

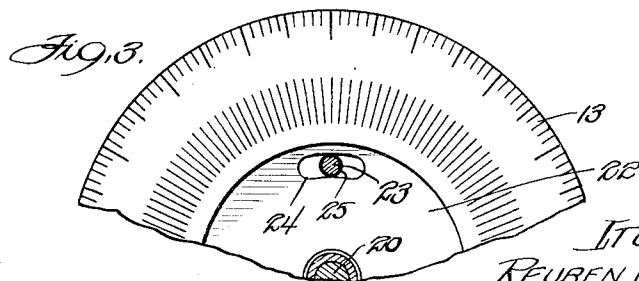
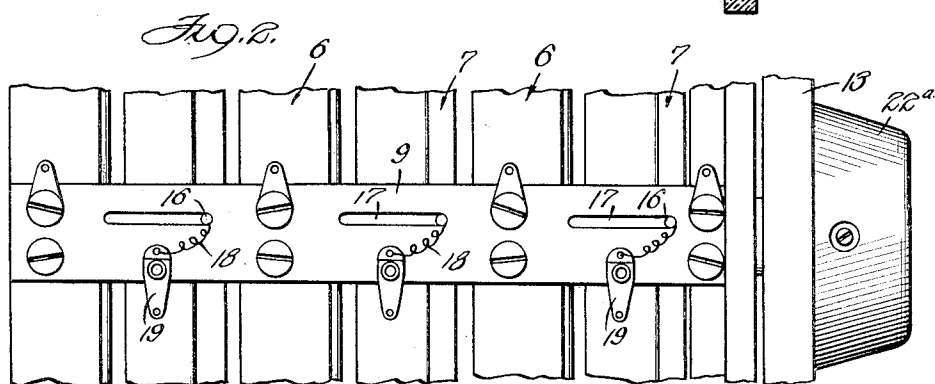
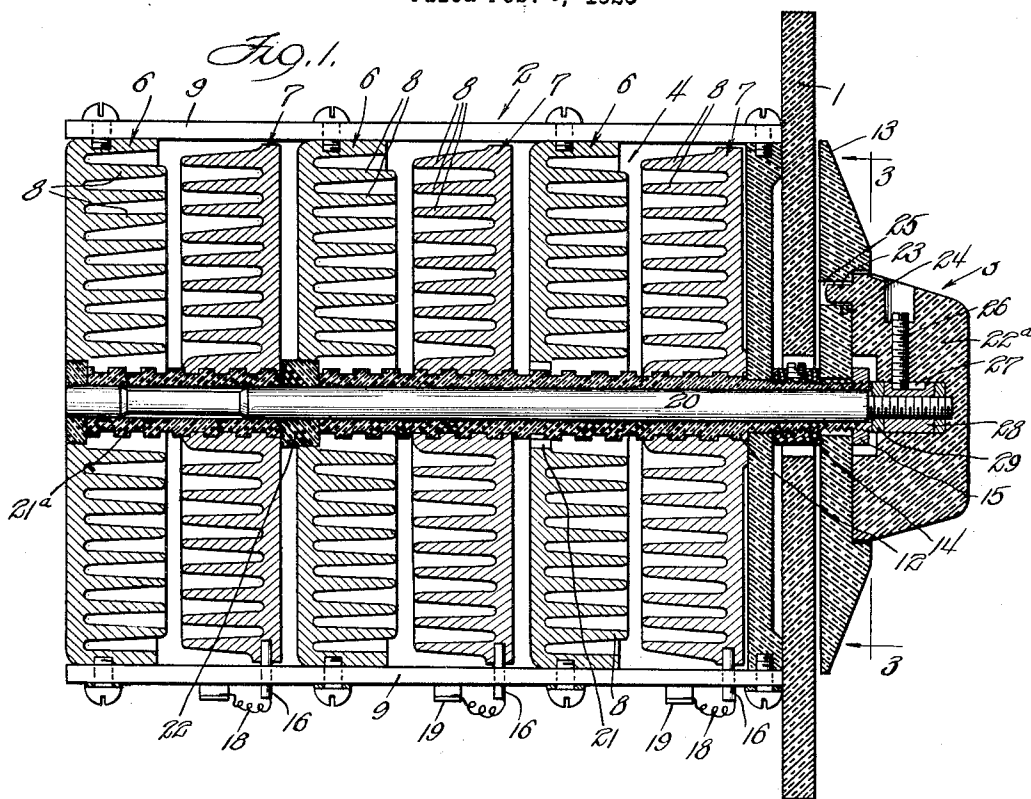
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CONDENSER

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UNITED STATES PATENT OFFICE.

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CONDENSER.

Application filed February 8, 1926. Serial No. 86,762.

My invention relates to condensers.

One of the objects of my invention is to provide a condenser of rugged construction.

A further object of my invention is to provide a condenser in which the relatively movable plates are not likely to get out of their proper position.

A further object of my invention is to provide a condenser which can readily be designed to obtain a straight line frequency effect.

A further object of my invention is to provide a multiple condenser having improved means for controlling the movement of the different units.

A further object of my invention is to provide a compact condenser.

Further objects will appear from the description and claims.

In the drawings, in which an embodiment of my invention is illustrated,

Figure 1 is an axial section through a multiple condenser;

Fig. 2 is a bottom view of part of the construction shown in Fig. 1; and

Fig. 3 is a sectional view substantially on the line 3—3 of Fig. 1.

Referring to the drawings in detail, the construction shown comprises an insulating panel 1, such as might be used in a radio receiving set, a three-unit multiple condenser 2 mounted on the rear of the panel, and a compound dial 3 mounted on the front of the panel for controlling the three condenser units. In certain types of radio receiving sets it is customary to have two of the condenser units move in unison, controlled by a single manually operable knob or dial, with the third condenser units having provision for adjustment independently of the pair which are moved in unison. The dial construction which I have shown provides for this method of operation.

The two front condenser units 4 and 5, those nearest the panel are mounted to operate in unison. Each of these two units comprises a stationary member 6 and an axially slidable member 7. These members are both provided with interfitting nested substantially cylindrical plate or leaf portions 8. The cylindrical plate portions of the movable member 7 enter the annular spaces between the cylindrical plate portions of the stationary member as the movable member is shifted axially. As shown in Fig. 1, the

plates of both the stationary and the movable member are tapered in axial cross-section so that relative movement of the two members with respect to each other, not only varies the overlapping area of the plates, but also varies the distance between the plates of the two members. By properly designing the taper, the capacity effect of the condenser may be made such that a straight line frequency variation may be obtained. These members 6 and 7 may be made with sufficient accuracy by die-casting. The nested cylindrical leaves or plates form a strong rugged construction which does not get out of adjustment.

The stationary member may be mounted on insulating bars 9 by means of screws 10. These bars may be secured at their front ends to an end plate 11, which, in turn, may be secured in any suitable manner to the front panel.

The axial movement of the movable members 7 is effected by means of a threaded sleeve 12 with which the movable members have threaded engagement. A manually operable dial 13 is secured to the front end of the sleeve 12. This dial is secured so that the sleeve will rotate therewith by means of two collars 14 and 15 threaded on the sleeve, between which collars the dial is clampingly held.

In order to prevent the movable members of the condenser units from turning with the threaded sleeve, in which they are mounted, each member is provided with a pin 16 on its lower side which slides in a slot 17 in the insulating bar 9. A flexible pig-tail connection 18 leads from this pin 16 to a binding terminal 19 mounted on the insulating bar 9. The fixed members of the condenser units are centered and insulated with respect to the rotatable sleeve 12 and shaft 20 by means of insulating collars 21 and 22.

The construction of the rear unit of the multiple condenser is substantially the same as that of the two units just described, except that the short threaded sleeve 21^a which gives the movement to the movable member 7 of the condenser is mounted on the shaft 20 extending through the long sleeve 12 which controls the movement of the two forward condensers. For operating the rear condenser a manually operable knob 22^a is mounted on the front end of this shaft. The construction of the dial 13 and knob 22^a is such that

the manually operable knob 22 may be used to control all three of the condenser units. For this purpose a combination clutch and lost motion connection is provided between the dial 13 and the knob 22^a. This clutch and lost motion connection comprises a pin 23 on the rear face of the knob and a recess in the dial with which the pin cooperates. The knob is feathered on the shaft 20 so that it can be slipped in and out a limited distance. In the forward position of the knob, the pin 23 fits in an arcuate slot 24 in the dial, but in the rear position of the knob the pin extends into and fits in a hole 25 extending from the bottom of the arcuate slot 24. Thus in the forward position of the knob a limited lost motion connection is provided between the knob 22 and dial 13, while in the rearward position of the knob relative rotation between the knob and dial is prevented and the dial and knob move in unison. The lost motion connection prevents the dial and knob from getting materially out of alignment with respect to each other, but still permits enough independent adjustment of the independent adjustable condenser unit for the purpose required in a receiving set. The feathered connection between the knob and shaft is effected by means of a screw 26 threaded in the knob 22^a and having its inner end slidable in a groove 27 in a sleeve 28 mounted on the front end of the shaft. This sleeve is held against relative rotation with respect to the shaft by means of two nuts 29 between which the sleeve is clamped.

In use, the three condenser units are tuned in unison for the first part of the operation by means of the knob 22^a in its rearward position with the pin 23 fitting in the hole 25 in the dial. For the final close adjustment of the independently adjustable condenser unit, the knob 22^a is pulled to its forward position so that the pin 23 on the knob is free to move in the arcuate slot 24 in the dial 13 to permit a slight further adjustment of the rear unit without any movement of the two front units.

In order to give the movable container members sufficient movement it may be desirable to use a double or triple plate on the threaded actuating members.

I claim:

1. In a radio receiving set, two adjustable electrical devices, and means for adjusting said devices, comprising a shaft for controlling one of said devices, a sleeve surrounding said shaft for controlling the other devices, and two cooperating clutch members, one on said sleeve and the other on said shaft, one of said clutch members being provided with a manually operable handle, one of said clutch members being slidable longitudinally with respect to said shaft for engagement and disengagement with respect to the other clutch member, said clutch members having

means for limiting their relative rotation when not in clutching engagement.

2. A gang condenser construction comprising a panel, framework mounted on said panel and extending rearwardly therefrom, a plurality of condenser units mounted on said framework, one in front of the other, each unit comprising a stator element secured to said framework and a slidable element slidable transversely of the panel toward and from said stator element, said stator and slider elements comprising intermeshing concentric condenser elements, means for actuating one of the slider elements comprising a hollow rotatable shaft coaxial with said concentric condenser elements extending through the panel and having threaded engagement with one of the slider elements, and means for actuating a second slider element comprising a shaft extending through the panel, hollow shaft, and one of the condenser units, and having a threaded engagement with said second slider element, said slider elements having a slidable engagement with said framework to prevent them from rotating with the actuating shafts.

3. A gang condenser construction comprising a panel, framework mounted on said panel and extending rearwardly therefrom, a plurality of condenser units mounted on said framework, one in front of the other, each unit comprising a stator element secured to said framework and a slidable element slidable transversely of the panel toward and from said stator element, said stator and slider elements comprising intermeshing concentric condenser elements, means for actuating one of the slider elements comprising a hollow rotatable shaft coaxial with said concentric condenser elements extending through the panel and having threaded engagement with one of the slider elements, and means for actuating a second slider element comprising a shaft extending through the panel, hollow shaft, and one of the condenser units, and having a threaded engagement with said second slider element.

4. A gang condenser construction comprising a panel, framework mounted on said panel and extending rearwardly therefrom, a plurality of condenser units mounted on said framework, one in front of the other, each unit comprising a stator element secured to said framework and a slidable element slidable transversely of the panel toward and from said stator element, said stator and slider elements comprising intermeshing concentric condenser elements, means for actuating one of the slider elements comprising a hollow rotatable shaft, extending through the panel and having threaded engagement with one of the slider elements, and means for actuating a second

slider element comprising a shaft extending through the panel, hollow shaft, and one of the condenser units, and having a threaded engagement with said second slider element.

5 5. A gang condenser construction comprising a plurality of condenser units mounted one in front of the other, each unit comprising a stator element and a slider element slidable toward and from said stator
10 element, said stator and slider elements comprising intermeshing cylindrical condenser elements, means for actuating one of said condenser elements comprising a hollow rotatable shaft having its axis extending
15 longitudinally of the axis of the cylindrical elements, and having threaded engagement with one of the slider elements, and means for actuating a second slider element comprising a shaft extending through said hollow
20 shaft and through one of the condenser units and having a threaded engagement with said second slider element.

6. A gang condenser construction comprising a panel, framework mounted on said
25 panel and extending rearwardly therefrom, a plurality of condenser units mounted on said framework, one in front of the other, each unit comprising a stator element secured to said framework and a slidable element
30 slidable transversely of the panel toward and from said stator element, said stator and slider elements comprising intermeshing concentric condenser elements, and means for actuating said slider elements
35 comprising a rotatable threaded shaft extending through said panel and stationary condenser elements and having a threaded engagement with said slider elements for actuating them.

40 7. In a multiple-unit condenser, each unit comprising a stator and a slider each having a series of concentric plates, a shaft for op-

erating the slider of one unit, a hollow shaft for operating the other units, said shafts having spiral grooves thereon, means on said
45 sliders engaging said grooves for changing the capacity relation between the plates of the stators and sliders, and means for limiting the independent movement of said first named shaft.

8. In a multiple-unit condenser, each unit comprising a stator and a slider each having a series of integrally formed concentric plates, a shaft for operating the slider of
50 one unit, a hollow shaft for operating the other units, said shafts having spiral grooves thereon, means on said sliders engaging said grooves for changing the capacity relation between the plates of the stators and sliders, and means for limiting the independent
55 movement of said first named shaft.

9. In a multiple-unit condenser, each unit comprising a stator and a slider each having a series of concentric plates, a shaft for operating the slider of one unit, a hollow
60 shaft for operating the other units, said shafts having spiral grooves thereon, means on said sliders engaging said grooves for changing the capacity relation between the plates of the stators and sliders, and lost
65 motion means for limiting the independent movement of said first named shaft.

10. A gang condenser construction comprising an actuating shaft, a plurality of stator condenser elements, one for each unit,
70 a plurality of condenser elements movable longitudinally of the axis of said shaft and actuated by said shaft, one of said stator elements being located between two of said movable elements and having an opening
75 through which said actuating shaft extends.

In witness whereof, I have hereunto subscribed my name.

REUBEN B. BENJAMIN.