May 5, 1925. 1,536,948

E. THOMSON

ELECTRIC CONDENSER

Filed May 24, 1921 2 Sheets-Sheet 1

Fig. 1

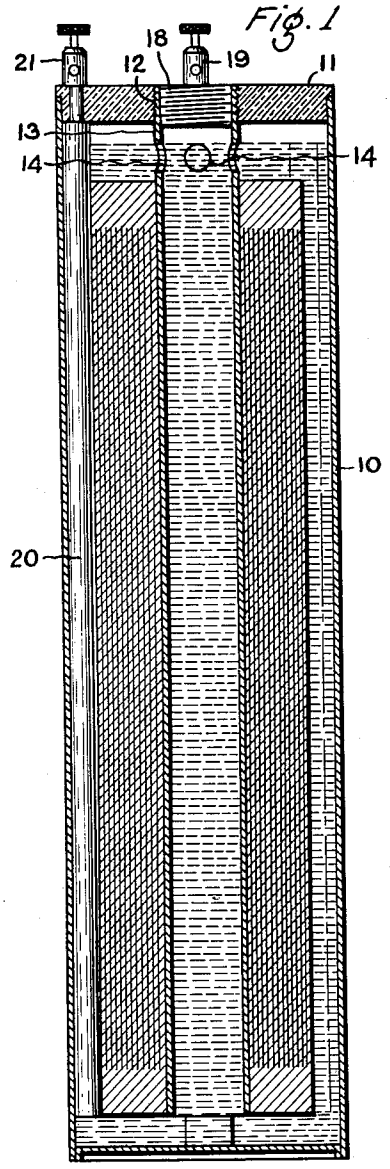
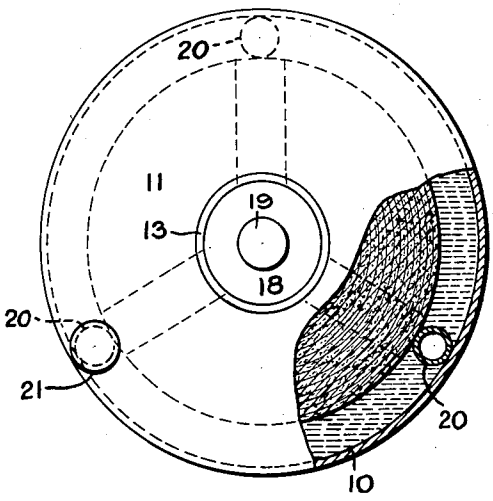


Fig. 2.



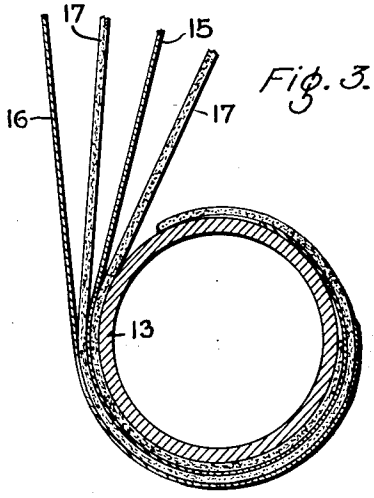
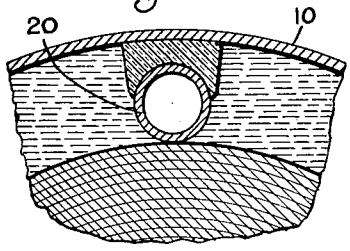


Fig. 3.

Fig. 4.



Inventor,
Elihu Thomson,
by Albert G. Davis
His Attorney.

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Fig. 5.

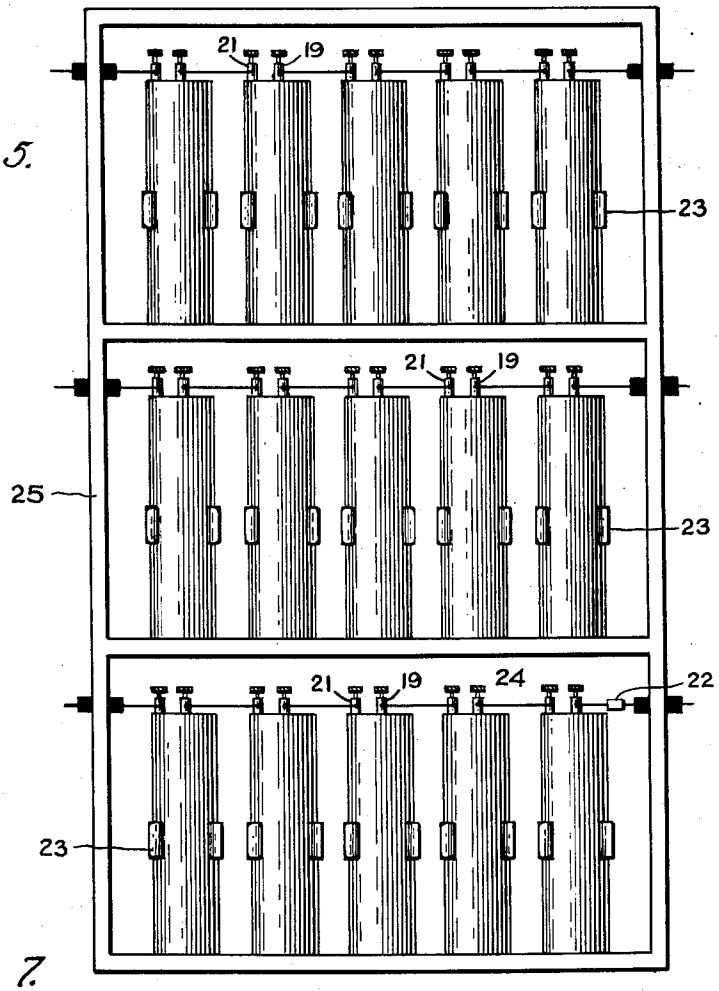


Fig. 7.

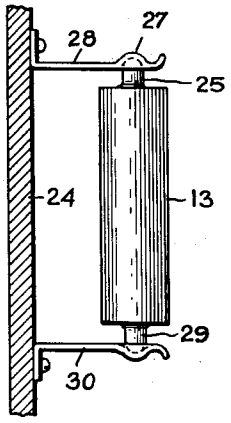


Fig. 6.

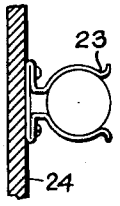
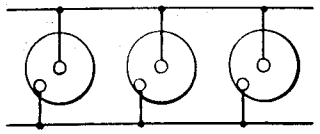


Fig. 8.



Inventor,
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His Attorney.

Patented May 5, 1925. 1,536,948

UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC CONDENSER.

Application filed May 24, 1921. Serial No. 472,155.

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Electric Condensers, of which the following is a specification.

This invention relates to electric condensers and one object thereof is to provide a condenser which may be formed of any desired number of interchangeable condenser units. A further object of my invention is to produce an improved condenser unit which is formed of a roll of alternate conducting and insulating sheets and is enclosed in a suitable casing which is adapted to contain a filling of insulating material.

With these and other objects in view, reference is had to the accompanying drawings, where Fig. 1, represents in section a condenser unit constructed in accordance with my invention; Fig. 2 is an enlarged plan view partly in section of a unit of slightly modified construction; Fig. 3 is an enlarged section of a partially formed condenser roll, showing the manner in which the sheets are wound upon the supporting tube; Fig. 4 is an enlarged detail showing a somewhat modified construction of a condenser unit for use on polyphase circuits; Fig. 5 is a front elevation of a rack containing three groups of condenser units, the members of each group being shown connected in series; Fig. 6 shows a clip for supporting the condenser unit in the rack; Fig. 7 shows an alternative holding means for use with a somewhat modified form of condenser, and Fig. 8 is a diagrammatic showing of an arrangement of condenser units connected in circuit in multiple.

Referring to Fig. 1 of the drawings, my condenser unit comprises an outer metallic tubular casing 10 formed with a suitable cover 11 of insulating material. This cover is formed with a central opening 12 within which is secured the upper end of a member 13 which as shown is a metallic tube. Tube 13 which is open at its lower end terminates somewhat above the bottom of the casing 10 and is provided adjacent its upper end with perforations 14. Tube 13 is closed at its top by means of a metallic plug or cap 18 upon which is formed a binding post 19. This plug and binding post constitute one of the terminals of the condenser unit and also provide means whereby the casing 10 may be filled with suitable insulating liquid. Intermediate the perforations 14 and the bottom of the tube 13 are wound condenser leaves in a manner shown in Fig. 3 of the drawing. These leaves comprise the conducting elements 15 and 16 between which are wound sheets of insulating material 17. The conducting sheet 15 is arranged to form contact with the tube 13 throughout the entire length of its inner end. It is to be noted that the member 13 performs the functions of enabling the casing 10 to be filled with insulating liquid, supporting the condenser sheets, forming a terminal for the same and providing a passage for the circulation of the liquid to prevent overheating. Conducting sheet 16 is secured to a metallic tube or rod 20 depending from the cover 11 and formed at its upper end with a binding post 21. This tube in the form shown in Fig. 1 is in contact with the metallic casing 10 which in effect constitutes one terminal of the condenser unit. Figs. 1 and 2 show three tubes 20 equally spaced around the condenser roll. But one of these tubes, however, is formed with a binding post, the remaining two being used merely for the purpose of properly spacing the roll from the casing. In a three phase condenser, a third conducting sheet will be wound upon the roll and this may be connected to a second tube 20 which will form a third terminal of the condenser. In this case, however, the second tube 20 should be insulated from the casing 10 in a manner shown in Fig. 4. In the manufacture of this condenser the usual method is employed, namely, drying the roll at a high temperature under atmospheric pressure, subsequent drying in a vacuum in a suitable vessel and admitting oil to the vessel which is still under a vacuum.

In Fig. 5 I have shown a rack 25 containing three groups of five units each, the members of each group being connected in circuit. The individual units are held in place by means of clips 23 secured to the back 24 of rack 25. The arrangement shown in Fig. 5 permits the ready removal of a defective unit without disturbing the remaining units and allows also for a variety of circuit arrangements. In case the units upon one of the shelves of the rack are to be arranged in parallel, the connections will be made as

shown in Fig. 8 of the drawing. It is preferable to include in circuit with a group of condensers in series such as is shown on one of the shelves of Fig. 5 a fuse 22 so that in case one of the condensers should become short-circuited, the circuit through the group will be broken to prevent injury to the remaining units.

In the modified form shown in Fig. 7 I provide an upper terminal 25 which is connected with the tube 13 and is formed with a rounded end adapted to cooperate with a socket 27 formed in the clip 28. Similarly the lower terminal is formed by a projection 29 secured to the casing 10 and adapted to be engaged by a clip 30.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

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

1. The combination of a casing an insulating liquid therein, a filling tube passing into said casing and condenser elements mounted upon said tube and submerged in the liquid in said casing.

2. The combination of a casing containing an insulating fluid, a filling tube extending into said fluid, condenser elements mounted upon said tube in said fluid and means for insulating and spacing said casing and tube from each other.

3. The combination of a casing, an insulating fluid therein, a filling tube extending into said casing and insulated therefrom, and condenser elements mounted upon said tube and immersed in said fluid, one of said elements being electrically connected to said casing and another of said elements being electrically connected to said tube.

4. The combination of a conducting casing provided with an insulating cover, a conducting member depending from said cover, conducting sheets wound upon said member and insulated from one another, one of said sheets being electrically connected to said member and another of said sheets being electrically connected to said casing.

5. In an electrical apparatus comprising a casing containing an insulating fluid, a filling tube for said casing forming a terminal for said apparatus and a cap closing the outer end of said tube and constructed to facilitate the attachment of a conductor.

6. The combination of a conducting casing adapted to contain an insulating medium, a cover of insulating material for said casing, a conducting tube passing through said cover into said casing, said tube communicating with the interior of said casing at upper and lower portions thereof and conducting condenser sheets wound about said tube, said sheets being insulated from one another, one of said sheets being in electrical connection with the tube and another of said sheets being in electrical connection with said casing.

7. The combination of a conducting casing adapted to contain an insulating medium, a cover of insulating material for said casing, a conducting tube passing through said cover into said casing, said tube communicating with the interior of said casing at upper and lower portions thereof, conducting condenser sheets wound about said tube, said sheets being insulated from one another, one of said sheets being in electrical connection with the tube and another of said sheets being in electrical connection with said casing and a conducting means for closing the upper end of said tube and forming a connection with an external circuit.

8. The combination of a conducting casing adapted to contain an insulating liquid, an insulating cover for said casing, a conducting tube passing through said cover and opening into said casing and a condenser within said casing surounding said tube and immersed in said liquid, one terminal of said condenser being connected to said casing and another terminal to said tube.

9. The combination of a container adapted to contain an insulating liquid, electrical apparatus within said container, and a filling tube for said container supporting said apparatus.

10. The combination of a container adapted to contain an insulating liquid, a condenser therein, and a hollow terminal member extending through the condenser, said terminal member having openings therein to permit the circulation of liquid through the condenser.

11. The combination of a casing, an insulating fluid therein, condenser elements immersed in said fluid, a cover for said casing and a combined filling tube and condenser supporting member secured to said cover.

In witness whereof, I have hereunto set my hand this twentieth day of May, 1921.

ELIHU THOMSON.