Jan. 16, 1934. W. M. BAILEY 1,943,715

MOLDED DIELECTRIC CONDENSER

Filed June 25, 1930

Fig. 1.

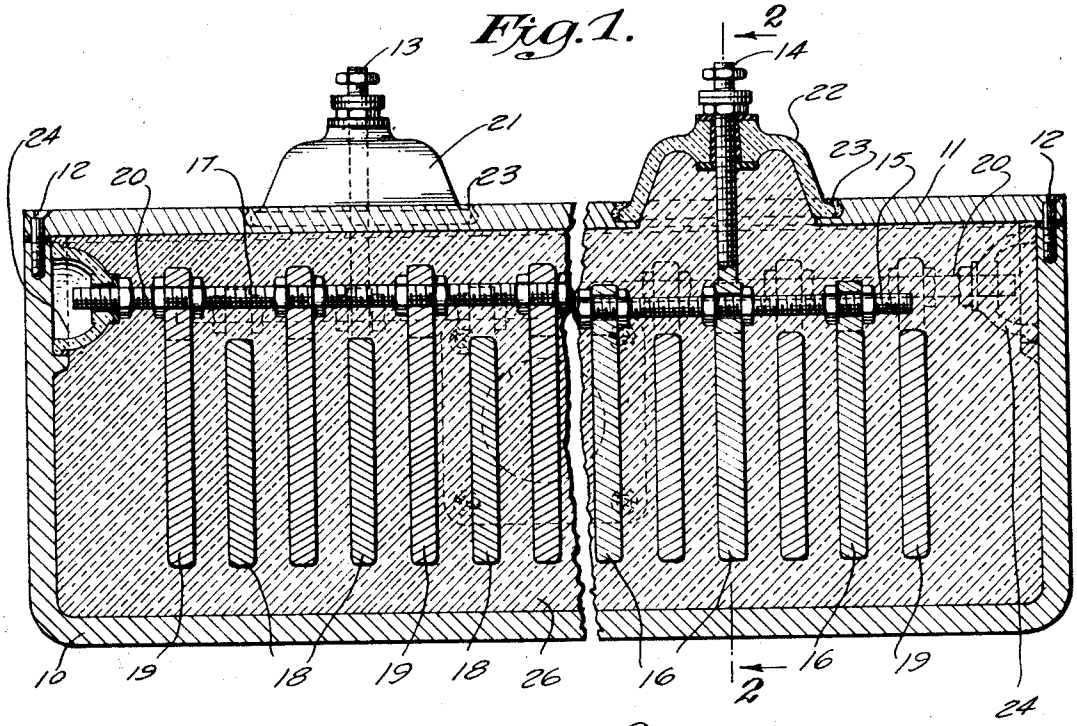


Fig. 2.

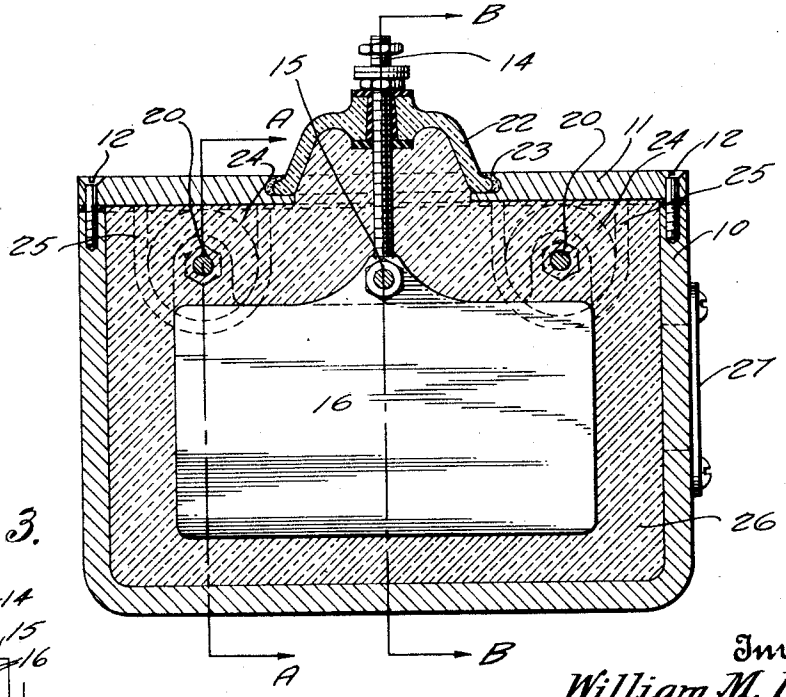
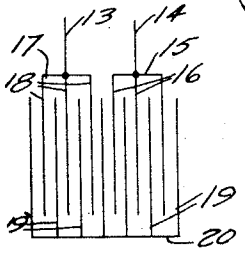


Fig. 3.



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MOLDED DIELECTRIC CONDENSER

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18 Claims. (Cl. 175—41)

This invention relates to high voltage short wave capacitors and has for its object to provide a compact device of substantial capacity. Another object is to provide a capacitor of such type which is enclosed by a metal casing or shield which is insulated from the capacitor.

In design of high voltage short wave capacitors it has been common practice to use two or three armatures; but to obtain increased capacity without undue bulk while at the same time retaining the characteristics suitable for short wave work has been difficult. This invention constitutes one solution of the problem.

Fig. 1 is a longitudinal section thru one embodiment of this invention, the portion to the left of the broken line being a section on the line A—A of Fig. 2 while the portion to the right of the broken line is a section on the line B—B of Fig. 2.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a wiring diagram illustrating the circuit connections of the disclosed form of the invention.

Referring to the drawing a metal casing 10 is provided with a removable metal cover 11 fastened to the casing by some usual form of securing means 12. Extending thru the cover are the terminals 13 and 14 each of which carries a horizontal armature-supporting rod extending a fraction of the length and centrally of the sides of the casing. The rod supported by the terminal 14 is designated by the numeral 15 at the right in Fig. 1 while the rod carried by the terminal 13 is designated as 17 at the left in Fig. 1. Suspended from the rod 15 are a plurality of armature plates 16. Similarly suspended from the rod 17 are a number of armature plates 18. The terminals are formed integral with the plates below them, right, Fig. 1. In electrostatically cooperative relation with each of the foregoing armature plates 16 and 18, are floating armature plates 19. These floating armature plates 19 are suspended at their upper corners from two metal rods 20 extending longitudinally of the casing but insulated therefrom and from rods 15, 17 and supported between opposite walls of the casing by the small inverted bowls 24 of pyrex or borosilicate glass, altho these insulators may be of any suitable structural insulating material. The two rods 20 are parallel with rods 15, 17 which in turn are in line with one another, Fig. 2. The insulators 21 and 22 around each terminal 13, 14 are preferably of the same material as the insulators 24 and are of similar shape and secured in place by means of cement 23 or in any other convenient manner. The insulators 24 are shown as being supported within guide grooves 25 formed on the inside of the casing so that no cement will be necessary for securing the insulators 24 in position when not desired. As shown in the drawing each of all the armature plates is secured in position on its own supporting rod by means of nuts threaded on to the rod. These nuts if desired may be of insulating material but they are preferably of metal in order to provide a good contact between the plates and their supporting rods.

The above spaced armature plates 16—17 and 18—19 are encased in a combined dielectric and embedment, which is preferably sulphur poured in liquid form and cooled in any manner to lessen the likelihood of cracks forming, such as by the successive layer cooling method. Since the high potential armature plates are supported in suspension from the cover, a separate filling opening is desirable, as in a side of the casing, and after the embedment is cooled the small cover 27 is removably secured over this filling opening. Instead of the embedment described, a liquid dielectric such as oil may be employed in the construction illustrated.

What I claim is:

1. A capacitor comprising a casing, terminals thereon, a plurality of armature plates connected to one terminal, a plurality of armature plates connected to another terminal and a plurality of connected floating armatures, each set of terminal plates being supported by its terminal; and insulating supporting means for the floating armatures, which last mentioned means is enclosed by said casing.

2. A capacitor comprising a casing, sets of armature plates, one set of plates supported thru an outwardly projecting bushing of insulating material, another set of plates being supported thru a bowl-shaped inwardly projecting insulator.

3. In a capacitor the combination with a metal casing, of a metal rod, armature plates secured to and connected together by said rod, and insulating supporting means for each end of said rod enclosed within said casing and supported thereby.

4. A high voltage short wave capacitor comprising a casing terminals passing thru the casing, armature plates connected to said terminals, an inverted bowl-shaped bushing supporting the plates connected to one terminal, a similar support for the plates connected to another terminal, connected floating armature plates supported inside said casing between opposite

walls thereof, and a combined dielectric and embedment of sulphur.

5. The compact, high capacity electrostatic condenser which includes a metallic casing formed with a terminal lead opening, and three armature plates enclosed by the casing and arranged successively face to face parallel with one another in a single row and successively spaced apart; means supporting one of said plates by and insulating it from the metallic casing as a floating armature; an insulating cover for said casing-opening and supported by the casing; a terminal lead projecting thru and supported by said insulating cover and connected to and supporting the armature plate on one side of said insulated plate; and means supporting the armature place on the other side of said insulating plate in its said spaced relation thereto inside the casing.

6. The compact, high capacity electrostatic condenser which includes a metallic casing formed with two terminal-lead openings, and three armature plates enclosed by the casing and arranged successively face to face parallel with one another in a single row and successively spaced apart; insulating covers for said casing-openings and supported by the casing; terminal leads projecting thru and supported by said insulating covers respectively and connected to and supporting two of said armature plates respectively; and means inside the casing and supporting the third armature plate as a floating armature between said first two plates and insulating it from the metallic casing.

7. The compact, high-capacity electrostatic condenser which includes a metallic casing formed with two terminal-lead-openings, and a plurality of armature-plates arranged therein in a row successively face to face in spaced-apart relation; means supporting a plate of said row in completely insulated condition as a floating armature; covers of insulating material for said two casing-openings and mechanically supported by the casing; two terminal-leads mechanically supported respectively by said insulating covers and extending inside the casing in positions adjacent different portions of the length of the plate-row; means mechanically connecting to one of said terminal-leads and in conducting relation therewith, a plate which lies in a portion of the plate-row adjacent said terminal-lead; and means mechanically connecting to said other terminal-lead and in conducting relation therewith, a plate which lies in the portion of the plate-row adjacent this other terminal-lead; said floating armature plate electrostatically connecting said other two armature plates in the plate-row, in series between said two terminal-leads.

8. The compact, high-capacity electrostatic condenser which includes a metallic casing formed with two top terminal-lead-openings, and a plurality of armature-plates arranged therein in a row successively face to face in spaced-apart relation; means supporting a plate of said row in completely insulated condition as a floating armature; covers of insulating material for said two top casing-openings, said covers being supported on the casing; two terminal-leads suspended respectively from the two covers and extending down inside the casing in positions adjacent different portions of the length of the plate-row; means mechanically suspending from one of said terminal-leads and in conducting relation therewith, a plate which lies in the portion of the length of said plate-row which is adjacent said terminal-lead; and means mechanically suspending from said other terminal-lead and in conducting relation therewith, a plate which lies in the portion of the length of the plate-row adjacent this other terminal-lead; said floating armature plate electrostatically connecting said other two armature plates in the plate-row, in series between said two terminal-leads.

9. The compact, high-capacity electrostatic condenser which includes a metallic casing formed with a terminal-lead-opening and a plurality of armature-plates arranged therein in a row successively face to face in spaced-apart relation; means including a metallic rod extending in the same general directions as said plate-row and mechanically supporting alternate plates of the row in completely insulated condition as floating armatures, said rod connecting said floating armatures together; a cover of insulating material for said casing-opening and mechanically supported by the casing; a terminal-lead mechanically supported by said insulating cover and extending inside the casing in a position adjacent one portion of the length of the plate-row; means including a metallic rod extending in the same general directions as the plate-row and mechanically supported by said interiorly-extending terminal-lead in conducting relation therewith, said rod itself mechanically supporting a plurality of plates in said row which lie adjacent said terminal-lead, said plates being supported in conducting relation with the rod, and the rod connecting said plates together; and means mechanically supporting a plurality of plates in a different portion of the length of the plate-row and in conducting relation with the oppositely-poled terminal-lead of the condenser and with one another; said floating armature plates electrostatically which alternate in the plate-row connecting in series, the two sets of armature plates which are connected to the two terminal leads and which lie in different portions of the plate-row.

10. The compact, high-capacity electrostatic condenser which includes a metallic casing formed with two terminal-lead openings and a plurality of armature-plates arranged therein in a row successively face to face in spaced-apart relation; alternating plates in said row being floating armatures; a pair of rods mechanically supporting said floating armatures; covers of insulating material for said casing-openings and mechanically supported by the casing; two terminal-leads mechanically supported respectively by said insulating covers and extending inside the casing in positions adjacent different portions of the length of said plate-row; a metallic rod mechanically supporting intermediate portions of other plates in the row in conducting relation to the terminal-lead which is adjacent one portion of the length of the plate-row; and a metallic rod mechanically supporting intermediate portions of other plates in the row in conducting relation to the terminal-lead which is adjacent the other portion of the length of the plate-row.

11. The compact, high-capacity electrostatic condenser which includes a plurality of armature-plates arranged in a row successively face to face in spaced-apart relation; two terminal-leads; means supporting alternate plates of the row in completely insulated condition as floating armatures; means mechanically supporting said leads in positions adjacent different portions of the length of the plate-row; means connecting to one

lead in mechanically supporting and electrically conducting relation therewith, alternating plates in the row which lie adjacent said lead; and means connecting to the other lead in mechanically supporting and electrically conducting relation therewith, alternating plates in the row which lie adjacent said second lead.

12. The compact, high-capacity electrostatic condenser which includes a plurality of armature-plates arranged in a row successively face to face in spaced-apart relation; two terminal-leads; means supporting said leads; means mechanically supporting and electrically connecting together and to one of said leads a plurality of the plates in one portion of the length of said plate-row; means mechanically supporting and electrically connecting together and to the other lead, a plurality of the plates in another portion of the length of the row; and means mechanically supporting in completely insulated condition as floating armatures, plates in the row which alternate with said plates in both said portions of the length of the row, whereby said floating armatures connect the other armatures electrostatically in series between said terminal-leads.

13. The compact, high-capacity electrostatic condenser which includes at least three armature-plates arranged in a row successively face to face in spaced-apart relation; two terminal leads; means mechanically supporting and electrically connecting to one of said leads, a plate in one portion of said plate-row; means mechanically supporting and electrically connecting to the other lead, a plate in another portion of the row; and means mechanically supporting in completely insulated condition as a floating armature, a plate in the row lying between the two plates connected to the two terminal-leads, whereby said intermediate plate electrostatically connects said two plates in series between the two terminal-leads.

14. The compact, high-capacity electrostatic condenser which includes a plurality of armature-plates arranged in a row successively face to face in spaced-apart relation; metallic means connected to upper portions of alternate plates from end to end of said row supporting them in suspension and in completely insulated condition as floating armatures and connecting them together; metallic means connected to upper portions of a plurality of alternate plates at one portion of the length of the row supporting them in suspension and electrically connecting them together; and metallic means connected to upper portions of a plurality of alternate plates at another portion of the length of the row supporting them in suspension and electrically connecting them together; said floating armatures electrostatically connecting said lead-connected plates in series with one another.

15. The compact, high-capacity electrostatic condenser which includes at least three armature plates arranged in a row successively face to face in spaced-apart relation; two metallic terminal-leads formed integral with two of the plates in said row; and means mechanically supporting in completely insulated condition as a floating armature, a plate in said row between said two plates, whereby said intermediate plate connects said two plates electrostatically in series with one another between their integral terminal-leads.

16. The compact, high-capacity electrostatic condenser which includes a plurality of armature-plates arranged in a row successively face to face in spaced-apart relation; two terminal-leads; two metallic rods extending along said plate-row, one adjacent one lead and the other adjacent the other lead; one of said rods supporting a plurality of alternate plates in the portion of the plate-row along such first rod, and the other rod supporting a plurality of alternate plates in the portion of the plate-row along such second rod, and said rods respectively connecting said sets of plates electrically to said terminal-leads; and means connecting together the remaining plates of the row and supporting them in completely insulated condition as floating armatures which connect the other two sets of plates electrically in series between the two-terminal leads.

17. The compact, high-capacity electrostatic condenser which include a metallic casing formed with two terminal-lead-openings, a plurality of armature-plates arranged in a row successively face to face in spaced-apart relation; covers of insulating material for said lead-openings and supported by the casing; two terminal-leads respectively extending thru said insulating covers and thereby insulated from the metallic casing, said leads being connected respectively to alternate plates in different portions of the length of said plate-row; and means inside the casing and insulated therefrom and supported thereby and in turn supporting and connecting together the remaining plates in the row in completely insulated condition as floating armatures; all whereby the metallic casing is insulated completely from the plate-row, and the floating armatures connect electrostatically in series the plates which are connected to the two insulated terminal-leads.

18. The compact, high-capacity electrostatic condenser which includes a metallic casing formed with two terminal-lead-openings; a plurality of armature plates arranged in the casing in a row successively face to face in spaced apart relation; covers of structural insulating material for said lead-openings; two terminal-leads extending thru said covers into the casing in positions adjacent different portions of the length of said plate-row; means connecting one of said leads to alternate plates in a portion of the row adjacent said first lead; means connecting the other lead to alternate plates in the portion of the row adjacent this second lead; means supporting the remaining alternate plates of the row in completely insulated condition as floating armatures in spaced relation to the plates connected to said leads, and connecting said plates electrostatically in series between the leads; a mass of sulfur supported by the casing and embedding said plate-row as a whole and filling the spaces between the individual plates as dielectric between the floating and the lead-connected armatures; and structural insulating means inside the casing and supported thereby and supporting said means which supports the floating armatures.

WILLIAM M. BAILEY.