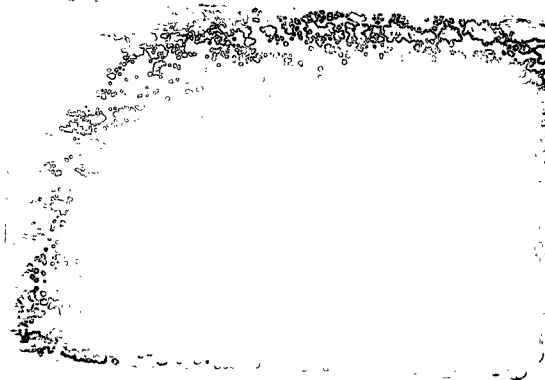


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AIRCRAFT ARMAMENTS, Inc.

QUARTERLY PROGRESS REPORT
INVESTIGATION OF TELECARTRIDGE
DISSEMINATION TECHNIQUES

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

ER-3043
REPORT NO.

April 1962
DATE

Prepared by: F. C. Latrobe, Jr. & J. R. Hebert
F. C. Latrobe, J. R. Hebert



QUARTERLY REPORT

FOR THE PERIOD OF 4 JANUARY THROUGH 31 MARCH 1963

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

I. INTRODUCTION

This is the first 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 January an existing 40 mm test fixture was modified to use the latest designs of dissemination nozzles and rupture discs. The liquid nozzle used has 6 one-sixteenth-inch diameter holes drilled at a 60-degree included angle around a nine-sixteenth-inch diameter circle. The rupture discs currently in use are made of .080" thick aluminum with a one-inch diameter V-groove .070" deep and .076" deep. This leaves a web thickness of .008" and .004" respectively. The powder nozzle fitted to this fixture is a deep conical nozzle with a one-inch throat diameter. This fixture was further modified to be fired by an electric match rather than a mechanically fired primer.

On January 24, this fixture along with hardware for both liquid and powder dissemination was delivered to H. Rosen at the Army Chemical Center.

Work at AAI was confined to designing and developing a test fixture and hardware to disseminate liquids at pressures up to 10,000 psi. The fixture is shown in Figures 1, 2 and 3.



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This fixture uses a standard Telecartridge configuration in which an aluminum cup is turned back into itself by means of a forming die, and then unrolled to its original shape by means of a propellant charge. As shown in Figure 1, this cup is placed into a fixture similar to a gun with a barrel, breech, firing device and end nozzle which retains the agent loaded into the barrel and cup. Figure 2 shows this fixture within three milliseconds after firing. The firing device has fired the primer, which in turn has ignited the propellant charge, blown out the brass cup, and provided sufficient pressure to start the Telecartridge to unroll. This pressure has been transmitted through the agent to the rupture disc of the nozzle which has failed and allowed the dissemination of the agent to proceed. Figure 3 shows the fixture at ten milliseconds after firing. The Telecartridge is entirely unrolled and the agent volume completely evaluated.

This fixture has been proof tested successfully to a maximum pressure of 11,380 psi.

The table in Figure 4 shows the pressures obtained in the series of test firings.

Figure 5 shows representative time-pressure curves from the second and fourth firings.

III. RECOMMENDATIONS FOR FUTURE INVESTIGATIONS

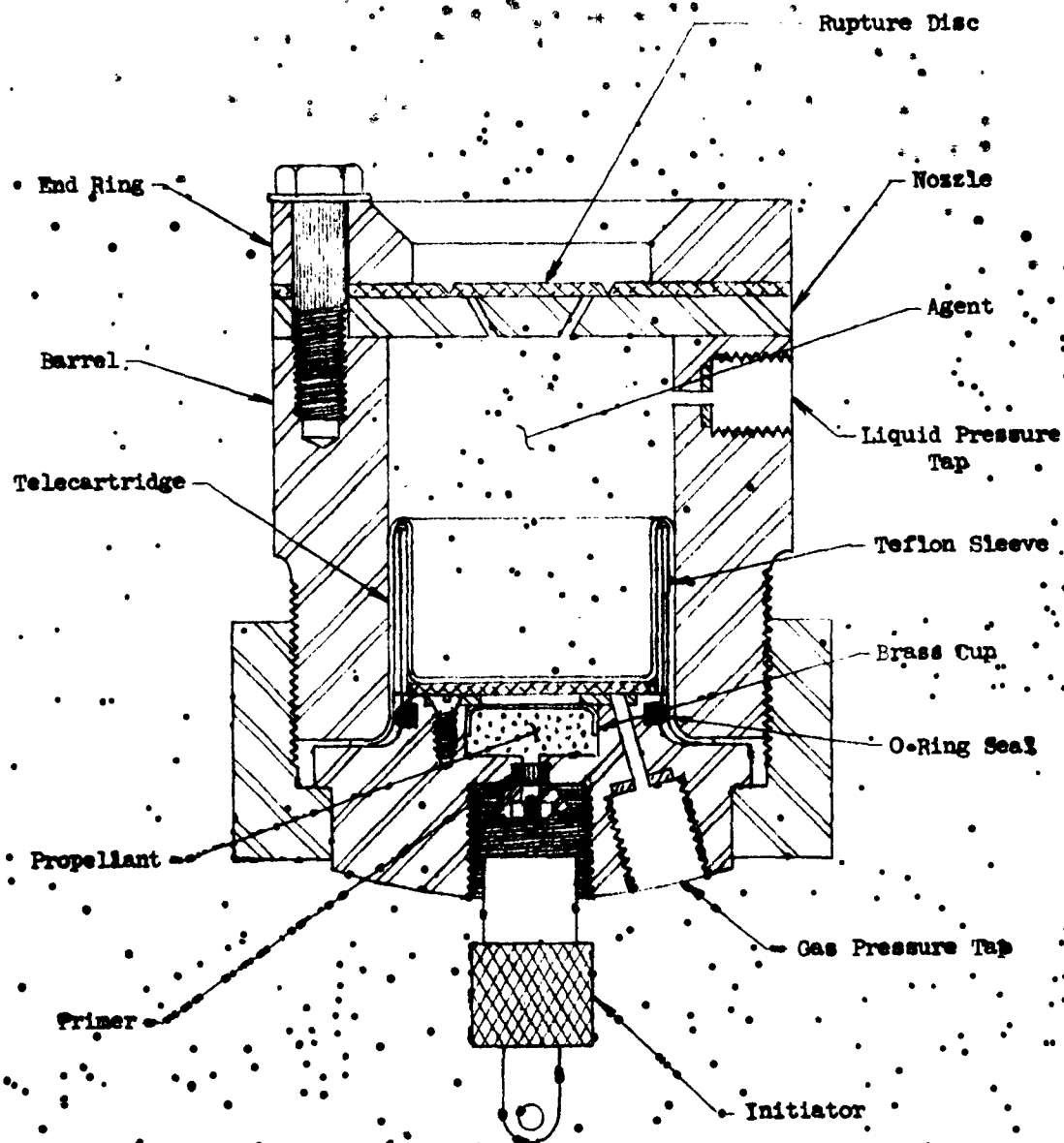
Experimental tests are presently being scheduled to correlate pressure, nozzle configuration, fluid properties, and aerosol particle size.



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PRESSURE TEST FIXTURE

Figure 1

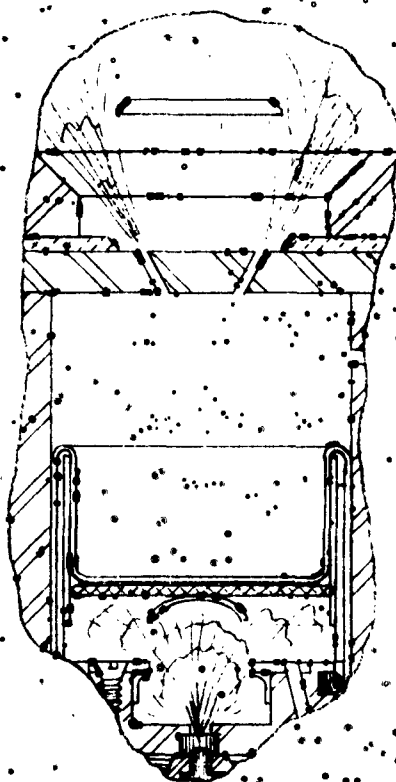
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Test fixture at firing showing primer igniting propellant charge, Telecartridge starting to unroll; rupture disc broken clear of end and agent starting to disseminate through nozzle.

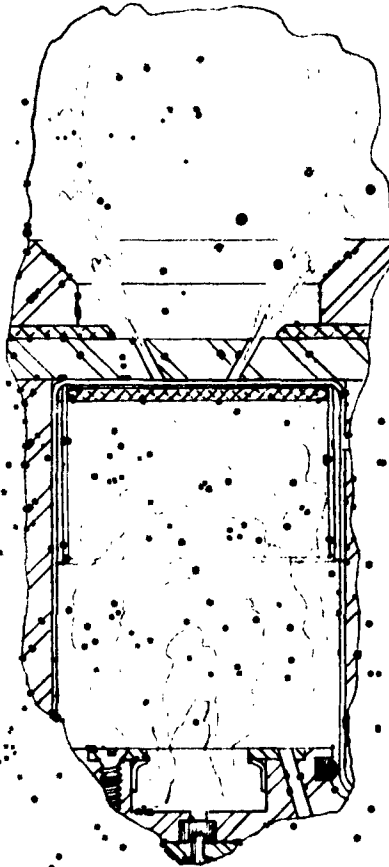
Figure 2



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Test Fixture after
firing showing Tele-
cartridge unrolled
and agent chamber
empty.

Figure 3

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<u>Shot No.</u>	<u>Propellant Charge</u>	<u>Max. Gas Pressure (psi)</u>	<u>Max. Liquid Pressure (psi)</u>
1	30 gr. M7	4750	4700
2	35 gr. M7	7600	6400
3	37 gr. M7	8850	7600
4	40 gr. M7	11,380	11,350

TABLE OF PRESSURES
OBTAINED DURING TEST FIRINGS

Figure 4.

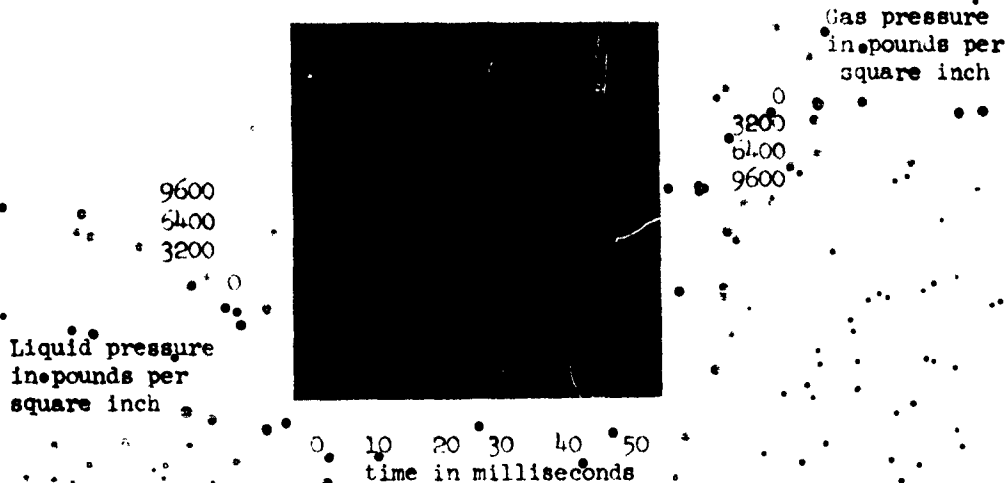


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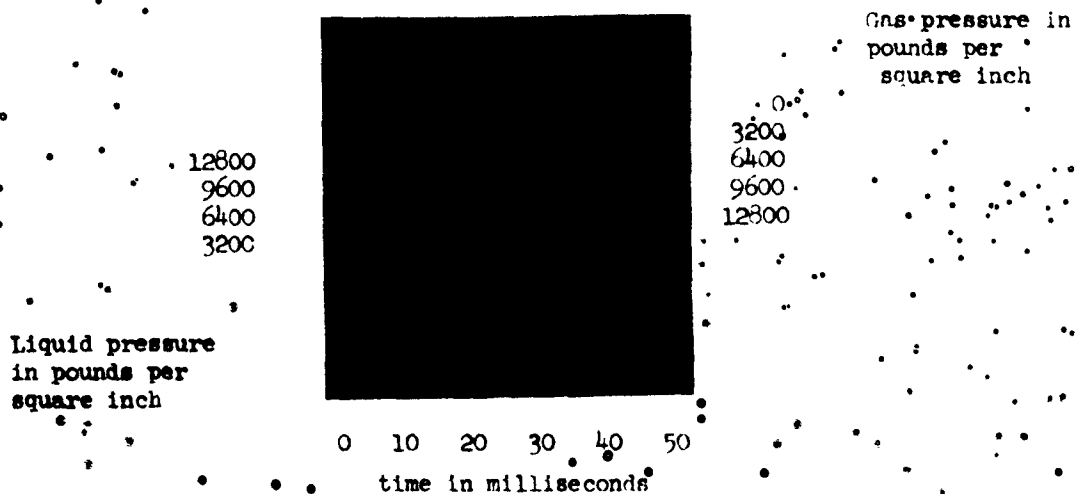
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Shot No. 2



Shot No. 4



Time-Pressure Curves

Figure 5