Aug. 6, 1946. C. M. SINNETT 2,405,526

AUTOMATIC STOP FOR PHONOGRAPHS

Filed Jan. 13, 1945

Fig. 1.

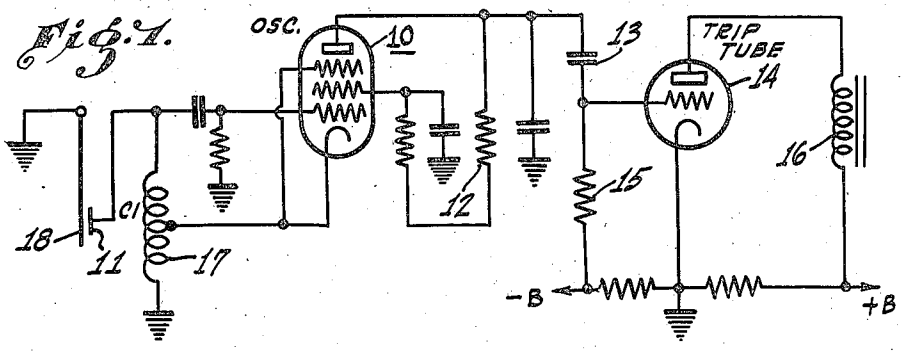


Fig. 2.

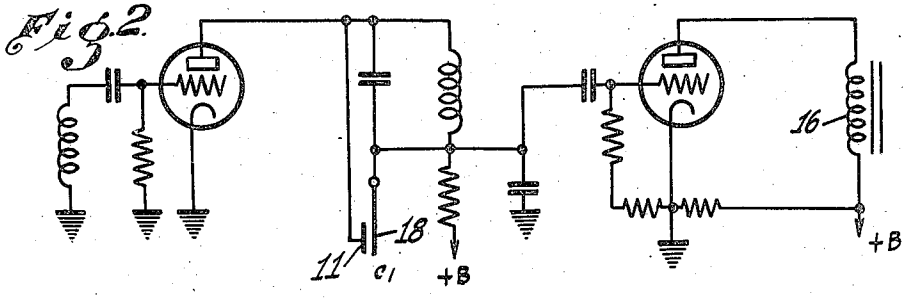
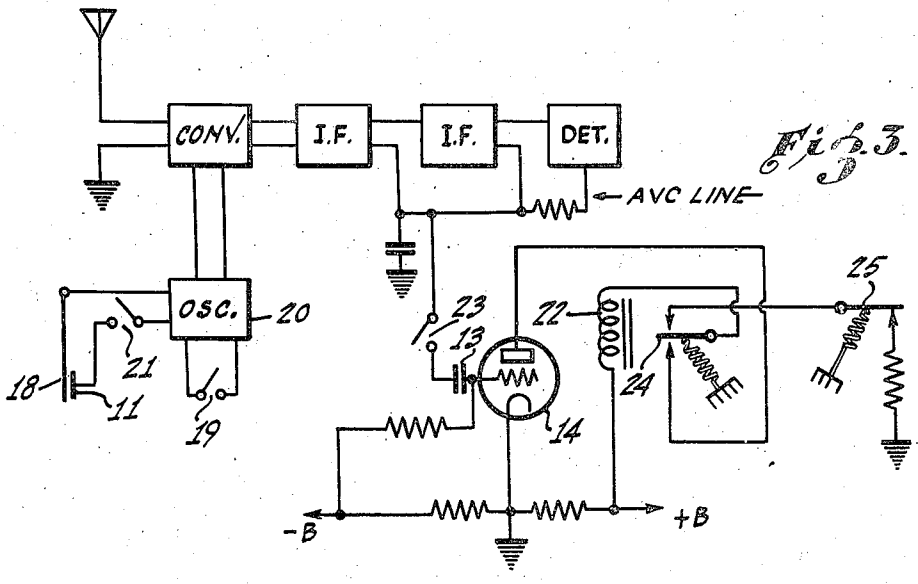


Fig. 3.



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AUTOMATIC STOP FOR PHONOGRAPHS

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5 Claims. (Cl. 179—100.11)

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This invention relates to automatic stops for phonographs, and has for its principal object the provision of an improved apparatus and method of operation whereby movement of the tone arm into a predetermined position functions to create an electrical effect by which a control relay is operated to interrupt the operating current of the phonograph, or to control operation of a record changing mechanism, or to initiate operation of another device.

In the specific embodiments of my invention to be described herein, the electrical effect, which interrupts the supply of operating current to the phonograph or produces some other effect, is produced in response to movement of the tone arm at a higher speed than that at which it is moved during the reproduction of sound from the sound record. One suitable means of effecting this relatively high speed movement of the tone arm is the concentric groove commonly provided at the end of the sound record groove for stopping rotation of the turntable or the like.

The electrical effect so produced may be a change in capacitance which is applied to the input of an oscillator and produces in the oscillator output a potential whereby the control grid potential of a control tube is so changed as to trip a relay.

Important objects of the invention are the provision of an improved circuit control means which functions in response to a relatively rapid change in capacitance to operate a relay or the like; and the provision of an improved control device and method of operation whereby the operating current of a phonograph is interrupted or its record changing mechanism is energized when its tone arm is moved at a faster speed than that required for proper reproduction of sound from a sound record.

The invention will be better understood from the following description considered in connection with the accompanying drawing and its scope is indicated by the appended claims.

Referring to the drawing:

Figure 1 illustrates an embodiment of the invention which includes an oscillator of the Hartley type,

Figure 2 illustrates another embodiment of the invention which includes an oscillator of the tuned-grid tuned-plate type, and

Figure 3 illustrates the invention as applied to a conventional super-heterodyne radio receiver.

The circuit of Fig. 1 includes an oscillator 10 which has its operating frequency varied in response to change in the capacitance of a capacitor 11, one plate of which moves with the tone arm of the phonograph. The output of the oscillator 10 includes a resistor 12 and is coupled through a capacitor 13 to the input of a gas triode or "trip tube" 14. This tube has a resistor 15 connected in its input circuit and a relay operating coil 16 connected in its output circuit.

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With these connections, the frequency of the oscillator 10 is determined by the values of the capacitor 11 and a reactor 17. Thus, when the movable plate 18 of the capacitor 11 is moved by the tone arm close to the stationary plate of this capacitor, the frequency of the oscillator changes and there is produced a change in the oscillator output current which flows through the resistor 12. The resulting change in the potential drop of the resistor 12 functions through the coupling capacitor 13 to change the grid bias of the tube 14 so that the relay operating coil 16 has its current changed in a manner to produce the desired operation of the relay. This relay may interrupt the operating current of the phonograph motor, start an automatic cycle, or the like.

An important feature of the circuit of Fig. 1 is that slow changes in the capacitance of the capacitor 11 will not trip the tube 14 and produce operation of the relay 16 because the charge of the capacitor 13 can leak off slowly. The relatively rapid change in the capacitance of the capacitor 11 caused by movement of the reproducer stylus into the concentric terminal groove, however, produces across the capacitor 13 such a rapid change in voltage that the tube 14 is tripped and the relay 16 is operated.

The circuit of Fig. 2 is similar to that of Fig. 1 with the difference that a tuned-plate tuned-grid oscillator is substituted for that of Fig. 1 and the capacitor 11 is connected in shunt to the plate circuit tuning elements of the oscillator.

Fig. 3 illustrates how the control means of this invention may be applied to a conventional superheterodyne radio receiver with a considerable reduction in the number of parts heretofore required for conversion to phonograph operation. In the present case, there is required only (1) a switch 19 for adjusting the frequency of the local oscillator 20 to approximate that of the intermediate frequency stages, (2) a switch 21 for connecting the capacitor 11 in circuit with the oscillator as previously explained, and (3) the trip tube 14 together with the relay and the required interconnecting circuits.

Change in the capacity of the capacitor 11, as in the previous cases, produces change in the fre-

quency of the oscillator **20**. This causes a change in the intermediate frequency signal supplied to the detector and a corresponding change in the automatic volume control bias. This change in bias is applied through a switch **23** and the capacitor **13** to the input of the tube **14** causing it to conduct, as in the previous cases.

As a result, operation of the cycling relay **22** is initiated so that the movable contact of the switch **24** is moved into engagement with its upper fixed contact and is held there by current through the coil **22** until the switch **25** is opened at some part of the automatic cycle and the normal standby condition of the circuit is restored.

I claim as my invention:

1. The combination of an oscillator including means responsive to movement of the tone arm of a phonograph for changing the frequency of said oscillator, means for moving said tone arm at slower and faster rates, and means responsive to said faster rate for changing a condition of said phonograph.

2. The combination of an oscillator including means responsive to movement of the tone arm of a phonograph for changing the frequency of said oscillator, means for moving said tone arm at slower and faster rates, impedance means connected in the output circuit of said oscillator, and means responsive to the potential drop of said impedance means for changing a condition of said phonograph.

3. The combination of an oscillator including

means responsive to movement of the tone arm of a phonograph for changing the frequency of said oscillator, means for moving said tone arm at slower and faster rates, and means including a gas triode having an input circuit coupled to the output circuit of said oscillator for producing an electrical effect in response to said faster rate.

4. The combination of an oscillator including means responsive to movement of the tone arm of a phonograph for changing the frequency of said oscillator, means for moving said tone arm at slower and faster rates, means including a gas triode having an input circuit coupled to the output circuit of said oscillator for producing an electrical effect in response to said faster rate, and circuit control means responsive to said effect.

5. The combination of a super-heterodyne radio receiver including a local oscillator and automatic volume control bias means connected between a detector and an intermediate frequency amplifier, means for adjusting said local oscillator to produce a frequency substantially the same as that of said intermediate frequency amplifier, means responsive to movement of the tone arm of a phonograph for changing the frequency of said oscillator, means for moving said tone arm at slower and faster rates, and means responsive to the potential drop of said automatic volume control bias means for producing an effect in response to said faster rate.

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