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A PORTABLE CESIUM COUNTER FOR FIELD USE

by

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## A PORTABLE CESIUM COUNTER FOR FIELD USE\*

During deer hunts on the Savannah River Plant,<sup>1</sup> all deer carcasses are screened for radioactive cesium content before removal from the plant site. Because sampling of tissue and subsequent laboratory analysis takes several days, a field monitor was developed to estimate cesium by direct count.

The monitor (Fig. 1) consists of a shielded 2-inch-diameter by 2-inch-thick sodium iodide scintillation detector coupled to a single-channel analyzer, power supply, and timer circuit (Fig. 2).

The counter is positioned over the flank of the deer, and a two minute count is taken. The built-in solid state timer consists of a unijunction transistor oscillator operated at a rate of one pulse every 1.2 seconds, followed by two integrated circuit decade dividers which provide an output pulse after 120 seconds of counting. This pulse disables the counting circuit and turns on an audible indicator to signal the operator that the count is finished. This feature allows the operator to prepare subsequent carcasses for counting or to record and calculate data from a previous count without the necessity of watching a timer.

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Indication that a count is in progress is given by a pilot lamp on the front panel.

To allow for a wide range of count rates, the analyzer output may be divided by factors of 1, 2, 4, or 10 before being coupled to the mechanical register driver circuit.

All circuits are powered by 6.25 volts obtained from rechargeable nickel-cadmium batteries, which allow an operating time of greater than 8 hours. A built-in recharging circuit restores battery capacity during a 16-hour recharge period. To ensure that the instrument is not used when the battery voltage has dropped low enough to affect the calibration of the analyzer, a voltage monitoring circuit shuts off operation when the supply voltage reaches  $\approx 5.7$  volts. The analyzer circuits and amplifier are regulated at 5.1 volts by an avalanche diode regulator. A panel meter allows visual monitoring of battery condition.

The instrument, with exception of the detector, is housed in a waterproof aluminum case with operating controls covered by a transparent plastic housing making it an all-weather monitor.

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REFERENCE

1. E. W. Rabon and J. E. Johnson, "Rapid Field Monitoring of  $^{137}\text{Cs}$  in White-Tailed Deer and Feral Hogs Destined for Human Consumption," submitted to Health Physics.

Being processed now.  
Reference will be amended  
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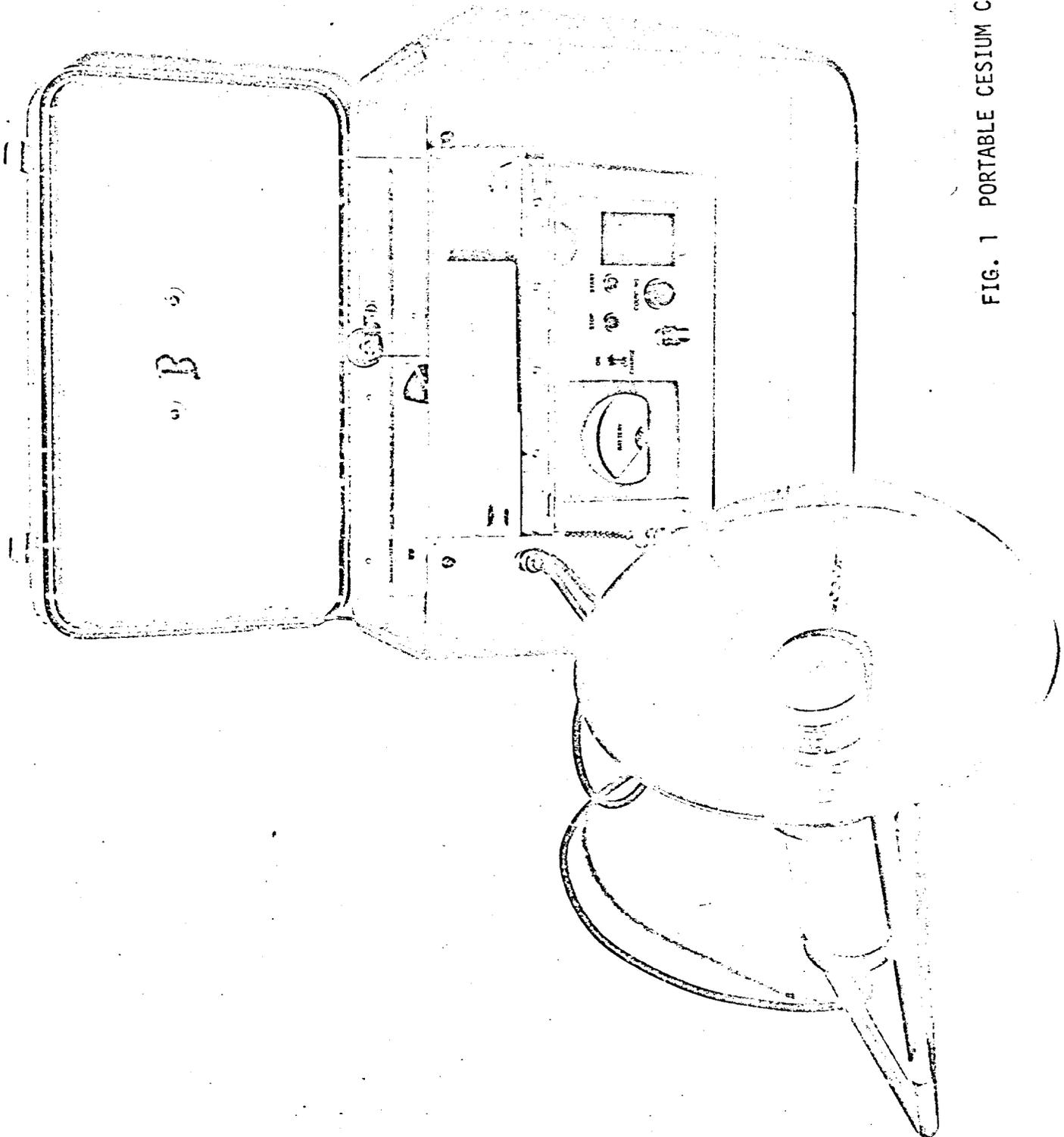


FIG. 1 PORTABLE CESIUM COUNTER

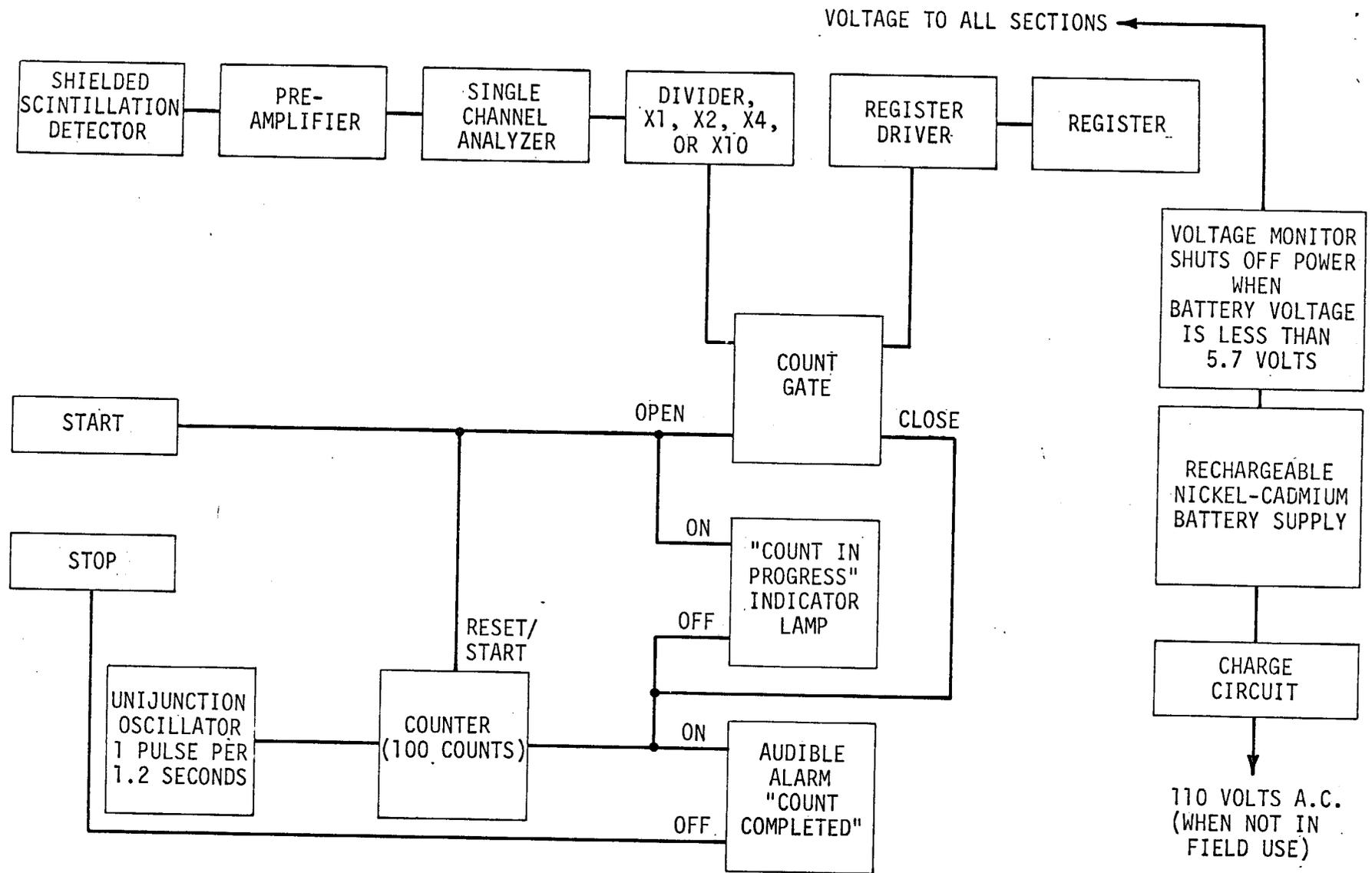


FIG. 2 CIRCUIT OF PORTABLE CESIUM COUNTER