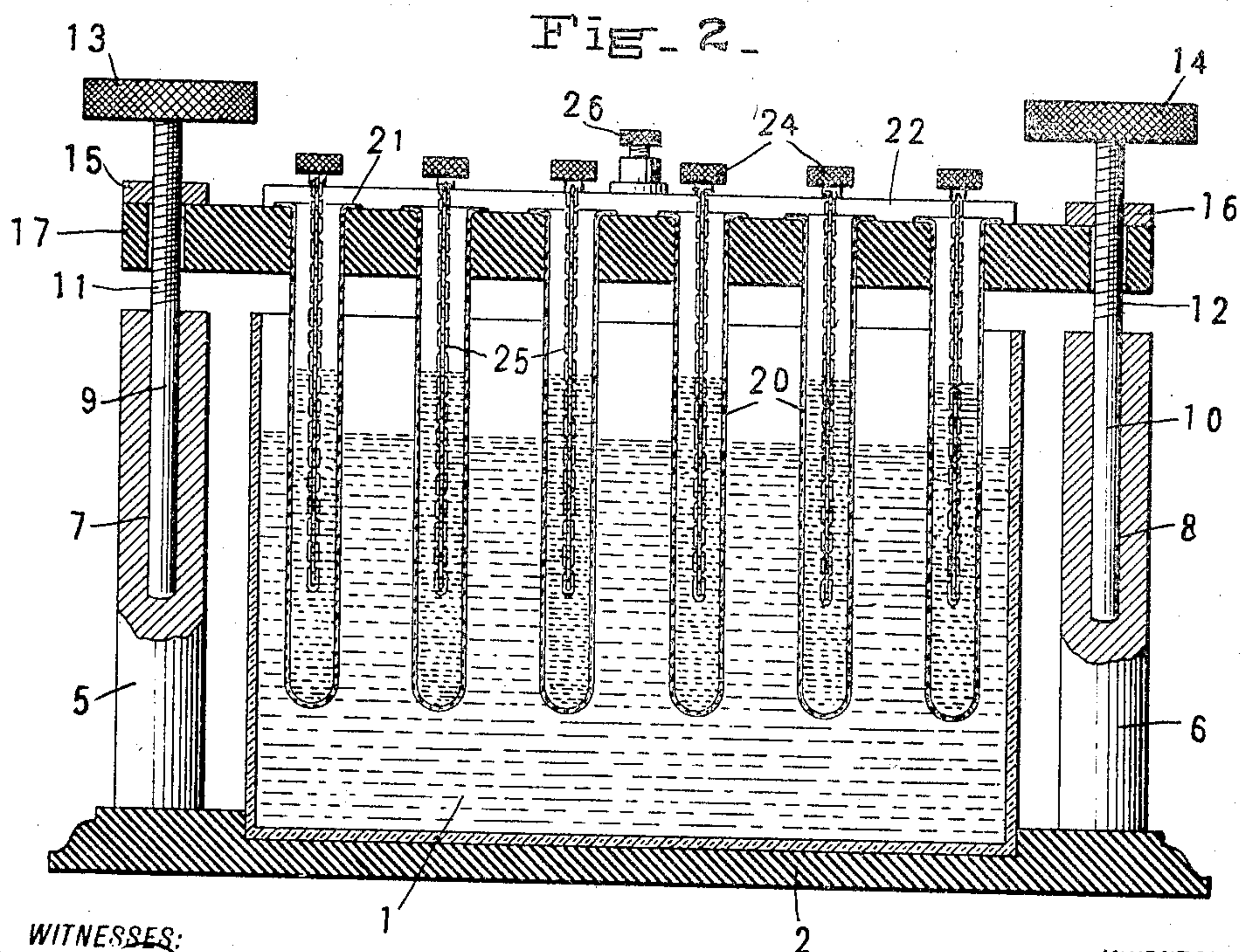
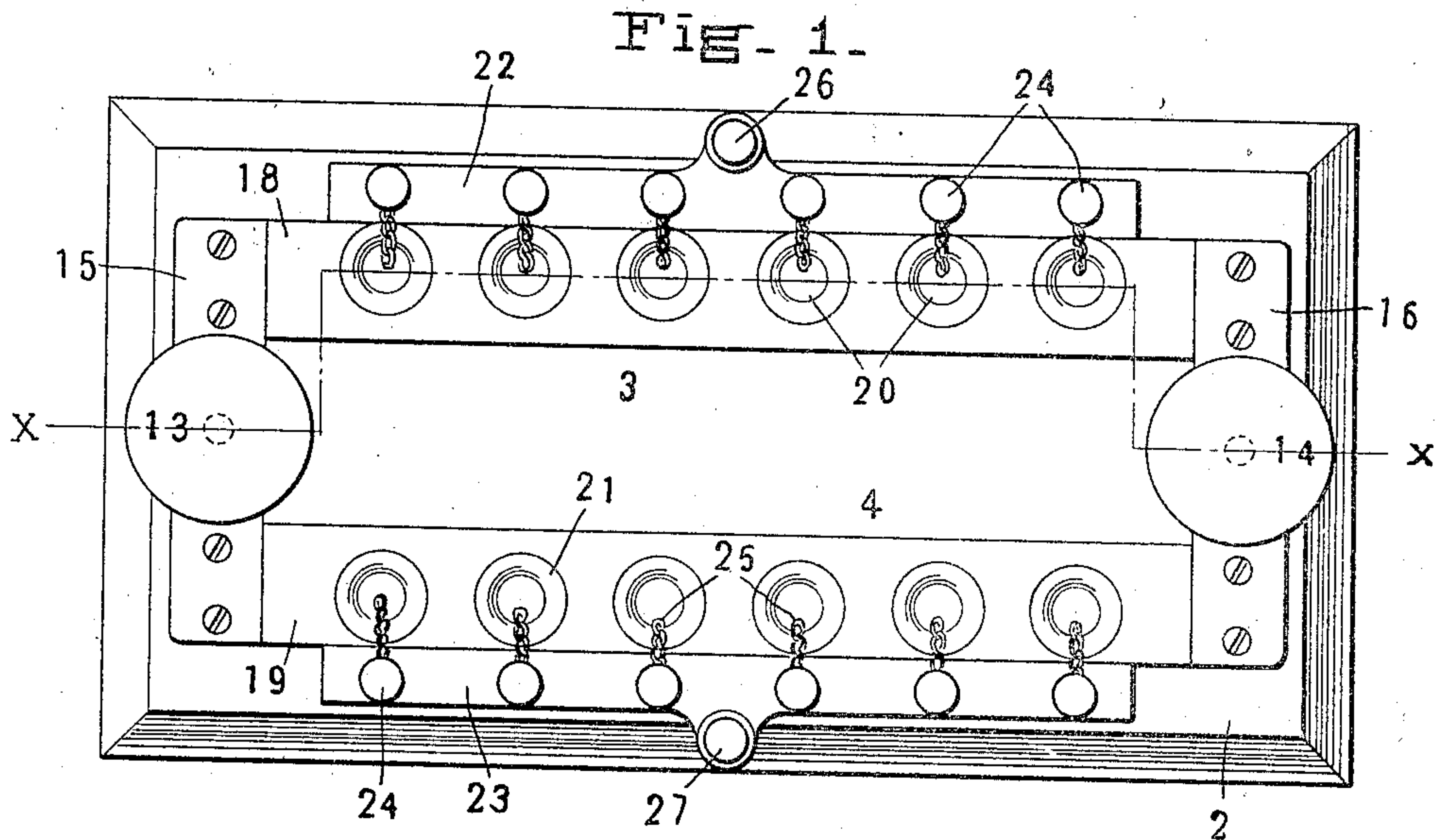


A. K. SLOAN, JR.  
ELECTRICAL CONDENSER.  
APPLICATION FILED NOV. 19, 1909.

995,728.

Patented June 20, 1911.

2 SHEETS—SHEET 1.



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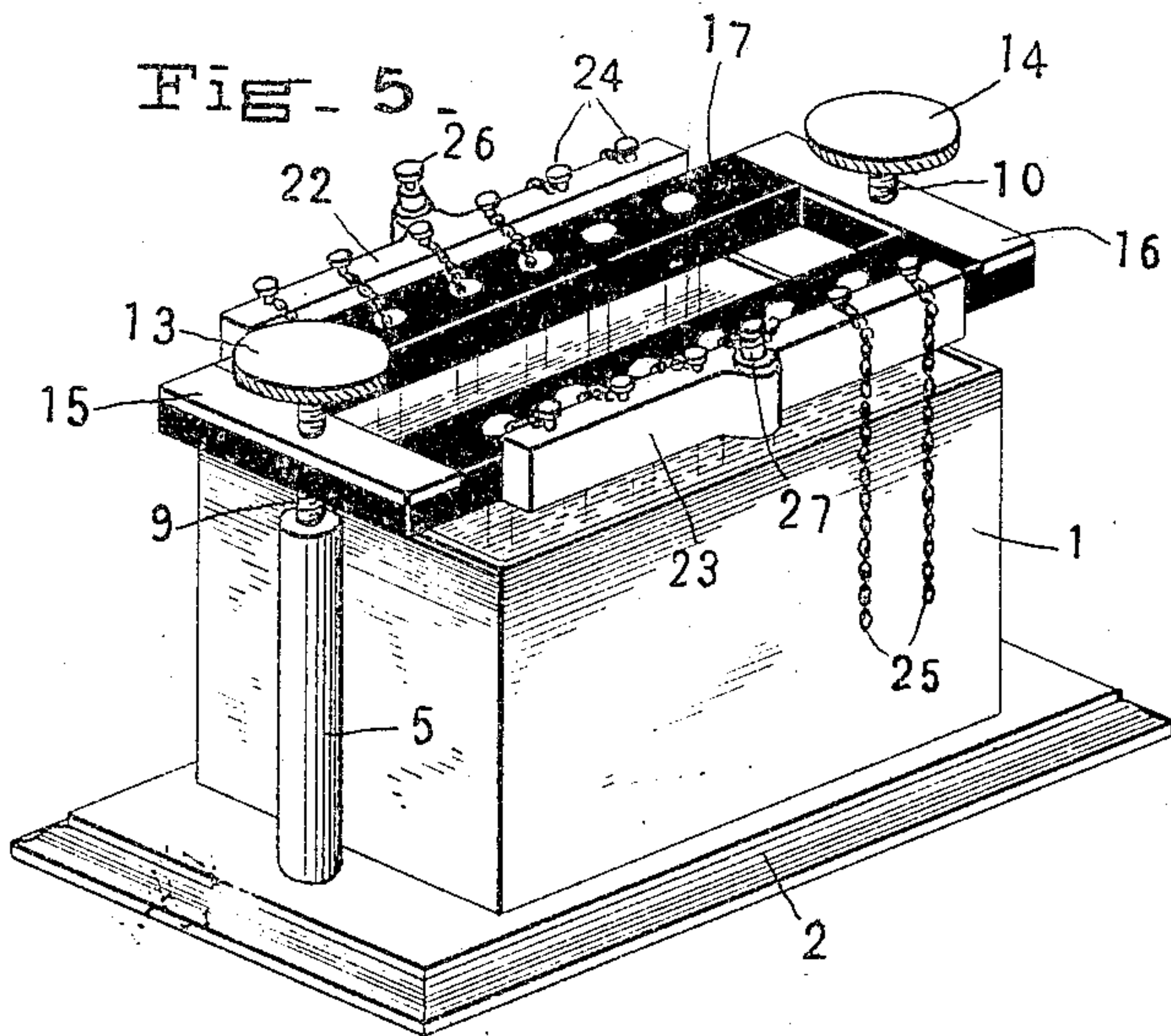
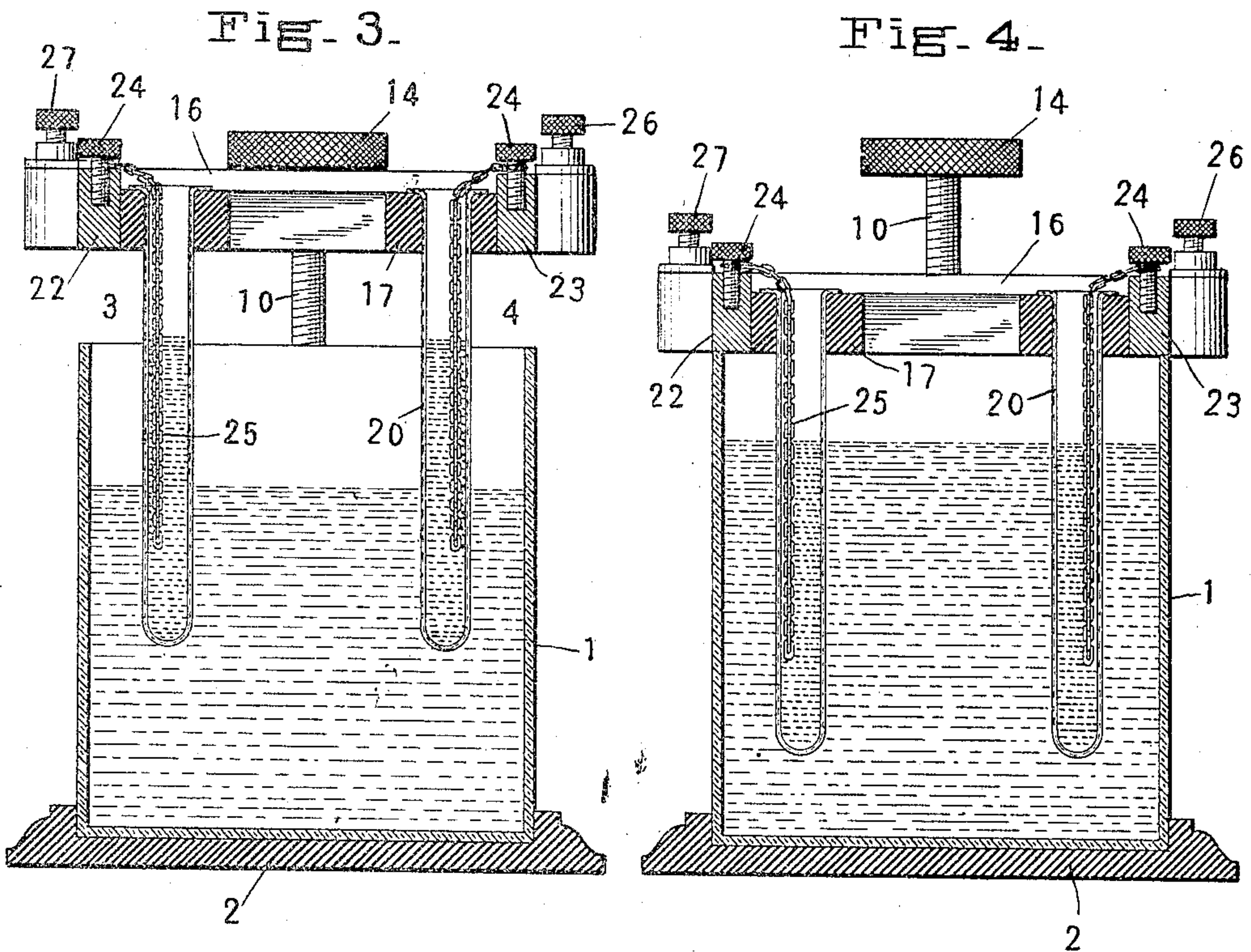


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# UNITED STATES PATENT OFFICE.

AUGUSTUS KELLOGG SLOAN, JR., OF BROOKLYN, NEW YORK.

ELECTRICAL CONDENSER.

995,728.

Specification of Letters Patent. Patented June 20, 1911.

Application filed November 19, 1909. Serial No. 528,914.

*To all whom it may concern:*

Be it known that I, AUGUSTUS KELLOGG SLOAN, JR., a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electrical Condensers, of which the following is a full, clear, and exact description, whereby any one skilled in the art may make and use the same.

The invention relates to electrical condensers or high potential accumulators, and more particularly to an accumulator having liquid armatures for use with high potential electric currents, such, for example, as are used in wireless telegraph or wireless telephone transmitters or receivers. Of course, its usefulness is not limited to such apparatus and it may be used in connection with low potential circuits, and, in fact, in any system where a condenser is desirable.

The objects of the invention are to provide a condenser of very simple and compact form with a comparatively large capacity and with little or no liability of breakage of the dielectric due to heating and high potential strains.

A further object is to provide a condenser having liquid armatures and with a plurality of units adjustable with reference to the armatures for changing the capacity of the condenser as a whole and with features of renewability and adjustability as to the individual elements, as will secure the most economic replacement and operation when in use.

A further object is to provide a condenser having its units so arranged that it may be used for various purposes and with various capacities by a simple adjustment of the elements, making up the condenser unit.

Referring to the drawings:—Figure 1 is a plan view of a complete condenser showing the relative arrangements of the several units. Fig. 2 is a cross sectional view through Fig. 1 on the dotted line  $x-x$  of said figure. Fig. 3 is a cross sectional view through Fig. 1 transverse to that indicated in Fig. 2 illustrating one position of adjustment. Fig. 4 is a similar view illustrating the opposite extreme adjustment. Fig. 5 is a perspective view illustrating the manner of cutting out the individual units by removing the flexible conductors therefrom.

It has been common practice to use plate

condensers of various forms, and in fact, liquid armature condensers for various purposes and in many instances, condensers have been employed as for instance, in wireless telegraphy and telephony wherein glass plates coated with foil have been utilized, and again there is the well known type of the Leyden jar. In such devices, the coating on the dielectric is subject to blisters and eventually heats, rupturing the dielectric. Not only this, but in the plate type of condenser, the heavy plates are very expensive and are very easily broken and even then the same faults exist with regard to the conductors arranged thereon. Furthermore, independent arrangements have been made for keeping such condensers cool, or, at least, dissipating so much of the heat as might cause a break-down of the plates and blowers and fans have been resorted to, making a most cumbersome device, which, at best, is not only dangerous but expensive and very difficult to repair under ordinary conditions of use.

It is one of the primal objects of the present invention to provide a condenser of such a form and with its several units so arranged that the capacity of the condenser as a whole may be varied at will and its maximum capacity may be readily maintained by the removal of injured parts, and their replacement at a minimum expense with little or no trouble or inconvenience to the operator or the device.

In a general sense, the device comprises a retainer 1, of any suitable insulating material mounted in any desired manner upon a base 2, and having adjustably arranged therein series of condenser elements 3, 4, which may be introduced or removed from the receptacle and its contents to any desired degree to vary the capacity of the condenser. More specifically, the base 2, supports at either end in convenient positions, upright members 5, 6, recessed as at 7, 8, to receive adjusting spindles 9, 10. These spindles, at their upper ends, are screw-threaded as at 11, 12, and provided with knurled ends or other means, for turning them, as indicated at 13, 14.

Coöperating with the threaded spindles 11, 12, are nuts 15, 16, suitably arranged upon a supporting bar or frame 17, which, as illustrated herein, is of insulated material and of substantially rectangular form. That is,



it has two transverse end portions and two side members 18, 19. The latter are perforated at given intervals and through these perforations extend dielectric members 20, which may conveniently be formed of glass sealed at their lower ends and with flanges 21, at their upper ends, which rest upon the side frame members 18, and 19. The tubular members 20, fit nicely within the openings or perforations in said members, and may be readily withdrawn and replaced with similar tubes. Extending along the sides of the side frame members 18, and 19, are bus-bars or conductors 22, 23, which, adjacent to the several tubes, are provided with binding screws 24, by which flexible conductors 25, which extend down into the tubular members 20, may be electrically connected with said bus-bars. These bus-bars are also provided with binding screw connections 26, 27, through which the line-wires may be connected with the opposed sides of the condenser.

The nut 15, heretofore described, in place of being a nut in the ordinary sense, may preferably be of plate form, as illustrated in the plan view of Fig. 1, and when so used, may extend to the side frame members, and into position to afford a suitable air gap between the bus-bars 22, 23, and the nut of plate form 15. This is a convenient means of taking care of any surcharge and may be utilized as a discharge for over-load conditions, exactly as an ordinary lightning arrester is used. The air gap, of course, must be sufficient to prevent the passage of current under ordinary conditions, but may be of such a width as to permit a bridging of the current in case of unusual over-load.

From the practice heretofore followed, it has been found that in transmitters of electro-radiant energy, the coatings or conductors used for the dielectric elements, owing to the fact that they could not be uniformly applied, caused a great percentage of breakage of the dielectric elements. In the device herein described, such coatings are displaced and a liquid armature, which will make most intimate contact with the dielectric, may be utilized and will not only give perfect and absolute uniformity of contact, but will serve to keep the temperature of the dielectric within such limits of safety that it will not be very readily destroyed. One of the liquid armatures is, of course, retained within the container 1, and may be of any desired or suitable consistency, such, for instance, as a saline solution or sodium bicarbonate. The character of the solution is quite immaterial so long as it is a conducting fluid and the use of any particular material will depend upon the nature of the other material used in the construction of the condenser. The tubular members 20, are also partially filled with a liquid of the

same general character as that used in the container 1, and the flexible chains 25, or flexible conductors of whatever form used, extend into the liquid contained in the several tubes.

The rectangular frame being adjustable in a vertical position, permits the withdrawal of or the immersion of the several tubes to a greater or lesser extent and thus the capacity of the condenser, considered as a whole may be graduated to a nicety. In fact, a single unit made up of a series of tubes, as above defined, may be used for either the receiving or the transmitting circuit of a wireless telephone or telegraph system and thus a material advantage is secured. For instance, where used on vessels with the great liability of breakage, a unit of uniform character may be adopted and of a suitable capacity for either the receiving or sending instruments, then, by simple adjustment as to the immersion of the elements making up the condenser, its capacity may be changed to give the exact "tuning" or condenser effect for either side of the system. It, therefore, requires but one type of condenser and repairs and breakages may be made or replaced at a moment's notice and without inconvenience to the operator or unduly delaying the ordinary use of the system. Furthermore, by using flexible conductors within each of the dielectric condensers, it is possible to cut down the capacity of the condenser or vary it at will in comparatively large increments by simply removing the flexible conductors from the tubes, it, of course, being apparent that a balance shall be maintained on either side of the condenser, by the removal of an equal number of chains or flexible conductors on opposite sides.

As illustrating the finer adjustment, which may be secured, Fig. 3 shows the rectangular frame fully elevated and with a comparatively small portion of the condenser units extending into the liquid armature of the retainer. Fig. 4 illustrates the members immersed to the greatest extent and, of course, it is apparent that the raising and lowering of the elements may be effected to any desired degree.

In Fig. 5, the method of cutting out any given number of condenser elements, is illustrated, wherein the flexible conductors or chains are simply removed from the dielectric members and dropped over the outer side of the condenser.

Obviously, various changes as to exact details might be made without departing from the spirit or intent of the invention, the main feature of which is adjustability and renewability, utilizing a plurality of units which may be individually removed or replaced or adjusted as a whole with the least possible inconvenience to the operator.



What I claim as my invention and desire to secure by Letters Patent is:—

1. A condenser comprising a container, a plurality of condenser units projecting into said container and each consisting of a tube of dielectric material, conducting liquid within each tube forming a condenser armature, conducting liquid contained in the container and in intimate contact with all of said tubes and forming the second armature thereof, and means for relatively adjusting the tubes and container whereby the capacity of the condenser may be varied.

2. A condenser comprising a container, a plurality of condenser units operatively arranged in said container in groups, one group on the negative side and one group on the positive side and supported by an adjustable frame, means for adjusting said frame and a conducting liquid in said container forming a common armature for all of said condenser units.

3. A condenser comprising a plurality of dielectric members, each containing a conducting fluid, a supporting frame for said dielectric members, a conductor borne on said frame, and flexible and removable conductors intermediate said conductor and dielectric members.

4. A condenser comprising a plurality of dielectric members, each containing a conducting fluid, a supporting frame for said dielectric members, a conductor borne on said frame, and flexible and removable conductors intermediate said conductor and dielectric members, and means for adjusting the frame.

5. A condenser comprising a container, a conducting fluid therein, an adjustable frame operatively mounted with reference to the container and having means for adjustment toward and away from the conducting fluid of the container, a plurality of dielectric members removably mounted in said frame and flexible conductors secured adjacent to the frame and extending into the dielectric members.

6. A condenser comprising a container for holding a conducting fluid, supports opera-

tively arranged with reference to said container, and spindles extending into said supports and provided with screw threads, an insulating frame having screw threads cooperating with the threads of the spindles, means for turning said spindles, and a plurality of dielectric tubes each removably mounted in said frame and adapted to be adjusted toward and away from the conducting fluid of the container.

7. A condenser comprising a fluid container, a plurality of dielectric members extending thereinto, and a frame controlling the position of said members, conductors extending along said frame adjacent to the dielectric members and supporting flexible conductors extending into said members, metallic bars extending across the frame and insulated from the conductors whereby a discharge or gap is formed for the release of current under abnormal tension.

8. A condenser comprising a plurality of dielectric members, each containing a conducting medium in intimate contact with the interior walls thereof, a supporting frame for said dielectric members, conductors appurtenant to said frame, flexible and removable conductors intermediate said frame conductors and the conducting medium of the dielectric members, a conducting armature for the dielectric members, and means for adjusting the degree of immersion of the dielectric members with reference to the conducting armature.

9. A condenser comprising a plurality of dielectric members, each containing a conducting medium, means for supporting said dielectric members, a conductor appurtenant to said supporting means, flexible and removable conductors intermediate the conductor of the supporting means and the conducting medium of the dielectric members and means for adjustably positioning the dielectric members.

A. KELLOGG SLOAN, JR.

Witnesses:

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