

April 15, 1930.

J. WEINBERGER

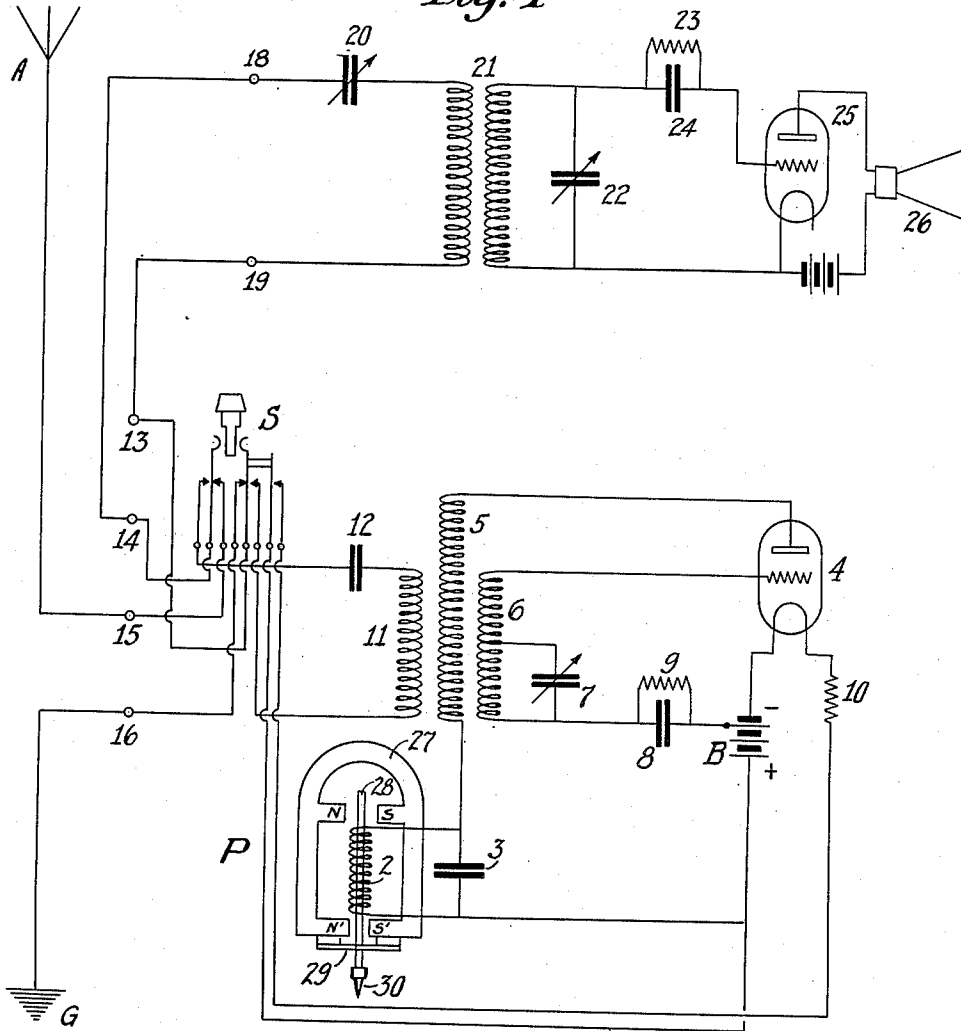
1,754,293

PHONOGRAPH ADJUNCT FOR RADIO SETS

Filed June 2, 1925

2 Sheets-Sheet 1

Fig. 1



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Fig. 2

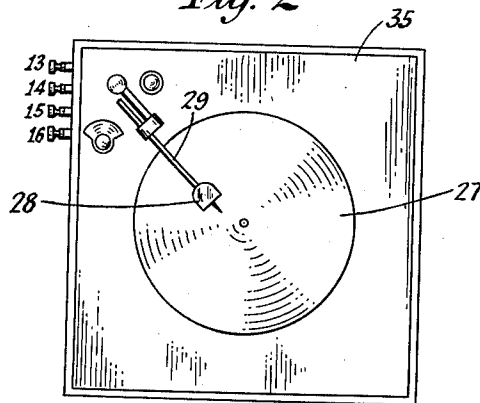


Fig. 4

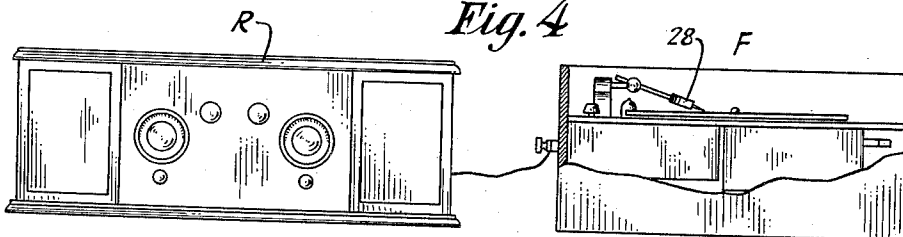
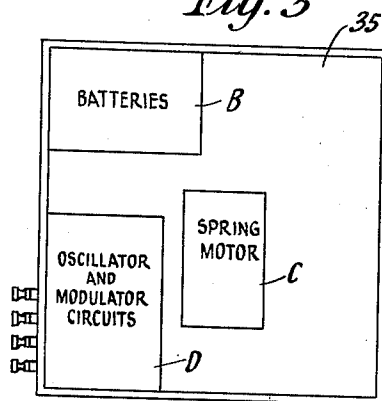


Fig. 3



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PHONOGRAPH ADJUNCT FOR RADIO SETS

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The invention concerns electric phonographs and combined radio receivers and electric phonographs and has for its principal object the provision of an electric phonograph in which the vibrations of the stylus will cause modulation of the output of a high frequency oscillator combined with a radio receiver for detecting the modulated oscillations.

10 A further object of the invention is to provide an electric phonograph in which the output of a vacuum tube oscillator will be modulated by changes in inductance in the modulating circuit resulting from vibrations of the stylus.

15 Still another object of the invention is the provision of an electric phonograph in which the vibrations of the stylus will modulate the output of an oscillator which output will thereafter be detected.

20 Still another object of the invention is to provide an arrangement combining an electric phonograph and a radio receiver in which the output of the electric phonograph will have substantially the same characteristics as signaling waves received on an antenna and in which a common receiver is used for the antenna and electric phonograph.

25 Still another object of the invention is an arrangement in which a common receiver may be used selectively for detecting incoming signals from the aerial or for detecting modulated high frequency waves from an electric phonograph.

30 Other objects of the invention will be in part pointed out and in part apparent from the following detailed description which should be read in connection with the accompanying drawings in which—

Fig. 1 shows a diagrammatic circuit arrangement of the apparatus;

35 Fig. 2 shows a top plan view of the phonograph used in connection with the invention;

Fig. 3 is a diagrammatic bottom plan view showing the arrangement of the oscillator batteries and phonograph motor, and

40 Fig. 4 shows diagrammatically a radio re-

ceiver connected to an electric phonograph as contemplated by the invention.

Referring now to Fig. 1 a radio antenna which may be of any suitable type is shown at A having its ground at G. The double throw switch S has its contacts so arranged that in one position it will connect the antenna and ground directly to the terminals 18 and 19 of the receiver circuit and in another position will connect the output circuit of the electric phonograph to these terminals. The receiver circuit as shown comprises an antenna tuning condenser 20, mutual inductance 21 with tuning condenser 22 across its secondary, detector 25 having the grid condenser 24 and grid resistance 23 in its input circuit and the signal responsive device 26 in its output circuit. While a detector tube alone has been shown in the receiver it is obvious that ordinarily one or more stages of audio amplification will be necessary to obtain the required volume for the signal responsive device 26 which ordinarily will consist of a loud speaker. With the switch S in the position shown the antenna will be connected directly to the receiver and the electric phonograph will be cut out of circuit.

The electric phonograph consists of a vacuum tube oscillator 4, self-excited by means of the plate coil 5 and the grid coil 6, the latter being tapped at a point intermediate its ends and tuned with the condenser 7. A battery B is provided for the plate circuit and a fixed resistance 10 is placed in series in the filament circuit so that the battery B may be used for supplying the filament current. The coil 11 is in inductive relationship with the output circuit of the oscillator and impresses the oscillations therein directly on the mutual inductance 21 when the switch S is thrown to its alternative position. When the switch S is thrown to its alternative position, therefore, the detector 25 will serve to rectify the oscillations from the oscillator 4 and if these oscillations be modulated with audible frequency the modulating frequency will cause response of the signaling device 26. The output of the oscillator 4 is modulated by the electro-magnetic reproducer indicated generally by the reference character P. This

reproducer consists of a permanent magnet 27 having two pairs of opposed pole pieces designated by N, S and N', S' respectively. Between the pole pieces is located the coil 2 which in the present circuit arrangement is shunted by the condenser 3 for by-passing high frequency oscillations from the oscillator 4. The phonograph stylus 30 is fixed on a magnetic steel rod 28 supported by a spring 29 and extending between the pole pieces N', S', and N, S, and through the central opening of the coil 2. The vibrations of the stylus 30, in response to cuts in a record groove, will cause vibration of the rod 28 which will thereby be displaced from its normal rest position and cause more or less of the magnetic flux to interlink with the coil 2, whereby the inductance of the latter will change in response to the vibrations of the rod 28 and the associated stylus 30. The coil 2 is connected in the plate circuit of the oscillator and the output of the latter will consist of high frequency waves modulated in response to the vibrations of the stylus 30. These modulated waves will be impressed on the detector through the mutual inductance 21, detected by the detector tube 29 and the original sounds recorded on the phonograph record will be reproduced by the signal responsive device 26.

It will be noted that the switch S in the position in which it is shown in the drawing connects the antenna A and ground G directly to the receiver by suitable contacts while the output circuit of the oscillator and its filament circuit are opened by other contracts. When the switch is shifted to its alternative position the antenna circuit A will be interrupted, the output circuit of the oscillator will be connected to the mutual inductance 21 and its filament circuit will be closed to set it into oscillation.

It is contemplated in the present arrangement that the apparatus in the upper part of Fig. 1 comprising condenser 20, mutual inductance 21, condenser 22 and detector 25 shall form a complete radio receiver as shown diagrammatically in Fig. 4, while the apparatus in the lower part of Fig. 1 comprising the switch S, reproducer P, oscillator 4 and their associated circuits shall form an electric phonograph indicated diagrammatically at F in Fig. 4. The arrangement of the phonograph is shown in Figs. 2 and 3 in which 35 represents the phonograph cabinet, 27 the turn table, 28 the reproducer and 29 a conduit replacing the usual tone arm. The spring motor for rotating the turn table is shown at C while the oscillator and its circuits are indicated generally at D. The batteries are separately housed in a casing or shelf B and the terminal contacts 13, 14, 15 and 16 are let out through the phonograph cabinet so that the electric phonograph may be readily attached to the radio receiver.

It will be noted that I have provided con-

venient and efficient arrangements by which a radio receiver may serve two separate purposes, one being its usual operation from the radio antenna and the other being to detect the output from a radio phonograph. In this manner it is possible either to receive broadcast programs or play the usual phonograph records at will with a common receiver. Furthermore, while I have shown the phonograph and receiver as separate entities it is obvious that both could be combined in a single casing if desired making a single instrument serve two distinct purposes.

While I have shown a specific embodiment of my invention it is obvious that many modifications will readily occur to those skilled in the art and I intend therefore to be limited only as indicated by the scope of the following claims:

1. An electric phonograph comprising a vibratory member, a record device to actuate the same, a radio frequency oscillator, electromagnetic means for translating the vibrations of said member into electric pulses, means for modulating the output of said oscillator with said pulses, means for demodulating said modulated output, and means for reproducing said demodulated output.

2. An electric phonograph comprising a vibratory member, a record device to actuate the same, a self-excited vacuum tube radio frequency oscillator, electromagnetic means for modulating the output of said oscillator comprising means responsive to the vibration of said member for varying the modulating currents, means for demodulating said modulated output, and means for reproducing said demodulated output.

3. An electric phonograph including in combination, a radio receiving apparatus having an input circuit, a radio frequency oscillator, an electro-magnetic pick-up device, said electromagnetic pick-up device being adapted to generate electrical undulations in accordance with a record groove device, means to impress said undulations upon said oscillator, whereby to modulate the output thereof, and means to impress said modulated output of the oscillator upon said input circuit.

4. An electric phonograph including in combination a radio receiving apparatus having an input circuit tunable over a range of frequencies, a radio frequency oscillator arranged to generate oscillations having frequencies within said range, an electromagnetic pick-up device, said device being adapted to generate electrical undulations in accordance with a record groove device, means to impress said undulations upon said oscillator, whereby to modulate the output thereof, and means to impress said modulated output of the oscillator upon said input circuit.