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ROTARY CONDENSER

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Fig. 1

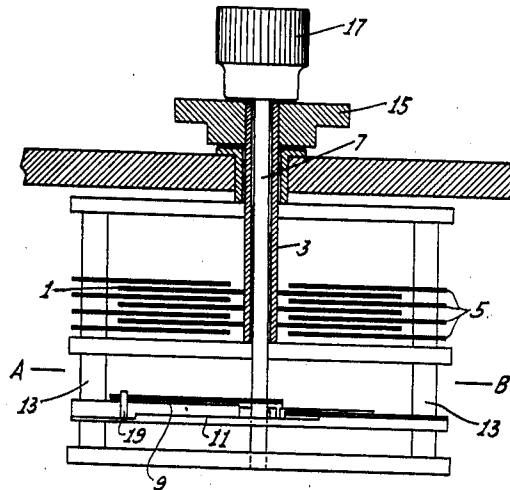


Fig. 2

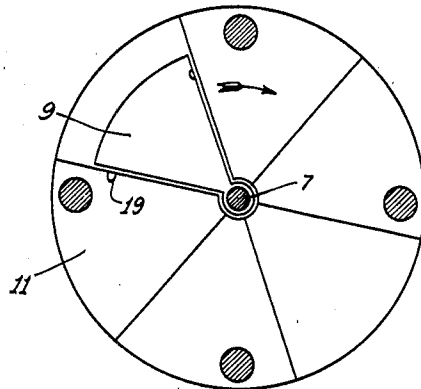
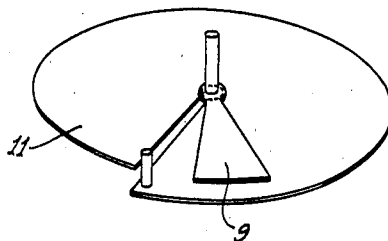


Fig. 3



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ROTARY CONDENSER.

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Rotary (superposed-plate) condensers are usually provided with a fine adjustment for the purpose of changing by small capacity values. This can be attained in the well-known manner by temporarily uniting the spindle or dial of the condenser with a fine-adjustment mechanism so that upon operation of the said fine-adjustment means, a small movement of the entire rotatable set of plates is accomplished. The form of construction, however, which is most extensively used is probably the one in which, only part of the total condenser is moved. In this scheme, one or several plates of the condenser are arranged so as to be rotatable separately, and with these fine adjustment is then feasible and is accomplished.

In connection with capacitance measurements, or for radio receivers comprising modern tube arrangements, it is often desirable to cover with the fine adjustment of the rotary condenser used a very slight change in capacity through a relatively large range of motion. For this object, however, the condensers with fine adjustment of the known types are not adequate since even in case of a minimum adjustment of the rotatable single plate intended to insure fine adjustment, a comparatively large change of capacitance is produced. Graduation of the scale to read in millionths of one microfarad of the capacity values for measuring purposes would be possible only with difficulty.

The present invention relates to a rotary condenser which is to be used particularly as a fine-adjustment condenser in combination with a coarse condenser of the usual type. This rotary condenser, according to usual practice, consists of a movable and fixed plate, change in capacitance, however, being produced by changing the air distance between the fixed and the rotatable plate upon movement of rotatable plate by virtue of a certain shape of the surface of the two plates rather than by changing the surface. For this object the stationary plate is preferably made step- or helix-shaped, while the rotatable plate is sector-shaped, the latter being movable above or below the stationary plate. Upon moving the sector plate, the active surface is preserved; the only thing that is varied, and this in a

steady way, is the thickness of the air dielectric. By this arrangement, the change in capacity produced by an actuation of the fine-adjustment mechanism between the initial position and the final position results in a minimum amount of change. Since the scale as a consequence can be made very large, this new condenser allows of accurately reading very small capacity values in capacity measurements.

Fig. 1 illustrates one application of the invention by way of example, that is, the combination of a so-called coarse condenser with the fine-adjustment condenser according to the invention.

Fig. 2 is a cross-section of the fine-adjustment condenser on line A—B, Fig. 1, and

Fig. 3 the fine-adjustment mechanism comprising a helix-shaped stationary plate.

The plate system for coarse adjustments in Fig. 1 consists of the rotatable set of plates 1 united with the hollow spindle or axis 3, and the fixed plate set 5. Guided inside the hollow spindle 3 is the spindle 7 to which the sector-shaped plate 9 of the fine-adjustment system is secured. The plate 11 carried by the distance or spacer pieces 13 in this scheme is built step-fashion. Coarse adjustment is effected by knob 15 and fine adjustment by knob 17. In Figs. 1 and 2, the fine adjustment is set to maximum capacity. On turning the sector plate 9 in the direction of the arrow as indicated, by means of a fine-adjustment knob 17, the capacity is gradually reduced by steps. The movement of the sector plate 9 is limited in the two terminal positions by means of an insulating pin 19. Knobs 17 and 15 may be furnished with a pointer which slides over a scale, and which allows of the indication of the capacity of either system at any given time.

The stationary plate of the fine-adjustment mechanism, as shown in Fig. 3, may also be helical. According to the direction of motion of the sector plate 9, the capacity is either raised or reduced steadily.

There are, of course, a great many other forms of construction adapted to the variation of the air distance between the stationary plate 11 and the movable plate or sector 9. For instance, arrangements can be so

chosen that on actuating the fine-adjustment knob 17 the sector plate 9 is turned, and simultaneously shifted axially upon the spindle. Furthermore, disk 11 need not necessarily be circular, for also a semi-circular shape can be chosen therefor. In this connection and this scheme it is also possible to give the semi-circular plate an inclined position, the sector plate being then moved above the said plate, and this results in a small variation of the dielectric strength of the condenser. By choosing a suitable form for the cross-section of the stationary plate 11, any desired shape may be obtained for the capacity curve, for instance, such that the capacity changes uniformly with the movement of the plate.

As can be calculated on basis of the formula

$$C = \frac{O}{4\pi s}$$

it is possible without special difficulties to attain capacity variations of 5 mf. and less between extreme positions of the fine adjustment mechanism; and the division of a scale provided on the condenser can then be easily made to read in terms of 1/100th of one mf.

The rotary condenser according to the invention can also be built separate, and can be used for special purposes, for example, as a neutralizing condenser and the like.

Having described my invention, I claim:

1. A rotary condenser having a fixed circular non-planar plate a planar plate and means for rotating said planar plate in a plane normal to the axis of said non planar plate whereby the distance between said plates may be varied.

2. A rotary condenser having a non-planar helical plate and a planar plate mounted for rotation in a plane normal to

the axis of said helical plate to vary the distance between said plates.

3. A rotary condenser having in combination stationary and planar rotary plates one of said stationary plates being non-planar whereby rotation of one of the rotary plates causes a change in the distance between said non-planar and rotary plate.

4. In a condenser, a fixed right helicoidal plate of constant thickness, a sector shaped planar plate mounted to rotate in a plane normal to the axis of said fixed plate, and means for rotating said planar plate.

5. In a condenser, a helicoidal plate, a planar plate mounted for rotation in a plane normal to the axis of the helicoidal plate said plates being so arranged that the area in mesh therebetween is constant, and means for rotating the planar plate, whereby the distance between said plates may be varied.

6. In a condenser, circular stationary plates including a non-planar plate, rotary planar plates disposed between said stationary plates and adapted to be rotated in a plane about the axis of said stationary plates, and means for rotating the rotatable plate adjacent said nonplanar plates so that the distance between said last named plates may be varied.

7. In a condenser, a nonplanar fixed circular plate, a sector like planar plate mounted for rotation about the axis of said nonplanar plate and means to rotate said planar plate relative to said fixed plate.

8. In a condenser, a helicoidal plate, a planar plate positioned in a plane normal to the axis of the helicoidal plate, said plates being arranged so that the area in mesh therebetween is constant, and means for rotating one of said plates whereby the distance between said plates is varied.

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