April 13, 1926. 1,580,873

J. J. WELDON

STATIC CONDENSER

Filed June 7, 1924

Fig. 1.

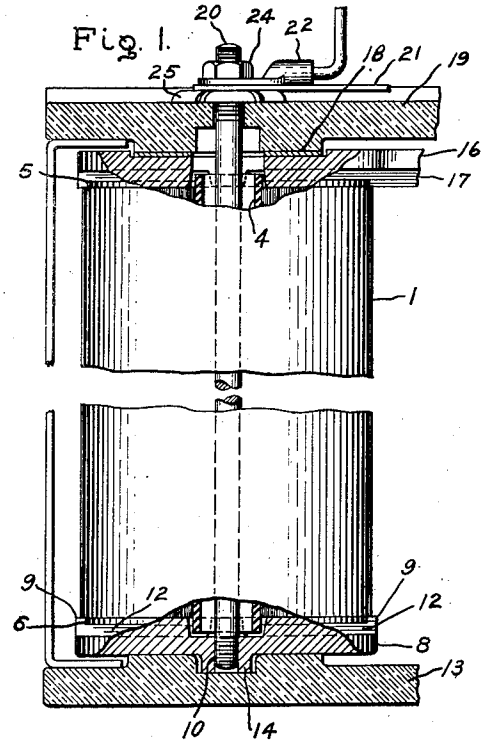


Fig. 3

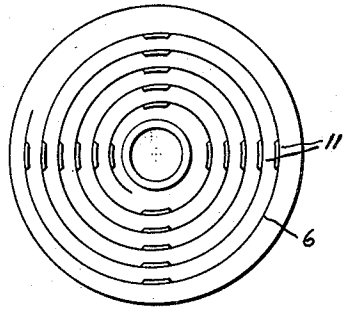


Fig. 4.

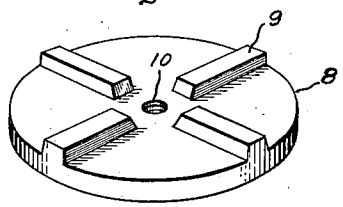


Fig. 2.

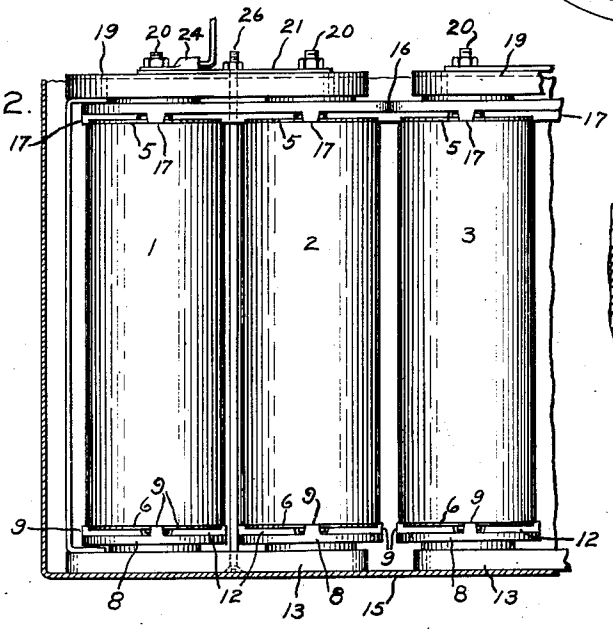
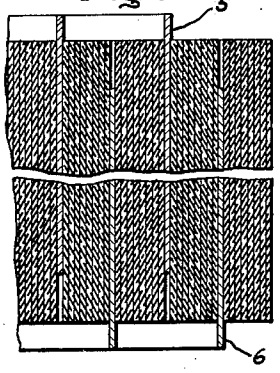


Fig. 5.



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UNITED STATES PATENT OFFICE.

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STATIC CONDENSER.

Application filed June 7, 1924. Serial No. 718,645.

To all whom it may concern:

Be it known that I, JOHN J. WELDON, a citizen of the United States, residing at Pittsfield, in the county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Static Condensers, of which the following is a specification.

My invention relates to the construction of static condensers of the type used for power factor correction.

One object of my invention is to provide a static condenser having improved means for dissipating the heat which is generated therein. Another object is to provide a condenser comprising a plurality of separate units having improved means for supporting the units and for making electrical connections thereto. A further object is the provision of improved means for securing the units together to form a group.

My invention will be better understood from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 shows an elevation partly in section of a single unit of a condenser constructed according to my invention together with portions connected therewith; Fig. 2 is an elevation drawn to a smaller scale of several connected units; Fig. 3 is an end view of one of the condenser rolls after an end plate has been applied thereto and removed; Fig. 4 is a perspective view of an end plate; and Fig. 5 is a fragmentary cross-sectional view of a condenser roll drawn to a greatly magnified scale.

According to my invention a complete condenser comprises a plurality of units, four in the present instance, each comprising a cylindrical roll of metal foil and dielectric and all connected together mechanically and electrically to form a group which is immersed in a tank containing an insulating liquid. The three units 1, 2 and 3, shown in Fig. 2, are identical in construction, unit 1 being illustrated on a larger scale and in greater detail in Fig. 1. Each unit roll is formed by winding on a tube 4 of insulation two strips 5 and 6 of metal foil, for example, aluminum, separated from each other by a suitable dielectric, for example, paper subsequently impregnated with a suitable insulating liquid. Good results have been obtained by using for the strips 5 and 6 aluminum foil having a thickness of one half mil and separating the strips by eight layers of a high grade linen paper each having a thickness of one half mil, the unit being afterward treated in a vacuum tank where the paper is thoroughly impregnated with an insulating oil, as for example transil oil. The unit is wound in such a manner that an edge portion of one strip of foil projects slightly beyond the dielectric at one end of the roll and an edge portion of the other strip of foil projects slightly beyond the dielectric at the opposite end of the roll. This is clearly illustrated in Fig. 5 where for convenience the foils and layers of paper are shown enlarged many times their natural size. It will be seen also from this figure that the edge of each foil opposite to that which projects beyond the dielectric does not quite reach the corresponding edge of the dielectric.

Each unit rests upon a contact disk 8 which as more clearly shown in Fig. 4 has on its upper face four radially extending ribs 9 and a central threaded aperture 10. When the unit roll is placed upon this disk with the insulation tube 4 projecting between the inner ends of the ribs 9 the projecting foil edges are bent over or crushed where they are engaged by the ribs until stopped by the edges of the dielectric. Fig. 3 illustrates how the end of the roll appears after the plate 8 has been pressed against the roll and removed. The projecting edge of foil 6 bends inwardly as shown at 11 wherever it is engaged by a rib 9. Those portions of the foil edges between the ribs 9 are not disturbed and since the height of the ribs is materially greater than the height of the foil projections a free space 12 is left between each two adjacent ribs for the insulating liquid to circulate in contact with the projecting foil edges. Heat generated within the condenser unit thus may be conveyed to the exterior thereof where it is given up to the insulating liquid which in circulating carries it away to cooler portions of the apparatus. The disk 8 rests upon a block 13 of insulating material, which for example may be porcelain, and is shown provided with a central projection 14 which fits into a corresponding depression in the insulating block. Each block 13 is shown in Fig. 2, having sufficient length to carry two units

and rests upon the bottom of the tank 15. Above the units a similar construction is used but differing fom that just described chiefly in that it comprises a single contact member 16 adapted to engage all of the units. This member preferably has the form of a plurality of disks, four in the present case, there being one for each unit, like disk 8, which are integrally joined together at their adjacent portions. The ribs 17 on the member 16 engage the projecting edges of foil 5 to make contact therewith and to provide a space for the insulating liquid to circulate in contact with the projecting foil just as has been described above in connection with the disks 8. Resting upon the member 16 and separated therefrom by a gasket 18 is the block of insulating material 19, such as porcelain, which may have a length sufficient to cover two units as illustrated for example by Fig. 2. A metal rod 20 is screw-threaded into the central aperture of each of the disks 8 and passing up through the center of the unit extends through suitable openings in the members 16 and 19. A conductor 21 connects together the units in pairs, as for example units 1 and 2, and, together with a terminal 22, is shown secured to the rod 20 between a nut 24 threaded thereon and a spring washer 25. Additional tie bolts are shown also at 26 for securing the blocks 13 and 19 together.

The circuit connections of the units will be obvious from the drawing for since the conductor 21 connects the terminal 22 to both rods 20 of units 1 and 2 and since the member 16 is common to units 1 and 2 these two units according to the structural arrangement illustrated are connected in the circuit in parallel. Likewise the other two units, one only of which is illustrated, will be connected in parallel. By means of the member 16 the two pairs of units will be connected to each other in series. It will be noted that as the contact member 16 is clamped to each of the condenser units it serves to unite them all in a group thereby facilitating the handling of the units without changing their relative positions or their connections one with another.

While I have described only one embodiment of my invention, I do not wish to be limited to the particular form shown and described as it will be apparent that many modifications therein may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A condenser comprising a roll formed of a plurality of metal foils and layers of dielectric and immersed in insulating liquid, said foils having edges exposed to said liquid at opposite ends of said roll, and means comprising radially extending members for making contact with portions of said edges.

2. A condenser, comprising a tank containing insulating liquid, a condenser roll having a metal foil projecting at each end thereof and adapted to conduct heat from the interior of said roll to said liquid, and supporting means for said rolls comprising members having engaging portions extending substantially radially of said rolls.

3. A condenser comprising a tank containg insulating liquid, a condenser roll comprising a pair of metal foils and a dielectric therebetween, each of said foils having an edge portion extending beyond the edge of the dielectric at opposite ends of said roll, a plate at each end of said roll having ribs thereon extending substantially radially thereof, and means for clamping said plates against said roll.

In witness whereof, I have hereunto set my hand this 5th day of June 1924.

JOHN J. WELDON.