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P. HAAS

1,766,381

COMBINED RADIO AND PHONOGRAPHIC RADIO REPRODUCING SYSTEM

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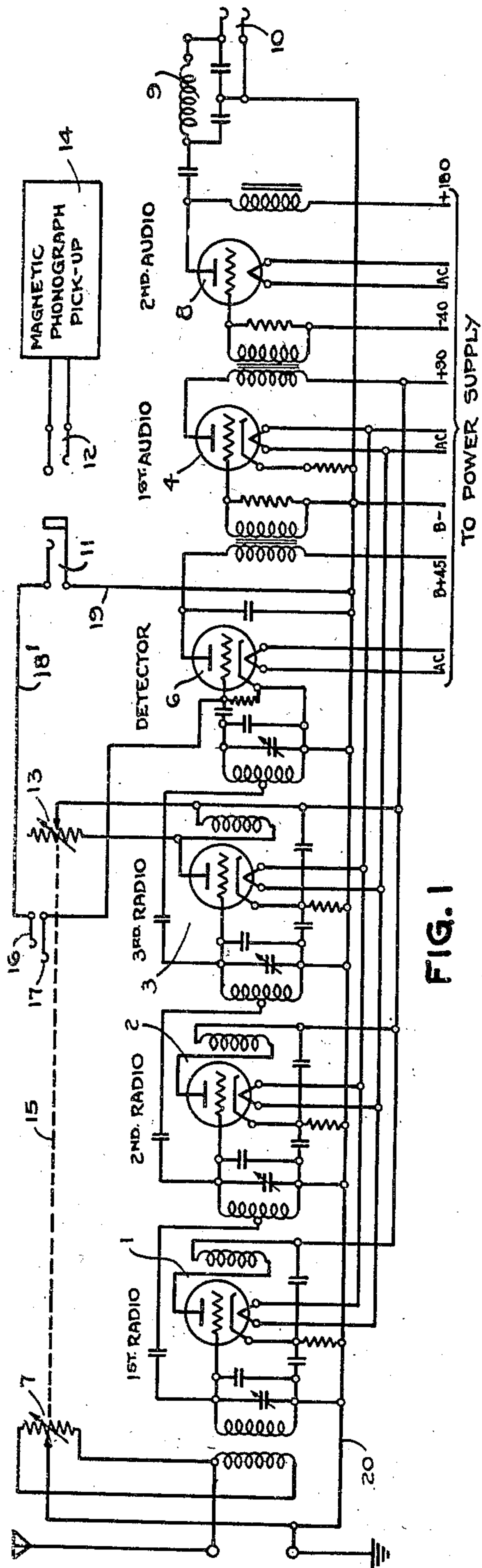


FIG. 1

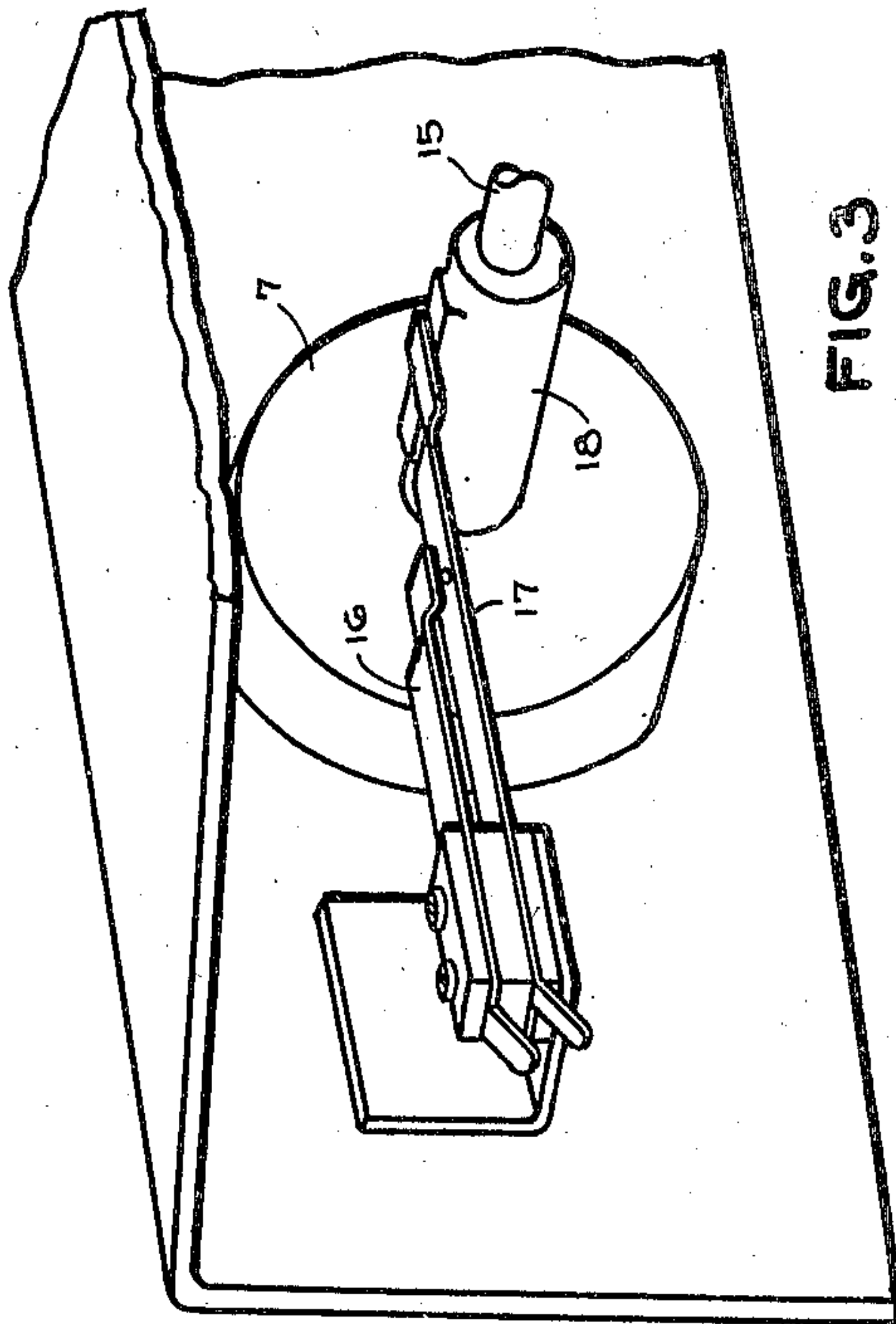


FIG. 3

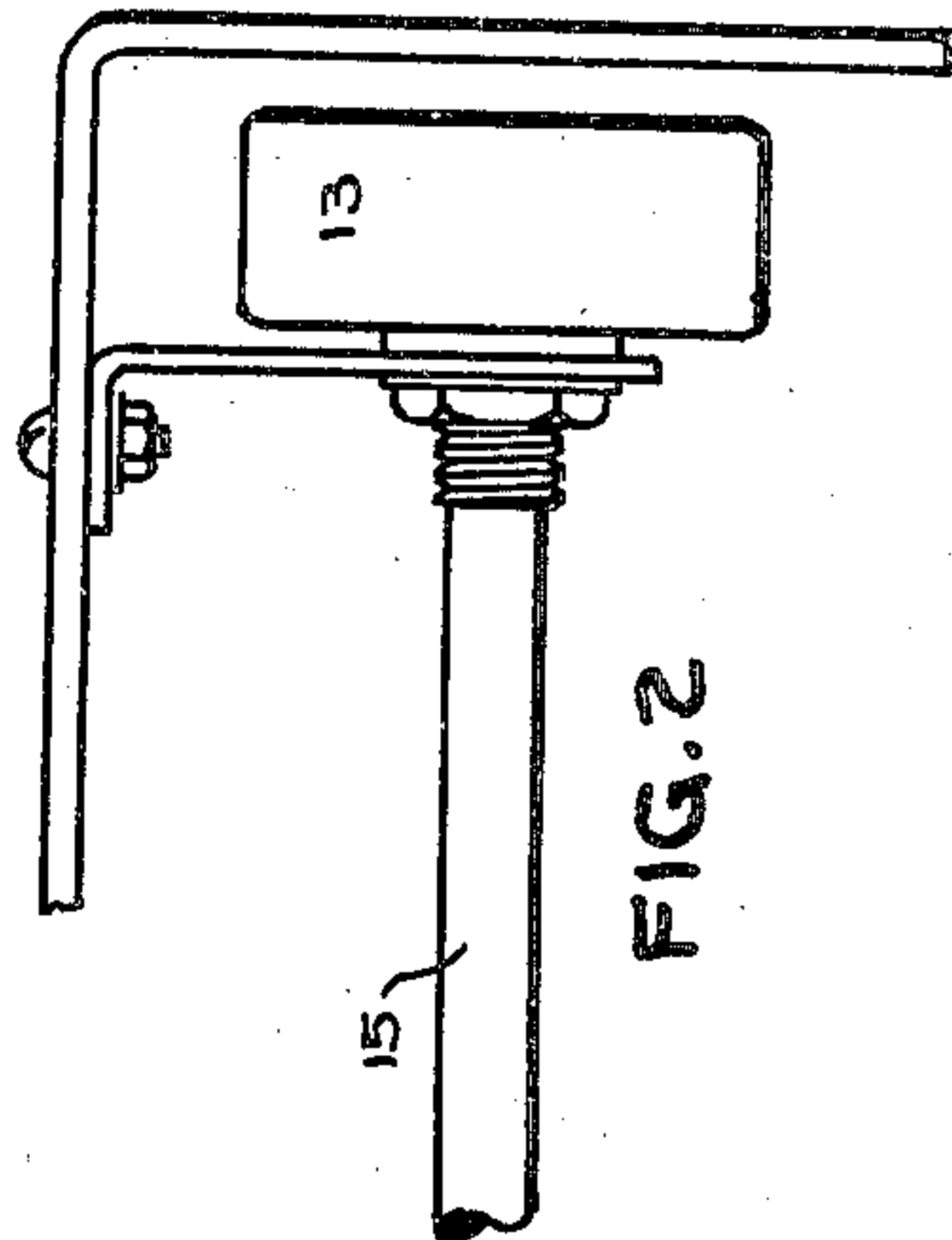


FIG. 2

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COMBINED RADIO AND PHONOGRAPHIC RADIO REPRODUCING SYSTEM

Application filed December 24, 1928. Serial No. 328,143.

This invention relates to signal reproducing systems and more particularly to combined radio receivers and electrical reproducing phonographs.

5 In the past it has been necessary to provide separate switches for controlling the operation of the radio receiver, and for making operative the phonograph portion of the apparatus while disabling the radio receiver
10 for radio signals when it was desired to reproduce phonograph signals. In former combinations of radio receiver and electrical phonograph there has been certain undesirable coupling conditions arising in the
15 circuit network by reason of the manner in which the radio frequency portion of the receiver has been rendered inoperative and the amplifying portion of the electrical phonograph has been connected in circuit.
20 In accordance with the present invention a novel arrangement has been devised which overcomes the coupling difficulty mentioned and which provides a simplified control for rendering operative the radio receiver or
25 for switching the phonographic portion thereof in circuit. Specifically the invention includes a switching arrangement controlled from the volume control device of the radio receiver such that when the volume
30 control device is turned to the "off" portion, the electrical phonograph is made operative and in addition the electrical pick-up of the phonograph is connected to the input of the detector in such a way that former coupling
35 difficulties have been overcome.

Referring to the drawing Fig. 1 represents a diagrammatic showing of the circuits of a combined radio receiver and an electrical phonograph of which the power
40 supply has been omitted but the notes associated with the various leads or conductors marked as leading to the power supply indicate how these circuits are connected to the source of power. Fig. 2 is a detailed
45 view of one portion of the volume control device for use in Fig. 1 whereas Fig. 3 is a perspective view of the remaining portion of the volume control device in which the switching mechanism forming a part of this
50 invention has been incorporated.

Referring especially to Fig. 1 there is represented an antenna and stages 1, 2 and 3 of a three-stage cascade radio frequency amplifier of the vacuum tube type, which stages may be of any approved form but in the arrangement shown includes neutralizing circuits whereby the several stages are rendered free from undesirable oscillations. At 7 and 13 there are represented two volume control devices indicated as being mounted
60 on a common shaft 15 and actuated from a single control or knob (not shown), the arrangement and operation of which volume control arrangement is more particularly described in a co-pending application of
65 Virgil M. Graham, Serial No. 280,405, filed May 25, 1928. The output of the third radio frequency stage is coupled by means of a transformer to the tuned input of detector 6 while the output of this detector is linked
70 to a two-stage vacuum tube audio amplifier, the stages of which are herein designated 4 and 8. The output of the last audio stage 8 including the filter 9 terminates in a jack 10 to which a loud speaker or other suitable
75 sound reproducing device may be connected. It will be understood that any suitable power supply having the proper voltages indicated in Fig. 1 may supply energy to the circuits therein disclosed. The radio re-
80 ceiver circuit network also includes a phonograph jack 11 designed to receive a phonograph plug 12 which is connected to the phonograph unit or a magnetic pick-up device 14.
85

In accordance with the present invention the shaft 15, common to the two volume control rheostats 7 and 13, is provided with an additional cam 18 which is arranged so that when this cam is in the position shown in
90 Fig. 3 spring 17 is moved into engagement with the spring 16. Therefore, when the volume control arrangement is in its "off" position as shown in this figure the electrical phonograph unit 14 is connected through
95 the contacts of the plug 12 and jack 11 to conductors 18' and 19. Conductor 18' is at this time completed through the springs 16 and 17 of the switch to the grid of the detector 6 while the conductor 19 is directly
100

connected to the common ground lead 20 also connected to the cathode of the detector. It will thus be seen that the phonograph unit 14 is connected to the input circuit of the detector 6 which in this instance instead of acting as a detector functions as a relay or amplifier which transmits the amplified signals of the phonograph into the first audio stage for further amplification.

It is especially important where a high impedance B supply circuit network is used that the radio portion of the radio receiver be effectively prevented from affecting the audio portion thereof when it is used for amplifying phonographic signals. For this reason in order to operate the phonograph portion of this receiver in accordance with the present invention, it is necessary to turn the volume control arrangement to the "off" position, otherwise the third radio frequency stage has a tendency to function as a rectifier so that any signals intercepted on the antenna and passed through the first and second radio stages are rectified and passed through the coupling of the high impedance B supply to the first and second audio stages. With the volume control in its "off" position this effect is substantially eliminated so that the phonograph signal is not affected by this foreign noise. When the volume control is turned to the off position as shown in Fig. 3 for the purpose just described, the springs 16 and 17 are closed by means of the cam 18. It is, therefore, unnecessary to provide a phonograph jack on the front of the panel or an additional knob or control to make the phonographic portion of the combination operative. The jack 11 may be mounted at the rear of the radio receiver and the magnetic phonograph pick-up may be continuously connected through the plug 12 to the jack 11 since the phonograph portion is disabled whenever the volume control is turned up to make the radio receiver operative.

What I claim is:

1. In combination with an electrical reproducing phonograph device, a radio receiver including a radio frequency amplifier, a detector and an audio amplifier, a volume control device for said radio receiver, and means including said volume control device and a switch actuated by said volume control device for rendering the radio frequency amplifier ineffective and for connecting the electric phonograph to said audio amplifier.

2. In combination with an electrical reproducing phonograph, a radio receiver including a radio frequency amplifier, a detector and an audio amplifier, a volume control device for said radio receiver, means including a switch for connecting said electrical reproducing phonograph to said audio amplifier, and means actuated by movement

of the volume control device to a certain position for disabling said radio frequency amplifier and for operating said switch.

3. In combination with an electrical reproducing phonograph, a radio receiver having a plurality of radio frequency amplifiers, a detector and an audio amplifier, means including a switch for connecting said electrical reproducing phonograph to said audio amplifier, a volume control device in each of said radio frequency amplifiers, said volume control devices being capable of disabling said radio frequency amplifiers, a common shaft for operating said volume control devices, and means controlled by the movement of said volume control devices to a position to effectively disable said radio frequency amplifiers, for closing said switch.

4. In combination with an electrical reproducing phonograph, a radio receiver having a plurality of radio frequency amplifiers, a detector and an audio amplifier, means including a switch for connecting said electrical reproducing phonograph to said audio amplifier, a volume control device in each of said radio frequency amplifiers, said volume control devices being capable of disabling said radio frequency amplifiers, a common shaft for operating said volume control devices and a cam on said common shaft actuated by the movement of said volume control devices to a position to effectively disable said radio frequency amplifiers, for closing said switch.

5. In combination with an electrical phonograph, a radio receiver including a radio frequency amplifier, a detector and an audio amplifier, a volume control device for said radio receiver, and means including said volume control device and a switch actuated by said volume control device for rendering the radio amplifier ineffective and for electrically connecting the electrical phonograph to said audio amplifier through said detector.

6. In combination with an electrical reproducing phonograph, a radio receiver having a plurality of radio frequency amplifiers, a detector and an audio amplifier, means including a switch for electrically connecting said electrical reproducing phonograph to said audio amplifier through said detector, a volume control device in each of several of said radio frequency amplifiers, said volume control devices being capable of disabling said radio frequency amplifiers, a shaft for operating said volume control device simultaneously, and means controlled by the movement of said shaft to a position to effectively disable said radio frequency amplifiers, for closing said switch.

In witness whereof, I hereunto subscribe my name this 18th day of December, A. D. 1928.

PAUL HAAS.