June 1, 1926. 1,587,389

O. G. LISSEN

CONDENSER

Filed March 13, 1924 2 Sheets-Sheet 1

Fig. 1.

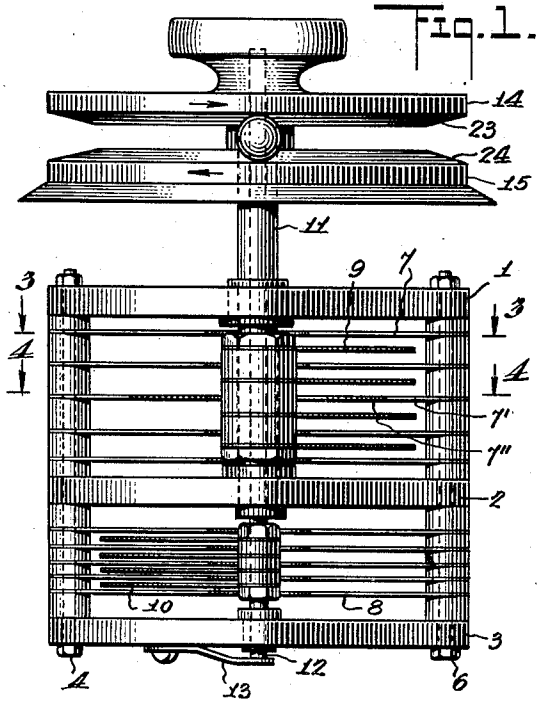


Fig. 3.

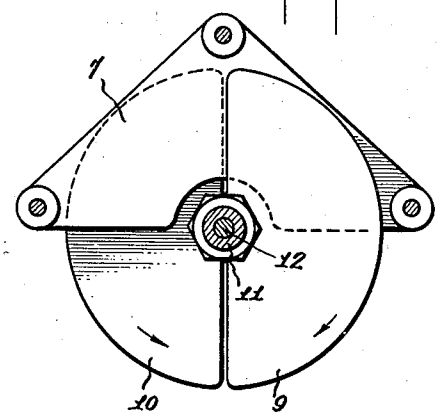


Fig. 2.

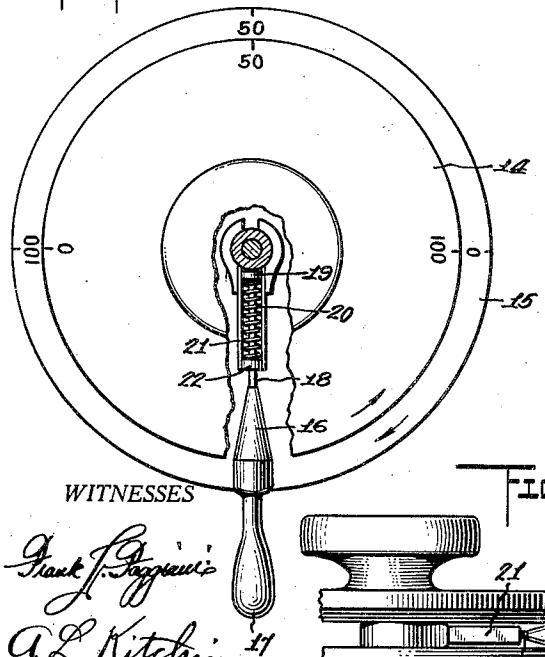


Fig. 4.

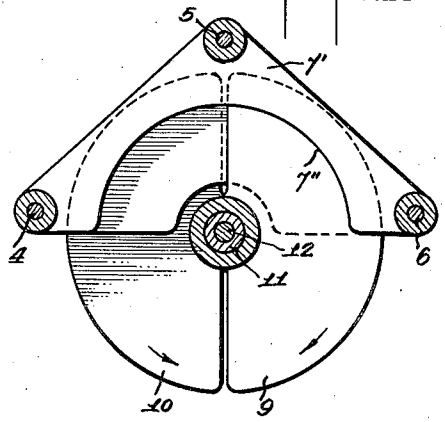
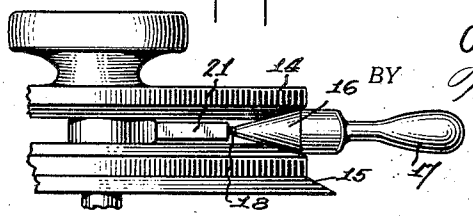


Fig. 5.



WITNESSES

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Fig. 6.

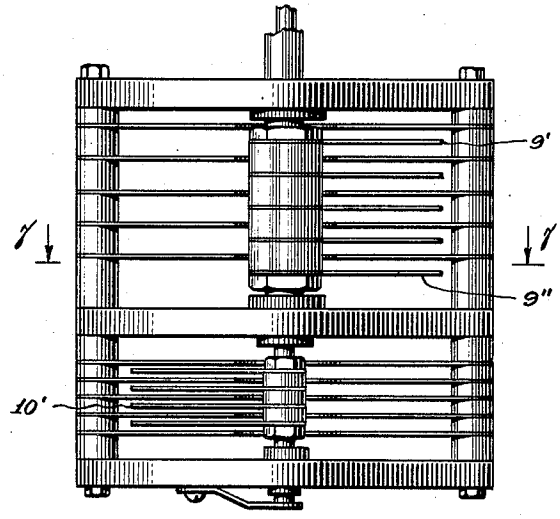
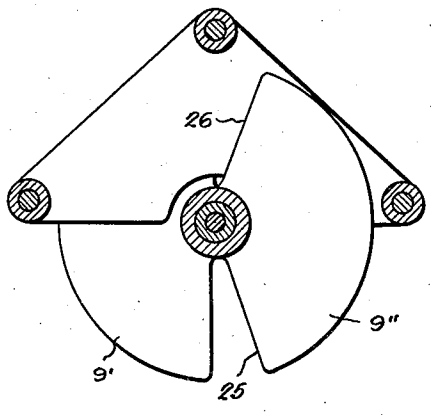


Fig. 7.



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UNITED STATES PATENT OFFICE.

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CONDENSER.

Application filed March 13, 1924. Serial No. 699,098.

This invention relates to condensers and particularly to an improved type wherein a very fine adjustment may be secured.

The object of the invention is to provide an improved construction wherein a plurality of sets of stators and rotors are provided which co-operate to produce a gradual changing in capacity as the parts are rotated.

Another object of the invention is to provide a condenser having a pair of sets of rotors wherein one rotor enters between the stators while the other leaves the stators.

A still further object of the invention is to provide a condenser in which one set of rotors enters the stator plates while the other leaves, the same being operatively associated with means for independently shifting either or both of the rotors individually.

In the accompanying drawing—

Figure 1 is an elevation of a condenser, disclosing an embodiment of the invention.

Figure 2 is an end view of the structure shown in Figure 1, certain parts being broken away.

Figure 3 is a sectional view through Figure 1, approximately on line 3—3.

Figure 4 is a sectional view through Figure 1, approximately on line 4—4.

Figure 5 is an enlarged fragmentary view showing part of the dials and a side view of the control member illustrating certain features of the invention.

Figure 6 is a view similar to Figure 1 but showing a slightly modified arrangement of condenser plates.

Figure 7 is a sectional view through Figure 6, approximately on line 7—7.

Referring to the accompanying drawing by numerals, 1, 2 and 3 indicate the supports which may be of any suitable insulation, said supports carrying the various clamping bolts or pins 4, 5 and 6. The various stators 7 and 8 are carried in the usual manner by these bolts but arranged in two groups as shown in Figure 1. Each of these groups have the same number of stators and co-acting with the same number of rotors 9 and 10 but the stators and the rotors in the respective groups are spaced apart differently whereby one group has a different condensing action than the other, even though the plates may be of the same size.

The rotor plates 9 are clamped in any desired manner to a tubular shaft 11 while the rotor plates 10 are clamped in any suitable manner to a shaft 12 extending through the shafts 11 and also through the insulating plate 3 so that it may be engaged by the contact spring 13. At the end opposite spring 13, the shaft 12 is rigidly secured in any desired manner to a dial 14 while the shaft 11 is secured to a dial 15. These dials are independently rotatable but by reason of the actuating cone 16 and associated parts, they may be operated in unison. This cone is provided with a handle 17 for ready manual manipulation and is provided with a rod 18 extending inwardly, said rod having an enlargement or stop 19 at the inner end. This stop co-acts with the spring 20 which is housed in the sleeve 21, said sleeve carrying a ring 22 at its outer end through which the rod 18 slidingly extends. The spring acting on the ring 22 and stop 19 maintains the cone 16 in engagement with the bevel walls 23 and 24 of the dials 14 and 15 whereby as the handle 17 is swung back and forth, both dials will be moved simultaneously and also the rotors 9 and 10 will be moved simultaneously.

In using the condenser when tuning a receiving apparatus, the parts are moved to the position indicated in Figure 2 and then the handle 17 rotated. This will cause the dials 14 and 15 to move in opposite directions and also cause the rotors 9 and 10 to move in oposite directions whereby they will both move inwardly or both move outwardly in respect to the stators. After the desired tuning has been secured in this manner, the rotation of handle 17 is stopped and the handle, with the two dials, are moved as one, either to the right or left to secure vernier adjustment. This swinging of the handle, together with the dials, will cause both sets of rotors to move simultaneously and, consequently, one to move in while the other moves out which will cause a very slight change in condensing action by reason of the different condensing actions of the respective sets or rotors and stators.

When it is desired to reset the condenser, handle 17 may be pulled outwardly so as to disengage the cone 16 from the dials and then the respective dials independently moved to their zero position. Also, by pulling the cone outwardly a short distance and swinging the same slightly to one side, either of the dials may be independently shifted. It will be understood that the sleeve 21 is loosely mounted on the shaft

11 and this loose movement is sufficient to permit the lateral movement of the cone 16 when one of the dials are to be independently adjusted through the action of the cone 16. The various stator plates 7 may have the same capacity or may be of different capacities as indicated particularly in Figure 4 wherein the stator plate 7' is cut away at 7''. This will reduce the condensing action between this plate and the two adjacent rotor plates appreciably.

In Figures 6 and 7, a slightly modified form of the invention is disclosed wherein there is provided five rotors 9' in one section of the condenser and four rotors 10' in the other section. Also it will be noted that one of the plates of the rotors 9' namely, the plate 9'', is cut away at points 25 and 26. It is evident that one or more of the plates or rotors 10' might be likewise cut away so as to cause an additional difference when the rotors have been actuated as described in respect to the preferred form of the invention.

What I claim is:

1. A condenser for radio apparatus, comprising a plurality of sets of condenser elements, each set of elements including a set of rotor plates, the various sets of condenser elements having different capacities, a shaft rigidly secured to each set of rotor plates, means for simultaneously moving said shafts in opposite directions for varying the effective condensing action of the apparatus, and means for locking said shafts together so that they will rotate together and vary the condensing action of the apparatus in proportion to the difference in condensing action of the various sets.

2. A condenser for radio apparatus, comprising a set of rotor and stator plates having a given maximum capacity, a second set of rotor and stator plates having different capacities, a shaft rigidly secured to the rotor plates of each set, an independent dial connected to each of said shafts whereby said shafts and the sets of rotor plates may be independently rotated, a rotary hand operated member engaging both of said dials for simultaneously rotating the dials but moving them in opposite directions, and means for causing said member to lock said dials together whereby they may be rotated in the same direction and at the same speed.

3. A condenser for radio apparatus, comprising a plurality of sets of rotor plates, a set of stator plates for each set of rotor plates, an independent dial connected to each set of rotor plates so as to actuate said rotor plates, each of said dials having an annular beveled section, and a hand operated cone member fitting said beveled section, said cone member being rotatable whereby as it is manually rotated said dials will be moved in opposite directions and when swung in a given direction, both of the dials will be rotated in that direction.

4. A condenser for radio apparatus, comprising a plurality of sets of condensing elements, a dial operatively associated with each set of condensing elements whereby as the dials are rotated, the effective condensing action of said elements will be varied, each of the dials having an annular friction surface, a manually actuated member normally engaging said friction surfaces, a spring for holding said member against said friction surfaces so that when the member is swung to one side the dials will be rotated to that extent and when the manually actuated member is rotated the dials will be rotated in opposite directions.

5. A condenser for radio apparatus, comprising a plurality of sets of condensing elements, some of which are movable, a dial operatively connected with each of the movable sets of condensing elements, each of said dials being provided with a beveled friction surface, a cone member engaging both of the friction surfaces simultaneously, a spring acting radially to press said cone against said friction surfaces whereby when said cone is manually rotated the dials will be moved to the same extent in opposite directions and when the cone is moved bodily in the arc of a circle, the dials will both be simultaneously moved in the same direction and the same distance.

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