

Memorandum M-1681

Page 1 of 2

Digital Computer Laboratory
Massachusetts Institute of Technology
Cambridge, Massachusetts

SUBJECT: UNIFORMITY TESTS ON FERRITE CORES

To: D. R. Brown

From: J. H. McCusker

Date: October 21, 1952

Abstract: One thousand ferrite cores from General Ceramics, M-1118 (fired 3-9-52), were tested for uniformity of the peak magnitude of the disturbed one. Approximately 25 per cent and 50 per cent of the cores were within ± 5 per cent and ± 10 per cent, respectively, of the mean magnitude of the disturbed ones. The 256 cores closest to the mean were then used as the memory in Ceramic Array II.

One thousand ferrite cores, MF-1118 (fired 3-9-52), were tested April 21, 1952 to determine the cores most suitable for use as a memory in Ceramic Array II. Uniformity was considered to be the principal desired feature. Peak magnitude of the disturbed ones was arbitrarily taken as the uniformity criterion.* After completion of this test, some doubt existed as to the usefulness of the disturbed one criterion because of the non-uniformity of non-selecting signals.

To facilitate testing, 30 cores were loaded onto a copper tubing through which two current leads ran (Figure 1). The current source was a thyatron unit which is unfortunately a low-impedance device. It was, therefore, found necessary to short out all cores except the one under test. One hundred cores per hour could be tested under optimum conditions.

From results obtained on the hard-tube pulse tester, 2.6 ampere-turns were selected as the optimum operating point. A comparison of the results obtained on both core testers showed that the relative magnitudes were properly measured by the thyatron unit.

The results of the test are shown plotted as a distribution curve in Figure 2. The peak magnitudes of the disturbed one varied from 0.24 to 0.79 volt. The mean magnitude was 0.56 volt. Approximately 25 per cent and 50 per cent of the cores were within ± 5 per cent and ± 10 per cent, respectively, of the mean value.

* See R-192, p. 54, "A Coincident-Current Magnetic Memory Unit", W. N. Papian (Digital Computer Laboratory, R-series report)

Memorandum M-1681

Page 2 of 2

D-C hysteresis curves (Figure 3) were run on three cores, a below-average core, an average core, and an above-average core. The flux outputs of the corresponding cores were in the ratios of 1, 1.25, and 1.4; the voltage output ratios were 1, 1.6, and 2.1 respectively.

Some correlation was also found between the width and weight of the cores and the test results (Figure 4).

The disturbed ones and disturbed zeros of the 256 cores in Ceramic Array II at 2.48 ampere-turns are shown in Figure 5.

Signed

J. H. McCusker
J. H. McCusker

Approved

DRB
D. R. Brown

JHM:jmm

cc: Group 63
W. Ogden
W. W. Papian

Drawings Attached:

SA-52839	Figure	1
SA-48372-G	"	2
SA-48373-G	"	3
SA-48374-G	"	4
A-52876	"	5

SA-52839

TEST JIG

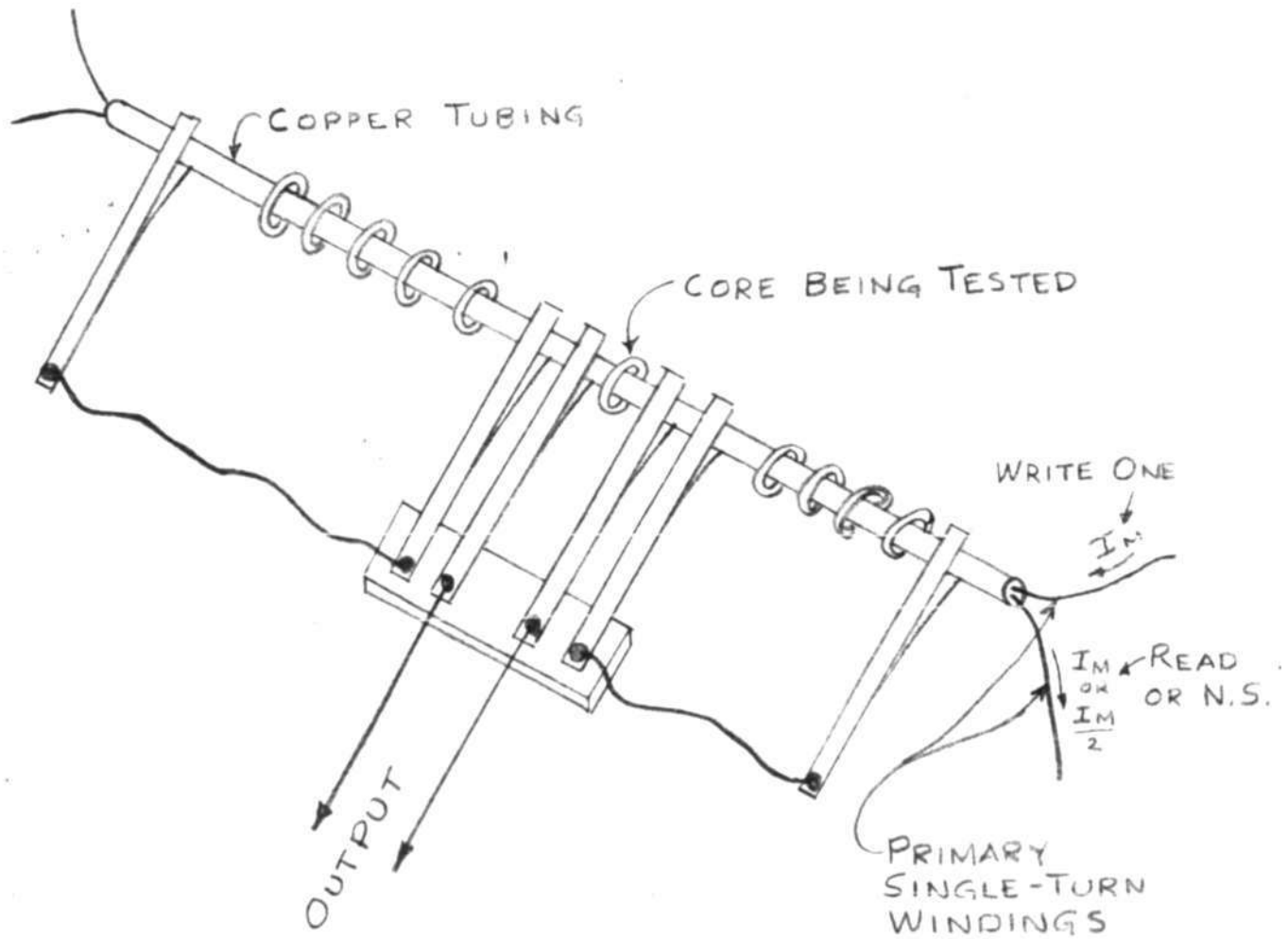


FIG. 1

P.K. BALTZER

SA-52839

SA-48372-G ✓

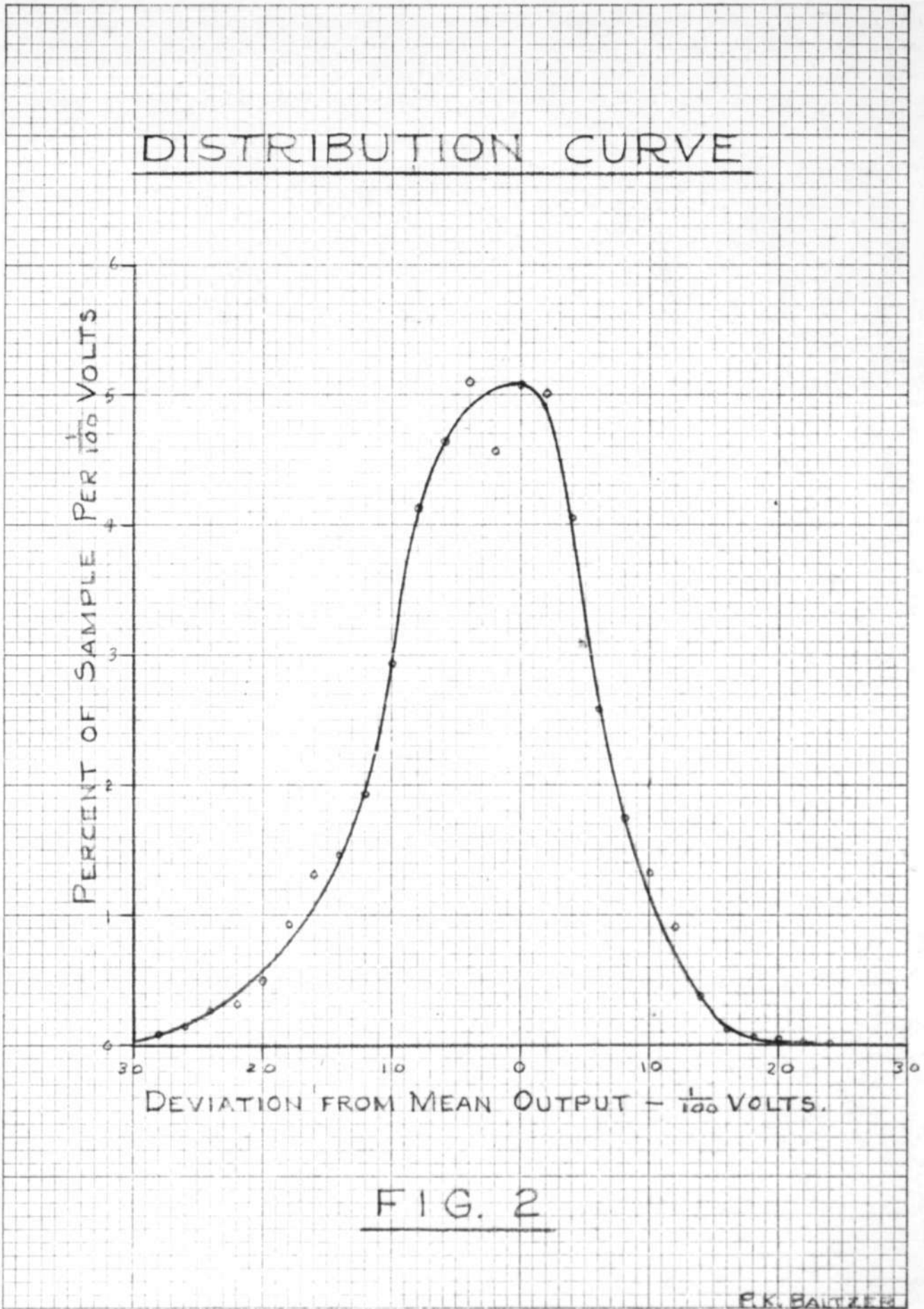


FIG. 2

E.K. BAITZER

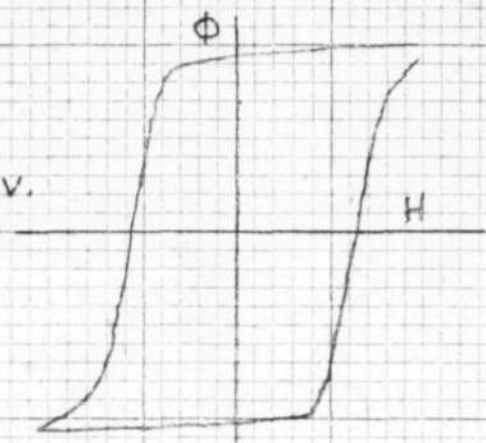
JUST-50 KEUFFEL & ESSER CO.
10 x 10 to the inch.
MADE IN U.S.A.

SA-48372-G

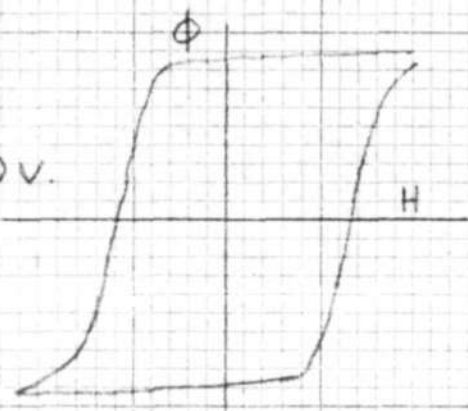
SA-48373-6

D.C. HYSTERESIS CURVES

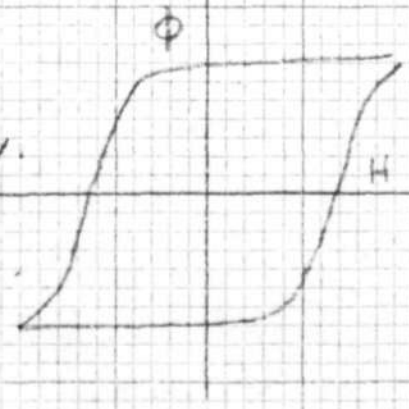
CORE #141
OUTPUT = .79 v.



CORE #007
OUTPUT = .60 v.



CORE #144
OUTPUT = .38 v.



ϕ
32 LINES

H
2.7 AMP-TURNS

SCALE

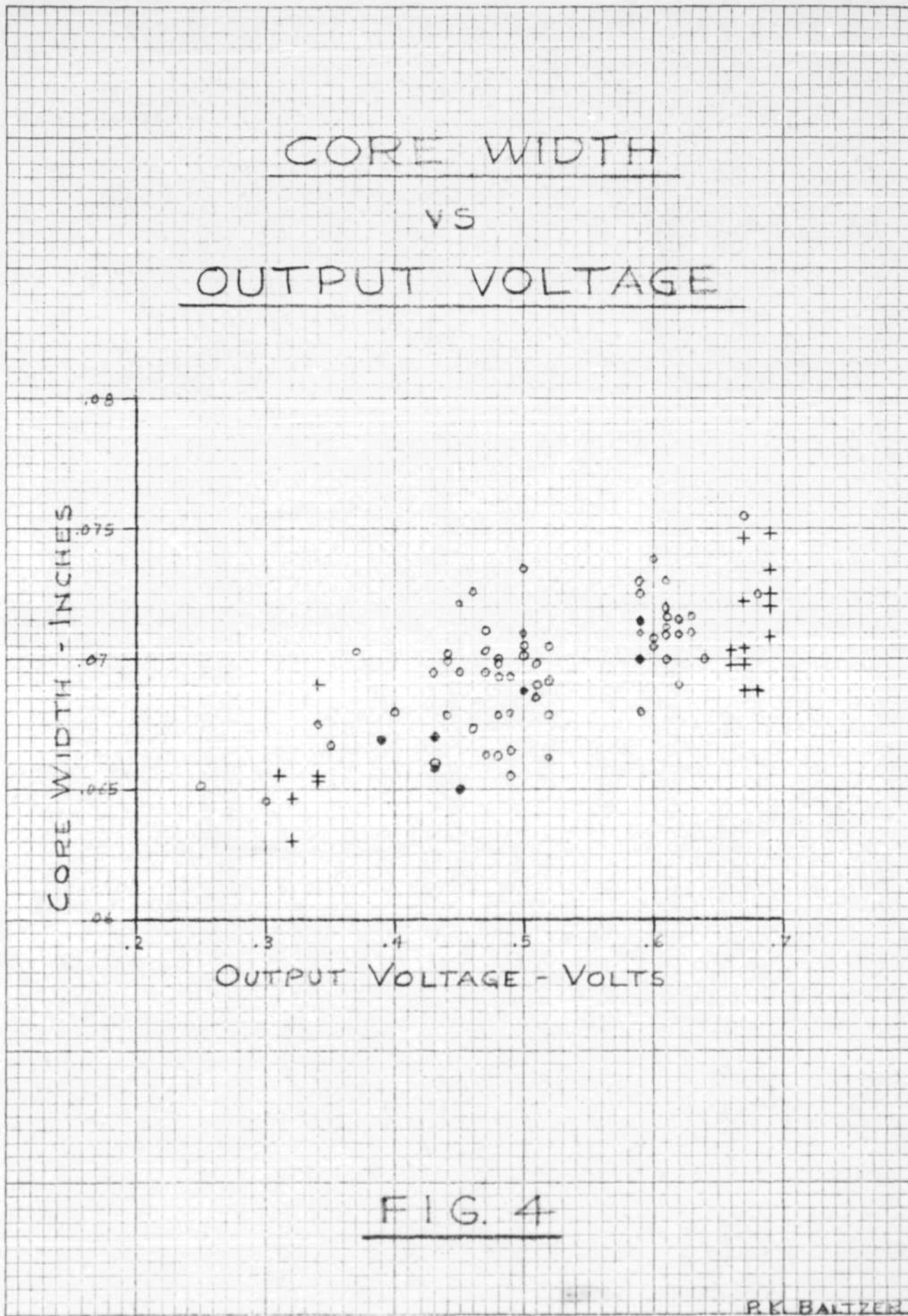
FIG. 3

P.K. BALTZER

308T-5C KEUFFEL & ESSER CO.
10 x 10 to the inch
MADE IN U.S.A.

SA-48373-6

SA-48374-5

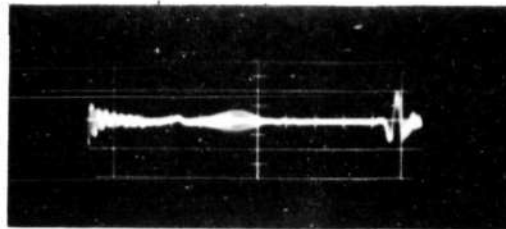


350T-5G KEUFFEL & ESSER CO.
10 X 10 to the Inch.
MADE IN U. S. A.

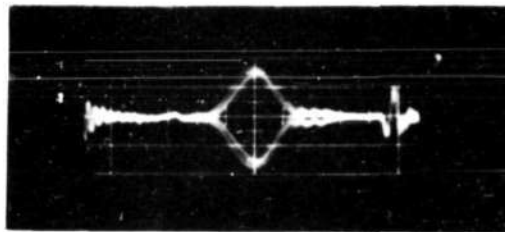
SA-48374-G

FIG. 4

R. K. BALTZER



DISTURBED
ZEROS



DISTURBED
ONES

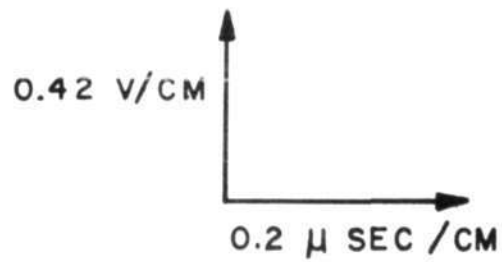


FIG. 5
OUTPUT — CERAMIC ARRAY #2