March 6, 1928. 1,661,351

H. R. VAN DEVENTER

ELECTRICAL CONDENSER

Original Filed Feb. 28, 1925 2 Sheets-Sheet 1

Fig. 1

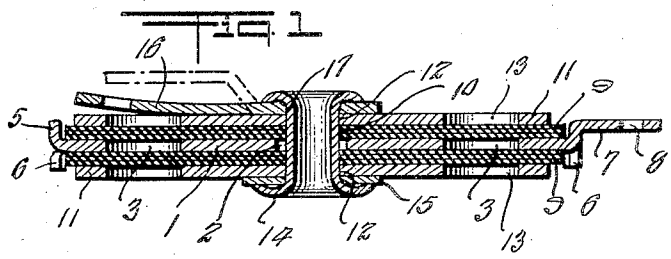


Fig. 2

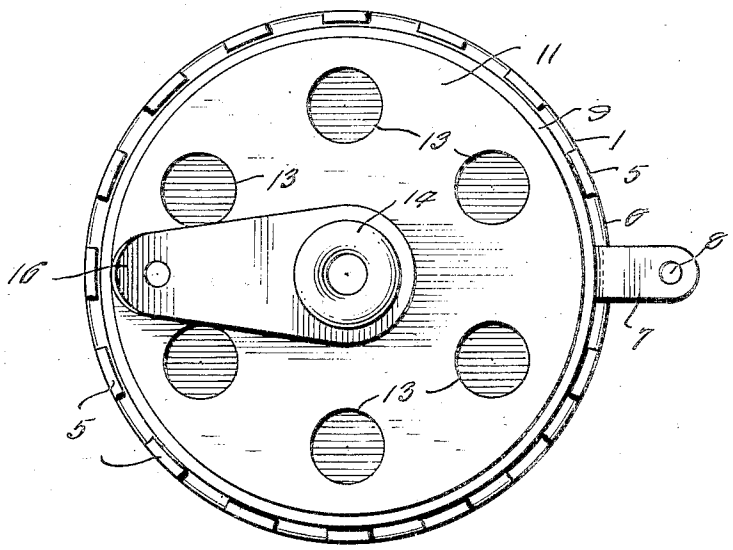
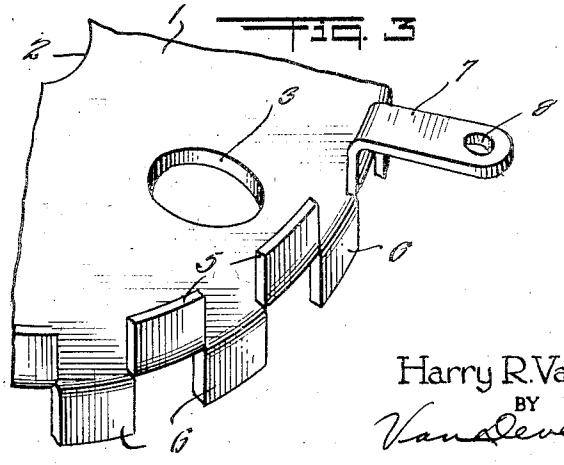


Fig. 3



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Fig. 4

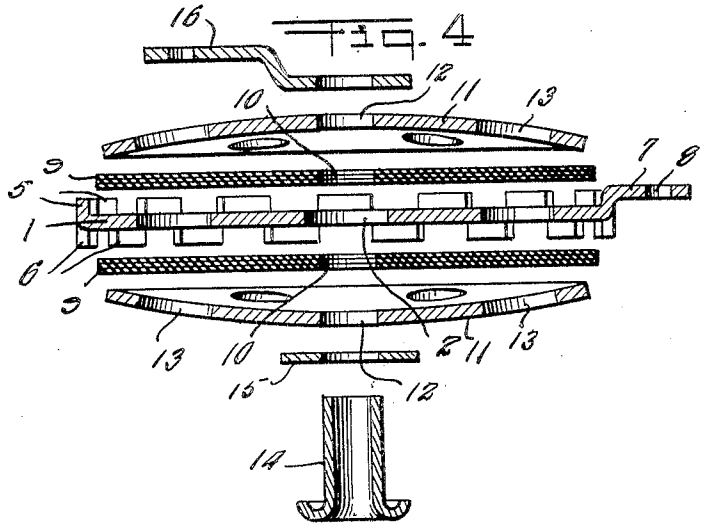


Fig. 5

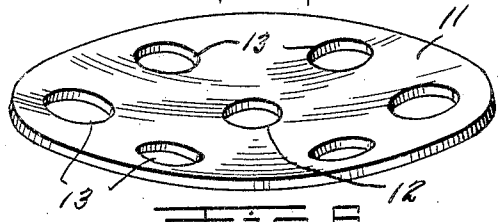
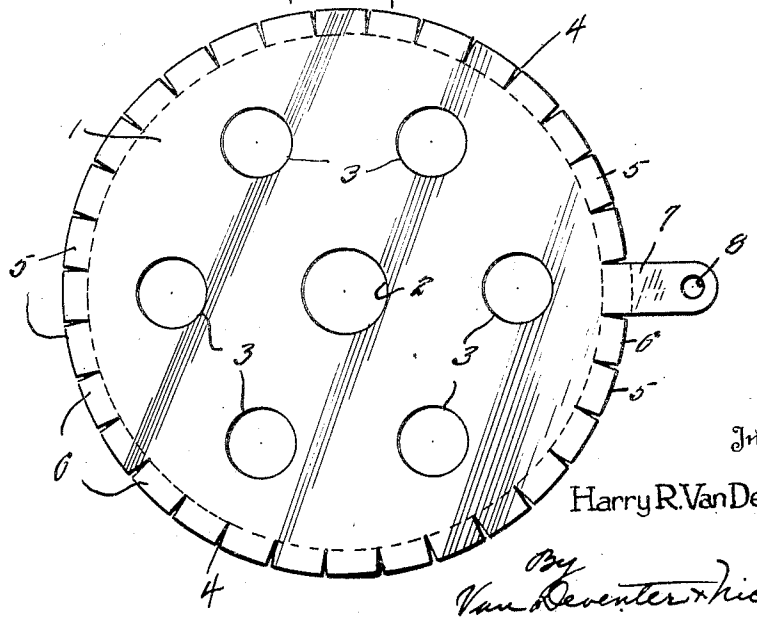


Fig. 6



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Patented Mar. 6, 1928. 1,661,351

UNITED STATES PATENT OFFICE.

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ELECTRICAL CONDENSER.

Application filed February 28, 1925, Serial No. 12,236. Renewed July 22, 1927.

This invention relates to electrical condensers, and more particularly to precision fixed condensers.

An object of this invention is the production of a precision fixed condenser which is the embodiment of simplicity, durability and effectiveness.

Another object of this invention is the production of a precision fixed condenser, the construction and arrangement of the various parts being such that assembly is accomplished with rapidity and accuracy.

Another object of this invention is the production of a precision fixed condenser, in which the capacity adjustment is effected in an exceedingly simple manner, made possible by the particular formation of the condenser elements, and when once adjusted to a predetermined capacity will not be affected through handling or rough usage.

A further object of this invention is the production of a precision fixed condenser wherein the various parts are of such configuration and of such a character that each is stamped or punched with but a very small amount of waste, thus creating an enormous saving in material in quantitative production.

With these and other objects in view which may be incident to my improvements, the invention consists in the parts and combinations to be hereinafter set forth and claimed, with the understanding that the several necessary elements comprising my invention may be varied in construction, proportions and arrangement, without departing from the spirit and scope of the appended claims.

In order to make my invention more clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect, without limiting the improvements in their useful applications to the particular constructions, which for the purpose of explanation, have been made the subject of illustration.

In the drawings:

Figure 1 is a vertical sectional view taken through the axis with the terminals in alignment;

Fig. 2 is a top plan view;

Fig. 3 is an enlarged perspective view of part of the central condenser plate;

Fig. 4 is a vertical sectional exploded view taken through the axis with the terminals in alignment;

Fig. 5 is a perspective view of one of the condenser plates; and

Fig. 6 is a plan view of the blank from which the central condenser plate is made.

In the manufacture of electrical condensers, it becomes desirable to produce a precision fixed condenser, a condenser which is not designed to be adjusted by the purchaser, as is the case with variable condensers, but one which is so arranged or constructed that it may be easily and quickly, with the aid of factory equipment, subjected to a precision setting preparatory to leaving the factory, and when once set cannot, without considerable trouble on the part of the purchaser, be changed.

In order to accomplish the production of a condenser susceptible to ready adjustment for facilitating precision setting, such condensers must of necessity take on some of the characteristics of a variable condenser, though it is not to be construed as such in the general and accepted interpretation. Such condensers must of necessity be variable to a greater or less degree, otherwise the setting thereof, even with factory facilities, becomes an intricate matter involving considerable skill, time and labor.

In the drawings 1 represents a circular condenser plate having a central aperture 2 and a series of radially disposed apertures 3 at an equal distance from the central aperture 2, and at an equal distance apart. The periphery of this plate has a series of radial slits 4 uniformly spaced and of a uniform depth. The sections between the slits 4 are bent alternately from side to side so as to form corresponding flanges 5 and 6, one of which is provided with an elongation 7 bent out to form a terminal 8.

The flanges 5 and 6 serve a two-fold function in that they locate and protect the corresponding and oppositely disposed dielectric disks 9, each consisting of a circular sheet of mica or other suitable dielectric material, having a central aperture 10 of a

somewhat smaller diameter than the aperture 2 in the plate 1, yet registering centrally with the aperture 2, in which position it is naturally located since its diameter is equal to the diameter of the plate 1 inside the flanges 5 and 6 on the periphery of the plate.

Bearing against the dielectric disks 9 are corresponding condenser plates 11, each consisting of circular concave plates having a diameter somewhat less than the diameter of the dielectric disks 9, and a central aperture 12 adapted to register with the apertures 10 in the dielectric disks and centered as related to the aperture 2 in the plate 1. The condenser plates 11 are also provided with a series of apertures 13 radially disposed at an equal distance from the central aperture and from each other. These apertures 13 are adapted to register with the apertures 3 in the condenser plate 1 when the condenser elements are assembled.

In assembling the condenser elements, a rivet 14 carrying a washer 15 is passed through the central apertures in the condenser plates and dielectric material, the washer 15 bearing against one of the condenser plates 11. A terminal 16 is then connected by slipping an aperture 17 therein over the rivet. Thus the terminal 16 bears against the other condenser plate 11 and performs the function of a washer as well as that of a terminal. I have shown in dotted lines in Fig. 1 the terminal 16 bent up from its shank and over to extend parallel with the upper condenser plate 11. The rivet is then set or compressed so as to effectively bind or clamp the condenser elements together.

In setting the eyelet 14, the oppositely disposed circular concave or spring plates 11 are compressed against the dielectric disks 9, thus flattening the plates 11 and causing the plates 11, by reason of their particular formation, to develop an intensive compression at the periphery of the plates 9 as well as throughout its surface.

The rivet not only serves to bind or clamp the elements together, but serves as a connection between the outside condenser plates 11 and their terminal 16. The pivotal aperture 2 in the plate 1 being larger in diameter than the pivotal apertures in the dielectric disks 9, the condenser plate 1 is thus free from contact with the eyelet, and has no other contact than through the terminal 8 on the periphery.

When the condenser has been fully assembled, the apertures 3 in the inside condenser plate 1 may register with the apertures 13 in the plates 11. In this position the maximum capacity of the condenser is obtained. The minimum capacity is obtained by misaligning the apertures, which is accomplished by turning the plates. Thus, by differentiation between these two extremes, precision setting is affected; the plates, being manipulated by suitable factory equipment, when once set are not to be tampered with.

To change the capacity of the condenser, one simply inserts a tool into the openings 13 of one or both plates 11, and turns these plates or either of them to the extent required.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details of construction herein set forth, by way of illustration, as it is apparent that many changes and variations may be made therein, by those skilled in the art, without departing from the principle of the invention, or exceeding the limits of the appended claims. For instance, it is not required that the plates 1 and 11 and disks 9 be always circular, or that the pivotal apertures 2 and 12 be always in the center of the plates, or that the openings or recesses 3 and 13 be always at the same distance from the center aperture in the respective plates, or the same distance from one another, as any convenient shape of the plates 1 and 11 and the disks 9, and any convenient method of arranging them so that a variable portion of the adjacent surfaces of the outside plates may be opposed to the upper and lower surface of the inside plate, are quite within the scope and spirit of the invention.

Having thus described the various features of my invention, what I claim as new and desire to secure by Letters Patent is:

1. A condenser comprising plates mounted to be relatively movable, each of said plates having one or more recesses therein so that when said plates are adjusted to put the recesses of the two plates wholly or partially into or out of registry, the capacity of said condenser may be varied, and insulation between the plates and in contact with substantially the entire opposing surfaces thereof.

2. A condenser comprising plates mounted to be relatively movable, each of said plates having one or more recesses therein so that when said plates are adjusted to put the recesses of the two plates wholly or partially into or out of registry, the capacity of said condenser may be varied, one of said plates having a flange encircling the rim thereof.

3. A condenser having a stack comprising an inner conductive plate, dielectric upon both faces of said plate, metallic cover plates, and a rivet passing through all of said plates and said dielectric to bind the parts of the stack together, the rivet having its ends expanded to exert pressure on the cover plates, and the inner plate having an aperture of greater diameter than the rivet,

so that said rivet does not make contact with said inner plate, the inner plate having a stiff terminal attached thereto, projecting from between the cover plates beyond the edges thereof.

4. A condenser comprising a plate, having a pivotal aperture therein, and apertures disposed around said pivotal aperture and flanges upon the periphery of the plate, extending from both faces of said plate.

5. In a precision fixed condenser, a conductive plate, a dielectric upon both faces of said plate and extending over the entire area thereof, a conductive plate bearing against the dielectric on each face of the first plate, said plates having one or more apertures by which part thereof is removed, and means for securing the plates and dielectric firmly together while permitting relative movement to adjust the capacity of the condenser.

6. In a precision fixed condenser, a conductive plate, a dielectric upon both faces of said plate and extending over the entire area thereof, a conductive plate bearing against the dielectric on each face of the first plate, and means for securing the plates together while permitting relative movement to adjust the capacity of the condenser, said plates all having apertures therein to permit adjustment of capacity, by the movement of said apertures toward or from registering position.

7. In a precision fixed condenser, a conductive plate, a dielectric upon both faces of said plate, concaved conductive plates bearing against the dielectric on each face of the first-named plate, and means for rotatably securing the plates together and keeping the concaved plates flattened, while permitting relative movement to adjust the capacity of the condenser.

8. In a precision fixed condenser, a conductive plate, a dielectric upon both faces of said plate, concaved conductive plates bearing against the dielectric on each face of the first-named plate, and means for rotatably securing the plates together and keeping the concaved plates flattened, while permitting relative movement to adjust the capacity of the condenser, said plates all having apertures therein to permit adjustment of capacity, by the movement of said apertures toward or from registering position.

9. In a precision fixed condenser, outside concaved plates, an inner plate between the concaved plates, dielectric separating said plates, the plates having apertures therein, flanges upon the periphery of the inner plate, and means for securing the plates together.

10. In a precision fixed condenser, outside concaved plates, an inner plate between the concaved plates, dielectric separating said plates, the plates all having openings, flanges upon the periphery of the inner plate, a terminal formed upon one of the flanges, a rivet passing through the condenser securing the plates together in the desired relation and making contact between the concaved plates, but being out of contact with the inner plate, and a terminal secured by the rivet.

11. In a precision fixed condenser, outside concaved plates, an inner plate between the concaved plates, flanges upon the periphery of the inner plate, dielectric separating the plates, the plates having pivotal apertures therein, and apertures around the pivotal aperture, a terminal formed upon one of the flanges, a rivet passing through the pivotal apertures for securing the plates adjustably together in the desired relation, the rivet making contact with the outside plates, and a terminal secured by the rivet.

12. A fixed precision condenser comprising a plate, a second plate movably secured to the first plate, and dielectric between said plates and extending over substantially the entire area of said plates, said plates and said dielectric being held in firm contact with one another, said plates having one or more apertures by which part thereof is removed and being relatively adjustable to cause a variable portion of the adjacent surfaces of the two plates to be opposed to each other, and thus fix the capacity of the condenser.

13. A fixed precision condenser comprising a plate, a second plate pivotally secured to the first plate, and dielectric between the plates and extending over substantially the entire area of said plates, the two plates and the dielectric being held in firm contact, said plates having one or more apertures by which part thereof is removed and being adjustable to cause a variable portion of the adjacent surfaces of the plates to be opposed to each other, to fix the capacity of the condenser.

14. A fixed precision condenser comprising an inner plate, dielectric upon both faces of said plate and extending over substantially the entire area thereof, and outer plates disposed against the dielectric, said inner and outer plates and said dielectric being secured in firm contact with one another, said plates having one or more apertures by which part thereof is removed, and said outer plates being adjustable to cause a variable portion of their adjacent surfaces to be opposed to the faces of the inner plate, to fix the capacity of the condenser.

15. A fixed precision condenser comprising an inner plate, dielectric upon the two faces of said plate and extending over substantially the entire area thereof, outer plates disposed against the dielectric, and means forming a pivot for the outer plates

to secure the said plates and dielectric together in firm contact with one another, said plates having one or more apertures by which part thereof is removed, the outer plates being adjustable about said pivot to cause a variable portion of the adjacent surfaces of the inner and outer plates to be opposed to one another, and thus fix the capacity of the condenser.

Signed at New York, in the county of New York, and State of New York, this 27th day of February, A. D. 1925.

HARRY R. VAN DEVENTER.