Timer for use with a Zeiss photocoagulator

P. GAY, K. WIGGINS, AND J. H. DOBREE

Departments of Medical Electronics and Ophthalmology, St. Bartholomew's Hospital, London

Photocoagulation, used at the present time for sealing retinal detachments to the underlying choroid, and for the destruction of intraocular tumours and of new-formed vessels in proliferative diabetic retinopathy, is not without dangers to normal ocular tissues. Thus it is important to minimize the quantity of light energy used, and moreover it is advantageous to compare results obtained in different types of case, and between different operators.

The intensity of the light used and the size of the aperture through which it enters the pupil are chosen by the operator, so that the chief variables are the number and duration of the coagulations applied. This timing instrument has been designed to record these data.

Apparatus

Referring to the circuit diagram (Fig. 1), the timer consists of a squaring amplifier, a gate, and two counters, together with the necessary mains power supply.

**FIG. 1 Circuit diagram**
Transistors T1 and T2 form the squaring amplifier, which uses a mains-derived 6.3 V 50 Hz sine wave to produce square waves which are passed to the AND gate formed by D1, D2, and R8. The gate is opened by transistor T3 which is turned off by the reed relay RL1. RL1 is closed by a voltage derived from the photocoagulator shutter-operating voltage, which is rectified by the diode bridge and smoothed by R12 and C1. The pulses from the gate then pass to T4, T5, and T6 which step Counter 1 at 50 times per second. The closure of RL1 also causes T7 and T8 to be switched on, thereby giving a count of one on Counter 2.

In operation, each time the coagulation button is pressed, a count of one is recorded on Counter 2 and Counter 1 counts seconds to the nearest 20 m sec. Thus the number and total time of the coagulations applied is recorded. After treatment both counters can be manually zeroed ready for the next patient. The instrument is shown in Fig. 2.

**Summary**

A simple timer has been devised, for use with the Zeiss Photocoagulator, for recording the number and duration of coagulations. It has now been in use for 2 years and has been found to be of considerable value for recording the dosage given.