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COMPACT PHOTOMULTIPLIER-TUBE BASE*

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A small-size photomultiplier-tube base for the 6810A and 56AVP photomultiplier tubes has been constructed.[1]

A schematic diagram is shown in Fig. 1. The base operates on a negative high voltage of 0 to -3 kV. The dynode divider chain has a resistance of approximately 2.7 MΩ. Dynodes 10 to 14 are accessible via a multicontact connector for the connection of additional capacitors and/or voltage stabilization.[2]

The construction is shown in Figs. 2 and 3. All connections, and the slide switch selecting the tube type, are accessible from the rear.

The base was tested on cosmic rays with a 3 × 3 × 3/8 inch plastic scintillator and a 56AVP photomultiplier-tube operated at 2500 volts. A photograph of the anode current pulse on a 50-Ω load is shown in Fig. 4.

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[1]The design is based on that of D. E. Groom, California Institute of Technology. The printed circuit board is an improved version of one in use at the Argonne National Laboratory. The base was constructed by R. Carman and J. McKee.

[2]A. Barna, Nucl. Instr. and Methods 24, 247 (1963).

FIGURE CAPTIONS

1. Schematic diagram. Unless otherwise noted, resistors are ±5%, 1/2 watt, and capacitors are 500-volt ceramic disk.
2. (a) Photograph of the assembled base.

   (b) Photograph of the base with the housing removed.
3. Outlines of the housing.
4. A cosmic ray event using a 3 × 3 × 3/8 inch scintillator and a 56AVP photomultiplier-tube. Sweep speed: 5 nsec/major division; sensitivity: 9.3 volts/major division.

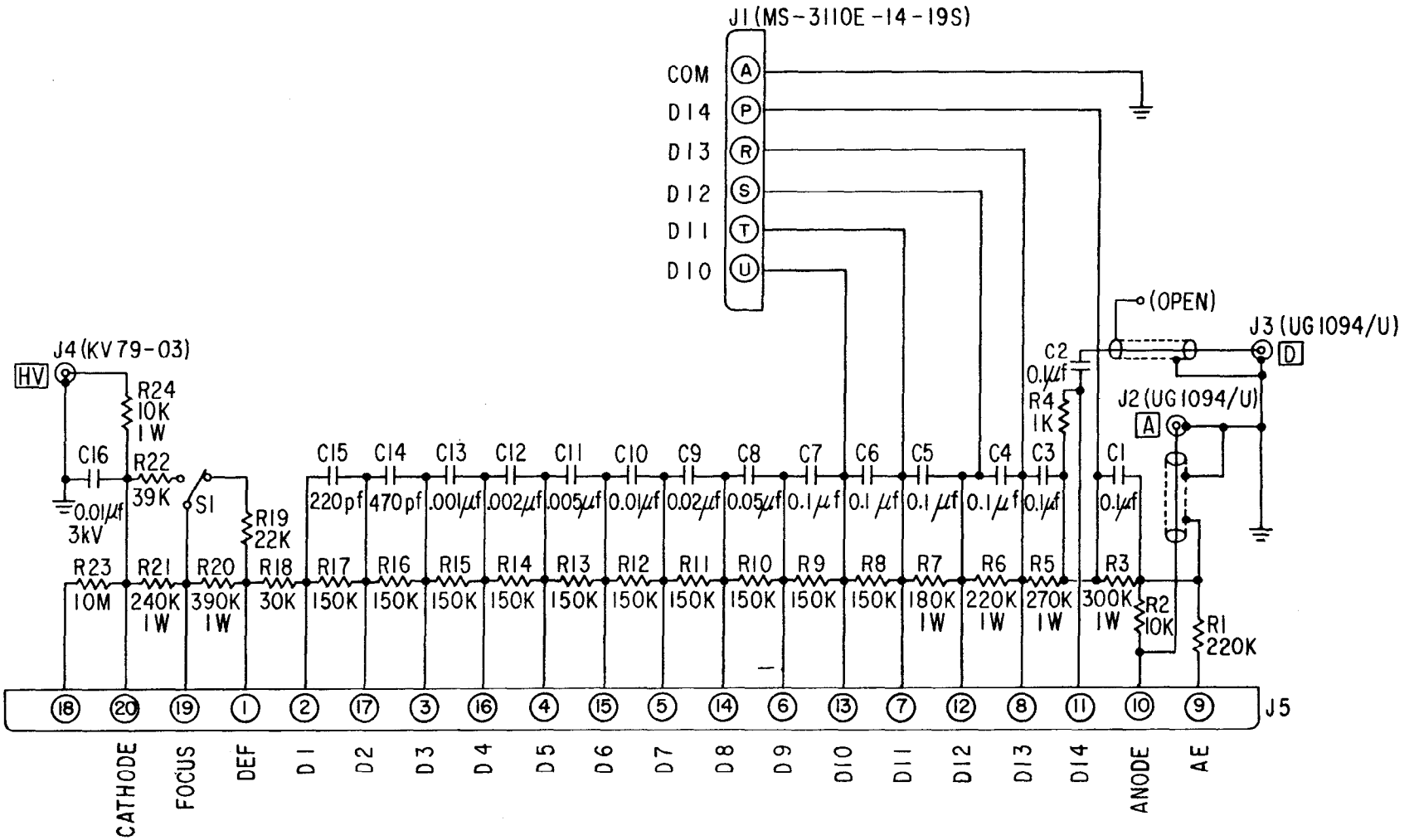
J1 (MS-3110E-14-19S)
COM
D14
D13
D12
D11
D10
(OPEN)
J3 (UG1094/U)
D
J2 (UG1094/U)
A
J4 (KV79-03)
HV
0.01μf
3kV
R24
10K
1W
C16
R22
39K
S1
R19
22K
C15 220pf
C14 470pf
C13 .001μf
C12 .002μf
C11 .005μf
C10 0.01μf
C9 0.02μf
C8 0.05μf
C7 0.1μf
C6 0.1μf
C5 0.1μf
C4 0.1μf
C3 0.1μf
C2 0.1μf
R4 1K
C1 0.1μf
R23 10M
R21 240K 1W
R20 390K 1W
R18 30K
R17 150K
R16 150K
R15 150K
R14 150K
R13 150K
R12 150K
R11 150K
R10 150K
R9 150K
R8 150K
R7 180K 1W
R6 220K 1W
R5 270K 1W
R3 300K 1W
R2 10K
R1 220K
18 20 19 1 2 17 3 16 4 15 5 14 6 13 7 12 8 11 10 9
J5
CATHODE
FOCUS
DEF
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
ANODE
AE

FIG. 1

167-1-A

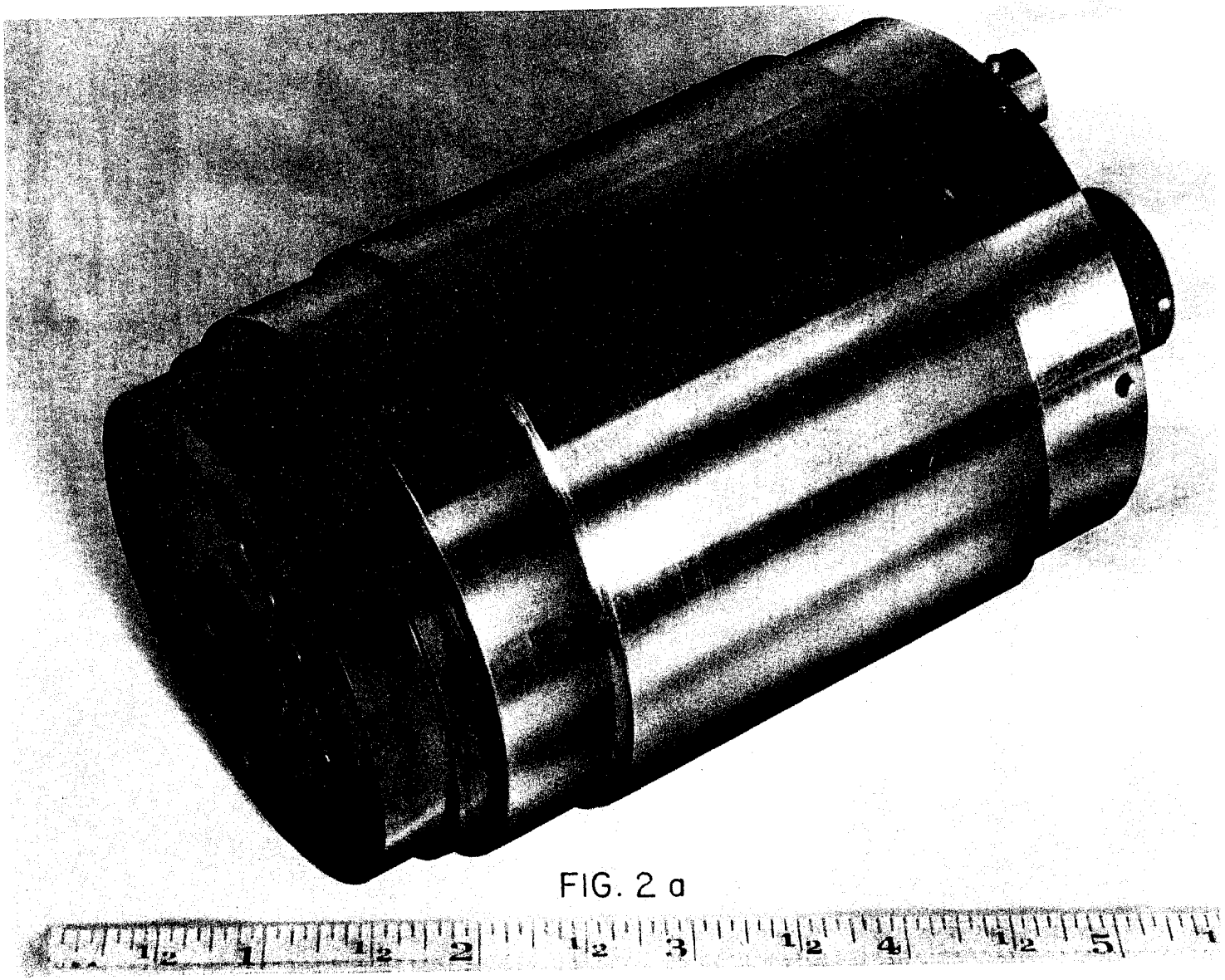

FIG. 2 a

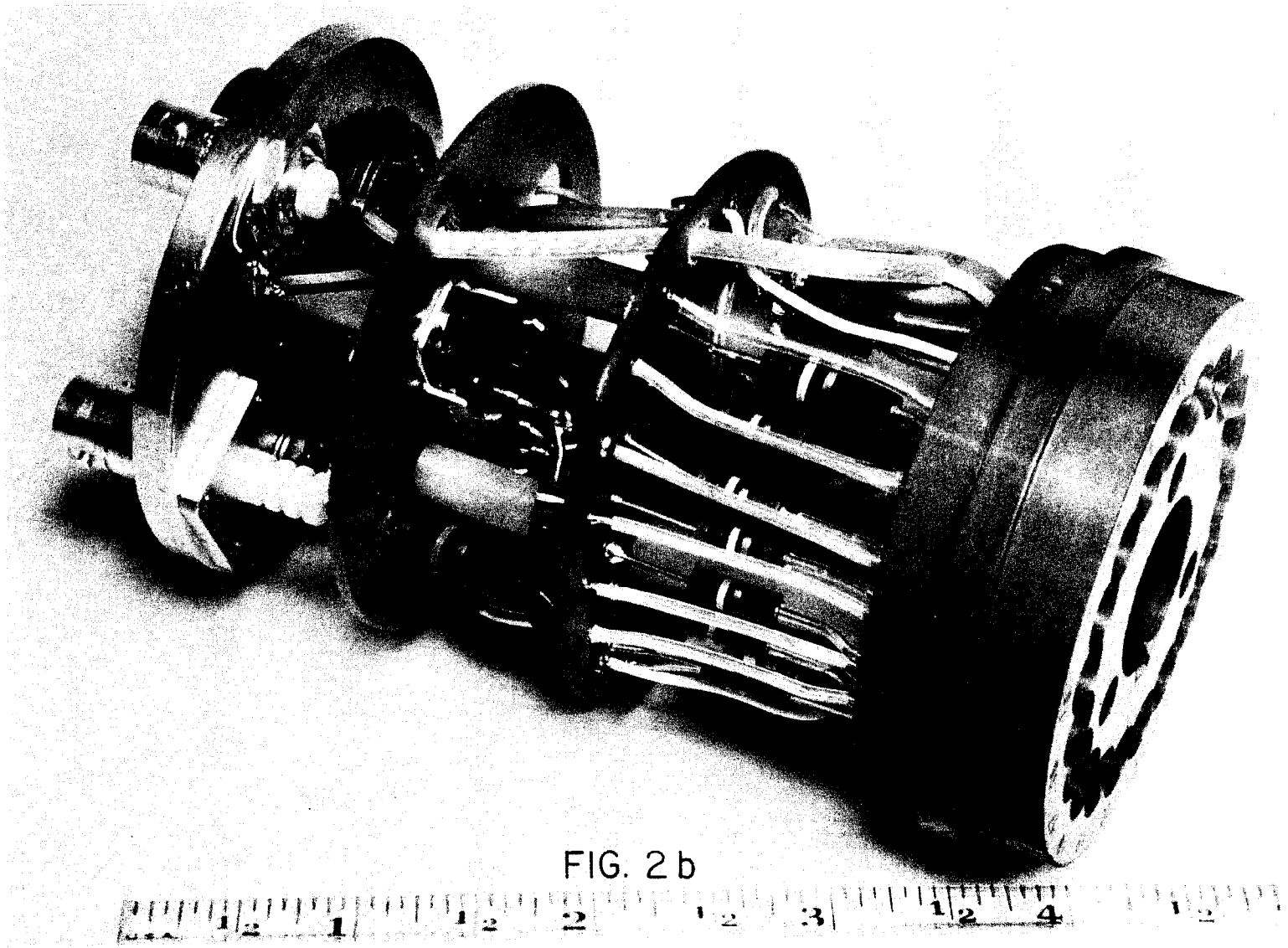

FIG. 2b

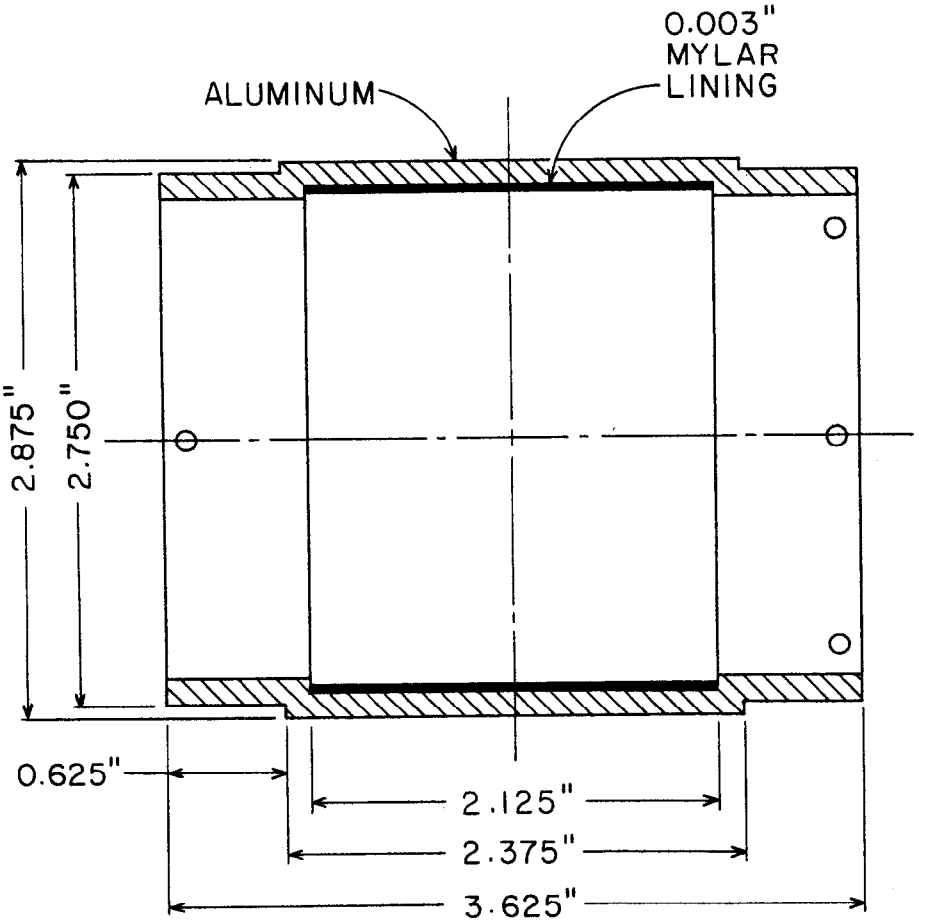

FIG. 3

167-2-A

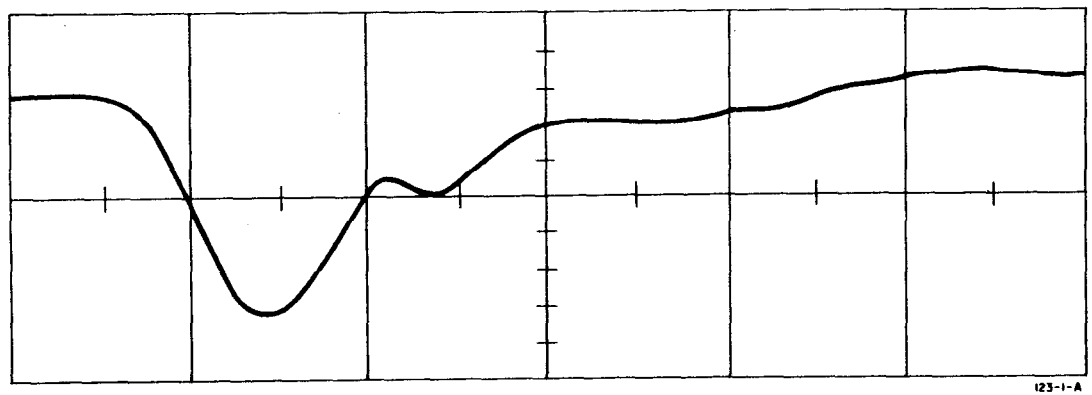

Fig. 4.

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Photomultiplier
Tube Base