

Oct. 9, 1934.

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1,976,571

ELECTRICAL APPARATUS

Filed March 9, 1931

2 Sheets-Sheet 1

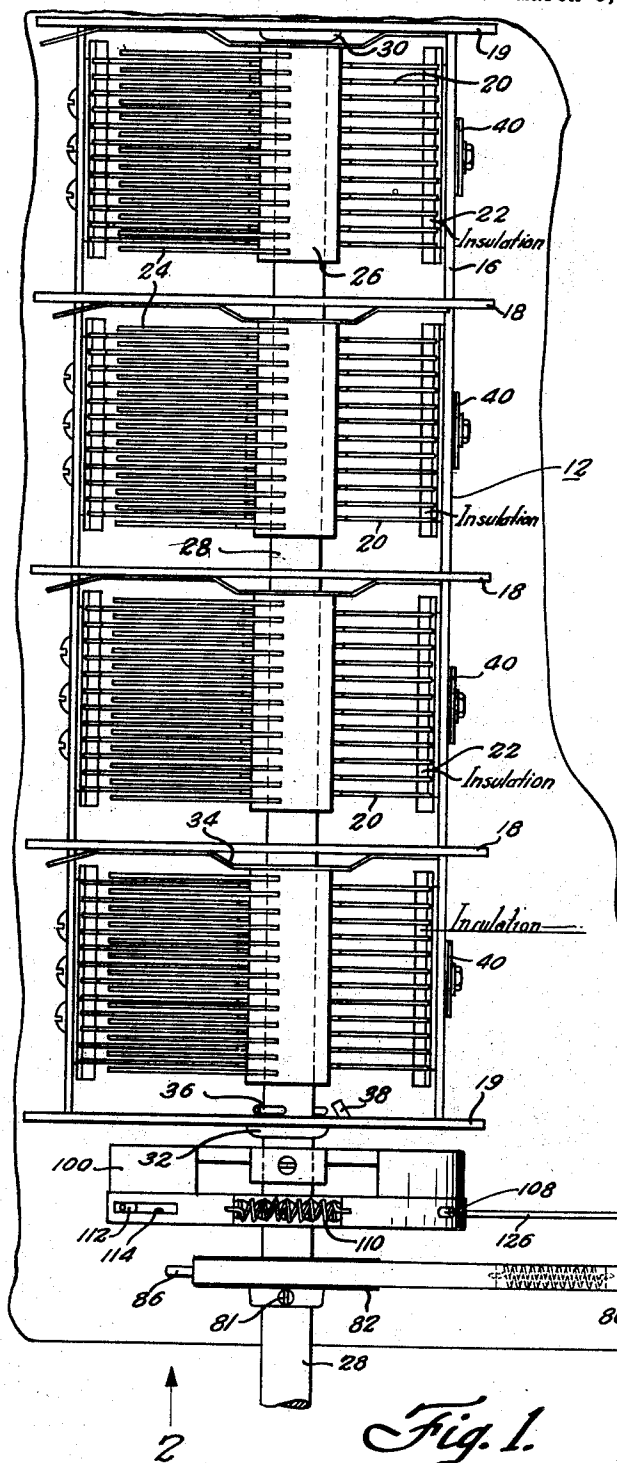


Fig. 1.

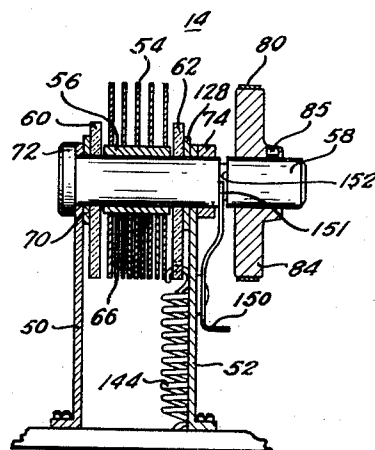
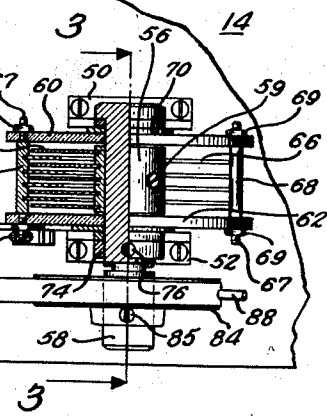


Fig. 3.



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2 Sheets-Sheet 2

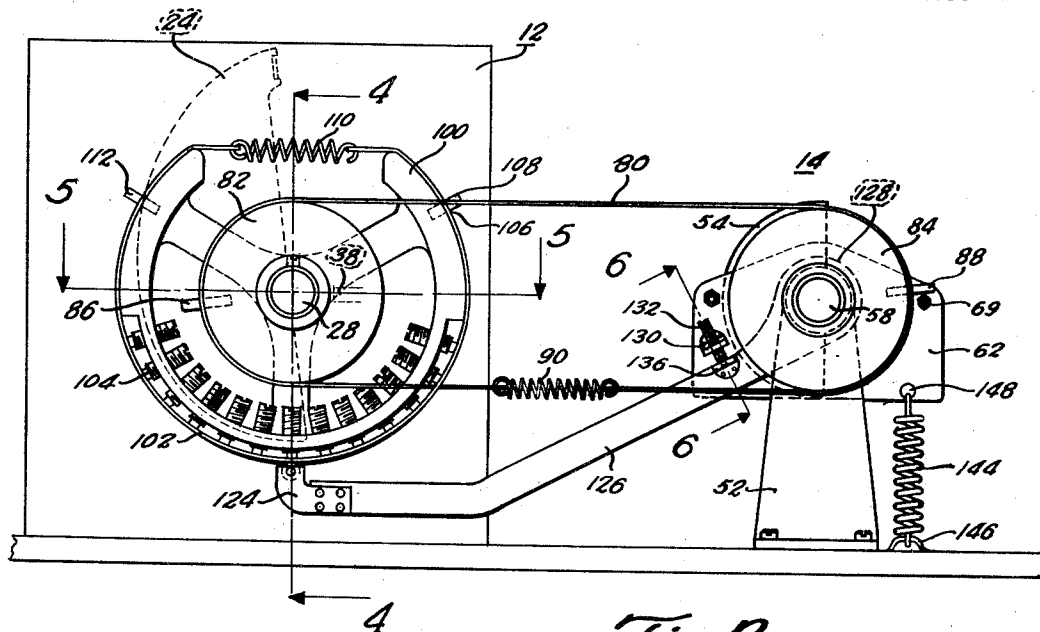


Fig. 2.

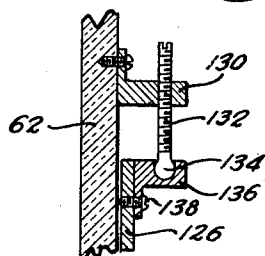


Fig. 6.

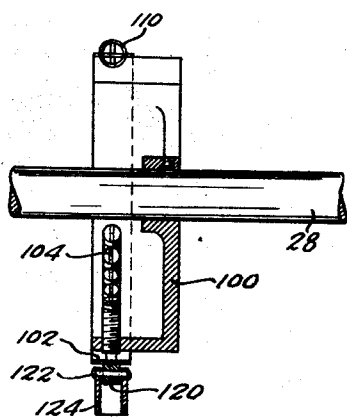


Fig. 4.

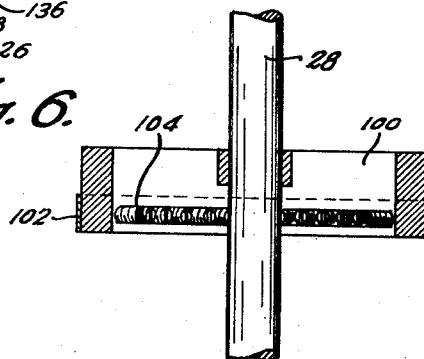


Fig. 5.

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ELECTRICAL APPARATUS

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Application March 9, 1931, Serial No. 521,207

3 Claims. (Cl. 175—41.5)

This invention relates to gang condensers and more particularly to a driving mechanism for the condensers.

In the modern radio receiver it is very desirable to have a common drive for actuating the tuning devices in the circuit in unison. In radio frequency amplifiers, difficulty is found in the adjustment of the antenna circuit in unison with the tuned circuit in the cascade amplifier for the reasons, that the reactance as reflected into the tuned circuit from the antenna circuit is not always the same as the reactance that is reflected from the anode circuits into a tuned circuit. Likewise in the amplification of radio signals by superheterodyne receivers it is very difficult to arrange the circuits so that the beat frequencies or intermediate frequencies is constant throughout the broadcast range as the capacity in the oscillator circuit does not change at the same rate as does the capacity of the selector circuit.

An object of this invention is to provide a variable driving mechanism that will take care of the variations of the electrical constants of the several circuits without these constants being the same.

Another object of this invention is to provide a cam mechanism for oscillating the stator of one of the variable gang condensers, whereby the movement of the stator will compensate for the irregularities in the constants of the circuit.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 discloses a plan view of the condenser structure with parts in section.

Fig. 2 is an end view looking in the direction of the arrow 2 in Fig. 1.

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

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 is an enlarged sectional view taken on the line of 6—6 of Fig. 2.

Mounted upon the frame 10 which may be the base of a radio receiver is found a plurality of gang condensers indicated broadly by the reference character 12 and an individual or auxiliary gang condenser indicated by the reference character 14. A suitable frame 16, that may be U-shaped is provided with end walls 19 and a

plurality of metallic partitions 18 that divide the condenser frame 16 into a plurality of compartments, each of which encloses the stator plates 20 carried by the insulation mounting 22, attached to the frame 16 and the rotors 24 suitably attached to sleeves 26 carried by a shaft 28 journaled in the end walls 19 at 30 and 32 and passing through the partitions 18.

In the modification disclosed in Fig. 1, the rotors have been grounded to the partitions 18 and one end wall 19 by brushes 34 that frictionally engage the end of the tubular sleeve 26. A pin 36 passing through the shaft 28 limits the rotation of the rotors 24, in that, the pin 36 engages a stop 38 that may be struck out of the end wall 19. Suitable adjustable condensers 40 for adjusting the capacity of each of the gang condensers may be carried by the frame 16. Thus far a conventional tuning condenser has been disclosed and does not form the invention per se.

The auxiliary condenser 14 is carried on a shaft 58, journaled in the uprights 50 and 52, mounted on the base 10. The rotor plates 54 are attached to a tubular sleeve 56 that is mounted on the shaft 58 and held in position by a suitable set screw 59. The cross bars 68 supporting the stator plates 66 are provided with reduced ends 67 that are threaded and that pass through insulating supports 60 and 62, pivotally mounted on the shaft 58. Suitable nuts 69 that threadedly engage the reduced portions 67, hold the cross bars 68 and the insulating supports 60 and 62 in a relatively rigid relation. A washer 70 is interposed intermediate the insulating support 60 and the upright 50 so as to properly space the supporting member 60 with respect to the upright 50. Endwise movement of the shaft 58 is prevented by a shoulder 72 integral therewith and by a collar 74 rigidly attached thereto in any suitable manner, such as by a key 76, as best seen in Fig. 1.

The condenser driving mechanism for rotating the shaft 58 and the rotor 54 includes a drive belt 80 that passes over the pulley 82 attached to the shaft 28 by set screw 81 and a pulley 84 attached to the shaft 58 by a suitable set screw 85. In order to prevent slippage a pair of pins 86 and 88 carried by the pulley 82 and 84 respectively pass through suitable apertures in the belt 80 so as to cause a positive drive between the rotors 24 and the rotor 54 of the auxiliary condenser 14. The tension of the belt 80 is maintained uniform by a spring 90.

In addition to the rotary movement of the rotor plates the stator plates 66 oscillate so as to cause a change in the capacity of the auxiliary

condenser that is a function other than the rotary movement imparted to the rotor by the belt 80. This oscillating movement of the stator 66 is caused by an oscillating mechanism now to be described.

The shaft 28 carries a cam sector 100 that is provided with an adjustable cam surface that includes a flexible band 102 supported on a plurality of adjustable studs 104 threadedly engaging member 100. The cam sector 100 carries a pair of radially arranged studs 108 and 112 that pass through aperture 106 and slot 114 in the flexible band 102 so as to hold the band in position on the sector 100, a spring 110 interposed between the ends of the band 102 takes up any slack in the belt caused by the adjustment of the studs 104.

A cam follower 120 that engages the flexible band 102, is carried on the pin 122 supported in a bifurcated arm 124, suitably attached to the rocker arm 126 having an end 128 movably mounted on the shaft 58. The rocker arm 126 is attached to the stator through an adjusting mechanism including a threaded bracket 130 suitably attached to the stator support 62 and an adjusting screw 132 having one end 134 cooperating with a socket member 136, suitably attached to the rocker arm 126 by screws 138, to form a ball and socket joint.

The cam follower 120 is biased toward the cam surface of the flexible band 102 by helical spring 144 mounted in tension intermediate the aperture 148 in the insulating support 62 and a loop 146 provided in the base 10. Instead of a spring tension a suitable spring could of course, be provided directly engaging the rocker arm 126.

A brush 150 having a bifurcated end 151 engages an annular groove 152 in the shaft 58 so as to either ground the rotor plates 54 or to provide a suitable terminal for connecting an external circuit to the rotor.

Operation

As the shaft 28 is rotated the rotors mounted thereon are also rotated in unison so as to change the capacities of each of the condensers mounted in the frame 16. As the shaft 28 is rotated the rotor of the auxiliary condenser 14 is also rotated so as to change the capacity of this condenser. When the condenser 14 is used in a circuit where it may become essential to change the curve of this condenser, for the reason, that there may be variations in electrical constants in this circuit that cannot very well be taken care of when building the radio receiver this may be taken care of by oscillating the stator. This is accomplished by adjusting the studs 104 thereby changing the characteristic curve of the con-

denser 14 by changing the swing of the oscillations of the stators 66. It can be readily seen that in addition to the movement of the rotors 54 the stators 66 are also moved so as to affect the capacity of the condenser 14 for particular settings.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a system wherein a plurality of variable condensers, each including movable plates and stationary plates are adjusted by means including a shaft common to the movable plates for adjusting the movable plates in unison, an auxiliary condenser separately mounted, said auxiliary condenser including rotary plates and oscillating stator plates, means drivingly coupling said auxiliary condenser to said condensers including a driving means for simultaneously driving all rotary plates, a cam mounted on said shaft and operatively associated with a driving arm adjustably mounted on the said oscillating stator plates.

2. In a condenser assembly wherein a plurality of condensers are driven by a common drive shaft which is adapted to rotate the rotors of the condensers in unison, an auxiliary condenser mounted separately from said plurality of condensers and including rotor plates and oscillating stator plates, a driving mechanism driven by said drive shaft, said driving mechanism simultaneously rotating the rotor and oscillating the stator of the auxiliary condenser.

3. In a condenser assembly wherein a plurality of condensers are driven by a main drive shaft which is adapted to rotate the condensers to change the capacity thereof in unison, an auxiliary variable condenser comprising a main frame, a rotatable auxiliary shaft mounted on the frame and displaced from the main drive shaft, a plurality of rotor elements mounted on the auxiliary shaft and adapted to be rotated therewith, a stator frame oscillatingly pivoted on the main frame, a plurality of stator elements fixed to the stator frame and arranged so as to interleave with the rotor plates, an adjustable cam mounted for rotation on the main drive shaft, a driver arm having at one end thereof a cam follower adapted to cooperate with the cam the other end of said driver arm being pivoted on the main frame, means for attaching the driver arm at a point intermediate its two ends to the stator frame and a spring element adapted to maintain the cam follower in engagement with the cam.

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