IN THE LABORATORY

An Interval-Timing, Automatically Resetting Switch to Operate After Any Given Number of Counts

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Two commercially available pieces of apparatus were inserted into a circuit that automatically rewinds a camera every time a given number of frames is exposed, thus preventing the tension of the camera's spring-drive mechanism from becoming so low as to result in erratic performance of the shutter. The frames are counted by causing the solenoid operating the single-frame plunger on the camera to close a switch at each stroke, thereby actuating an electrically operated counter[1]. The counter is modified[2] by removing all but the first two wheels and sliding onto its shaft a brass wheel arranged to turn in unison with the second digit wheel. Two electrical contacts are made to the circumference of the brass wheel. One is a permanently closed wiping contact, and the other is interrupted by insulating segments so spaced that contact is made every 180°, or twice in each revolution of the second digit wheel, *i.e.* once every 50 counts.

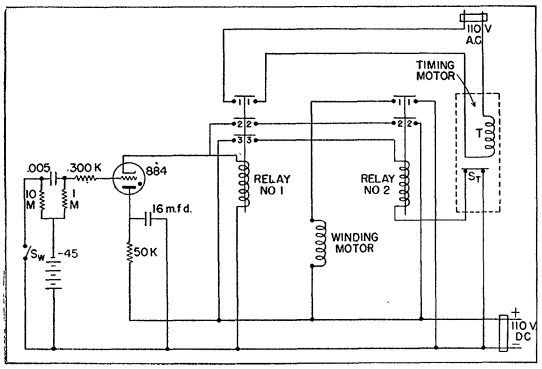

FIG. 1

On every 50th count, therefore, a second switching circuit is closed (at the point shown as S_w, Fig. 1). This simultaneously energizes the camera winding motor and a timing motor (synchronous)[3] set to cut both itself and the winding motor off after a predetermined interval (15 seconds in this case) sufficient to rewind the camera mechanism enough to restore the original spring tension in the camera drive. The synchronous timing motor has a magnetic clutch bringing the gear train of the timer into place when the motor is energized. When the clutch is demagnetized upon opening the motor circuit, a spring disengages the gear train, allowing another spring to reset the time-delay mechanism. To make the timing motor circuit independent of the duration of closure of the counter contact, which would vary with exposure rate and would remain closed if the counter were stopped on the 50th or 100th frame, the circuit from the counter is arranged so that, when closed, it produces only a short triggering pulse firing a thyratron. The output of the thyratron closes relay #1, and relay #2 is closed through contact 3 of relay #1, switch S_t in the timing motor being normally closed. Closure of contacts 2 on both relays completes a holding circuit to keep the relays closed after the pulse from the thyratron has ended. Contact 1, relay #1, starts the a-c timing motor. Contact 1, relay #2, starts the camera winding motor. After 15 seconds the timing motor opens switch S_t, which breaks the holding circuit and allows both relays to open, removing the voltages from timing and winding motors. The timing motor then resets itself, and conditions are returned to the original state.

The application described prevents the spring drive on our camera from running down enough to produce erratic performance of the shutter, which has to be maintained in synchronization with recurring single sweeps of the cathode-ray beam being photographed. Other related timing problems could be solved in this fashion by suitable small modifications of the counter and the choice of a timing motor of appropriate range.

[1] Manufactured by Gorrell & Gorrell, New Jersey.

[2] We wish to thank Gracient Eidt, school machinist, for his cooperation in constructing the modified counter.

[3] Manufactured by Haydon Manufacturing Company, Connecticut.

Simplified Techniques for Inoculating Chick Embryos and a Means of Avoiding Egg White in Vaccines[1]

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Most of the current techniques for inoculating chick embryos, as, for instance, those outlined in the report by Beveridge and Burnet (*1*), involve the use of a dental drill, an instrument seldom available except in specially equipped laboratories. The techniques described below render the drill unnecessary and also have the advantage of avoiding nonspecific lesions which drilling often causes on the chorioallantois.

Chorioallantoic inoculation. The eggs are candled, and the margin of the air space is marked on the shell in pencil on the side where the chorioallantois is best developed. The shell around this area is disinfected with 1/100 Zephiran or other suitable disinfectant. Using a pair of round, pointed forceps, a hole is made in the shell over the air space, a few millimeters from its margin. The shell is jabbed with the points of the

[1] Work carried out while the author was working under a grant by the Australian National Health and Medical Research Council as a guest worker at the Pasteur Institute.