

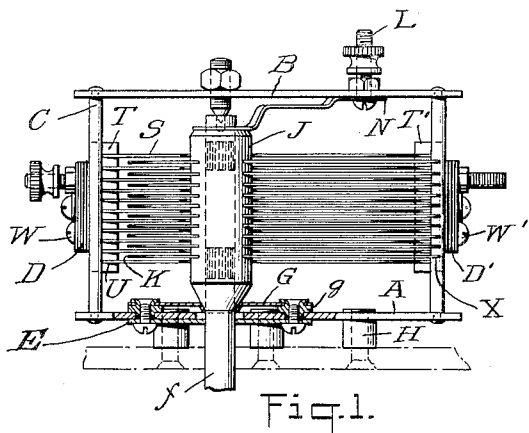
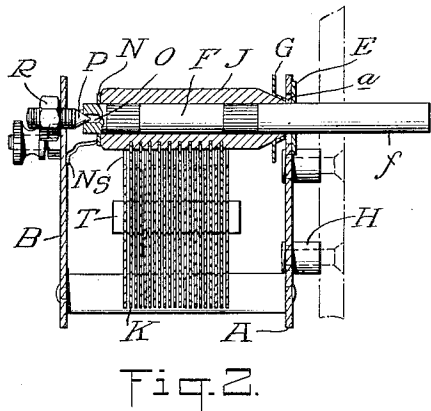
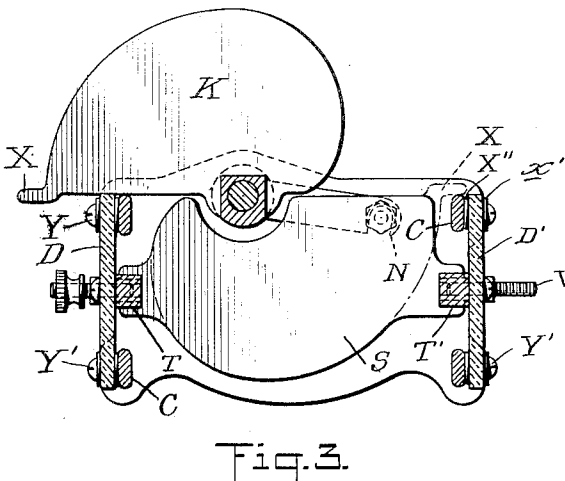
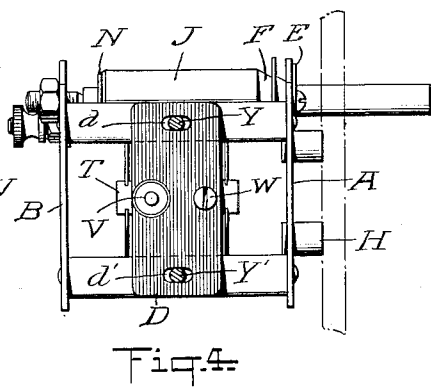
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M. H. BENNETT ET AL

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VARIABLE CONDENSER

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INVENTORS
Morris A. Bennett
and William Colina
BY
Philip S. Sweeney & Associates
ATTORNEYS

UNITED STATES PATENT OFFICE

MORRIS H. BENNETT AND WILLIAM COLINA, OF WATERBURY, CONNECTICUT, ASSIGNORS TO SCOVILL MANUFACTURING COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT

VARIABLE CONDENSER

Application filed September 11, 1925. Serial No. 55,656.

This invention relates to improvements in variable condensers and more particularly to condensers of that class used in radio receiving sets.

5 One object of this invention is to provide a variable condenser which can be made in separate units and such units then easily and quickly assembled at small cost and yet have the required rigidity. Another object of the
10 invention is to so arrange the various parts that those parts requiring adjustment may be quickly and accurately adjusted. A further object is to provide such a bearing for the rotor that the latter will turn smoothly and
15 easily at any position of the rotor relative to the stator and yet will not be loose in its bearings.

For a full understanding of the invention a detailed description of a construction embodying the same in its most advantageous
20 form will now be given in connection with the accompanying drawings forming a part of this specification, and the features forming the invention then will be specifically
25 pointed out in the claims.

In the drawings—

Figure 1 is a top plan view of a variable condenser embodying the features of the present invention;

30 Figure 2 is a cross section of the same with parts broken away;

Figure 3 is a longitudinal section; and

Figure 4 is an end elevation.

Referring to said drawings, front side A
35 and rear side B are secured in spaced relation to each other by standards C, and, to attain the advantage of interchangeability, these standards C will be similar in construction with flat surfaces to provide a larger
40 bearing face and be better adapted to support insulating blocks D, D', hereinafter referred to, but the edges of standards C will be rounded and their ends reduced to project through holes pierced through each corner
45 of sides A and B, when such ends of said standards C will be turned down to rivet them to said sides A and B and thus secure said standards and sides together to form a frame. Side A will have a suitably located
50 opening *a*, of such size that the handle end

of rotor shaft F, may be positioned in said opening.

A plate E having an opening of such size that it closely fits over end *f* of shaft F, will
55 cover any excess of opening *a* in side A and be secured in said side by screws, threaded into posts *g*, hereinafter described. The plate E also constitutes a support for end *f* of shaft F. Plate E is so shaped that it does not
60 project beyond the edges of side A. Side A will also be provided with a plurality of perforations to receive studs H, threaded to receive screws for securing the condenser to the
65 usual panel board to which such condensers are attached, either in vertical or horizontal position. The rear ends of these studs will be turned down securely against side A.

Plate G is secured to the inner side of side A in any suitable manner, as by posts *g*,
70 the inner ends of which posts are turned down to take against plate G, their outer ends being secured by screws passing through such posts and also through cover plate E. Plates G is also provided with a flanged opening
75 of such size that it allows shaft F, with its sleeve J, after the plates K have been secured thereon, to pass through, the flange thereof conforming in shape and size substantially to that of the cone shaped end of
80 sleeve J to form a cone type of bearing for said shaft and sleeve. The plate G is made of resilient material and is spaced by posts *g* from side A in order that it will act as a spring to press against the cone end of the
85 rotor-plate-carrying sleeve J on shaft F, and thus cause said sleeve, and with it said shaft F, to be forced against rear bearing P, thus preventing any play of the rotor and still allowing the rotor to turn smoothly.

The surface of shaft F is provided with
90 knurled portions at suitable distances from either end so that when said shaft is forced into sleeve J, or vice versa, these two parts will be securely held from movement independent of each other.
95

The sleeve J carried by rotor shaft F, which is of brass, though it may be made of any other suitable material, is provided with a set of plates K (10 being illustrated herein though a greater or less number may be
100

used), each plate of this set being rigidly secured in any suitable manner as by soldering or swaging in slots in said sleeve J and spaced an equal distance from each other so that they will each be capable of being rotated between two plates of the set of stator plates S rigidly fixed in blocks T, T'.

One end of shaft F is provided with a bearing at side B, which may advantageously be a cone bearing as shown, comprising a countersunk portion O in the end of said shaft adapting it to receive the cone-shaped end of screw P passing through a threaded hole in side B, which screw will be held in position by lock-nut R, and said screw P will also be provided with a slot to permit adjustment of said shaft F and sleeve J by means of a screw driver or other simple tool.

Rear side B is provided with a binding post and binding screw of any suitable construction, that shown consisting of screw L passing through said side, having its slotted head on the inner side of side B to admit of adjustment. The yoke formed at one end of lead plate N, is held in position by the head of screw L, while the opposite end of said lead plate, being perforated, takes over the end of shaft F on the inner side of side A and thus presses against shaft F or its sleeve J, and will thus not only act as a lead for one of the condenser terminal contacts, but being of spring metal, will also provide additional aid in keeping shaft F in proper position in its bearings.

It may be of advantage to have the rotor plates K shaped substantially as shown, so that they may be entirely free of plates S, when shaft F has revolved them to their zero capacity position, (Fig. 3) which would be an advantage in the process of assembling and disassembling.

It will be of advantage also to have the rotor plates K provided with extensions X to act as stops on striking post C.

Stationary plates S (11 being shown herein, and, while the number may vary, there should be one more than the number of rotor plates K) are supported against movement toward or from each other, by having the extension of each plate positioned in slots U formed equidistant from each other in blocks T, T', hereinafter referred to, in which blocks the ends of each stator plate S will be soldered, swaged or otherwise suitably fixed. These stationary plates may also be of any other suitable form than that shown.

Plates K and S may be made of any suitable material, but brass will better meet the requirement in condenser construction of low resistance. Each of plates K and S also must be kept insulated from each other and there should be no relative movement between the respective plates of a set when the condenser is in use.

Two insulating blocks D, D' are provided,

which serve as adjustable supporting blocks to support the set of stator plates and permit the adjustment of the set, as a unit, relative of the rotor-plates. These adjustable supporting blocks will advantageously be made of hard rubber because of the high insulating quality of that material, though any other suitable material may be used. These blocks are secured to the standards C by screws Y, Y', and provided with protecting washers x' , x'' , above and below said blocks. These blocks D, D', also for uniformity in structure, and in order that they may be interchangeable, are provided with screws V having their bases in blocks T, T', their free ends passing through blocks D, D', to receive binding nuts of usual construction for connection of a circuit terminal, though but one such terminal is usually required. The slots d , d' , in said blocks D, D', through which screws Y, Y' pass, will be somewhat larger than necessary for the passage of such screws, in order to permit sufficient movement of said blocks D, D', and with them the blocks T, T' carried thereby, for adjusting the position of the stationary plates S secured in said blocks T, T' relatively to the rotating plates K. It will be of advantage also to have the upper and lower edges of these blocks D, D' located substantially in a plane with the top and bottom, respectively, of the set of stator plates S, as such location will be more convenient, will minimize the movement necessary in adjusting the blocks T, T' and also the possibility of their displacement after adjustment. This adjustment will be accomplished by loosening one of the screws, Y, at the end of the block being adjusted, whereupon the loosened end of that block will be permitted to swing on the screw Y' at the other end of the same block as a pivot, thus allowing the upper ends of stator plates S and their carrying block T to be spaced equidistant from the adjacent rotary plates between them, and screw Y is then tightened. Screw Y' of this same block will then be loosened to permit the block to swing on screw Y as a pivot and allow the lower ends of said stator plates and said block T to be similarly adjusted. The blocks D' and T' at the opposite end of the condenser may then be similarly adjusted, if necessary. In such adjustment the screws Y, Y' will be tightened securely to prevent any lateral shifting of the adjusted end of said blocks D, T, in which the stationary plates S are carried, as rigidity of such plates is very important.

It is important also that the slots d , d' be positioned as near the edges of blocks D, D', as practicable, so that the longitudinal axes of the screws Y, Y', will be substantially in line with the top and bottom edges, respectively, of said stator plates, and thus avoiding any movement of the adjusted end while the other end is being adjusted.

By the use of plate adjusting means with the spring adjustment for the rotor shaft F and its adjustable bearings, a condenser of rigid construction, which is very important in such a device and a feature that is difficult to secure, will be obtained and at the same time the advantages of adjustability of the parts retained.

The assembling of the various parts necessary to make up a complete variable electric condenser, when assembled part by part, is quite expensive because of the large number of small parts and the accuracy and rigidity required. When a condenser is made in accordance with my invention, however, these disadvantages may be largely overcome by having the parts first assembled into units and such units then assembled into the completed condenser.

One unit may advantageously consist of the frame comprising the sides A, B and connecting standards C, with shaft receiving opening, spring plate, lead, terminal contact, and studs; another unit may advantageously consist of the set of stator plates and their mounting blocks; another the rotating shaft with its rotor plates and supporting sleeve, and securing nut; and another the pair of insulating blocks with their slots, terminal contact, binding post and screws.

While the rotor plates are illustrated herein as rotatable counter-clockwise for decrease of capacity, it is to be understood that equally satisfactory results will be obtained when rotated clockwise for such decrease.

As the operation of the device will be fully understood from the foregoing, detailed description thereof will not be necessary.

What we claim is:

1. A variable condenser comprising a frame, a rotor-shaft rotatably mounted in said frame, a set of rotor-plates carried by said rotor-shaft, a set of stator plates, a pair of adjustable supporting blocks connected to the set of stator plates, one at each end of said set, each supporting block being arranged for lateral and angular movement in contact with the frame and having a slot near each end and screws passing through said slots and into the frame, the screws for one supporting block being in axial alignment with the corresponding opposite screws for the other supporting block, the axial lines through the corresponding opposite screws passing close to the corresponding edges of the central stator plate.

2. A variable condenser comprising a rotor-shaft having a conical bearing, said shaft having a reduced portion extending beyond the conical bearing, a set of rotor-plates secured to the rotor-shaft, a plurality of stator plates secured together at each end to form a unit, a frame having side plates and connecting members, one of said side plates having an opening larger than the reduced por-

tion of the rotor-shaft into which the latter may be inserted at an angle, the other side plate having bearing means for supporting the rotor-shaft, said stator plates being detachably secured to the frame, a spring plate arranged to be secured on the inside of the frame, said spring plate having an opening into which the conical bearing of the rotor-shaft will fit, and means for securing the spring plate to the frame after the rotor-shaft and plates have been assembled in the frame.

3. A variable condenser comprising a rotor-shaft having a conical bearing, said shaft having a reduced portion extending beyond the conical bearing, a set of rotor-plates secured to the rotor-shaft, a plurality of stator plates secured together at each end to form a unit, a frame having side plates and connecting members, one of said side plates having an opening larger than the reduced portion of the rotor-shaft into which the latter may be inserted at an angle, the other side plate having bearing means for supporting the rotor-shaft, said stator plates being detachably secured to the frame, a spring plate arranged to be secured on the inside of the frame, said spring plate having an opening into which the conical bearing of the rotor-shaft will fit, an outer bearing plate provided with an opening in which the reduced portion of the rotor-shaft fits, and means for securing the spring plate and the outer bearing plate to the frame after the rotor-shaft and plates have been assembled in the frame.

In testimony whereof, we have hereunto set our hands.

MORRIS H. BENNETT.
WILLIAM COLINA.