UNCLASSIFIED

[redacted]

1116

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 7-27-98
Authority: ☐ADC ☒ADD
Name: W Layne
2nd Review Date:
Authority: ADD (NOT REQUIRED)
Name:
Determination (Circle Number):
1. Classification Retained
2. Classification Changed to: U
3. Contains No DOE Classified Information
4. Coordinate With:
5. Contains UCNI? NO
6. Comments:
DECLASSIFY

Case Number 560.00
Ref. Sym: 1612
Project No. TM-170

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP
CLASSIFICATION CHANGED TO: U
Emelda Segeh 7/29/98
PERSON CHANGING MARKING & DATE
W. C. Layne 7/30/98
PERSON VERIFYING MARKING & DATE
AUTHORITY: W.C. Layne
RECORD ID: 98SN3178
DATED: 7/27/98

MR. S. A. MOORE - 1322

Re: Thrust Test of 3.5-inch Bazooka Rocket Motors

Summary of Results

Four Model M29A2 bazooka rocket motors, Lot No. COP-2-26, dated August, 1951, from uncontrolled storage and three from Lot No. COP-3-172, dated January, 1953, were tested to determine thrust-time characteristics.

No differences in characteristics between the two lots of rockets were detected.

Object of Test

The object of this test was to determine the characteristics of two lots of Model M29A2, 3.5-inch bazooka rocket motors.

Reason for Test

This test was requested in a Work Order Authorization from S. A. Moore, 1322, to Structural Test Division, 1612, dated August 7, 1953.

CDL No.
ACCOUNTABILITY CARD
FILE No. Xw7/Betty 2-4
XRef. M-6 alpha

Setup for Test

I. 7 Model M29A2 bazooka rocket motors as follows:

4 Model M29A2 bazooka rocket motors, Lot No. COP-2-26
3 Model M29A2 bazooka rocket motors, Lot No. COP-3-172

II. Test Equipment:

1. Rocket firing condenser bank, 100-microfarad capacity
2. Rocket-to-load-cell adapter
3. Load-cell-to-load-cell plate adapter
4. Load cell plate, 2 X 2 Ft. x 1/2 In. steel plate

III. Instrumentation:

1. Leeds and Northrup thermocouple meter, Serial No. 1013153
2. Miller carrier-type amplifier, Type C-3, Serial No. 7
3. Miller oscillograph, Model H, Serial No. 161
4. Mercury thermometer, 0-120° F
5. Baldwin SR-4 load cell, Type U-1, 5000 pounds capacity, Serial No. 2127

[redacted] 452 OCT 7

UNCLASSIFIED

UNCLASSIFIED

Figure 1 shows the bazooka rocket motor in place on top of the load cell which is attached to the load cell plate.

Procedure

The air temperature was measured with a mercury thermometer and the rocket temperature was obtained by using a Leeds and Northrup thermocouple meter.

Firing and instrumentation hookup circuits were set up as shown in Fig. 2. Some concern was expressed during the pendulum tests as to the repeatability of thrusts of rockets from different lot numbers. Since a number of rockets wired in parallel were used for these tests, a 0.03-ohm resistor was placed in parallel in the firing circuit to simulate 34 rockets. A 900-ohm resistor was used in series in the line to the Miller galvanometer to reduce the 475 volts discharged by the condenser bank to prevent excessive deflection of the galvanometer.

The charging system and the firing box located in the instrument trailer were utilized.

The load-cell-to-load-cell plate adapter was bolted to the load cell plate, after which the load cell was fastened in place. An adapter was also used between the load cell and the rocket.

A twenty-five-pound lead shot bag was placed in each corner of the plate to hold it securely in place.

As the rocket motor was screwed into place, one wire of the firing line was inserted between the rocket motor body and the adapter and clamped tightly. The other wire was fastened to the lead wire from the rocket motor. This arrangement is shown in Fig. 2.

The condenser bank was charged to 475 volts and then discharged through the rocket squib and 0.03-ohm load used to simulate 34 other rockets wired in parallel.

The thrust was recorded on the Miller oscillograph, as was the firing impulse.

The energy for each rocket motor was obtained by integrating the thrust-time curves. The average thrust was calculated by dividing the energy by the total burning time for each rocket motor.

This isn't energy, it is impulse

UNCLASSIFIED

[redacted]

UNCLASSIFIED

S[illegible] 3 1953

Ref. Sym: 1612
Project No. TM-170

The results of the test are tabulated in Table I. No differences in characteristics between the two lots of rockets were detected. Figures 3-9 show the thrust-time curves for each rocket motor. The zero time on these curves is the start of burning.

Robert L. Ault
ROBERT L. AULT - 1612-1

Approved by:

Original Signed By
P. H. ADAMS
PAUL H. ADAMS - 1612

RLA:1612:dd

Distribution:
S. A. Moore - 1322
F. J. Given - 5300
A. F. Cone - 1510
T. B. Morse - 1610
G. M. Byrne - 1925-3
J. M. Ralls - 1521-4 Attn: 1500 Drawing File

UNCLASSIFIED

[redacted]

[redacted]

#1119

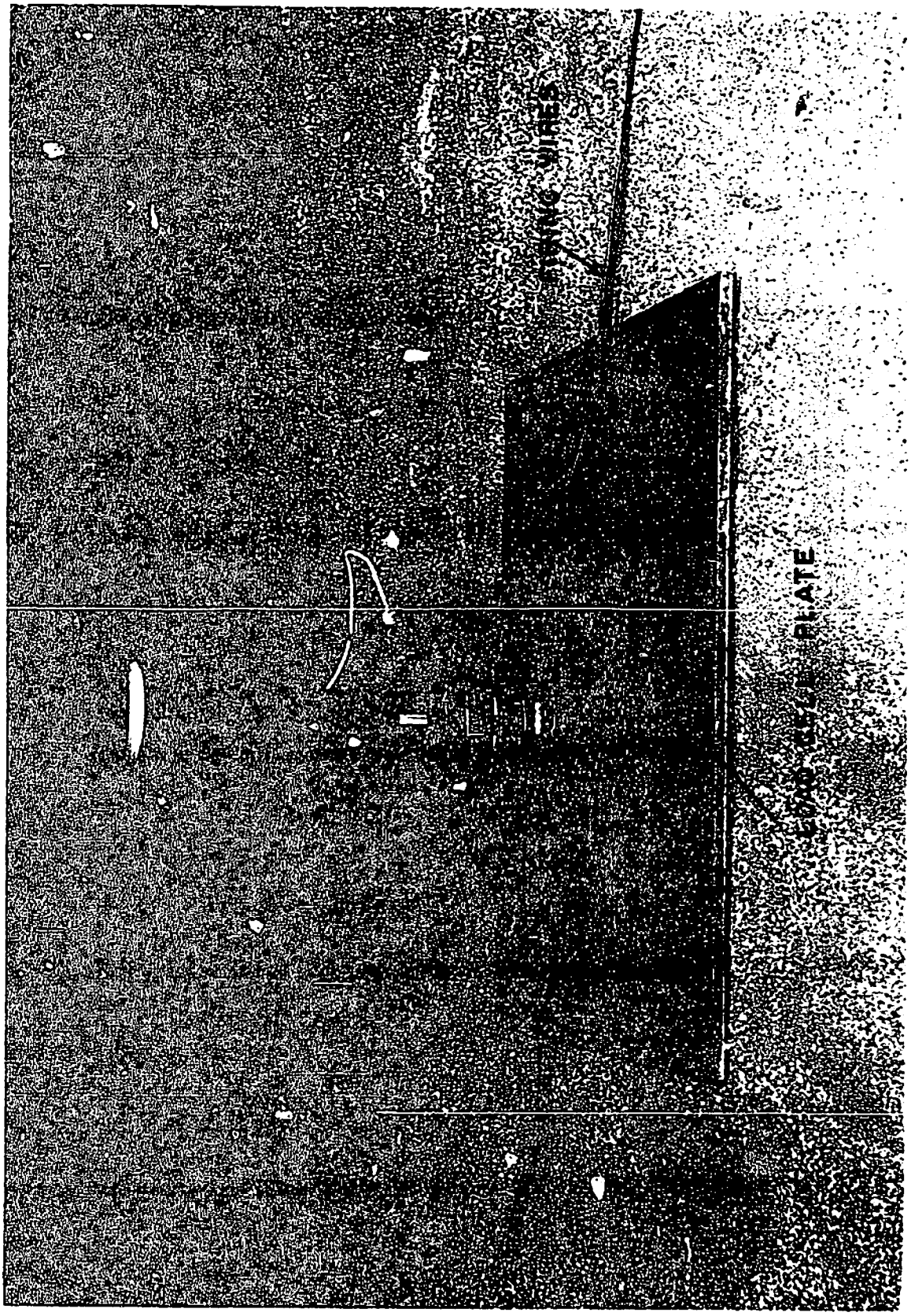


FIG. 1 - LOAD CELL-ROCKET MOTOR SETUP -- 3.5" BAZOOKA ROCKET MOTOR THRUST TEST

TM-170
REF. SYM. 1612

D#41132

[redacted]

UNCLASSIFIED

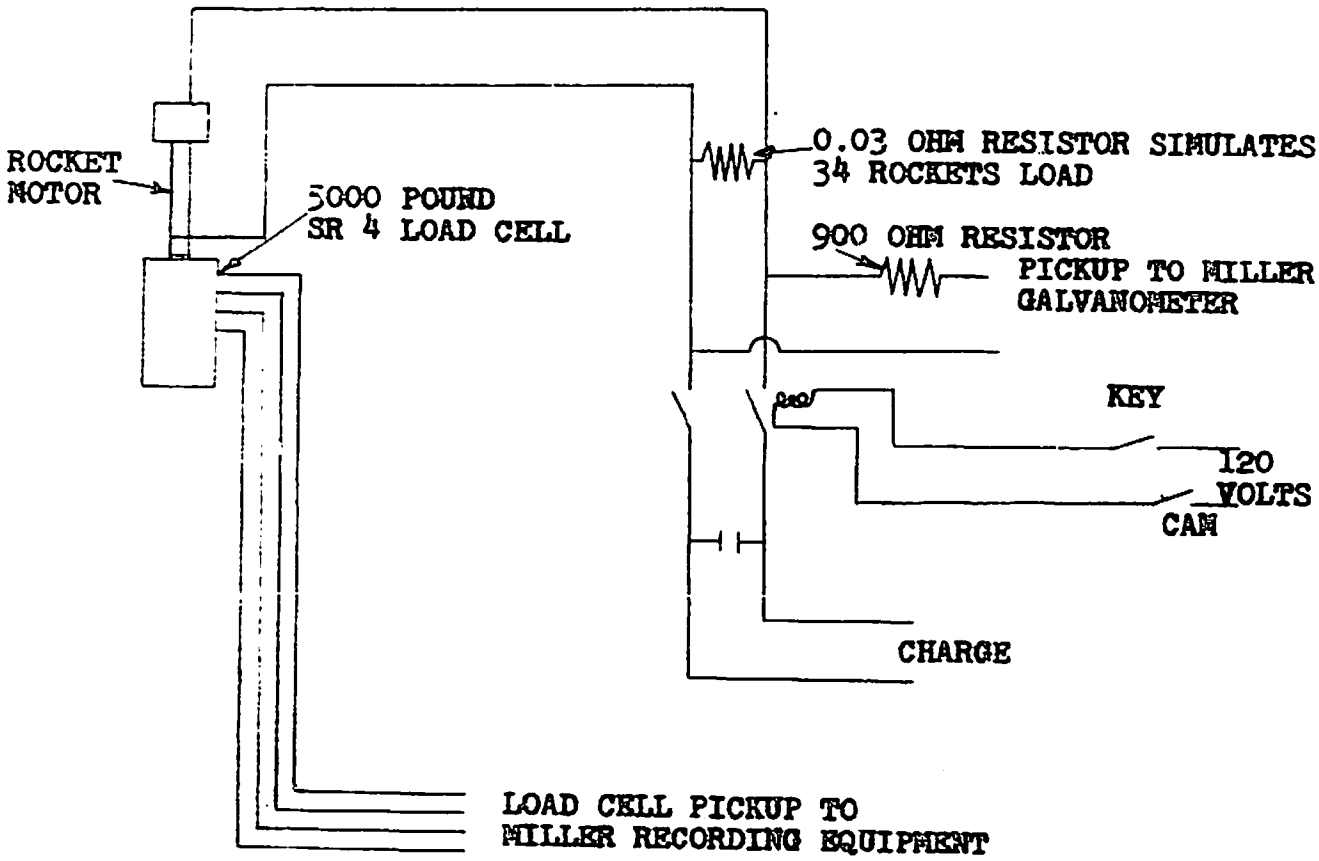


FIG.2 FIRING AND INSTRUMENTATION CIRCUITS-
BAZOOKA ROCKET MOTOR THRUST TEST

TM 170
REF SYM 1612

UNCLASSIFIED

KEUFFEL & ESSER CO.
10 x 10 to the ½ inch, 5th lines accented

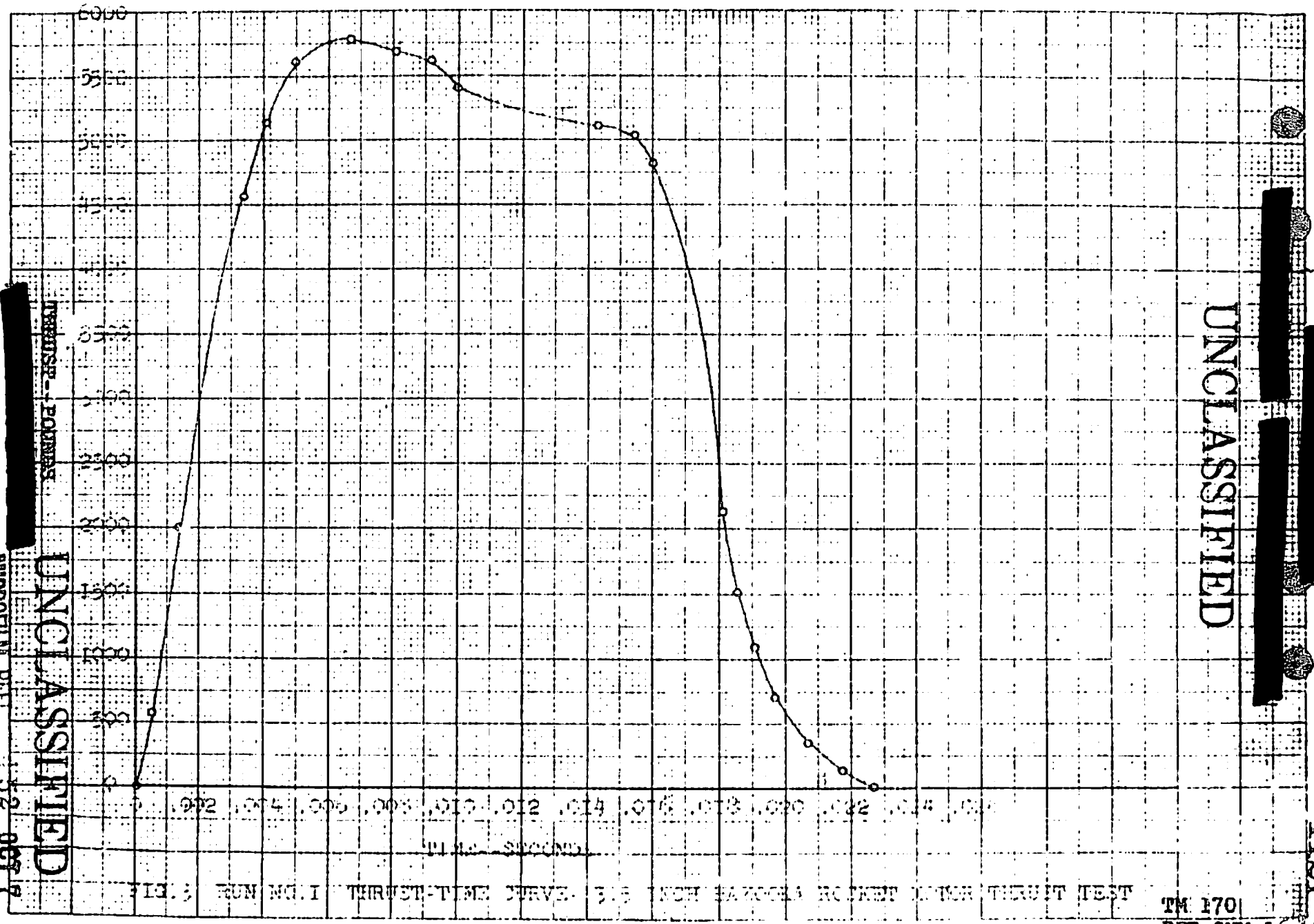


FIG. 3 RUN NO. I THRUST-TIME CURVE 3.5 INCH BAZOOKA ROCKET MOTOR THRUST TEST

UNCLASSIFIED
THRUST - POUNDS
UNCLASSIFIED
MICROFILM REEL
52 OCT 7
TM 170
REF SYM 16-12
1121

UNCLASSIFIED

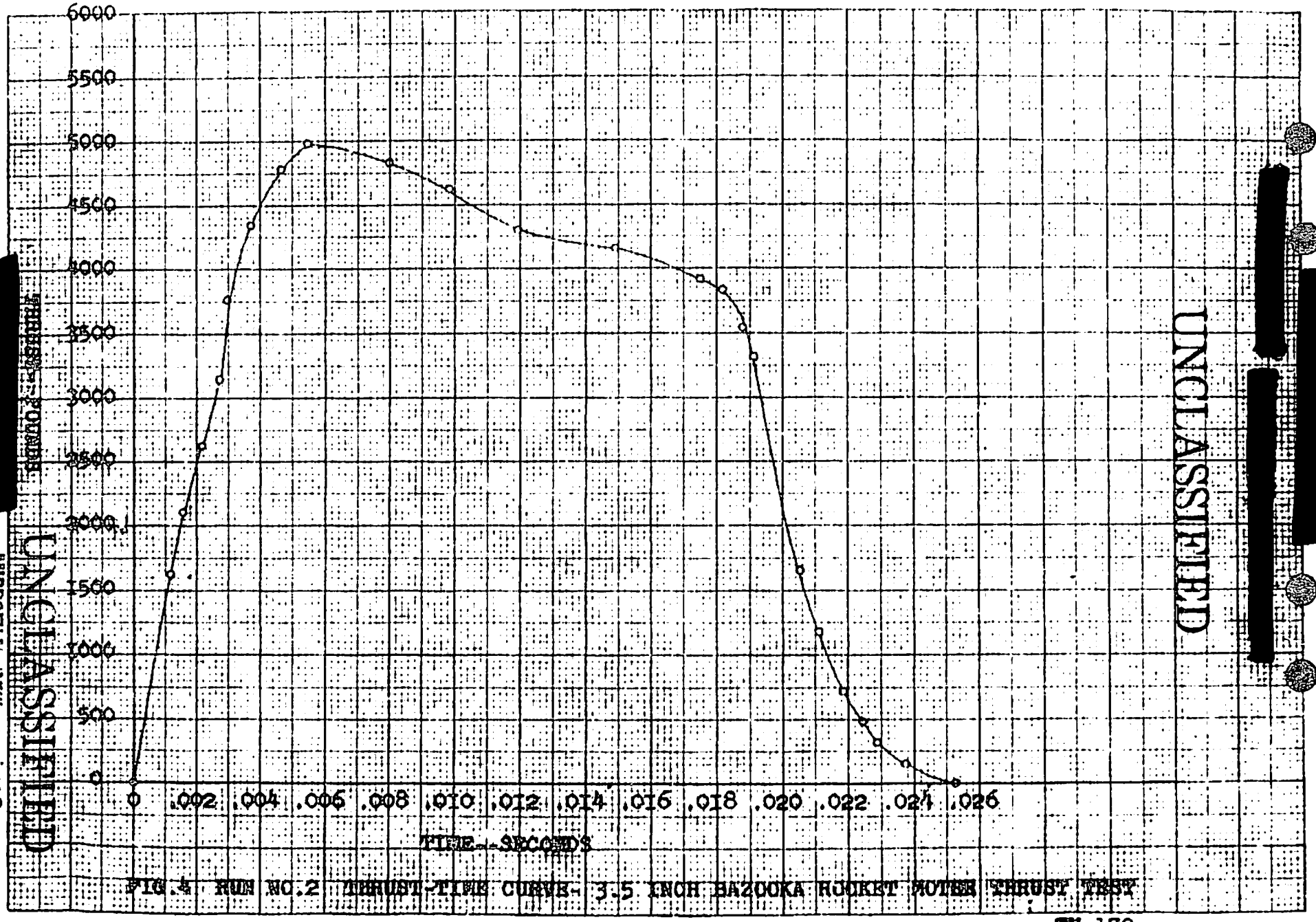


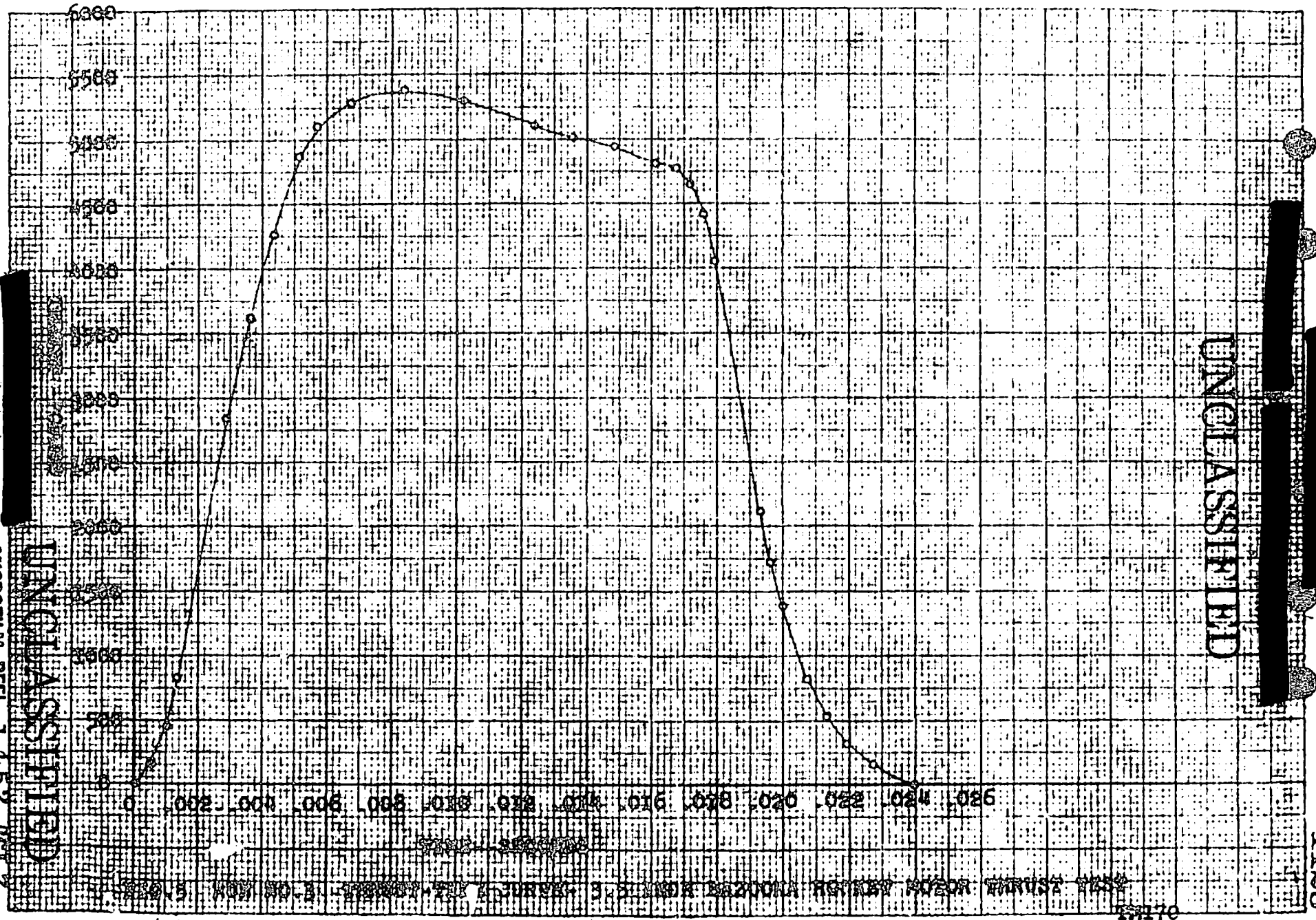
FIG.4 RUN NO.2 THRUST-TIME CURVE- 3.5 INCH BAZOOKA ROCKET MOTER THRUST TEST

UNCLASSIFIED
MICROFILM REF 7 52 OCT 7

TM 170
REF SYM 1612

1122

KEUFFEL & ESSER CO.
10 X 10 to the ½ inch, 5th lines accented.
MADE IN U.S.A.



UNCLASSIFIED

UNCLASSIFIED

MICROFILM REEL 1452 OCT 7

1123

T.170
REF SYM 1612

KEUFFEL & ESSER CO.
10 X 10 to the ½ inch, 5th lines accented.

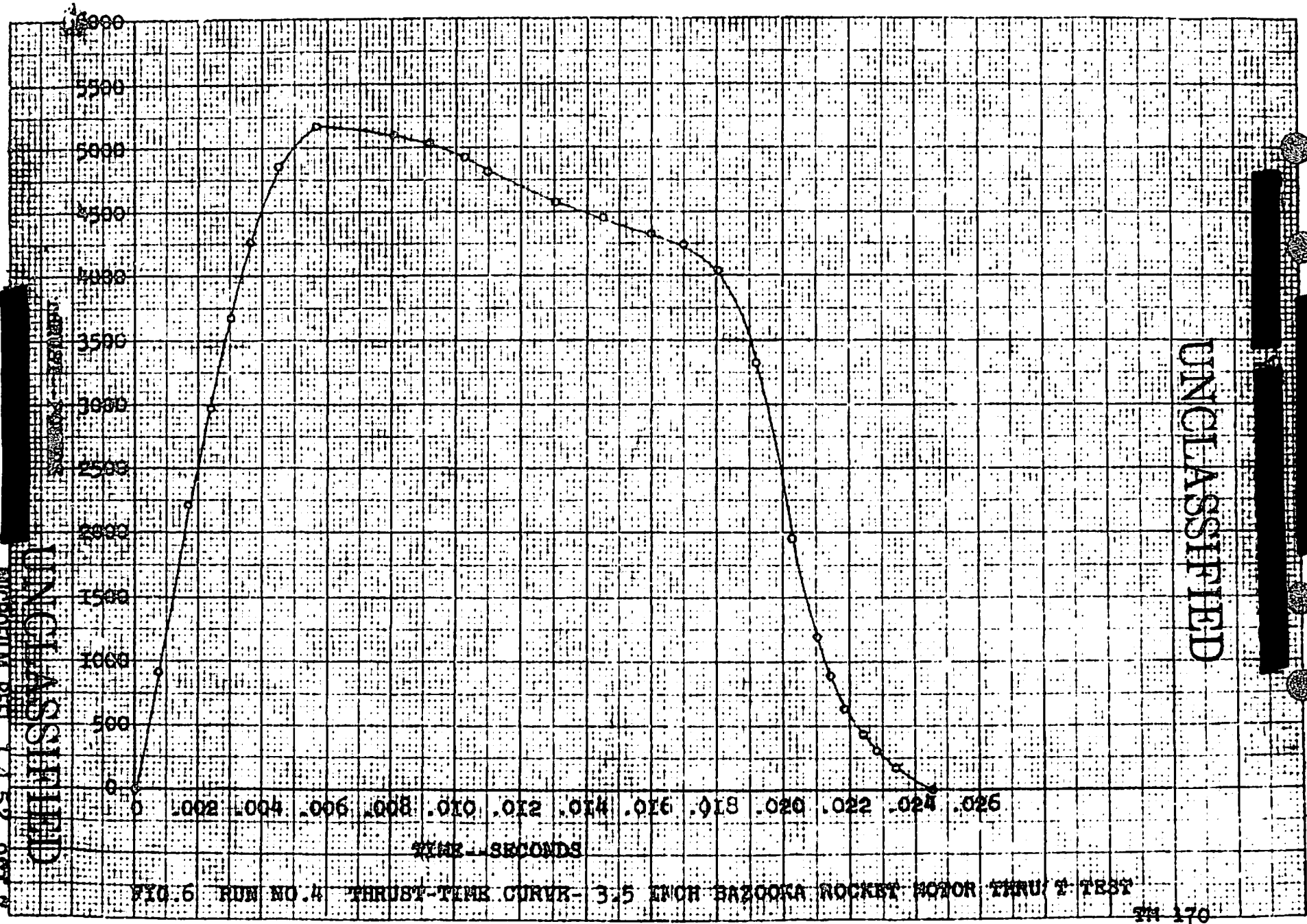


FIG.6 RUN NO.4 THRUST-TIME CURVE- 3.5 INCH BAZOOKA ROCKET MOTOR THRUST TEST

TM 170
REF SYM L612

UNCLASSIFIED
UNCLASSIFIED
MICROFILM REEL 1452 OCT 7

1124

KEUFFEL & ESSER CO.
10 × 10 to the ½ inch, 5th lines accented.
MADE IN U.S.A.

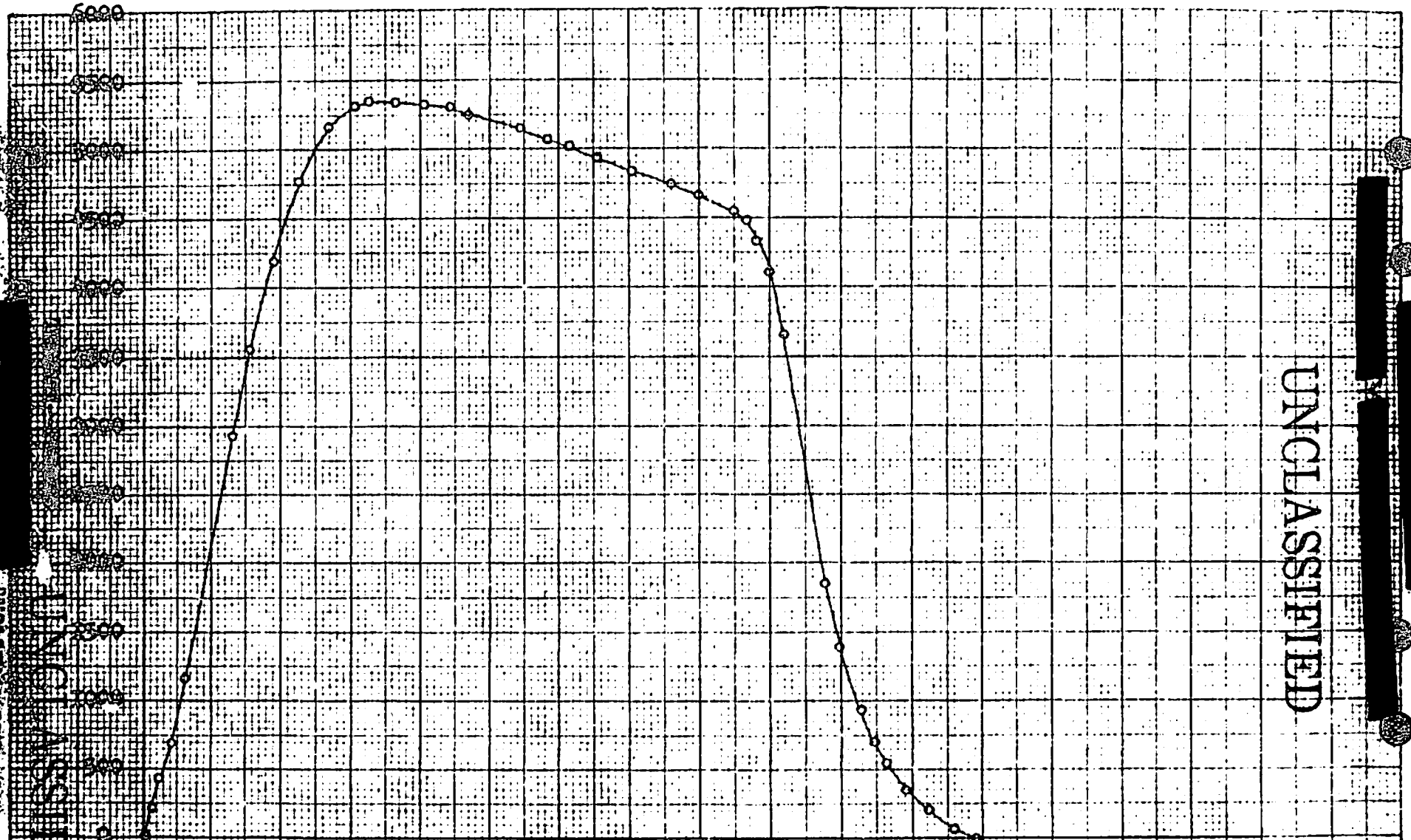


FIG.7 RUN NO.5 THRUST-TIME CURVE- 3.5 INCH BAZOOKA ROCKET MOTOR THRUST TEST

UNCLASSIFIED
UNCLASSIFIED
UNCLASSIFIED
REPL 1 4 52 OCT 2

TM 170
REF SYM 1612

1125

UNCLASSIFIED

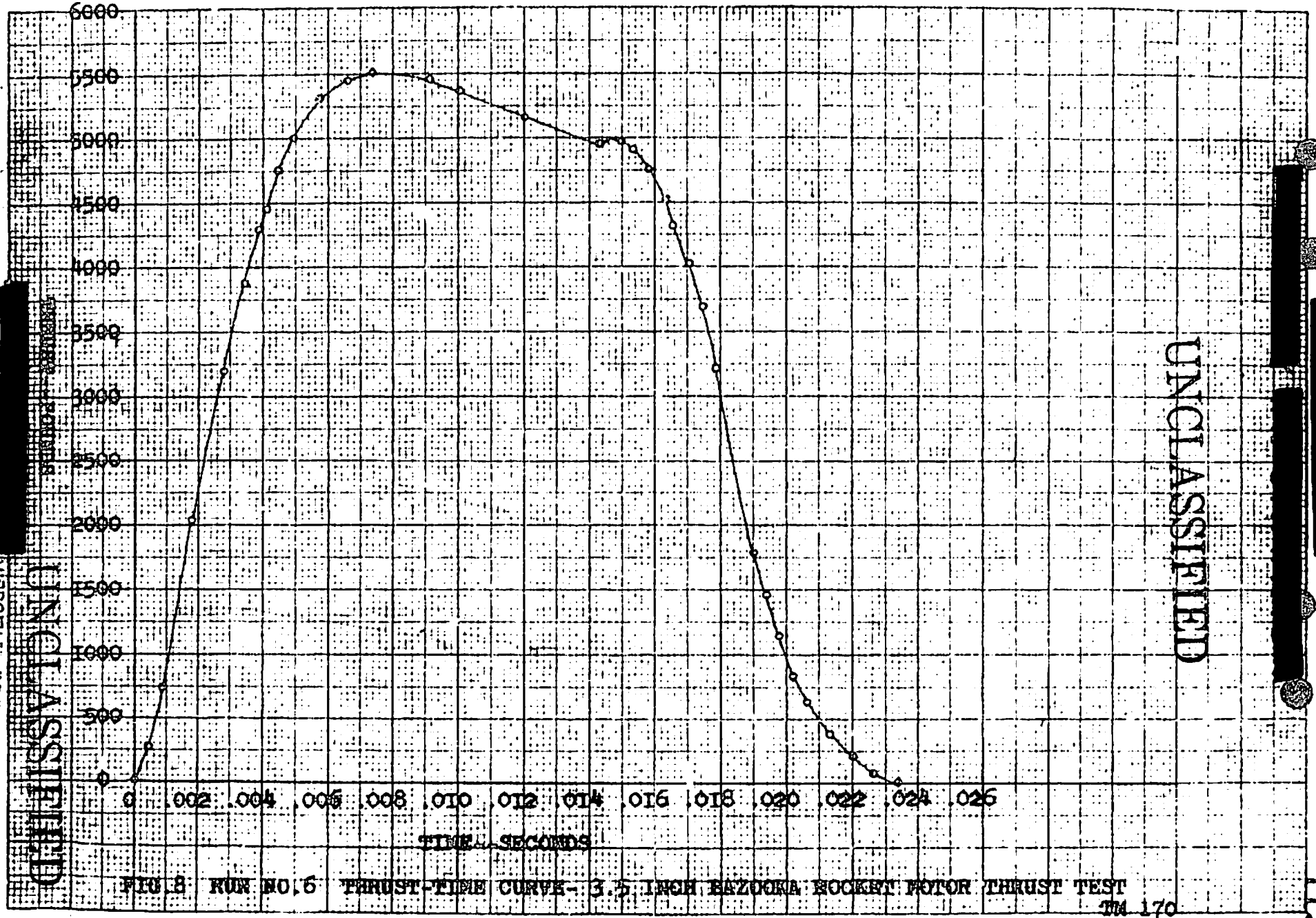


FIG.8 RUN NO.6 THRUST-TIME CURVE- 3.5 INCH BAZOOKA ROCKET MOTOR THRUST TEST

TM 170
REF SYM 1612

UNCLASSIFIED
MICROFILM REF 52 OCT 7

1126

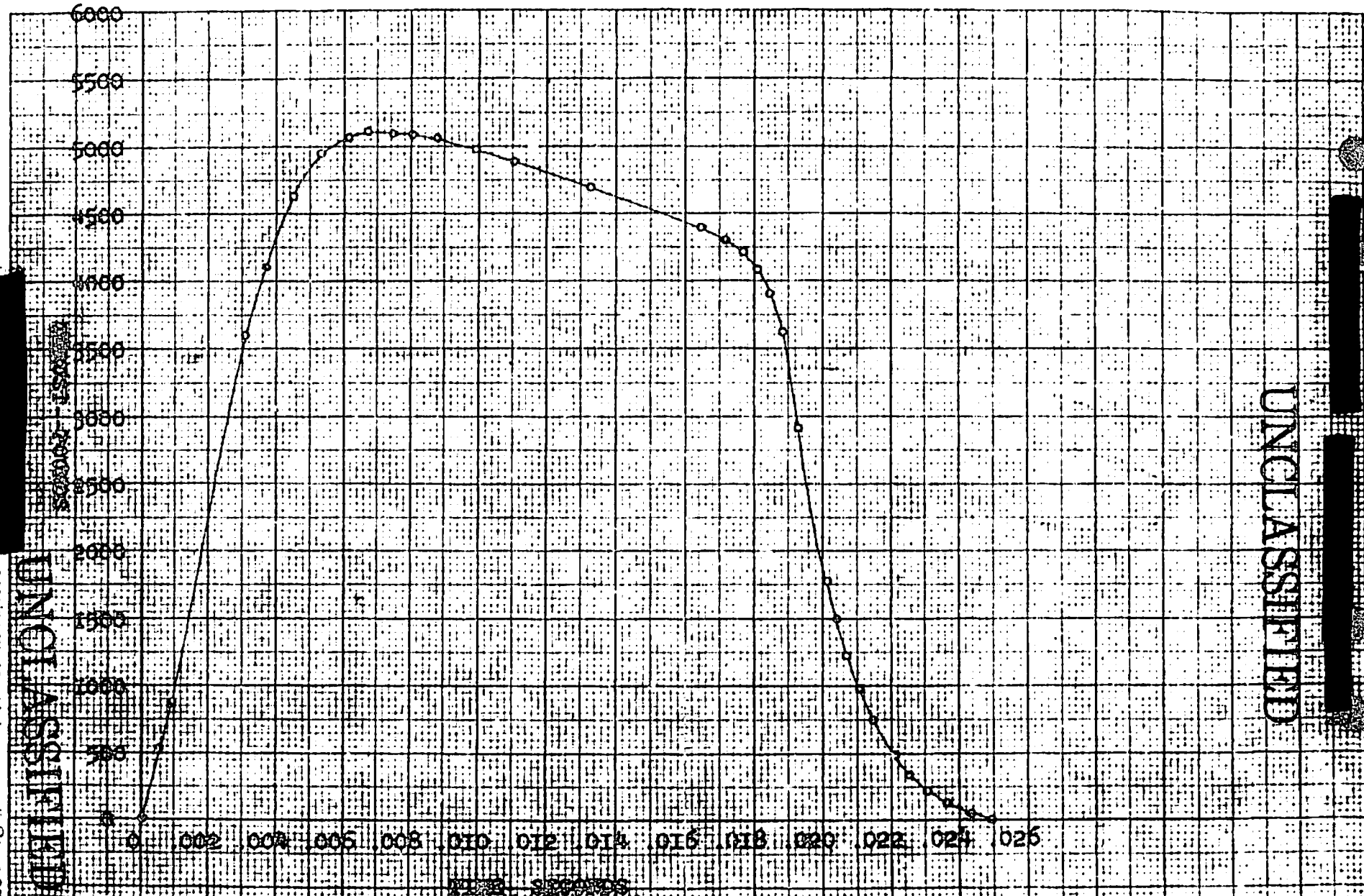


FIG. 3 RUN NO. 7 THRUST-TIME CURVE- 3.5 INCH BAZOOKA ROCKET MOTOR THRUST TEST

TM 170
REF SYM 1612

UNCLASSIFIED
UNCLASSIFIED
[redacted]
[redacted]
[redacted]
[redacted]
22 OCT 7

TABLE I

THRUST-TIME DATA

3.5-INCH BAZOOKA ROCKET MOTOR THRUST TEST

Ref. Sym: 1612
Project No. TM-170

RUN NO.	LOT NO.	AIR TEMP. (°F)	ROCKET TEMP. (°F)	TIME (SECONDS) FIRING TO INITIAL BURN	INITIAL BURN TO MAX. THRUST	INITIAL BURN TO END OF BURN	PEAK THRUST (POUNDS)	Impulse ~~ENERGY~~ (POUND-SEC)	AVERAGE THRUST (POUNDS)	ROCKET MOTOR LEADS LENGTH (INCHES)	GAUGE
1	COP 2-26	95.5	95.5	0.0040	0.0068	0.0228	5750	85.4	3745	36	16
2	COP 3-172	96	96	.0034	.0054	.0252	4990	81.5	3235	37	12
3	COP 2-26	97.5	97	.0053	.0084	.0240	5410	87.6	3650	38	16
4	COP 3-172	96	96	.0067	.0058	.0246	5200	88.0	3575	37	12
5	COP 2-26	97	97	.0123	.0068	.0239	5370	86.8	3630	36	16
6	COP 2-26	97	97	.0054	.0075	.0235	5520	81.1	3450	38	16
7	COP 3-172	97.5	97.5	.0039	.0068	.0250	5140	83.7	3350	36	1[illegible]

MICROFILM REEL 1 4 52 OF 7