July 11, 1933. M. H. BENNETT ET AL 1,917,487

VARIABLE ELECTRIC CONDENSER

Filed May 8, 1929

Fig. 1.

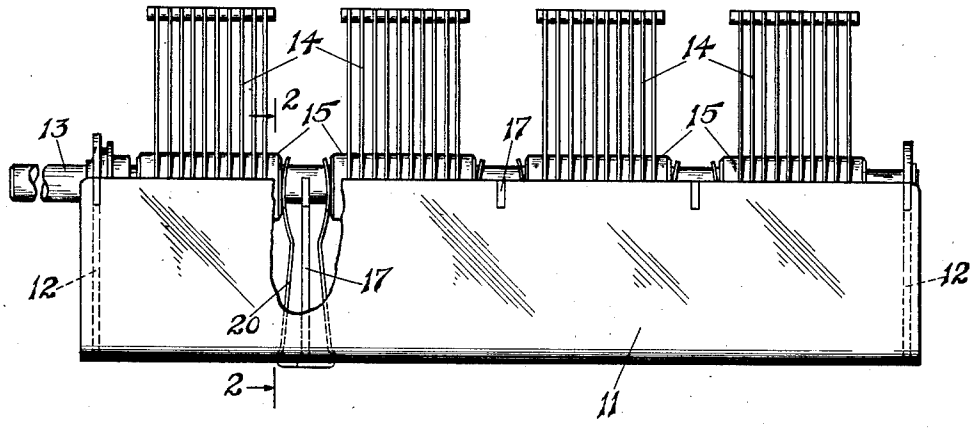


Fig. 2.

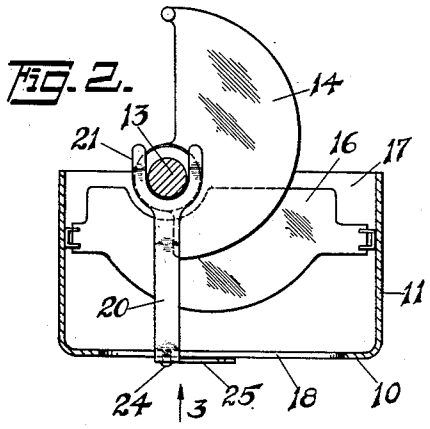


Fig. 3.

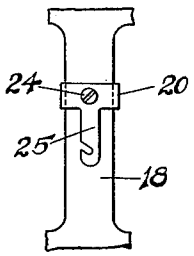
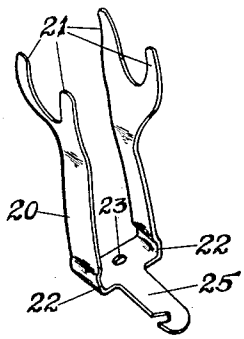


Fig. 4.



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UNITED STATES PATENT OFFICE

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VARIABLE ELECTRIC CONDENSER

Application filed May 8, 1929. Serial No. 361,270.

This invention relates to variable electric condensers.

In radio receiving circuits involving several stages of amplification, it has been the practice to mount the rotors of the variable condensers for all the stages on a common shaft and frame for so-called one dial control. It has further been the practice to journal the shaft in the frame at its ends with the rotor elements of all the condensers connected or grounded to the frame by their connection with the shaft.

When employing such arrangements on very sensitive sets with a gang of condensers, it has been found that those condensers mounted along the shaft away from its point of contact with the frame have their rotor elements at a different potential than those near to the points of support, the difference being due to the potential drop along the shaft length. Such difference in potential causes transfer of energy from stage to stage and produces undesirable electrical unbalance.

It is an object of this invention to provide a gang condenser construction such that the rotor elements of the gang condensers are equalized as to potential.

With this general object in view, the invention consists in the features, combinations, details of construction, and arrangements of parts which will first be described in connection with the accompanying drawing and then more particularly pointed out.

In the drawing:

Figure 1 is a side elevational view of a gang condenser constructed and arranged in accordance with the present invention;

Figure 2 is a transverse sectional view taken as on line 2—2 of Figure 1;

Figure 3 is a bottom view of a portion of the construction;

Figure 4 is a perspective view of an element of the construction.

Referring to the drawing, the illustrated exemplification comprises a frame having a bottom 10, side walls 11, and end walls 12. The frame supports a gang of condensers (in the example, four), the rotors of which are mounted on a common shaft. The common shaft 13 extends lengthwise of the frame and is journalled in the end walls 12. The condenser rotor elements 14 are carried on this shaft in spaced relation and comprise groups of plates mounted on sleeves 15 on the shaft. The rotor plates are adapted for intermeshing with sets 16 of stator plates supported on and within the frame. The rotor shaft is extended at one end beyond the end wall for attachment of a dial knob (not shown) or for other means for rotating said shaft.

The construction advantageously includes means for electrostatically shielding the separate condensers of the gang assembly. In the example shown, such means comprise cross plates 17 mounted between the condensers and supported by the frame. The bottom side of the frame is also advantageously provided with openings between the cross plates, leaving cross members 18 which plates 17 engage.

The invention in its entirety includes the provision of means for equalizing the potential of the rotor elements with respect to the frame. This may be accomplished by electrically connecting each rotor to the frame independently of the end bearings. In structures embodying the invention to what is now considered the best advantage, the electrical connections are obtained by brushes associated with the frame and making wiping contact with the rotors. In this exemplification, the brushes contact with the ends of the sleeves carrying the rotor plates. To this end, the brushes are advantageously constructed in the form of yokes 20, the ends of which terminate in spaced fingers 21, which accommodate the rotor shaft and wipe along adjacent end surfaces of adjacent sleeves 15. The brushes are shown as of thin conducting sheet metal to engage the ends of the sleeves with little friction and permit freedom of rotation of said shaft, while establishing good wiping contacts.

Means are provided for securing the brushes to the frame, both mechanically and electrically. To this end, the brushes slip over the cross members 18 of the frame and are formed with off-set seats 22 so as to be snapped into place on the cross members.

The seats embrace the cross members when the brushes are in their final positions with the fingers wiping against the sleeve ends. In order to further secure the brushes to the frame, the former may be tapped as at 23 to receive threaded screws 24 or other fastening elements which are passed into the cross members embraced by the brushes. In lieu of such fastening means, the brushes may be soldered in their positions.

Means may be advantageously provided for securing conductors to the frame or to the brushes. This may be conveniently accomplished by providing the brushes, preferably the bight portions thereof, with tabs 25 to which connection may be made in any suitable manner.

It is evident that the brush assembly here shown and described may be easily and economically manufactured, being readily stamped out of sheet stock and formed in one operation. In general, the resistances and inductances of the brushes should be low, for best results, and made as small as practicable.

With the construction described, there is provided a simple and effective arrangement whereby equalization in potential between gang condensers may be accomplished.

What is claimed is:

1. In a gang condenser, and in combination, a frame, a shaft journalled therein at its ends, sleeves on said shaft, rotor elements carried by said sleeves, and means for electrically connecting said sleeves to said frame comprising forked yokes each wiping the ends of a plurality of said sleeves and being secured to said frame.

2. In a gang condenser construction, and in combination, a main frame including cross members, a shaft journalled in said frame, rotor elements carried by said shaft, and means for connecting adjacent rotor elements to said frame comprising brushes for making wiping contact with said elements, said brushes comprising yokes embracing the cross members, said yokes being shaped to fit the contour of said members and to snap over said members in place.

3. In a gang condenser construction, and in combination, a main frame, a shaft journalled in said frame, spaced rotor elements carried by said shaft, and means for connecting adjacent rotor elements to said frame comprising U-shaped brushes, the base of each U-shaped brush member being secured to the frame and each of the upstanding arms thereof making wiping contact with a different rotor.

4. In a gang condenser construction, and in combination, a main frame, a shaft journalled in said frame, spaced rotor elements carried by said shaft, and means for connecting adjacent rotor elements to said frame comprising U-shaped brushes, the base of each U-shaped brush member being secured to the frame and each of the upstanding arms thereof carrying spaced fingers having wiping contact with a different rotor.

5. In a gang condenser, and in combination, a frame, a shaft journaled therein, a plurality of spaced groups of rotors carried by said shaft, and means for equalizing the potential between adjacent rotors comprising a yielding brush connected to said frame and having spring wiping contact arms urged in opposite directions, one arm against one rotor group and the other against another rotor group.

6. The combination with a gang condenser including a common shaft and frame and rotor elements spaced on said shaft, of a plurality of conducting yokes connected to the frame, each of said yokes having wiping contacts with adjacent rotors.

7. The combination with a gang condenser including a common shaft and frame including a yoke carrying portion, spaced sleeves carried by said shaft and having adjacent ends, and rotor elements on said sleeves, of a forked conducting element having a pair of resilient arms providing a frame engaging seat and receiving between them in frictional gripping relation said yoke carrying portion, each of said arms having wiping contact with a different rotor.

In testimony whereof, we have hereunto set our hands.

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