terminal clamps forced under pressure into said insulating plate receiving means, to hold the clamping terminals from movement in any direction and to assist in drawing the terminal clamps onto the stack.

7. A condenser comprising a stack of dielectric and metallic sheets arranged in groups having projecting ends of opposite polarity, at least one bearing member of stiff insulating material overlying a face of the stack, terminal clamping members of relatively stiff metallic material extending around and reaching over the opposite ends or sides of the stacks and of substantially the same width as the condenser and engaging said group ends and securing means cooperating between at least one bearing member and the clamping members whereby the terminal clamps are drawn into secure and firm engagement with the said group ends and bearing member on the stack.

8. A condenser comprising a stack of dielectric and metallic sheets, arranged in groups having projecting ends of opposite polarity, at least one bearing member of stiff insulating material overlying a face of the stack, terminal clamping members of relatively stiff metallic material extending around the opposite ends or sides of the stack and of substantially the same width as the condenser and engaging said group ends and securing means arranged to cooperate between at least one bearing member and the terminal clamping members so as to secure pressure on the group ends and bearing member by the clamps for substantially their full length.

9. An electrical condenser comprising a stack of suitably insulated conductive sheets extending alternately at opposite ends of the stack, bearing members of relatively stiff insulating material overlying opposite faces of the stack, clamps embracing and extending over the opposite ends of said sheets and bearing members and clamping same together and in electrical contact with sheets of opposite polarity, at least one of said bearing members having at least one opening therethrough extending on opposite sides of a median line between the clamps and substantially parallel to the ends of the stack, and a securing device positioned in each of said openings and coacting with its associated clamp and the bearing member for holding said clamps in said clamping position.

10. A condenser comprising a stack of conducting layers separated by insulation, at least one cover plate for said stack, and a plate at each side of the condenser, part of said layers being electrically connected to one of said side plates and the remaining layers to the other side plate, each side plate having its opposite edges bent over so that at least one edge engages the outer face of said cover plate, said edge having securing means for engaging said cover plate and assisting in securing said edge against same without projecting beyond the inner face of the cover plate into said stack.

11. In a condenser comprising a stack of conducting layers separated by insulation, at least one relatively rigid insulating cover plate for said stack, and a deformable conducting plate at each side of the condenser, part of said layers being electrically connected to one of said side plates, and the remaining layers to the other side plate, each side plate having its opposite edges bent over so that at least one edge engages the outer face of said cover plate, said edge having securing means and said cover plate having openings to receive said means to assist in holding said edge against said cover plate, said means being too short to project from the inner faces of said cover plate into said stack.

In testimony whereof, I affix my signature.

HARRY A. HATCH.