March 16, 1926. 1,576,829

F. O. JOHNSON

ELECTROSTATIC CONDENSER

Filed August 23, 1924

Fig. 1.

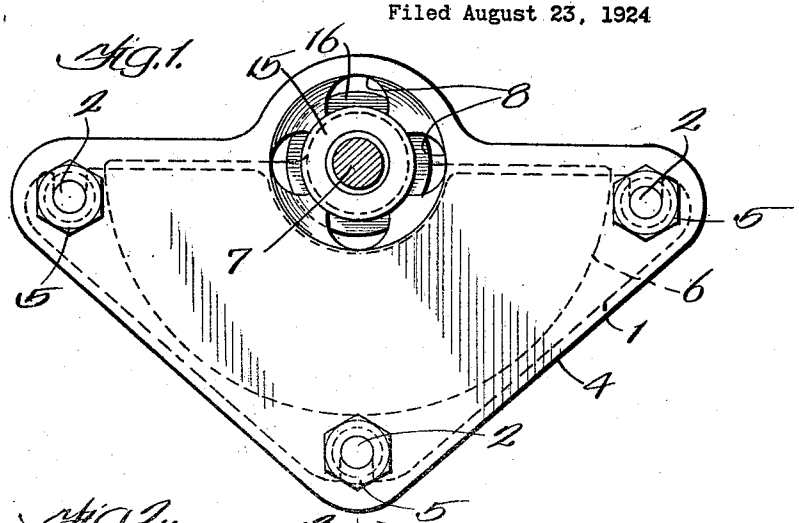


Fig. 2.

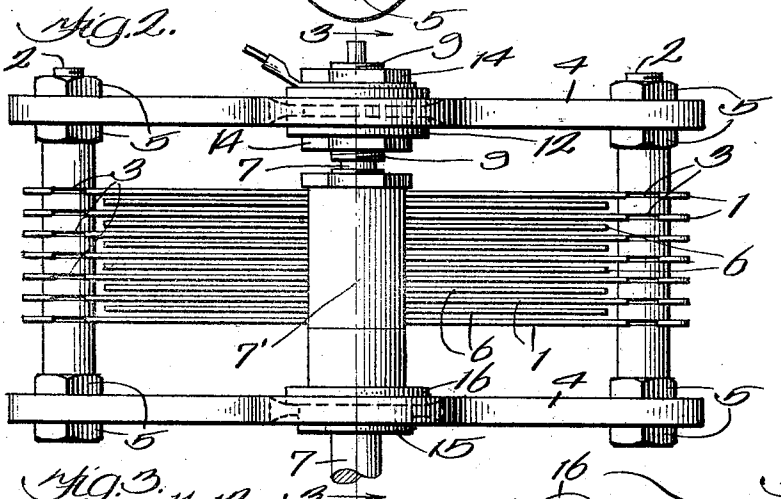


Fig. 3.

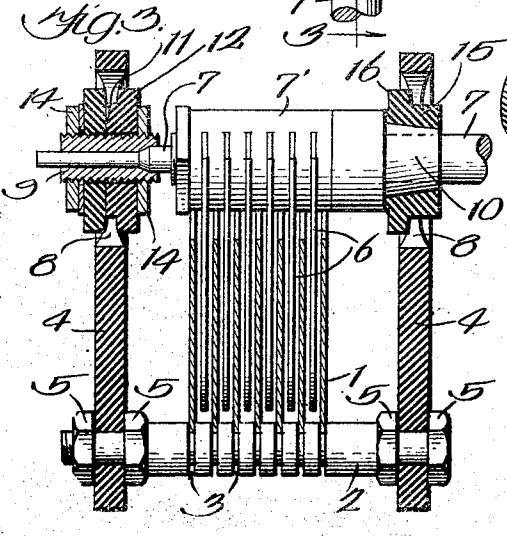
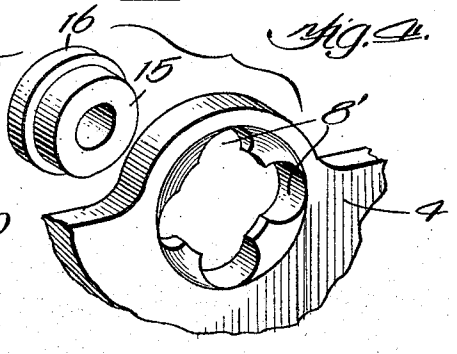


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANK O. JOHNSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO RELIANCE DIE & STAMPING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELECTROSTATIC CONDENSER.

Application filed August 23, 1924. Serial No. 733,748.

To all whom it may concern:

Be it known that I, FRANK O. JOHNSON, a citizen of the United States, residing at Chicago, in the county of Cook and the State of Illinois, have invented a certain new and useful Improvement in Electrostatic Condensers, of which the following is a full, clear, concise, and exact description.

My invention relates to electrostatic condensers, including metallic assembling posts, metallic end plates and bushings of insulating material receiving the posts and themselves received in openings formed through the plates and held by engagement with the plates at the margins of the openings. It is the general object of my invention to reduce, as far as possible, the capacity relation or condenser effect between the metallic posts and the metal end plates and the surface leakage between these parts. Absorption losses which may arise through the bushings, if insulation of certain makes is employed, is reduced by reducing the volume of material in the bushings with the result that the minimum capacity of the condenser is further reduced. The capacity between the posts and plates is also reduced by increasing the distance between the posts and plates, introducing air gaps between the bushings and the plates, and by having the engaged surfaces of the bushings and plates of less depth than the thickness of the plates. More generally stated, the bushings of insulating material do not fill the openings in the plates which receives these bushings, the areas of contact being less than the wall surfaces of the openings.

The invention will be more fully explained in connection with the accompanying drawing in which Fig. 1 is an end view of a condenser constructed in accordance with the preferred embodiment of the invention; Fig. 2 is a side view; Fig. 3 is a sectional view on line 3—3 of Fig. 2 and Fig. 4 is a perspective view illustrating a bushing and the adjacent metal end plate in separated relation.

The condenser illustrated includes one side formed of a plurality of triangular metal plates 1 which are held in spaced apart relation by means of metallic posts 2 formed with arcuate recesses or slots 3 receiving said condenser plates and so spaced apart as to maintain these plates in suitable spaced apart relation. The metallic posts 2 pass through thick triangular metal end plates 4 and are held in assembly therewith by means of the metallic nuts 5 threaded upon the rods in pairs, each end plate being received between the nuts of a pair. The remaining condenser side comprises a plurality of metal plates 6 which are mounted upon a metallic post 7 which passes through openings 8 formed through the end plates 4. The plates 6 are alternated with the plates 1, the space between the plates of each condenser side being equal to the spaces between the plates of the other condenser side. The post 7 is journaled in the bearings 9 and 10. The bearing 9 is screwed within the bushing 11 of insulating material that is carried by one of the plates 4 within the opening thereof. This bushing has a flange 12 engaging the inner side of the plate 4 which contains it, there being an insulating washer 13 upon the other side of this plate, flange 12 and washer 13 being clamped against the opposite sides of the corresponding end plate 4 by means of nuts 14 which are screwed upon the bearing 9. The bearing 10 is conically and outwardly tapered upon its exterior to be received within the correspondingly shaped bore of the bushing 15 of insulating material. This bushing has a flange 16 which is pressed outwardly upon by the larger portion 7′ of the shaft 7. The condenser illustrated is thus a variable or adjustable condenser, to which end the post 7 is also a shaft turning within the bearings 9 and 10 and having a knob, not shown, to permit of its turning. The invention, however, is not to be limited to an adjustable condenser.

The openings 8 are preferably of similar shape in both of the plates 4, the bushings of insulation that are within these openings being so shaped as only partially to fill the same. In the preferred embodiment of the invention, each of the bushings of insulating material has a circular or cylindrical perimeter and the opening receiving each bushing desirably has four equi-distant enlargements 8′ distributed around the bushing to be located at four sides thereof, whereby air gaps are introduced between portions of the bushings and the adjacent sides of the opening whereby the capacity relation between the metal post 7 and each end plate 4 is materially reduced, while, at

the same time, the surface leakage over the bushings and their flanges and also over the washer 13 is materially reduced.

The bushings and the insulating washer 13 are made from insulating material that preferably has practically no absorptive characteristic. If insulating material having appreciable absorptive effect is employed, this effect would be materially reduced by reason of the construction illustrated.

In the preferred embodiment of the invention, in addition to forming the air gaps as described, I also make the engagd surface of the bushings and plates less in depth than the thickness of the plates. In the preferred embodiment of the invention this result is secured by tapering the metal of the plates surrounding the openings 8 therein toward the bushings. This characteristic of my invention is not to be limited to the presence of air gaps between the bushings and the surrounding end plates.

Changes may be made without departing from my invention.

Having thus described my invention, I claim:—

1. An electric condenser including the two sides thereof and a metallic post assembled with one condenser side; a metal end plate assembled with the other condenser side; and a bushing of insulating material receiving said post and received in an opening formed through said plate and held by engagement with the plate at the margin of said opening, said bushing having a circular perimeter and said opening being enlarged along one side of the bushing to introduce an air gap between a portion of the bushing and the adjacent side of the opening, the portion of the plate that engages the bushing being reduced in thickness.

2. An electric condenser including the two sides thereof and a metallic post assembled with one condenser side; a metal end plate assembled with the other condenser side; and a bushing of insulating material receiving said post and received in an opening formed through said plate and held by engagement with the plate at the margin of said opening, the portion of the plate that engages the bushing being reduced in thickness.

In witness whereof, I hereunto subscribe my name.

FRANK O. JOHNSON.