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TEMPERATURE RESPONSIVE CONDENSER

Filed Jan. 10, 1929

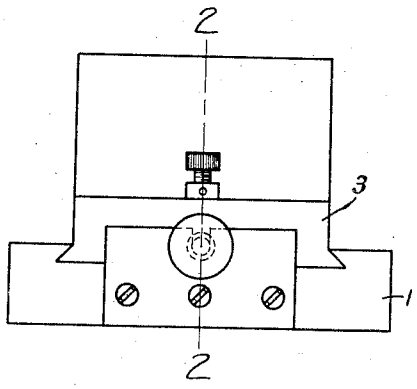


Fig. 1

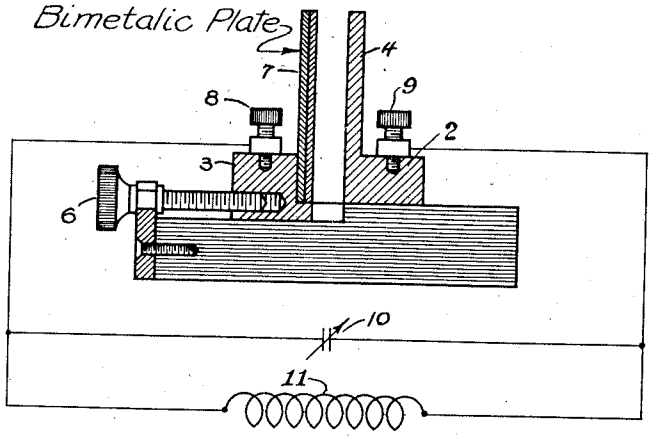


Fig. 2

Inventor

Ross Gunn

By Harold Dodd.

Attorney

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ROSS GUNN, OF WASHINGTON, DISTRICT OF COLUMBIA

TEMPERATURE RESPONSIVE CONDENSER

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Heretofore the frequency of radio resonant circuits have been controlled by pieces of quartz particularly dimensioned to afford the particular constant vibration period of frequency inherent in such dimensioned quartz and desired to be maintained in the circuit whose current flows through said quartz. This established frequency cannot be substantially changed except by the substitution of a differently dimensioned piece of quartz. However, such quartz controlled substantially constant frequency varies slightly due to temperature differences which minutely vary the quartz dimensions. Such minute changes in dimensions tend to produce correspondingly slight changes in such frequency. At low frequencies these effects of said minute changes are inconsequential, but at high frequencies of two million cycles or more, they become consequential. The effects of such minute changes have been overcome by a modification thereof consisting of thermostatically supporting an electrode of the oscillating quartz for maintaining constant the free vibration period of the quartz element of such circuit irrespective of temperature changes.

My method is most specifically distinguished from the prior practice by its steps of passing current of a resonant circuit through an inductance coil, a control condenser and a variable condenser, manually selecting the desired frequency for said circuit by appropriately adjusting the variable condenser and the plate space distance of the control condenser, and automatically adjusting, proportionate to temperature changes, the plate space distance of said control condenser to maintain said selected frequency against change in the constants of said circuit due to temperature changes.

The manual adjustment of the control condenser is for the purpose of obtaining different rates of change of capacity of the control condenser, which different rates of change are necessary for different values of the inductance and variable condenser settings for different frequencies.

Many disadvantages are inherent in the prior practices which my method has overcome, including the dispensing with crystal control and the necessity of cutting a differently dimensioned crystal for each different frequency desired, and interposing in the circuit an appropriate one of such crystals to obtain the desired frequency crystal control.

My invention relates broadly to method of and apparatus for conveniently selecting frequencies and automatically controlling the selected frequency of a generated current and more particularly to selecting and controlling the frequency of the high frequency currents in oscillating circuits.

The object of my invention is to provide a method of and apparatus for more conveniently selecting frequencies and preventing variations in the selected frequency of generated high frequency currents which variations are caused by the variations in the constants of the circuits due to effect of changes in temperature upon the apparatus constituting said circuits.

Further objects of my invention will appear more fully hereinafter as the description of the method and apparatus is developed.

It is well known that in the radio transmitting and receiving sets of the present day that the set must be operated for some time until the frequency of the apparatus becomes definitely established by the attainment of a definite temperature before any constant frequency can be transmitted or received with accuracy. This is particularly true with the transmitting sets in which there are very large changes in temperature which are very often only transient.

My invention consists substantially in the method as well as in the construction, combination and arrangement of the apparatus and the parts associated therewith or as will be more fully hereinafter set forth as shown by the accompanying drawing and finally pointed out in the appended claims.

Reference is to be had to the accompanying drawing forming a part of this specification in which like reference characters in-

dicate corresponding parts throughout the several views and in which:—

Figure 1 is a side view of my invention, and

Figure 2 is a section through Figure 1 on the line 2—2 and shows the condenser connected in an illustrative position of use.

Referring to the drawing numeral 1 designates a base plate of insulating material upon which two mounting members 2 and 3 are positioned. Mounting member 2 is rigidly fastened to the base plate 1 and carries the fixed condenser plate 4 of my condenser that is mounted thereon in any suitable manner. The member 3 is adjustably mounted in a dovetail groove in the base 1 by means of a micrometer screw 6 and carries a bimetallic plate 7 which forms the variable plate of my condenser. The mounting members 2 and 3 are metallic and carry terminals 8 and 9.

Referring particularly to Figure 2 which shows my condenser in illustrative connection with one of the circuits with which it may be used, numeral 11 designates a coil and numeral 10 a parallel variable condenser, forming therewith a resonant circuit. By the proper adjustment by screw 6 of the relative distance between the plates 4 and 7 and the requisite manipulation of the condenser 10 the circuit may be placed in operation at the thus selected frequency. Should there be any increase in the surrounding temperature sufficient to cause the inductance of the coil 11 to decrease the increase in capacity of the circuit caused by the bending of the bimetallic plate or thermostat 7 toward the plate 4 will maintain the system resonant at the selected frequency irrespective of the temperature changes thereabout.

It is to be understood that the circuit with which I have shown my condenser is not to be construed as limiting the use of it in any combination within the scope of the appended claims. Further, the above description and accompanying drawing comprehend only the general and preferred embodiment of my invention and that minor detail changes in the construction and arrangement of parts may be made within the scope of the appended claims without sacrificing any of the advantages of my invention.

The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to me of any royalty thereon.

Having thus described my invention what I claim is:—

1. In a variable condenser, the combination of a plurality of condenser plates insulated from each other and adapted to be interposed in an electric circuit, means for varying the spacing between said plates in proportion to temperature changes, said means consisting of a separate plate of metal integrally attached to one side of at least one of said condenser plates, thereby forming a composite condenser plate or plates having a characteristic of expansion differing from that of its adjacent condenser plate, means for slidably supporting said composite condenser plate or plates for bodily movement closer to and further from its adjacent condenser plate, and operating means for said supporting means.

2. In a condenser, the combination of a plurality of electrically conductive condenser plates adapted to be interposed in an electric circuit, means for mounting said plates in insulated spaced relation to each other, means for varying the spaced relationship of said plates, in accordance with temperature change, said means comprising a separate plate of different composition from and attached to at least one of said condenser plates thereby forming a composite condenser plate, means for slidably supporting said composite plate or plates for bodily movement closer to and further from its adjacent condenser plate, and operating means for said supporting means.

ROSS GUNN.