AIRCRAFT ARMAMENTS, Inc.
COCKEYSVILLE, MARYLAND

AIRCRAFT ARMAMENTS, Inc.

QUARTERLY PROGRESS REPORT

INVESTIGATION OF TELECARTRIDGE DISSEMINATION TECHNIQUES

CONTRACT NO. DA18-108-AMC-80(A)
CP3-9800

ER-3043B
REPORT NO.

October 1963
DATE

Prepared by:

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QUARTERLY REPORT

FOR THE PERIOD OF 1 JULY THROUGH 30 SEPTEMBER 1963

CONTRACT NO. DA18 108 AMC 80(A) CP3 9800

I. INTRODUCTION

This is the third in a series of quarterly progress reports which will be submitted under the terms of Contract No. DA18 108 AMC 80(A) CP3 9800.

II. RESUME OF ACCOMPLISHMENTS

During the period of 1 July to 30 September 1963, new hardware was designed and constructed to improve the method of gathering time pressure data for analysis and comparison with results obtained from tests at the ACC.

The media under test during this quarter were water, BIS*, and a slurry consisting of egg albumin in carbon tetrachloride. (1)*

During this time two series of shots were fired at the ACC Test facilities for dissemination measurement. The first was conducted with a slurry of egg albumin in carbon tetrachloride, in varying percentages, for correlation with data previously collected at the AAI test facilities. The second series was the beginning of a series of shots to be fired using BIS* as the simulant.

Figures 1 and 2 show the results of these two series of shots. Curves relating to these tests are in Figures 3 and 4.

At this time, existing hardware was redesigned and altered to adapt to a change in the method of telecartridge operation. The effect of the change

(1)* Bis (2 Ethythexyl) Hydrogen Phosphite

was to change the method of operation of the telecartridge from an "unrolling" process to a "rolling" process. The new telecartridge is shown in Figure 5.

A new nozzle was designed and constructed according to calculations made to eliminate the problem of simulant spray being directed directly onto the walls of the ACC test chamber. Figure 6 shows a diagram of this new nozzle.

This unit was fired several times at the AAI test facilities but has not been fired at the ACC for dissemination measurement data.

While proof tests, on the new telecartridge and nozzle, were being conducted at the AAI test facilities, plans were made to design a new nozzle and high pressure gun in order to obtain a smaller simulant particle size. The gun and nozzle were designed and constructed. Both are now undergoing proof tests at the AAI test facilities to gather data for analysis. To be evaluated are the effects of propellant charge on time-pressure curves, stroke time, and overall efficiency of the telecartridge. A diagram of the nozzle and gun is in Figure 7.

Several shots have been fired near the proposed working pressure of the gun and within a short time the gun will be ready for testing at the ACC test facilities to determine its dissemination capabilities. Representative curves are shown in Figures 8 and 9.

III. RECOMMENDATIONS FOR FUTURE INVESTIGATIONS

Time-pressure and fluid properties data will continue to be gathered and analyzed.

The new hardware will be tested at the ACC test facilities to obtain data on percent yield and particle size.

Dissemination properties and cloud configuration will be further investigated with the aid of high speed motion pictures.

RUN NO.	S251	S252	S253
CHARGE (grains)	30	20	30
TIME (minutes)			
1/2	37.7	6.3	13.0
1 1/2	25.9	4.8	10.0
2 1/2	14.9	4.3	17.5
3 1/2	10.1	3.0	15.4
4 1/2	8.3	3.8	5.9
6 1/2	5.8	1.5	3.2
8 1/2	4.0	1.8	2.8
10 1/2	3.5	1.9	2.4
15 1/2	3.2	1.5	1.9
20 1/2	2.6	1.2	1.9
25 1/2	2.0	1.2	2.8
30 1/2	2.0	1.4	1.2
1 1/2	40.5	5.6	17.1
8 1/2	7.5	1.8	1.6

Test Series No. 8
18 July 63
Corresponds to Curves on Figure 3

FIGURE 1

RUN NO.	649	650
CHARGE (grains)	20	30
TIME (minutes)		
1/2	6.4	11.7
1 1/2	3.9	3.4
2 1/2	1.8	2.8
3 1/2	1.2	1.9
4 1/2	1.1	1.7
6 1/2	0.8	1.2
8 1/2	0.6	0.9
10 1/2	0.5	0.8
15 1/2	0.3	0.5
20 1/2	0.3	0.3
25 1/2	0.2	0.3
30 1/2	0.1	0.3

Test Series No. 9
25 July 63
Corresponds to Curves on Figure 4.

FIGURE 2

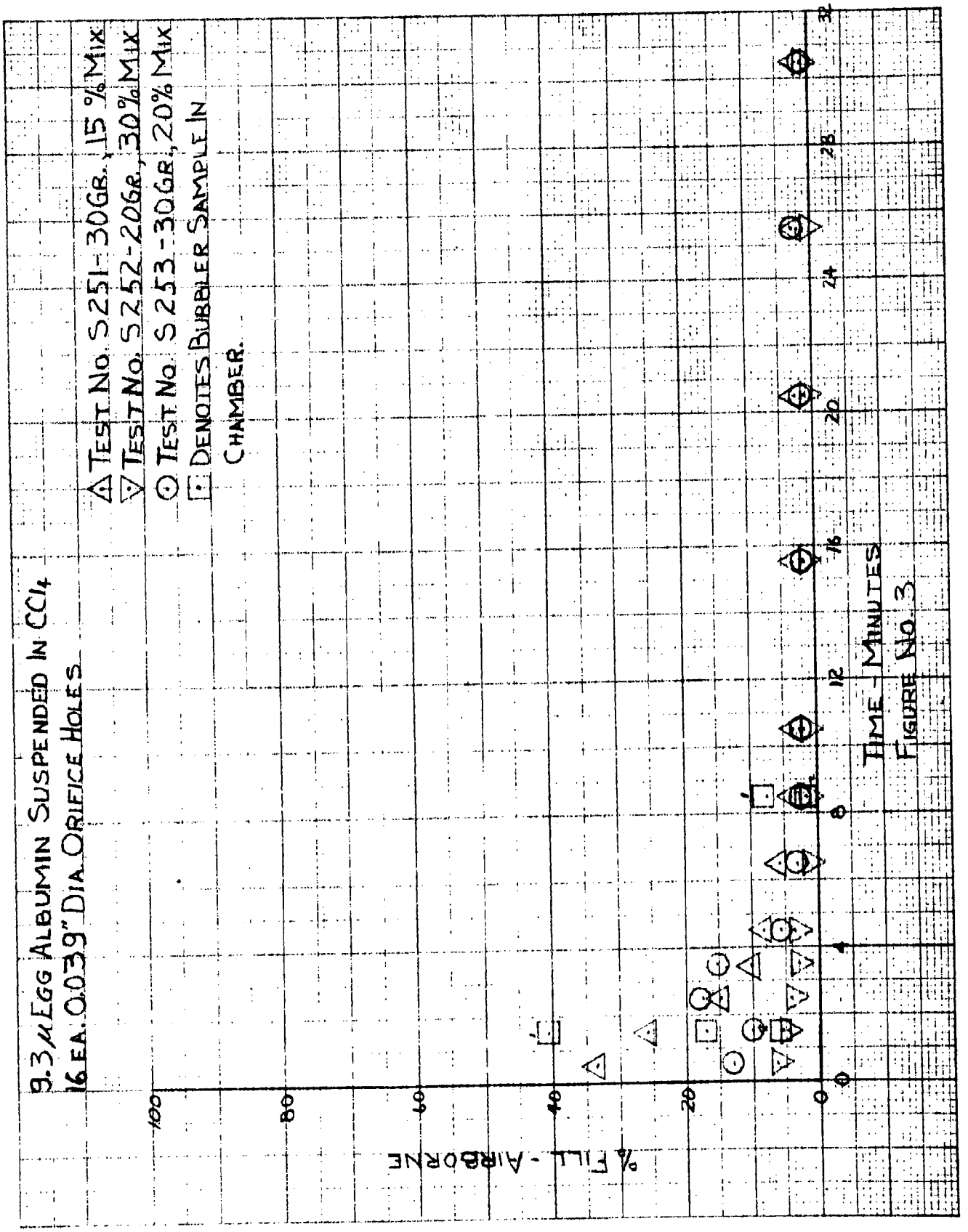

9.3μ Egg Albumin Suspended in CCl_4
16 ea. 0.039" Dia. Orifice Holes
△ Test No. S251-30GR., 15 % Mix
▽ Test No. S252-20GR., 30% Mix
○ Test No. S253-30GR., 20% Mix
⊡ Denotes Bubbler Sample In Chamber.
% Fill - Airborne
100
80
60
40
20
0
0
4
8
12
16
20
24
28
32
Time Minutes

Figure No. 3

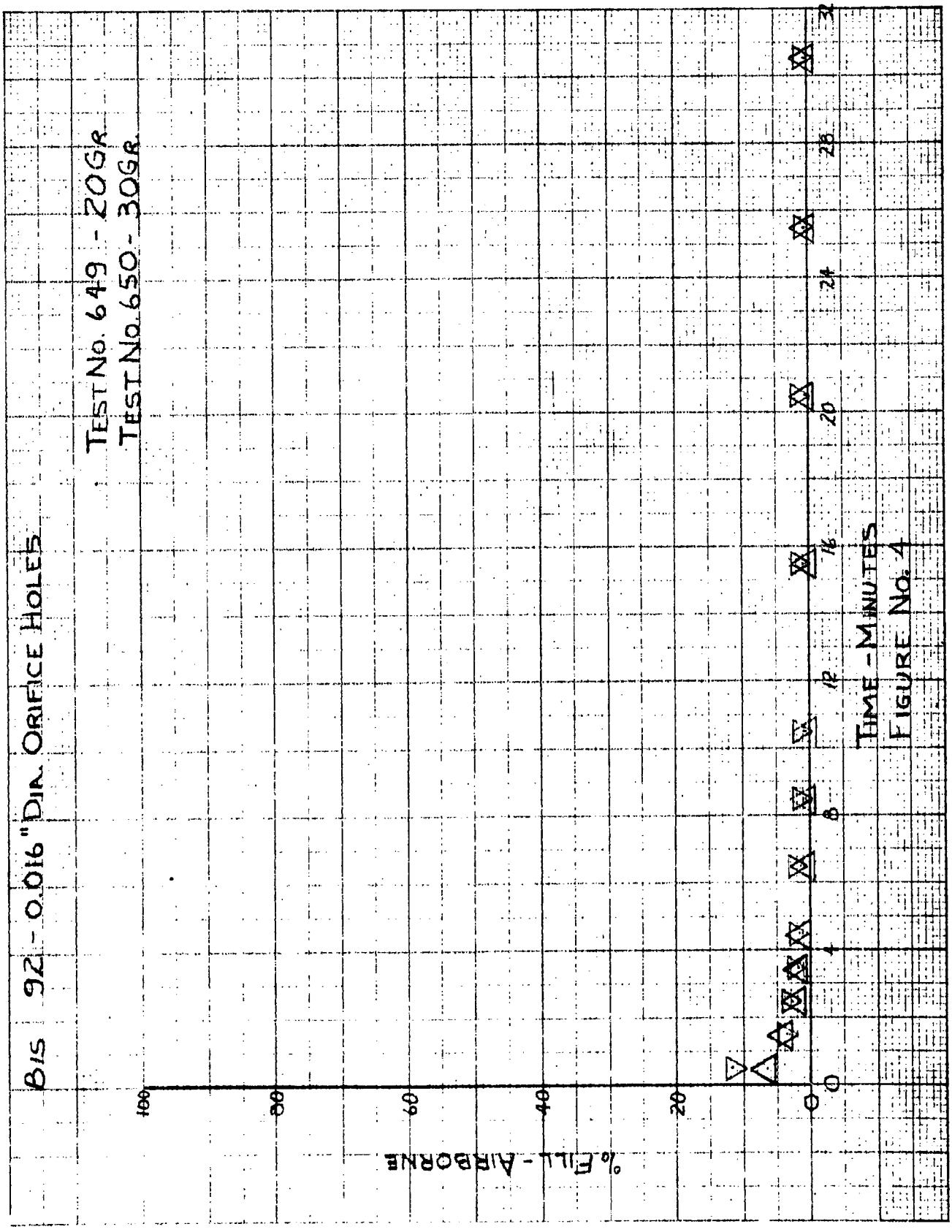
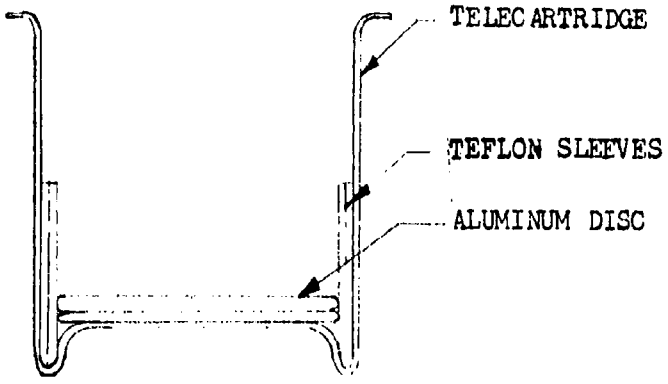
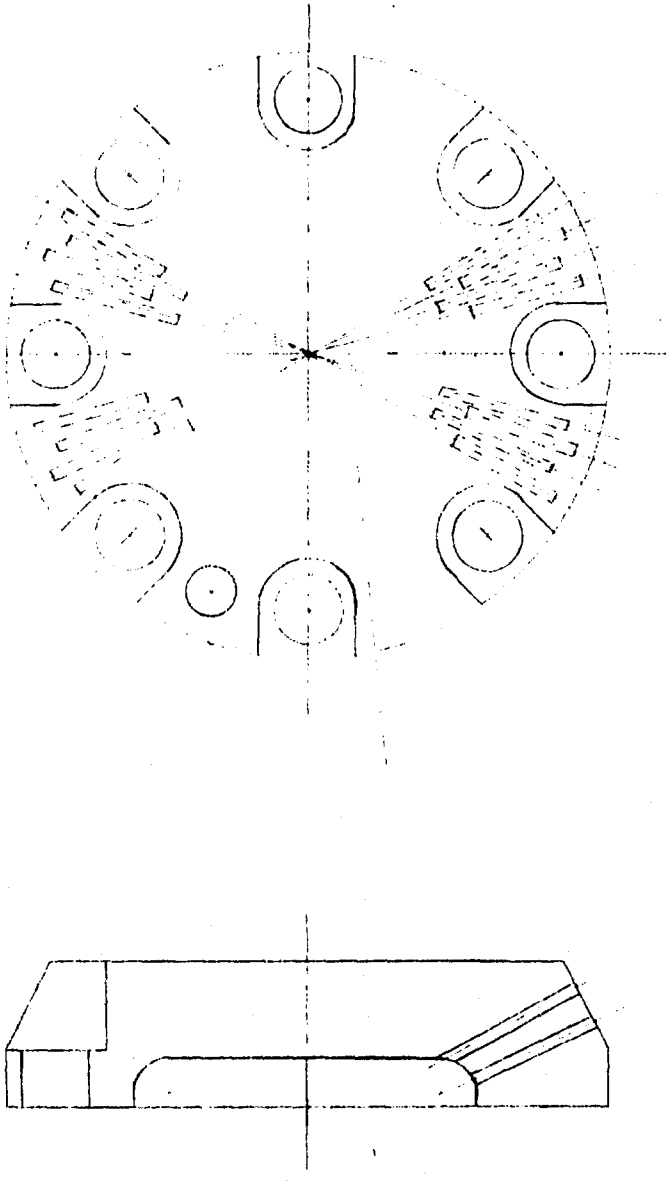

B15 92 - 0.016" DIA. ORIFICE HOLES
TEST No. 649 - 20GR
TEST No. 650 - 30GR
% FILL - AIRBORNE
100
80
60
40
20
0
0
4
8
12
16
20
24
28
32
TIME - MINUTES

FIGURE No. 4



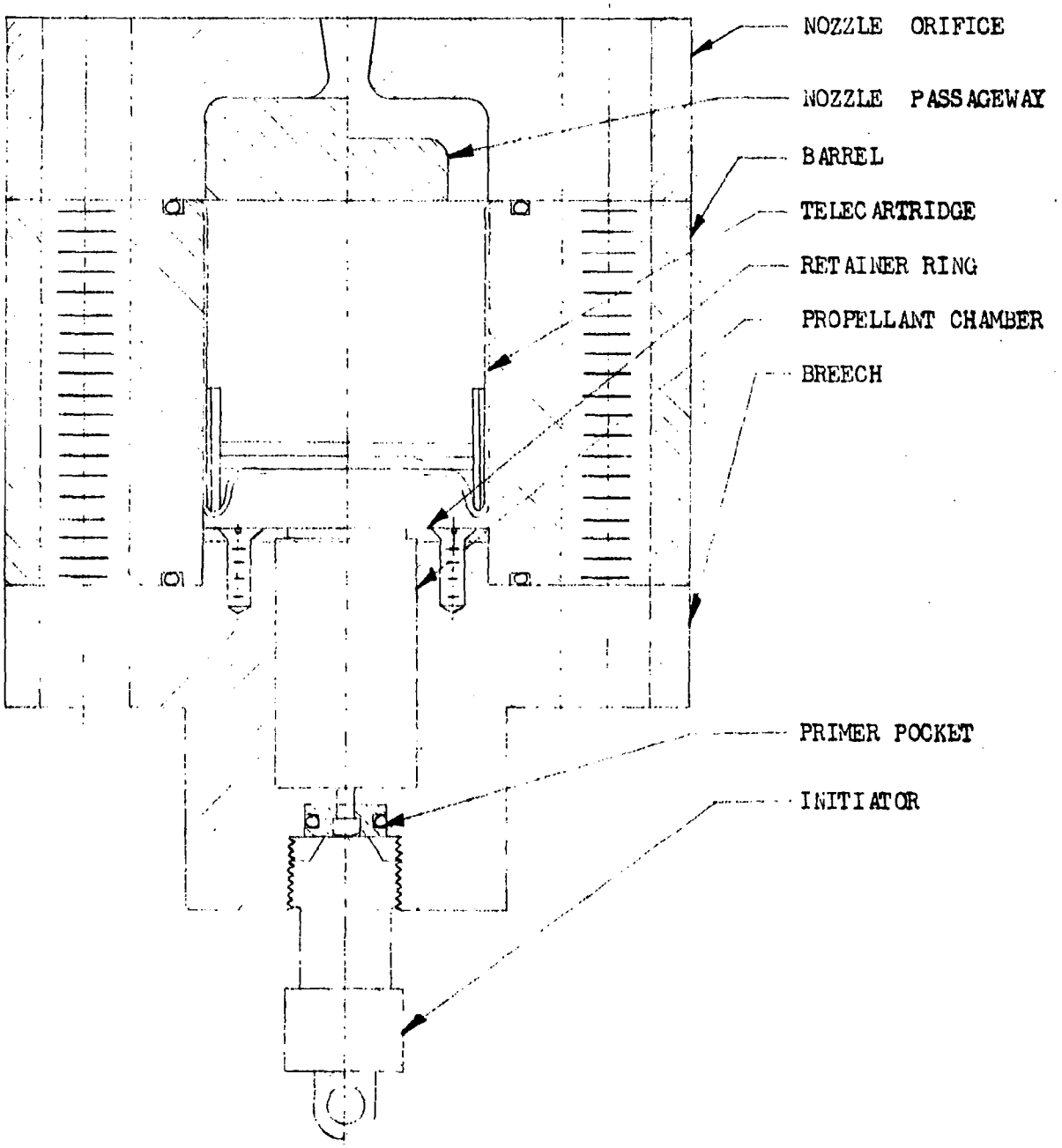
NEW TELEC ARTRIDGE

FIGURE No. 5



LOW ANGLE NOZZLE

FIGURE 6



PRESSURE TEST FIXTURE

FIGURE 1.0. 7

SHOT NO. 2

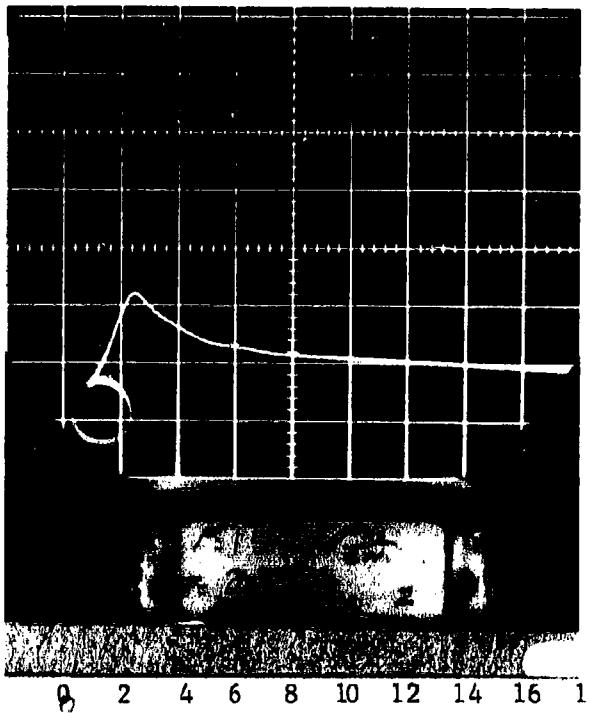
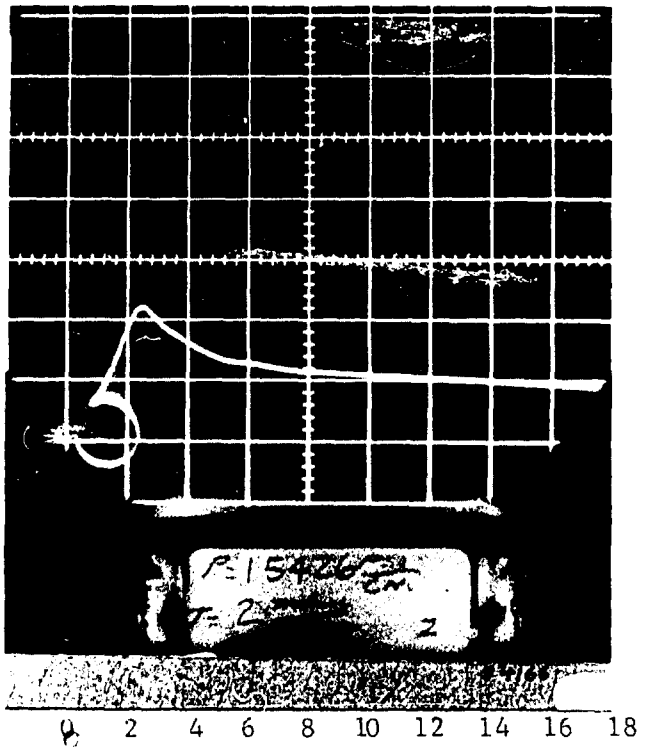


FIGURE 8

SHOT NO. 2



46278

30852

15426

0

GAS PRESSURE IN POUNDS PER SQUARE INCH

TIME IN MILLISECONDS

FIGURE 8

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Report No. 3, October 1963, 12 pp - 5 illus., 2 tables, 2 curves.

Contract DA18-108-AMC-80(A) CP3-9800

1. Telecartridge Dissemination Study
2. Contract DA18-108-AMC-80(A) CP3-9800

Progress is reported for the following work: (1) Nozzle design for most efficient dissemination. (2) Ballistic tests. (3) Actual test firings and instrumentation at ACC test facilities for BIS (2 Ethythexyl) Hydrogen Phosphite and Egg Albumin-Carbon Tetrachloride

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