July 28, 1925. 1,548,015

A. B. BERGEN

CONDENSER PLATE SYSTEM

Filed Oct. 4, 1924

Fig. 1.

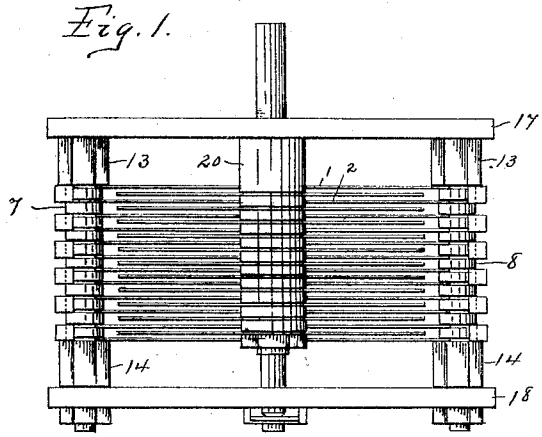



Fig. 2.

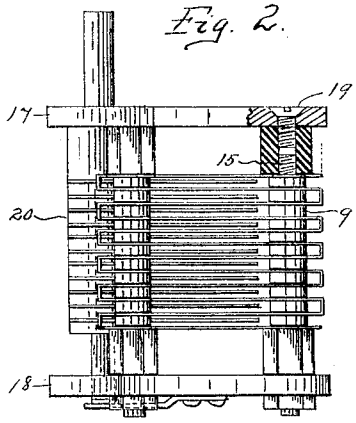



Fig. 4.

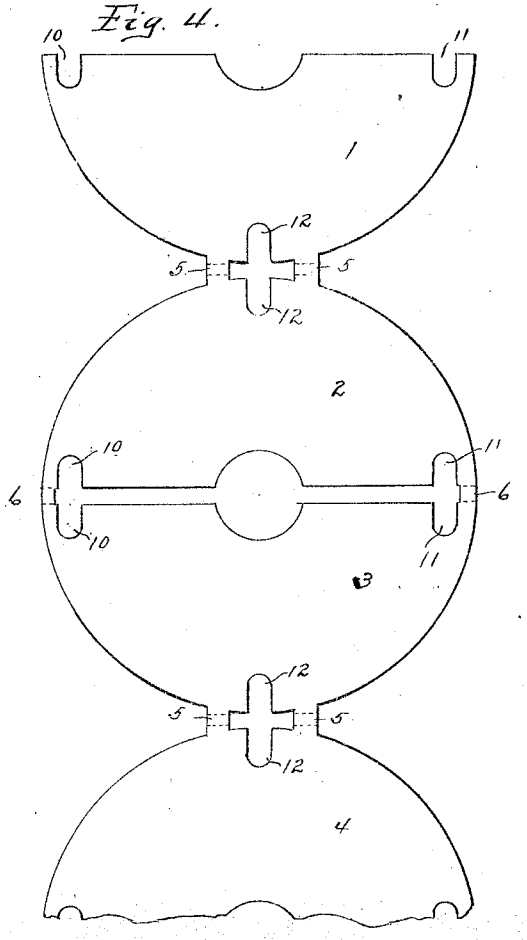



Fig. 3.

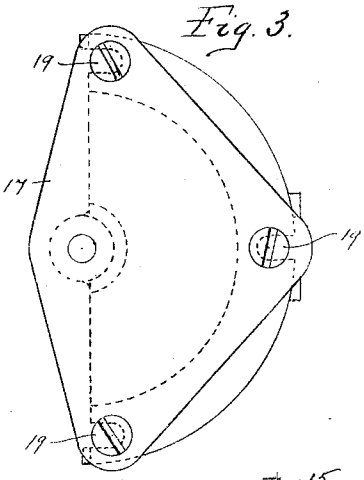
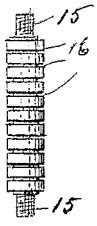



Fig. 5.




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# UNITED STATES PATENT OFFICE.

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## CONDENSER-PLATE SYSTEM.

Application filed October 4, 1924. Serial No. 741,547.

*To all whom it may concern:*

Be it known that I, A BEEKMAN BERGEN, a citizen of the United States, residing at Newtown, Bucks County, in the State of Pennsylvania, have invented a new and useful Improvement in Condenser-Plate Systems, of which the following is a specification.

In the prior patent application of Edward M. Squarey, Frederick Koch and Alwyn E. Borton, Ser. No. 709,395, filed April 28, 1924, a condenser plate system is shown and described wherein the stator plates are made up of a continuous strip of sheet metal folded back and forth from one end to the other, the purpose being to reduce capacity losses due to imperfect or incomplete metallic connections between the several plates to a minimum. And further in the prior application of Frederick Koch for a condenser plate mounting, Ser. No. 709,395, filed, April 28, 1924, and also in a second application of Frederick Koch, Ser. No. 730,810, filed August 8, 1924, separate forms of condenser mountings are shown, the purpose in each case being to provide spacing members for the stator plates whereby as nearly perfect spacing of the plates may be had as is practicable in such mechanical appliances. My present invention is in the nature of an improvement upon the stator plate mountings and spacing devices of the above named prior applications and it is designed for use in connection with the continuous condenser plate system of the above named application of Squarey, Koch and Borton. The principal object of my improvement resides in the provision of a substantially cylindrical corner post, having a series of circumferential grooves accurately spaced apart and of uniform width, so that the condenser plate system above referred to may be mounted upon said corner posts and the whole supported in the frame of the condenser in such a manner that the entire structure conforms to the usual standard shape and contour of such devices. In the accompanying drawing illustrating the particular embodiment of my invention,—

Fig. 1 is a plan view of a well known form of condenser in which the plate system is that of the above named application of Squarey, Koch and Borton.

Fig. 2 is a side elevation of the same.

Fig. 3 is an end elevation of the same.

Fig. 4 is a fragmental plan view of a series of connected stator plates as they appear prior to folding.

Fig. 5 is a plan of one of the corner posts showing the spacing grooves therein.

Similar reference numerals refer to like parts throughout the specification and drawing.

In the practical use of the variable plate condenser as used in radio telephony and telegraphy, many unaccounted for capacity losses have been found and many attempts have been made to reduce these losses to a minimum. In attempting to account for the losses in the variable plate condenser they have been ascribed to incomplete or imperfect contact connections between the several plates and the supporting or with the lead-out connections. The use of the continuous stator plate system of the Squarey, Koch and Borton application has materially reduced these capacity losses so that now for many purposes the losses are so low that they may be disregarded. However, certain other uses to which the variable condenser is put requires still greater accuracy with the requirement of still greater reduction in capacity loss. To accomplish this result and at the same time keep the cost of quantity production of such condensers at a minimum, I have designed a peculiar form of supporting corner posts for the plate system. As above indicated, the plate system is made up of a strip of integrally connected plates as 1, 2, 3, 4, which are connected together by means of the tangs 5, 5, 6, 6, throughout the length of the entire strip of stator plates. These plates are folded back and forth as indicated in edge view in Fig. 2 with the connecting tangs serving as spacing elements at the front and the rear of the plates. When so folded, the stator plate system will appear substantially as illustrated in Figs. 1 and 2. The corner posts 7, 8, and 9 are then respectively inserted into the notches 10, 11, and 12, after which the end spacing nuts 13, 14 are screwed on to the screw threaded ends 15 of said posts. From a reference to Fig. 5, it will be noted that the corner posts 7, 8 and 9 are of a general cylindrical form, having the reduced screw threaded ends 15 and provided with a series of accurately turned grooves 16. These grooves are of a width very slightly greater than the thickness of the plates 1, 2, 3, etc.

The reason for such width of the grooves resides in the fact that the strips of metal from which the plates 1, 2, 3, etc. are stamped is not of absolute uniform thickness throughout its length no matter how perfect such strips of metal may be rolled. A long series of tests has determined that the thickness in different parts of the strips varies as much as 3/1000 of an inch. The standard thickness for such strips has been selected as 25/1000. With this variation in thickness it is found there are spots in the strip which will have a thickness of as much as 27/1000; and again other spots may be found where the thickness will be 1/1000 of an inch under standard. With this variation in the thickness of the metal to contend with it is found to be necessary to make the grooves in the corner posts of a width not less than 28/1000 of an inch so that various plates may be slipped into the grooves in the posts without distortion. The making of the plate system integral throughout the length by means of the connecting tangs obviates any capacity loss which might be due to imperfect contact between the corner posts and the notches in the plate while the use of the integral corner posts has resulted in materially reducing the cost of the assembly of the stator plate system without any attendant capacity loss in the completed product.

After the complete stator plate system has been assembled and the spacing nuts 13, 14 secured in place, it is only necessary to assemble the end plates 17, 18 by the insertion of the screws 19 through the end plates and into the spacing members 13, 14, at the same time inserting the rotor 20.

It is only in the combination of the peculiar form of corner post with the continuous stator plate system that I am able to accomplish the results sought, for when the plate system is folded across the tangs 5, 6 and then the corner posts 7, 8 and 9 are inserted, that substantially perfect electrical contact takes place between the stator plates and said metal posts. If the plates 1, 2, 3, etc., are separate and disconnected plates the contact between them and the grooved part of the corner posts would be so imperfect as rather to add to the losses than to obviate them. This fact has been proven by frequent tests of posts similar to those above described with separate stator plates. The slight elasticity of the material from which the plates are made is sufficient to cause the faces of said plates to contact with the walls of the grooves throughout the length of the corner posts. Whether that contact be against one face or the other of the plate is immaterial. My improvement therefore resides in the combination of the corner post substantially as described with the continuous stator plate system of the above named Squarey, Koch and Borton application.

I claim:

1. A stator plate system for variable condensers, comprising a plurality of plates stamped from a single strip of sheet metal and integrally connected at their adjacent edges in combination with a plurality of metallic posts each having a plurality of circumferential grooves therein forming spacing members, said plates being inserted respectively into said grooves and held in place by said spacing members.

2. In a variable condenser, the combination of a stator frame comprising a pair of end plates, metallic posts connecting said plates together, a plurality of integrally connected stator plates folded in parallel relation and mounted upon said posts, said posts being provided with circumferential grooves into which the said plates are respectively inserted.

3. In a variable condenser, the combination of a plurality of parallel stator plates integrally connected together at points upon their edges and folded in parallel relation, with metallic circumferentially grooved corner posts upon which said parallel stator plates are mounted and uniformly spaced apart.

4. In a variable condenser, the combination of a plurality of integrally connected stator plates folded together in uniformly spaced parallel relation, a frame in which said plates are mounted and means for uniformly and rigidly spacing said plates apart comprising a plurality of corner posts each circumferentially grooved to receive notched portions respectively of said plates whereby an integral spacing member is formed, and means for securing said spacing member into said frame.

5. In a variable condenser, the combination of a plurality of stator plates integrally connected together and folded in spaced parallel relation with a spacing member therefor comprising a circumferentially grooved corner post forming integral spacing members thereon adapted for insertion between adjacent stator plates.

6. In a variable condenser, the combination of a plurality of parallel stator plates integrally connected together at their edges and folded in parallel spaced relation, with a spacing member therefor, said spacing member comprising a cylindrical corner post having screw threaded ends and a plurality of spacing circumferential grooves, each of said grooves adapted to receive a notched portion of one of said stator plates.

7. In a variable condenser, the combination of a spacing member for condenser plates comprising a cylindrical corner post having screw threaded ends adapted for securing said posts in the end plates of a con-

denser frame, said post also having a plurality of uniformly spaced circumferential grooves therein.

8. A spacing member for condenser plates comprising a cylindrical corner post having a plurality of spacing circumferential grooves to form therebetween a plurality of spacing elements each adapted for insertion between adjacent edges of a pair of condenser plates said posts also having their ends screw threaded whereby the same may be secured to a condenser plate frame.

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