of the input circuit of the trigger. To check the work, a pulsed generator (2) is provided in the circuit. Linearity of the integrating amplifier is ensured by the resistor R_6 and the circuit is linear to 500 pulses/sec. The time constant is chosen by selecting the capacitor C_4.

An advantage of the instrument is the simplicity of its circuit and the possibility of studying the dynamics of processes under investigation on an oscilloscope screen without the use of expensive computers.

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AN ELECTRONIC DEVICE FOR DETERMINING MOTOR ACTIVITY

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A brief account and the theoretical circuit are given of an electronic device for determining the motor activity of laboratory animals. The device is based on the principle of recording changes in capacitance arising in animals during motion.

Several devices exist for recording the motor activity of laboratory animals: mechanical, electromechanical, photoelectric, telemetric, etc. However, most of them have disadvantages and they are not produced on a large scale in the USSR, although there is a need for instruments of this type.

An actograph, based on the principle of recording changes in capacitance arising in animals during motion, has been designed, built, and tested for a long period successfully for determination of the motor activity of small laboratory animals in the Central Research Laboratory of Minsk Medical Institute. The theoretical circuit of one of the possible alternative forms of the instrument is shown in Fig. 1.

The actograph consists of capacitance grid transducer (Fig. 2), connected to a device converting changes in capacitance into electric pulses, consisting of a two-stroke balanced generator with load resistance at the tube anodes of the order of 20-100 kΩ. The output of the converter is led through a differential circuit with a filter and through a microcurrent amplifier, the load resistance at the anode of which is 15 MΩ, connected with a cathode follower. A voltage divider, connected to the cathode follower, has at its midpoint an output for connection to the recorder, such as the SB1M electromechanical counter. It is also possible to record a certain total number of pulses (1000-10,000) on continuously moving squared paper followed by simple determination of the total motor activity of the animal over any given period of time.

During the experiment the animals are kept in a special transparent plastic cage, differing little in shape and size from the cages in which they are normally kept. The cage is placed on the capacitance grid transducer.

Trials showed that the motor activity of albino mice (individual animals) during the day time in an air temperature of 20-22°C was equivalent to 70-80 pulses of the electromagnetic counter over a period of 1 min and 600-700 pulses over a period of 10 min. Repeated measurements over a long period of time confirmed the precision and stability of operation of the instrument.

The suggested actograph is thus sufficiently sensitive to record movements of small laboratory animals, but at the same time it is resistant to high-frequency interference and to

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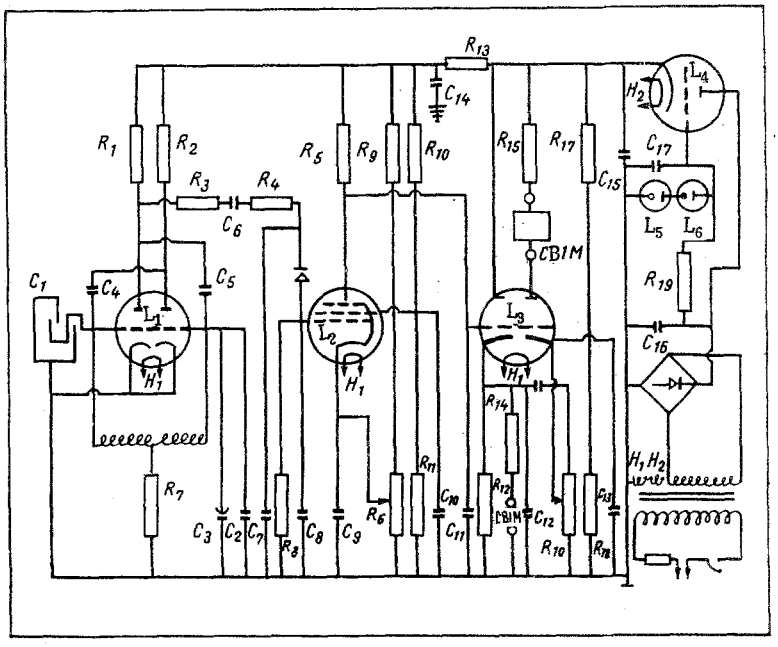

Fig. 1. Theoretical circuit of actograph. R_1 and R_2 47 kΩ; R_3 and R_4 100 kΩ; R_5 15 MΩ; R_6 7 kΩ; R_7 12 kΩ; R_8 2 MΩ; R_9 2.2 MΩ; R_{10} 1 MΩ; R_{11} 68 kΩ; R_{12} 100 kΩ; R_{13}, R_{14}, and R_{15} 10 kΩ; R_{16} 470 kΩ; R_{17} 100 kΩ; R_{18} 1.5 kΩ; R_{19} 7 kΩ; C_1 capacitance transduder; C_2 40 pF; C_3 5-15 pF; C_4 and C_5 91 pF; C_6 01 μF; C_7 and C_8 2200 pF; C_9 500 μF × 6 V; C_{10} 1 μF; C_{11} 2000 pF; C_{12} 2 μF; C_{13} 5000 μF × 6 V; C_{14} 200 μF × 300 V; C_{15} 40 μF × 300 V; C_{16} 40 μF × 450 V; C_{17} 20 μF × 450 V; C_{18} 1 μF; L_1 6N3P; L_2 EF-804 (6Zh32P); L_3 6N1P; L_4 6S19P (6S15P); L_5 S21P; L_6 S22P; SB1M electromechanical counter.

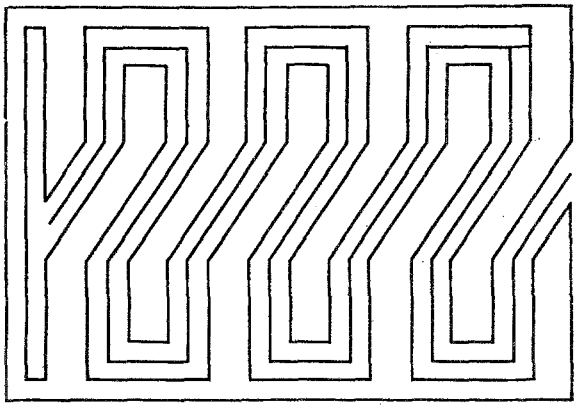

Fig. 2. Capacitance transducer (grid) of the actograph (C_1).

vibration. Its use imposes no limits on the weight of the animals, and by increasing the size of the capacitance grid transducer and, correspondingly, of the cage the device can be used for work with large laboratory animals.

While the actograph is working no acoustic or lighting effects arise to affect the animals' behavior, and the constant presence of the experimenter is unnecessary. The instrument is relatively simple in design. In the writers' opinion it can be recommended for objective quantitative evaluation of the motor activity of laboratory animals.