C. D. BABCOCK.

STATIC CONDENSER.

APPLICATION FILED JUNE 30, 1908.

918,257. Patented Apr. 13, 1909.

Fig. 1.

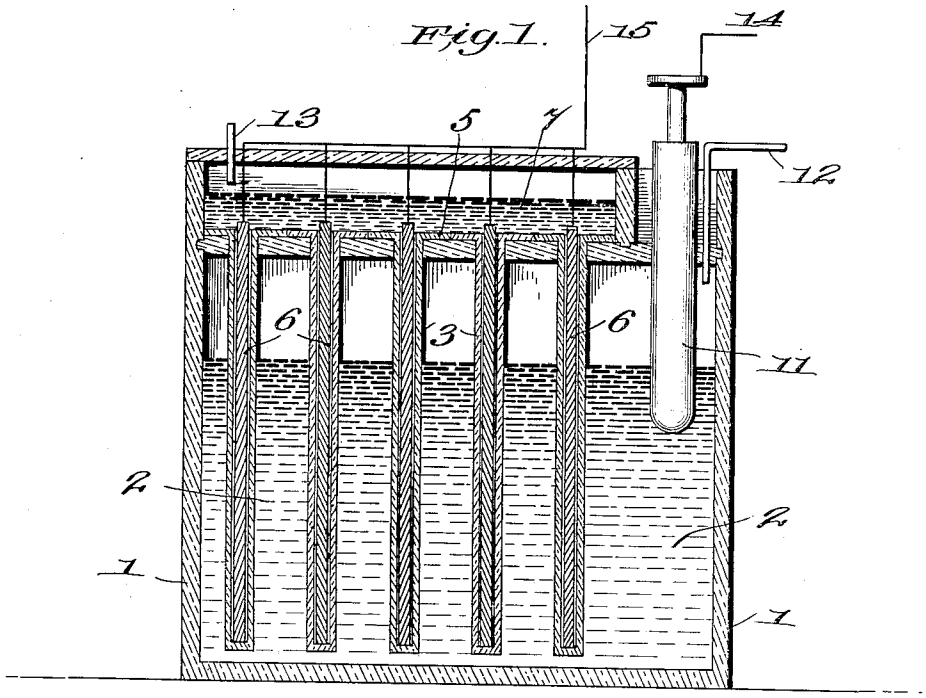


Fig. 2.

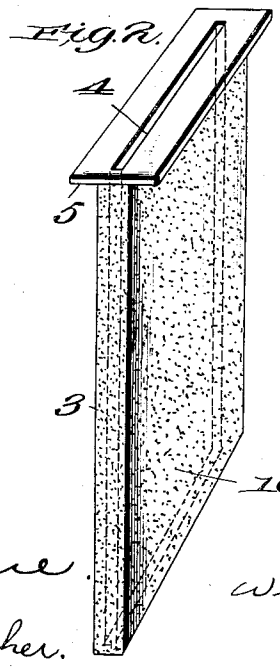


Fig. 3.

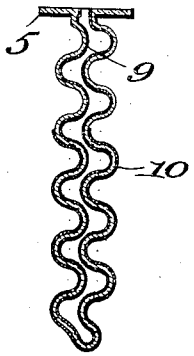
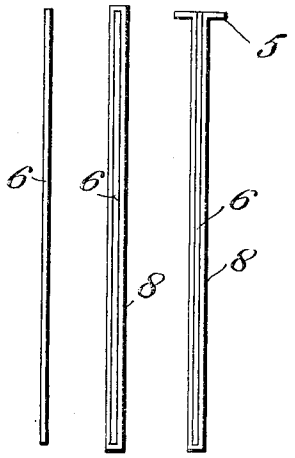


Fig. 4 Fig. 5. Fig. 6.



Witnesses

Geo. A. Byrne.

Martin T. Fisher.

Inventor

C. D. Babcock by

Wickersham Fisher &

Wickersham

Attorneys

UNITED STATES PATENT OFFICE.

CLIFFORD D. BABCOCK, OF NEW YORK, N. Y.

STATIC CONDENSER.

No. 918,257. Specification of Letters Patent. Patented April 13, 1909.

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To all whom it may concern:

Be it known that I, CLIFFORD D. BABCOCK, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Static Condensers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to static condensers, and has for its object the production of such a condenser which will occupy a comparatively small space, will be efficient in action, will be suitable for high tension work and will be comparatively inexpensive to construct.

It is well known that the ordinary Leyden jar condensers, now so commonly used in wireless telegraph stations, take up a great deal of room; that they are subject to brush discharges, or short circuits of high resistances between their inner and outer coatings; and that their inner coatings are subject to a strong chemical action, owing to the constituents of the air being decomposed and the ions of the decomposition attacking the said coatings to such a degree that it is next to impossible to keep them intact.

It is likewise well known that the type of condenser known as Franklin panes, and consisting of a series of tin foil coated insulating plates, is likewise subject to the brush discharge at the edges of the conductive coatings; that they are wasteful of space, especially when means have to be provided for changing the capacity and for immersing them in oil, as is the case in wireless telegraphy. These condensers are exceedingly inconvenient owing to the impossibility of excluding all air bubbles in their manufacture, and the subsequent puncturing or destruction of the plates under the enormous voltage used which is sure to follow. When this takes place in an oil bath repair work is not only disagreeable, but the oil is apt to soil the instruments and other surroundings.

I overcome all the above objections by my present invention as will be more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification:—Figure 1 is a sectional elevational view of my improved condenser. Fig. 2 a perspective view of one of the dielectric separators. Fig. 3 a modified form of separator also showing the inner and outer conducting coatings. Fig. 4 an edge view of one of the conducting plates. Fig. 5 a modified form of cell, and Fig. 6 a still further modified form of cell.

1 represents any suitable insulating container, and 2 any suitable conducting fluid therein.

3 represents an envelop made of any suitable dielectric material, glass being preferred, having an interior 4 of small dimensions as compared to the exterior. That is to say if the outside dimensions are 8″ by 8″ by $\frac{1}{2}$″, the dimensions of the interior may be not over $7\frac{7}{8}$″ by $7\frac{7}{8}$″ by $\frac{1}{8}$″. A flange 5 extends at right angles to the outside and inside surfaces of the envelop 3, as shown, and for a purpose to be described later.

Into the opening 4 of the envelop I may insert the single conducting plate 6 and permit a thin film of the fluid 7, which may be a conducting or a non-conducting fluid, to occupy the space between the inside walls of the envelop and the outer surfaces of the plate; or I may, as shown in Figs. 5 and 6, form the di-electric 8 rigid with the conducting plate 6, like enameled coatings are now formed over metal surfaces, leaving no space therebetween in which the liquid may enter. The inner walls of the envelop may be suitably coated with a very thin film 9 of a conductor, as by chemical precipitation electro deposition, or otherwise, and the envelop may be corrugated as shown in Fig. 3, to increase its surface; or it may be formed into any desired shape. In fact, when the fluid 7 is a conductor, as above stated, no coating on plate 6 is needed; for in that case the conductor fills the interior of the envelop, just as effectually as it does in the modifications shown in Figs. 5 and 6, and all that is then necessary to do is to connect said fluid with one of the condenser terminals. In such case, however, it is preferred to roughen the surfaces with which the fluid contacts, in order that a better connection between the fluid and di-electric may be had.

The omission of an inside coating has the great advantage of doing away with air bubbles, besides its cheapness and simplicity. The outside of the envelop may be likewise coated, by any suitable means, with a thin conducting film 10, as shown in Fig. 3; but I prefer to leave it bare as shown in the other

figures, to make the fluid 2 conducting and to likewise roughen its surfaces, as shown at 16 in Fig. 2.

11 represents an adjustable plunger which may be moved up and down in the fluid 2, in order to lower and raise the level of the liquid therein.

12 and 13 represent tubes for the escape of the gases due to the decomposition of the fluids; and 14 and 15 the leads to the condenser terminals.

I have found in practice with high tension work if a flange such as 5 extends at substantially right angles to the surfaces of the di-electric that leakage from brush discharges disappears. I am unable to account for this most remarkable phenomenon, except on the theory that as the frequencies of these high tension oscillations approach the frequencies of long light waves, they have greater and greater tendencies to leave conducting surfaces and to shoot off into space in straight lines. However, this may be, the leakage waves from these condensers do not seem to be able to turn a corner; and therefore I find the flange 5 a very convenient expedient to aid in maintaining a high insulation.

It will be observed that by flattening the interior of the several cells constituting my condenser, I am enabled to save a great deal in the space necessarily occupied by Leyden jars. And owing to the fact that the interior and exterior wall surfaces of cylindrical vessels are less in area for a given cubic content than corresponding walls of rectangular vessels of the same volume, it will be seen that the electrical capacity of my cells are quite as great as, if not slightly greater than, the corresponding cylindrical ones.

In the form employing conducting liquids, air bubbles are practically eliminated and therefore puncturing is not liable to occur; but should it occur for any cause all that is necessary to do in order to repair the condenser is to slip out the broken dielectric and slip in a new one.

When the capacity is to be changed, not only can different sets of cells be cut in or cut out, as is ordinarily done, but the level of the liquid in one or more sets can be changed by suitably adjusting the plunger 11; and thereby changing the conducting area in contact with the outer surface of the dielectric.

I may use any suitable fluids as conductors for my condensers, such as mercury, fusible alloys, slightly impure water, or solutions of various salts, and in practice I find an ordinary solution of sodium chlorid very satisfactory. I also find a rough surface on the envelops 3 can be easily and cheaply formed by a sand blast, and to be very convenient when the surfaces of the same are to be coated with a thin metallic film; for that it will render the same more adherent; although in all cases these surfaces may be left smooth if desired.

Of course I do not wish to be limited to the exact details of construction and operation above disclosed, for it is evident that both may be varied by those skilled in the art without departing from the spirit of my invention.

What I claim is:—

1. A dielectric for a condenser provided with an insulating flange extending at substantially right angles to the insulating surfaces of said dielectric, substantially as described.

2. A dielectric for a condenser provided with an insulating flange extending at an angle thereto, and provided with a conductor on its interior, substantially as described.

3. A condenser comprising a suitable casing provided with a dielectric in the form of a readily removable flat envelop provided with a conductor on its interior, and a conductor on its exterior, substantially as described.

4. A condenser comprising a suitable casing provided with a dielectric in the form of a readily removable flat envelop provided with a flange extending at substantially right angles to its surfaces, a conductor on its interior, and a conductor on its exterior, substantially as described.

5. A condenser comprising a suitable casing provided with a dielectric in the form of a flat hollow envelop provided with a conductor on its interior, a fluid on its exterior, and means to adjust the level of said fluid, substantially as described.

6. A condenser comprising a suitable casing provided with a dielectric in the form of a flat hollow envelop having an insulating flange extending at substantially right angles to its surfaces, and provided with a fluid conductor on its interior, a fluid on its exterior, and means to adjust the level of said fluid, substantially as described.

7. A condenser comprising a suitable casing provided with a plurality of readily detachable dielectrics in the form of hollow envelops, each provided with insulating flanges extending at substantially right angles to their respective surfaces, each having a fluid conductor on its interior and each dipping into a fluid conductor contained in said casing; and means for adjusting the level of said last mentioned conductor, substantially as described.

8. A condenser comprising a suitable casing provided with a plurality of readily detachable dielectrics in the form of hollow envelops, each roughened at its outer surface, and provided with insulating flanges extending at substantially right angles to their respective surfaces, each having a fluid conductor on its interior and each dipping

into a fluid conductor contained in said casing; means to permit gases to escape from said casing; and means for adjusting the level of said last mentioned conductor, substantially as described.

9. A condenser comprising a suitable casing 1, provided with a partition near its top; a plurality of flat hollow envelops 3 passing through said partition, and having insulating flanges 5 extending at substantially right angles to their surfaces; a fluid conductor 7 adapted to enter said envelops; a fluid conductor 2, into which said envelops dip; a plunger 11 adapted to regulate the level of said conductor 2; and an exit for the escape of the gases of decomposition from said fluids, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

CLIFFORD D. BABCOCK

Witnesses:
MOSES ELY,
JOSEPH S. HUNT.