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Simplified Amplifier for Magnetic Recording of EKG and EEG from Body in Motion

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The main object of this investigation is to have an amplifier dispensed with time-constant components which are likely to act to disturb measurement of EKG and EEG above all in the case of the body under investigation is in motion.

One method for EKG is shown in Fig. 1, where a three staged FET DC amplifier with 1000 c/s chopping modulation device is employed. The capacitors C_2 and C_3 are for isolating the ground point Ed_3 from the EKG electrodes Ed_1 and Ed_2 regarding low frequency range in order to keep the performance free from noise likely happen between Ed_2 and Ed_3 and to pass 2000 c/s carrier only. As 1mV marker, a C/R discharge curve as shown in Fig. 2 is used for the convenience of checking (1) lineality of amplifier and also (2) time-base difference if exists between recording and play-back speed.

The Fig. 3 illustrates a method for performing EEG modulation on 1000 c/s carrier at the top-head stage of the amplifier in order to dispense with time-constant components having a large value to handle EEG signals. In this method the time constant value can be kept so small that only higher frequencies covering 1000c/s can be passed. It is extremely difficult to have a direct modulation on a carrier with such a minute voltage as in EEG with a conventional modulation system and in the present work a special feature has been developed for the top-head modulation. The experiment has been made applying a 1000 c/s mechanical vibration on the anode electrode of the vacuum tube 5676 as shown in Fig. 4 thus for varying the mutual conductance of the tube in order to mix 1000 c/s carrier and supplying EEG signal to the control grid of the tube for performing EEG amplitude modulation.

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