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Engineering

REPORT NO. 1-8-50G-1

MONTHLY PROGRESS REPORT

ENGINEERING PROGRAM FOR THE
DEVELOPMENT OF A LIGHTWEIGHT
ANTI-TANK ROCKET

FOR THE PERIOD

MONTH OF JANUARY 1958

CONTRACT NO. RD-142

~~ORDNANCE PROJECT NO~~

~~DEPT OF ARMY PROJECT NO~~

~~SECRET~~

Hesse-Eastern Progress Report #I-8-50G-I

HESSE - EASTERN DIVISION

FLIGHTEX FABRICS, INC.

PROGRESS REPORT #5

ENGINEERING PROGRAM FOR THE DEVELOPMENT OF A LIGHTWEIGHT ANTI-TANK ROCKET

JANUARY 1958

CONTRACT NO. RD-142

PREPARED BY Paul V. C.
Paul V. C.
Project Engineer

APPROVED BY Charles B. W.
Charles B. W.
General Manager

PREPARED BY Tom F.
Thomas F.
Project Engineer

SUBMITTED BY: HESSE-EASTERN DIVISION
FLIGHTEX FABRICS, INC.
CAMBRIDGE, MASSACHUSETTS

Hesse-Eastern

WORK DONE DURING THE MONTH OF JANUARY 1958

REPORTING PERIOD 11 JANUARY TO 6 FEBRUARY 1958

SYSTEM EVALUATION PROGRAM

A table showing all data obtained from tests of Evaluation Model No. 1 was prepared and the project reviewed from the point of view of the performance of Evaluation Model No. 1. The last test with E. M. No. 1 components was conducted on 5 February. Nine rounds were dynamically tested for penetration. Three fuze malfunctions occurred. Remedial action was started to correct the malfunctioning condition. The dynamic penetration results are in line with the results obtained from the static penetration test. The improved version of the liner with a heavier wall was assembled into 25 head bodies for static testing. Static tests were conducted with the igniter assembly of the launcher. After overcoming some preliminary difficulties, satisfactory initiation of the .22 cartridge was obtained. Some redesign of the linkage from the trigger to the igniter assembly was completed.

A meeting was held with representatives from your agency, and the future course of action as regards the E. M. No. 2 was decided upon. The problems encountered with the fuze assemblies were not included in this discussion, since the malfunctions occurred the day after the conference.

MOTOR DEVELOPMENT PROGRAM

A table showing the data obtained from all flight tests to date is enclosed. This shows that stability, velocity and accuracy of E. M. No. I appear to be satisfactory. The test samples used were rather small. However, the results are sufficiently consistent to warrant the above statement. During January components for a 200 lot of E. M. No. 2 were being manufactured. Some minor delays occurred in the delivery of components. Two hundred igniter assemblies were also ordered. One half of this order will have no provision to be used in conjunction with the launcher. The remainder will be used for tests of the complete weapons system. Due to delays in obtaining motor and other round components, testing of E. M. No. 2 will have to be postponed until the end of February or the beginning of March. It, therefore, appears that March and April will be spent in intensive flight testing of E. M. No. 2. It is expected that the manufacturing delays encountered to date will be compensated by a speed-up of the test program. The propellant was received from Radford Arsenal toward the end of the reporting period. It was used for the first time on 31 January and 5 February. As far as can be determined from this test, the results compare favorably with the machined propellant.

WARHEAD DEVELOPMENT PROGRAM

Twenty-five head bodies were matched with 25 liners at the Eastern

Tool Company and soldered together. Note was taken of the run-out between the inside wall of the head bodies and the center line of the liner. As mentioned in last month's report, the head bodies had been already manufactured before it was possible to change the tolerances. The heads were received toward the end of the reporting period. It is planned to measure the volume of Comp B very carefully and by running a comparison with the weight to find the density of the load. It is also planned to take Xrays of the charges before conducting the static penetration test. Upon completion of this preparatory work, the static test will be conducted as soon as possible.

Ogives and head bodies for E. M. No. 2 were being manufactured during the month. Some sample ogives were received at the end of the reporting period.

DYNAMIC PENETRATION TEST, 5 FEBRUARY 1958

Nine rounds were fired for dynamic penetration. One was tested on 31 January and the remainder on 5 February. Due to the fact that three fuze failures occurred, penetration results are available only on six rounds.

The test was conducted by firing the rocket against a steel target at a zero angle of obliquity. The target consisted of two pieces of armor plate having a thickness of 3" each with an air space of 1/4" in between.

Only one of the six rounds penetrated both pieces of armor plate. The remaining rounds appear all to have penetrated the first plate. The nature and bulk of the target did not permit a measurement of the exact extent of the penetration of each round.

The results of this test confirm the test results obtained from the static penetration test. The liners used were the first design having a thinner wall than the new lot of liners which is presently being readied for a test.

It is expected that better penetration results will be obtained when the heavier wall liners and the improved methods of assembly (See December Report) will be used. Since this was an "either-or" test, no Xrays of the charges were taken.

FUZE DEVELOPMENT PROGRAM

INTRODUCTION

Parts for the new fuze model (shroud design) were detailed and manufactured. No malfunctions showed up in the static tests with this design. Nine fuzes were used in conjunction with the dynamic penetration test on 5 February. Three failed to function. The design used was C-8162 (double ball design). An investigation into the cause for the malfunctions is in progress. It was possible to recover one of the three fuzes in question. A program to speed up the fuze development was formulated. Initial steps were taken to obscure the design. A photographic record of the fuze assembly procedure was prepared.

STATIC TEST OF THE SHROUD DESIGN

Design No. D-8242 (See photograph enclosed in appendix) was statically tested by dropping the fuze on its base from a height sufficient to set back the triggering components (approximately 36"). This test was performed on 15 fuzes and repeated 50 times. No malfunctions occurred. Twenty sets of components were ordered to conduct dynamic tests at the earliest possible opportunity.

DYNAMIC TEST WITH THE DOUBLE BALL DESIGN

Nine fuzes were flight tested with HEAT heads on 31 January and 5 February. Three rounds failed to function. Due to the fact that HEAT heads were used, the disassembly of these rounds presented a problem. It was felt that, since the test on 5 February (when all the malfunctions occurred) was a penetration test and the number of rounds insufficient for a fuze functioning test, another functioning test would be run as soon as parts for E. M. No. 2 become available. Only one of the rounds could be disassembled without endangering personnel. The examination of this fuze showed that:

1. The rotor was in the unarmed position.
2. The triggering components had set back.
3. The firing pin had been released and had struck the rotor approximately 0.20-0.30" from the retaining hole.

EVALUATION OF RESULTS OF DYNAMIC TEST

In evaluating the problem encountered inasfar as this can be done to date, we refer to the Progress Report of September, 1957, page 34, Section B.

The examination of the parts of the recovered fuze reveals a condition similar to the one discussed in this paragraph, i.e., the triggering components have gone back and latched. However, the firing pin was released to immediately (or in an extremely short increment of time) be driven into the rotor by the firing spring. This condition could be caused by excessive overtravel. The likelihood of this is, however, not very great, since the effect of overtravel would be the same whether the set-back forces are great or small. It must be remembered that this condition was not encountered in static testing nor was it encountered in all the fuzes fired dynamically. All the fuzes fired on 5 February were statically tested at least 3 times before final assembly.

The possibility that some other condition than excessive overtravel caused the malfunctions must then be faced. In trying to arrive at a solution, the following has to be taken into consideration:

When the inertia element hits the base plate of the fuze upon set back, its backward motion is arrested. The greater the set-back force the greater will be the velocity and energy of the inertia element at this point in time. If we assume that no deformation of any parts occurs, we find that the reaction to the energy developed by the inertia element, and the triggering components contained therein will equal the energy with which it hits the base plate. The triggering components will then be moved forward again but not merely by the action of the firing spring but by this additional energy. The inertia element can only go forward as far as the latching spring will permit. However, the triggering sleeve is held on by the frictional force of the balls only. If the triggering components then have enough energy from the reaction here discussed, the possibility exists that the triggering sleeve will be thrown off and the firing pin fired prematurely.

Another way in which premature release of the firing pin could be brought about is through overtravel. However, if overtravel would cause the malfunctions, it would have shown up during the static tests. The cause for prematurely throwing off the triggering sleeve under conditions of excessive overtravel is the action of the firing spring which would be the same during static and dynamic operation as long as the triggering components are set back.

Immediately after the dynamic test more static testing was conducted. This time the fuzes were dropped from a greater height to come closer to the acceleration encountered when the rocket is fired. Some malfunctions occurred. Preparations have been completed to take high speed camera pictures of a transparent fuze setting back. A lucite fuze body is being machined at the present time. The result of these tests will show the way to overcome the present difficulties. It is very probable that the answer will consist in putting a buffer behind either the inertia element or the whole fuze. This will have the effect of absorbing the excess energy of the triggering components and thus avoid the condition described above.

SAFETY PIN

Some components have been completed, and others are still in process. As soon as a full set of components - consisting of housings with the appropriate groove, safety sleeves and safety pins - have been received, static and dynamic testing of the safety concept will commence. Since the round has to travel a distance of approximately 2" before the safety pin is ejected, there exists a possibility that reliable fuze functioning will occur as soon as the safety pin is used in dynamic tests. The reason for this is the fact that the steepest part of the acceleration curve is likely to be encountered during the first 1" or 2" of motion.

FUTURE PROGRAM

Intensive static testing will be conducted to try to correlate the failures encountered during the last period to the static testing program, i.e., to obtain the same type of malfunction statically. Different approaches to the problem will be tried out, and dynamic testing will commence as soon as the static program has shown results.

The dynamic testing program will consist of tests of approximately 50 rounds. These will be used to eliminate the malfunctioning conditions and to establish operation of the safety device. The next lot of test rounds will be used to establish arming distance. If possible, heavy walled motor bodies will be used in order to be able to use motors repeatedly. It is not anticipated that the problems encountered so far will result in a dealy of the fuze program.

ASSEMBLY PROCEDURE

A step-by-step photographic record of the fuze assembly procedure is enclosed in the appendix.

LAUNCHER DEVELOPMENT PROGRAM

Extensive laboratory tests were conducted during January to determine the over-all workability of the design and to bring the igniter and trigger assembly to the point where a reliable design has been established.

One hundred tests were conducted to establish initiation of the .22 blank cartridge. Some trouble was experienced at first in consistently setting off the cartridge. It was found that the strength of the firing spring had to be increased and the distance between the point of the firing pin and the cartridge lengthened. The shape of the firing pin also had to be modified.

Upon completion of the above modifications, the assembly worked reliably. The restraining plunger stop was also redesigned. The tube surrounding the triggering link has been extended rearward in order to protect the parts from damage if the weapon should be dropped on its end. Modifications were also made to the trigger assembly in order to obtain more finger room.

The discussion of the launcher during the conference on 4 February produced the following decisions:

1. The trigger components will be redesigned still further to increase room available for the trigger finger.

2. The trigger and safety handle will be designed with a plastic covering over the trigger. This will result in a better feel of the weapon.

3. A three-round package will be considered for shipping purposes. The handle assembly will be designed in such a way as to permit folding it

sideways if necessary to reduce bulk.

4. We will assume that a light (perhaps wooden) plug will be used as the forward stop when the weapon is packed.

5. Two safety pins will be incorporated. One will be located in the safety handle, the other in the igniter assembly. Both pins will have to be manually withdrawn before the weapon can be made operative.

FUTURE PROGRAM

1. Static Testing

Fuze tests to investigate and eliminate malfunctions if this can be done statically.

Static launcher tests to obtain proper sights, weight distribution and ease of handling.

2. Design Tasks

Pefform necessary changes as indicated by static and dynamic testing.

Modify launcher details to make it possible to adopt inexpensive methods of production (slide machines, moldings, punchings, etc.).

3. Dynamic Testing

Formulate program of intensive dynamic tests with 200 rounds to check out E. M. No. 2. Basically, these tests will consist of the following:

(a) Stability and accuracy of E. M. No. 2 at both extremes of temperature.

(b) Establishing reliable fuze operation.

(c) Operation of safety pin.

(d) Arming distance.

(e) Graze functioning.

(f) Dynamic penetration.

4. Static Penetration Test with the New Liners

This will be conducted as soon as possible to check out head design.

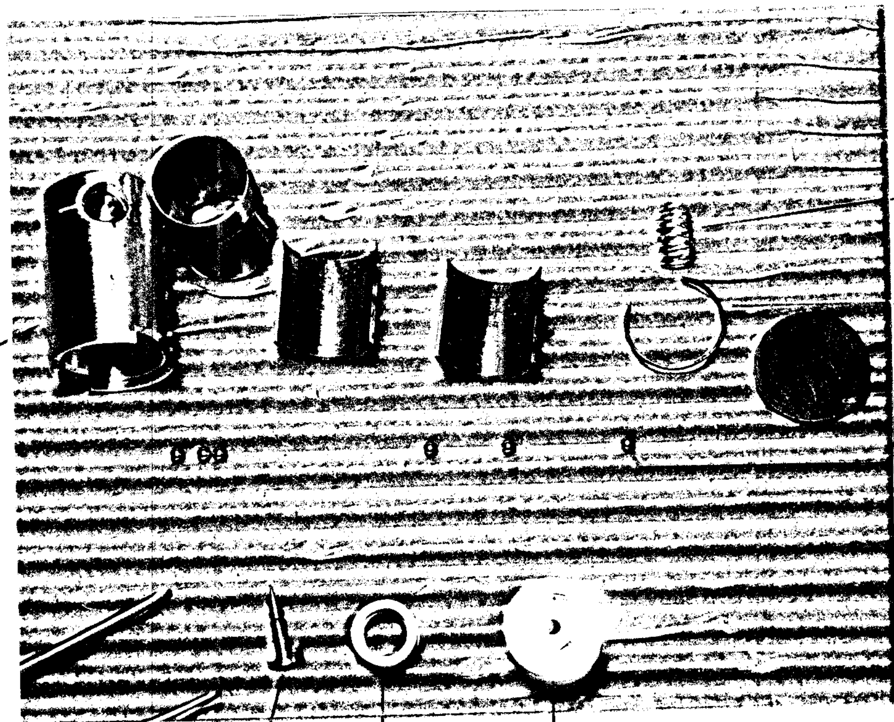
Paul K. C
Project Engineer

Evaluated vs. costs expended for the month

12,094.41 OK
PKC for CBW
General Manager

APPENDIX

Pictorial Record of Fuze Assembly



Photograph No. 42

Showing fuze housing and rotor assembly and triggering components ready for assembly. Note split sleeve and solid sleeve used for assembling lock spring. Double ball design illustrated.

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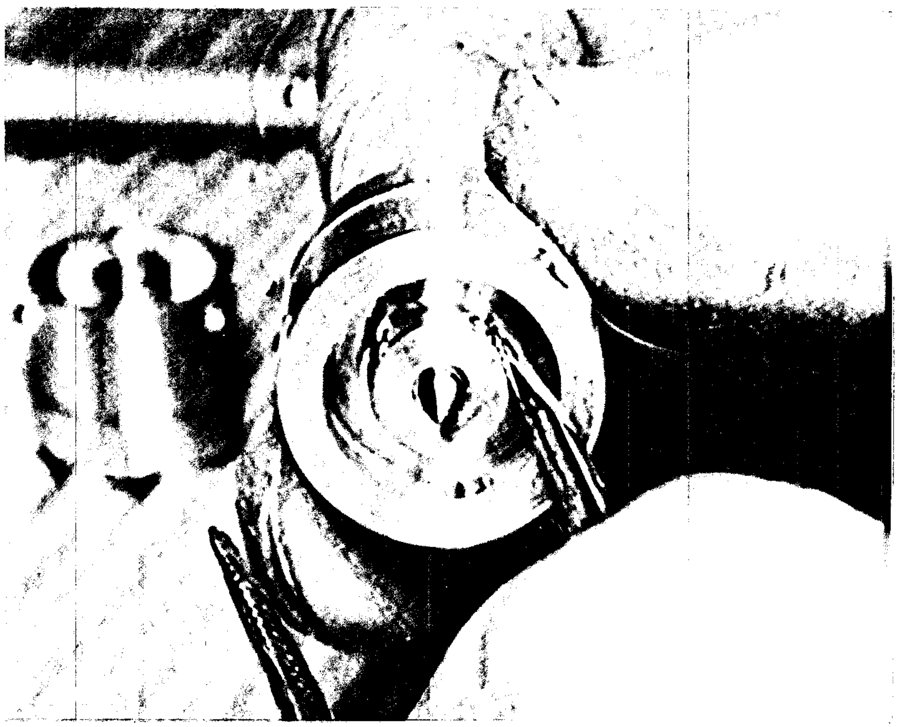
Step I

Photograph No. 43

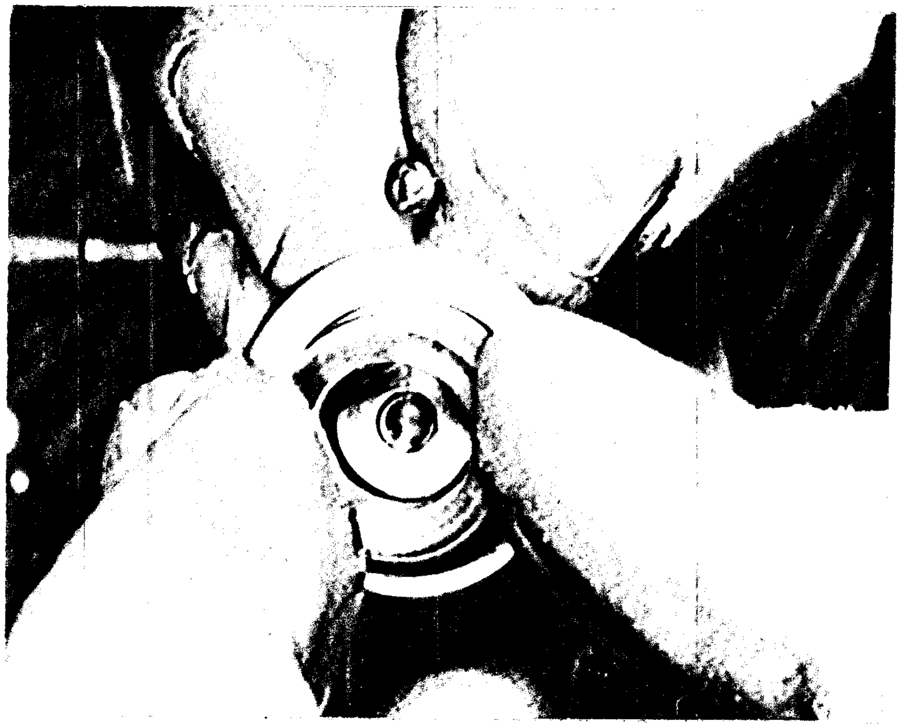
Inserting firing pin into inertia element



Step 2

Photograph No. 44

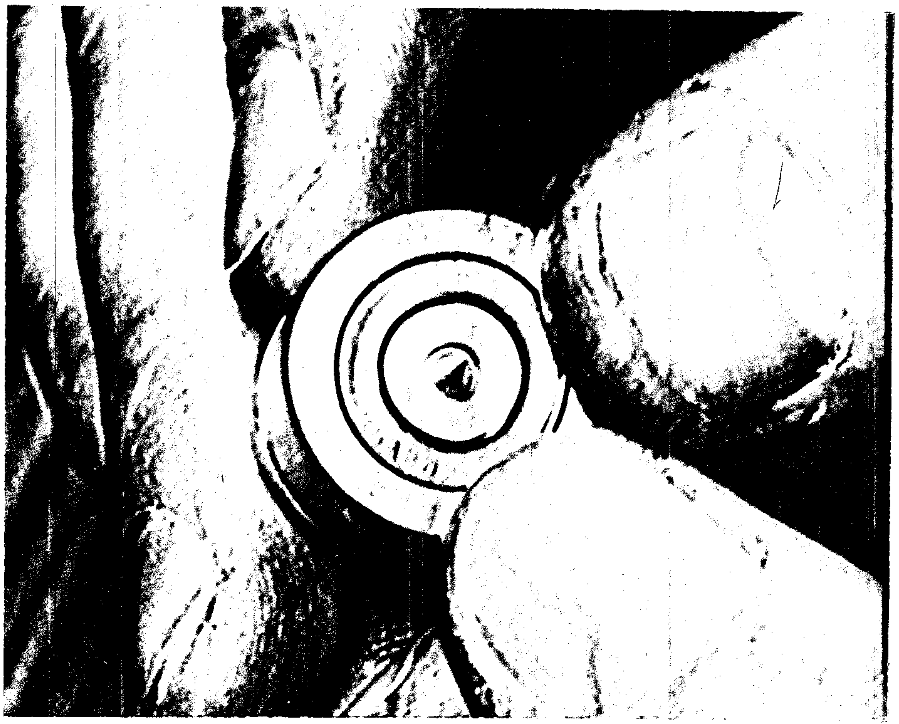
Placing first of three retaining balls in position



Step 3

Photograph No. 45

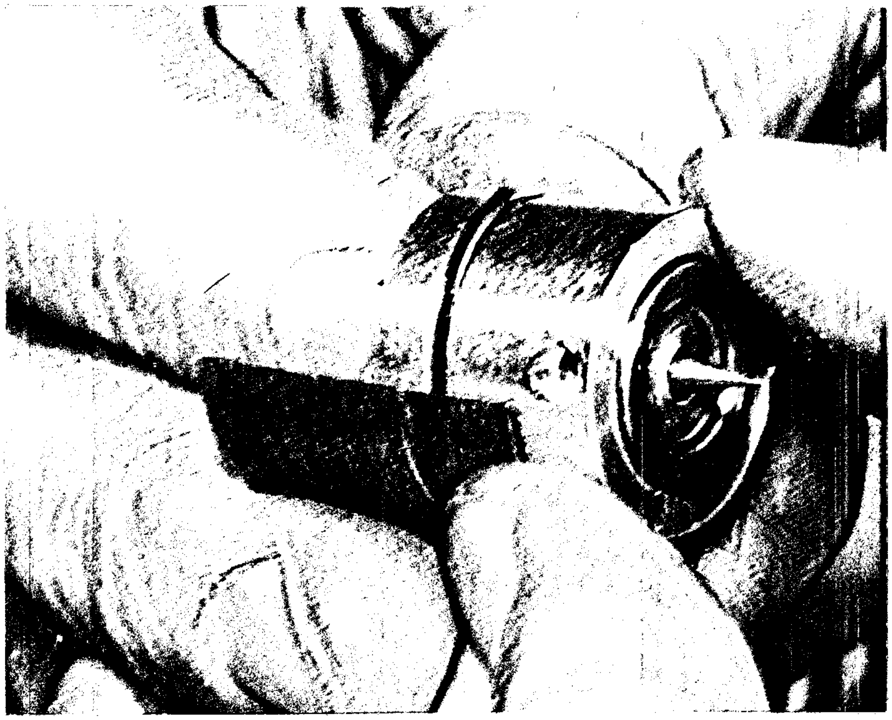
Holding ball already in position by means of triggering sleeve and dropping next ball into its hole. (Special slots are provided in the shroud type design to facilitate assembly.)



Step 4

Photograph No. 46

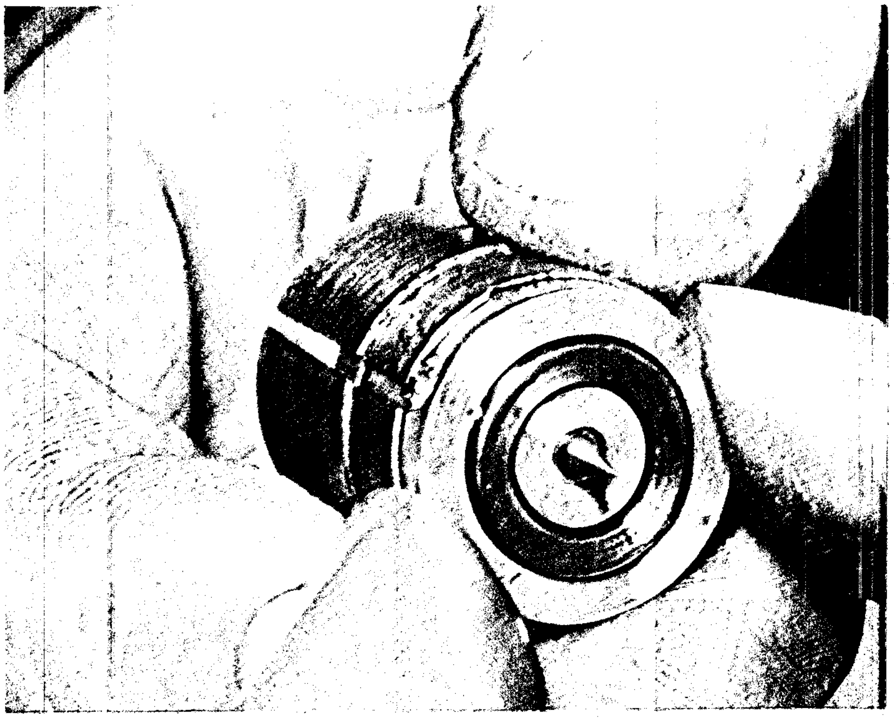
Dropping triggering sleeve in place. Firing pin is now held and a check should be made that it has the proper amount of radial and axial play.



Step 5

Photograph No. 47

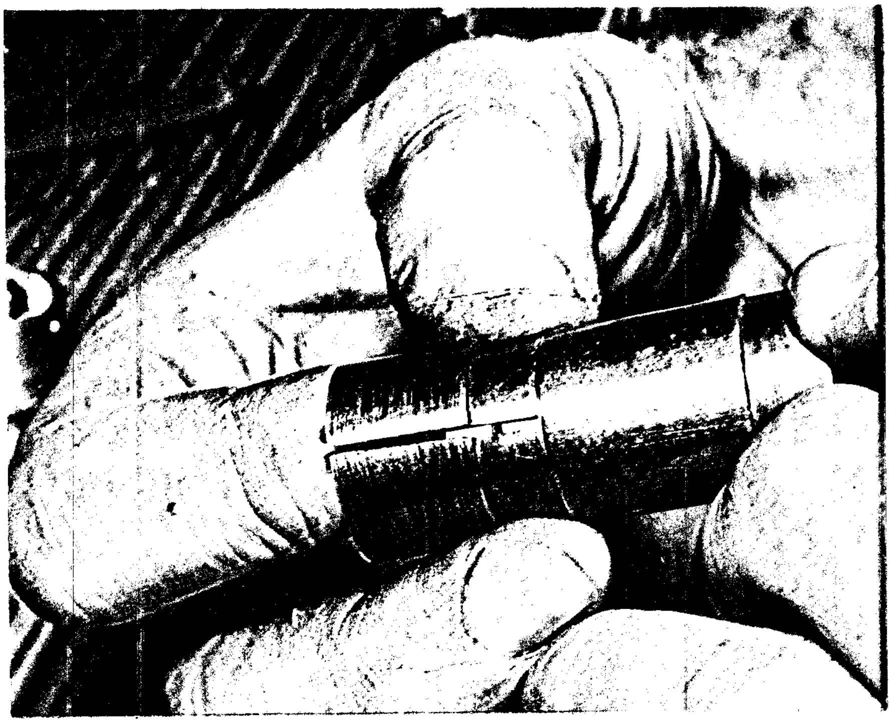
Using split sleeve to hold locking spring in place



Step 6

Photograph No. 48

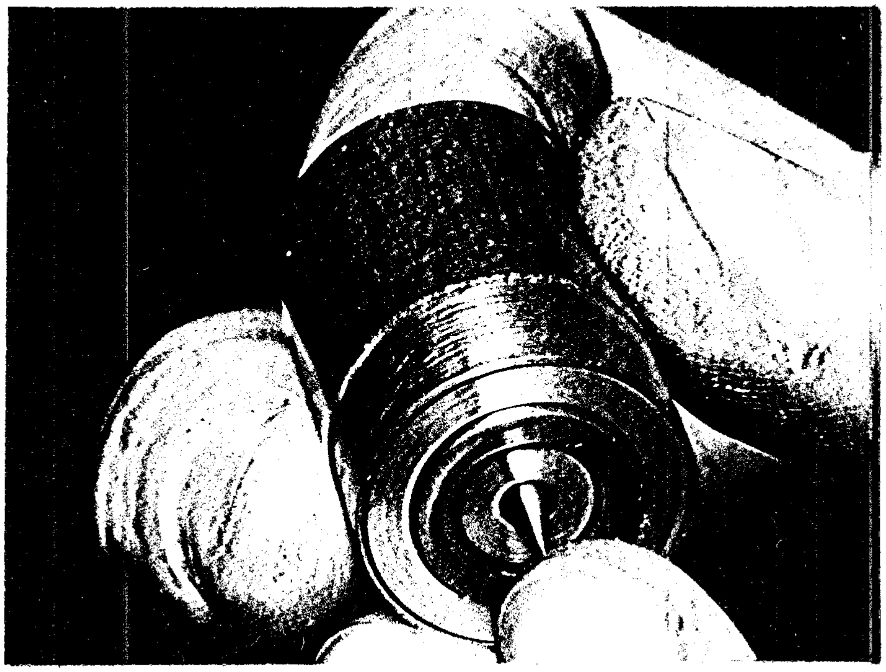
Second half of split sleeve is in position



Step 7

Photograph No. 49

Inertia element is pushed into solid sleeve. (This makes assembly into the fuze housing easier. However, this step may be omitted.)



Step 8

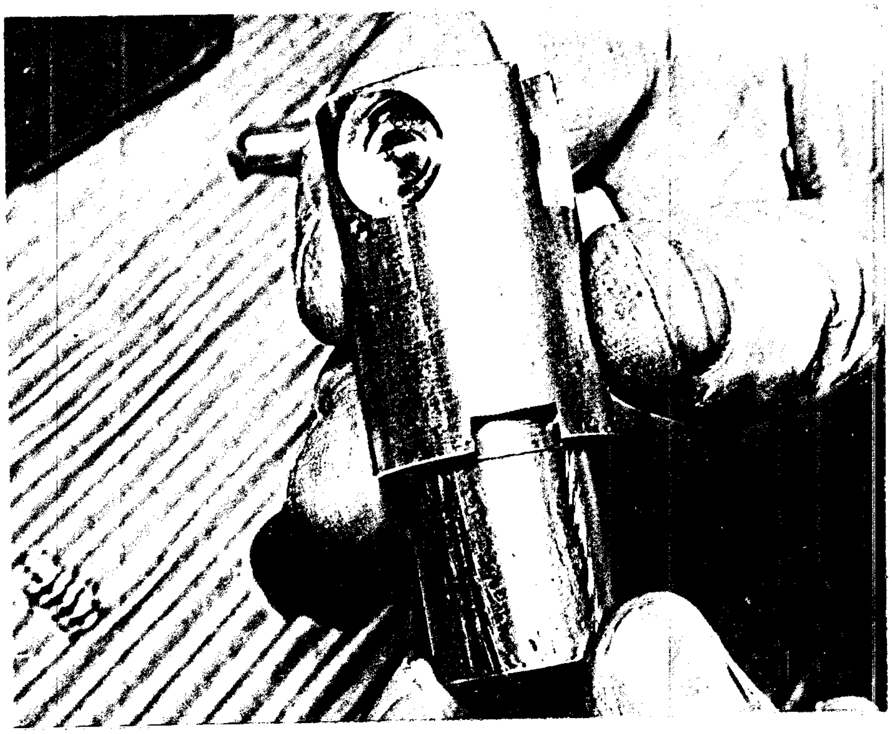
Photograph No. 50

Testing firing pin

Step 9

Photograph No. 51

Inserting locking balls



Step 10

Photograph No. 52

Inertia element firing pin and balls being assembled into fuze housing.

Step II

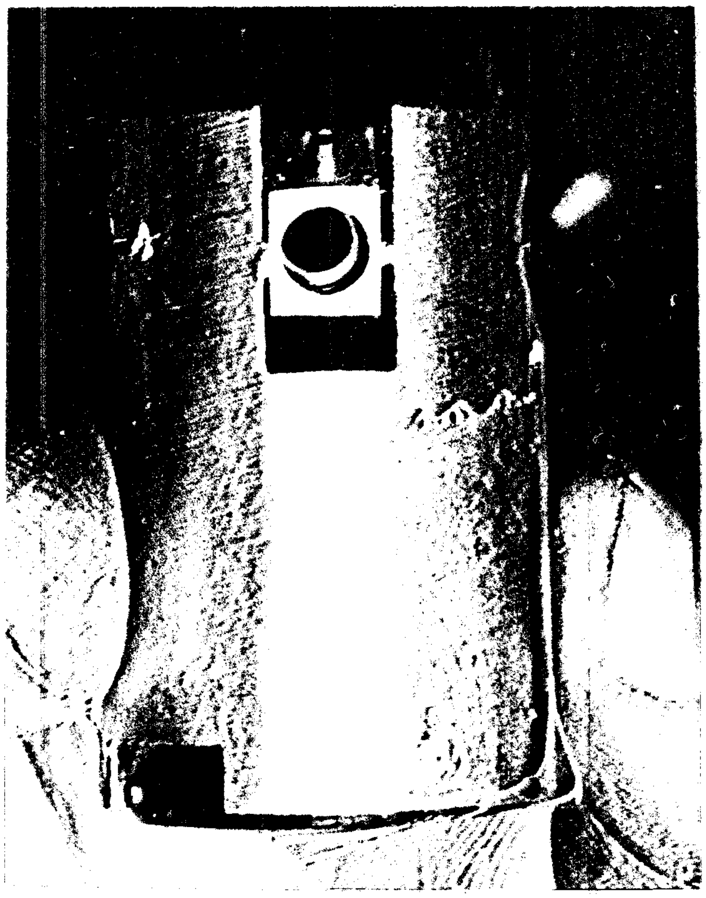
Photograph No. 53

Pushing components into position. Note rotor held in unarmed position against torque spring.

Step 12

Photograph No. 54

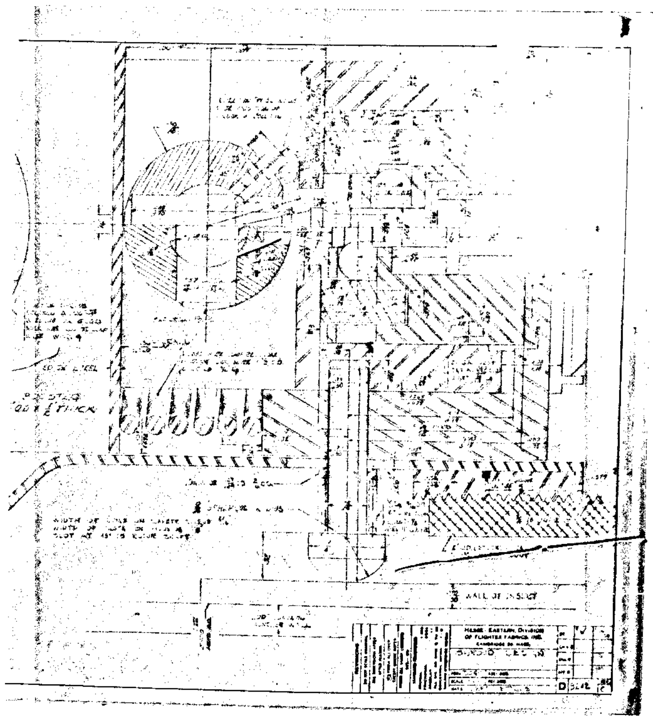
Assembling firing spring



Step 13

Photograph No. 55

Base assembled. (Scotch tape is used for test fuzes in order to be able to re-use parts. This will later be substituted by crimp. Total assembly time approximately 1 1/2 minutes per fuze.



Photograph No. 56

Fuze, Shroud Design
Drawing No. D-4282-
D-5242

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TEST DATE	TEST DESCRIPTION & PURPOSE	ROUND #	TEMP	DESCRIPTION OF PERTINENT COMPONENTS	TEST RESULTS	COMMENTS
	STATIC W/O INST.	1	+120°	MOTOR DRWG # , CHARGE 4 GRAINS M7 O.D. I.D. 4.72" LONG	MOTOR DID NOT DEFORM	6061 T-3 to 6 AL. SATISFACTORY. CHARGE UPPER LIMIT "
10/4	FLIGHT TO CHECK PROP. CHARGE DYNAMICALLY. TO DETERMINE IF THE CHARGE CONFIGURATION THEORETICALLY EVOLVED WOULD PERFORM SATISFACTORY I.E. PROPEL THE ROUND WITHOUT FAILURE OR LONG BURNING. ALSO AS A SECONDARY PURPOSE TO OBSERVE IGNITION & AERODYNAMIC EFFECTS	2 3 4 5 6 7 8 9 10 11	+120 +120 +120 +120 +120 +120 +120 -20 -20 -20	E.M #1, DRWG # D 8016 IGNITER PLASTIC BAG WITH BLACK POWDER AND OR AI SQUIB. THROAT CONSTRICTED WITH CORK STOPPER. Rds 2-8 USED 3 grams FFFg POWDER Rds 9-11 USED 5 grams FFFg POWDER. FIXED FINS WITH SHROUD ON ALL ROUNDS	CHARGE OK DELAYED IGNITION UNSTABLE FLIGHT CHARGE OK PARTIAL IGNITION UNSTABLE FLIGHT	CHARGE SATISFACTORY VELOCITY ABOUT 260 ft/sec RANGE OK - MOST ROUNDS ALTHOUGH UNSTABLE EASILY REACHED 100 yds + ROUNDS WERE VIOLENTLY UNSTABLE WITH TUMBLING OCCURING AT LESS THAN 50 yds. IGNITION WAS NOT SATISFACTORY - BELIEVE MOST PROBABLE CAUSE TO BE TOO EASY BLOWOUT OF IGNITER. POSSIBLE CAUSE OF UNSTABILITY UNFAVORABLE C.G. LOCATION
10/11	FUZE TEST, TO CHECK FOR SETBACK & LATCHING OF INERTIA ELEMENT & FUNCTIONING TIME ON TARGET	12 13 14 15 16	+120 AMB. " +120 AMB.	E.M #1 DWG # D 8016 FUZE TEST VEHICLE III PHOTOGRAPH # , EXTRA LAYER OF HEAVY DUTY SCOTCH TAPE WERE ADDED TO THE CORK STOPPER TO RETARD IGNITER BLOWOUT	F.T .002 SEC, VEL 295 ft/sec F.T .001 SEC, CRUSH UP 2.82" F.T. 001 SEC. VEL. 286 ft/sec CRUSHUP 3.3" CRUSHUP 7.2" - POOR PICTURE - FUNCTION OK DUD - LOCKSPRING & INERTIA E. COCKED	
	FLIGHT TEST - TO CHECK EFFECT ON STABILITY OF LIGHTENING MOTOR ADAPTER & HEAD THUS MOVING C.G. FOWARD	17 18 19 20 21		E.M. #1 DRWG # , MOTOR WALL REDUCED TO .110", ALSO ADAPTER & HEAD WT. SLIGHTLY REDUCED	STILL UNSTABLE - BUT MAINTAINED FLIGHT TRAJECTORY OVER LONGER RANGE THAN BEFORE	FURTHER IMPROVEMENT NECESSARY FOR STABILITY. USE OF DRAG RING ON OGIVE AS PER "BLINDICIDE" ROCKET MAY HELP.

REVISIONS

DO NOT SCALE DRAWING

ALL DIMENSIONS APPLY AFTER PLATING

125 FINISH ALL OVER EXCEPT WHERE NOTED

BREAK ALL SHARP CORNERS .005—.010

STANDARD TOLERANCES
DECIMAL ±.005
FRACTIONAL ±1/64
ANGULAR ±1°
ALL DIA. ON SAME ℄ TO BE CONCENTRIC WITHIN T.I.R.
UNLESS OTHERWISE NOTED

HESSE—EASTERN, DIVISION OF FLIGHTEX FABRICS, INC.
CAMBRIDGE 38, MASS.

ROUNDS # 1 - 21

PROJ.		ASSY DWG	
SCALE		REF DWG	
MAT'L.			

BY	[signature]	2/24/58
CH'K'D		
ENG'R		
APP'D		

B 8261 REV. 0

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TEST DATE	TEST DESCRIPTION & PURPOSE	ROUND #	TEMP.	DESCRIPTION OF PERTINENT COMPONENTS	TEST RESULTS	COMMENTS
10/13	FUZE TEST TO CHECK WHETHER COCKING CONDITIONS HAVE BEEN ELIMINATED	22	-20	E.M. #1. D3016 FUZE TEST VEHICLE III NO CHARGE [illegible]	FUZE FUNCTIONS FURNISH PROOF OF THE FEASABILITY OF FUZE DESIGN PROBLEM ON [illegible]	INDICATIONS AS TO THE PROPER SHAPE OF IGNITER OBTAINED FUZE DESIGN SATISFACTORY PENDING FURTHER TESTS FUZE FUNCTIONING
		23	-20			
		24	-20			
		25	+120	E.M. #1 WITH FIRST COMPLETE FUZE PROTOTYPE	FUZE FUNCTIONED FT. .0015 SEC CRUSH UP 2.84"	SATISFACTORY NO IGNITION PROBLEM @ 120°
		26	+120	SAME EXCEPT TEST VEHICLE III FUZE	" " FT. .0005 " " 3.4"	
	FLIGHT TEST TO DETERMINE EFFECT OF DRAG RING	27	+120	SAME AS 22-26 EXCEPT DRAG RING ON OGIVE FUZE T.V. III	FUZE FUNCTIONED INCOMPLETE IGNITION	IGNITION PROBLEM PERSISTS
		28	+120		" " IGNITION OK STABILITY IMPROVED BUT NOT GOOD	
		29	-20		" " NO IGNITION	
		30	AMB.	TAPE IGNITERS USED ON ROUNDS 22-31	INCOMPLETE IGNITION ONLY SMALL IMPROVEMENT IN STABILITY	FURTHER DEVELOPMENT TO IMPROVE STABILITY REQUIRED NEED FOR LARGER FINS
		31	+120			
11/1	FLIGHT TEST WITH FOLDING FINS	32	AMB	6 FINS E.M. #1 WITH FOLDING FINS FUZE T.V. #3	STABLE FUZE FUNCTIONED	FOLDING FINS ARE STABILIZING THE ROUND NEW IGNITER NOT AVAILABLE FOR THIS TEST
		33	"	" LAST TEST WITH TAPED IGNITERS	" " " INCOMPLETE IGNITION	
		34	"	8 FINS	" " " " "	
		35	"	6 FINS SAME AS 32-34 ONLY NO FUZE	" INCOMPLETE IGNITION	
11/27	FLIGHT TEST ACCURACY AT 100 yds WITH VARYING NUMBERS OF FOLDING FINS IGNITER B 8120	36	-20	4 FINS E.M. #1 DUMMY HEADS DUMMY FUZES	BEST RESULTS OBTAINED WITH 6 FINS ALL ROUNDS STABLE	
		37	-20	4 "		
		38	-20	4 "		IGNITION PROBLEM APPEARS SOLVED FUZE FUNCTIONING NOT ESTABLISHED CHANGES IN TRIGGERING COMPONENTS INDICATED
		39	-20	6 "	IGNITION WITHOUT DELAY ON ALL ROUND, TWO MALFUNCTIONS ON THE FUZE	
		40	-20	5 "		
		41	-20	5 "		
	SAME AS 36-41 ADD FUZES WITH ROTORS FUNCTIONING TEST	42	+120	4 "	ALUM. PLATES & PINS SATISFACTORY	
		43	+120	4 "		
		44	+120	6 "		
		45	+120	5 "		
		46	+120	4 "		
	SAME AS 36-41	47	+120	5 "		
		48	+120	6 " ALUM. PLATES		

REVISIONS

DO NOT SCALE DRAWING

ALL DIMENSIONS APPLY AFTER PLATING

125 FINISH ALL OVER EXCEPT WHERE NOTED

BREAK ALL SHARP CORNERS .005—.010

STANDARD TOLERANCES
DECIMAL ±.005
FRACTIONAL ±1/64
ANGULAR ±1°
ALL DIA. ON SAME ℄ TO BE CONCENTRIC WITHIN T.I.R.
UNLESS OTHERWISE NOTED

HESSE—EASTERN, DIVISION
OF FLIGHTEX FABRICS, INC.
CAMBRIDGE 38, MASS.

ROUNDS 22 TO 48

PROJ.		ASSY DWG	
SCALE		REF DWG	
MAT'L.			

BY	[illegible]	2/24/[illegible]
CH'K'D		
ENG'R		
APP'D		

B 8262 REV. 0

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TEST DATE	DESCRIPTION & PURPOSE	ROUND #	TEMP	DESCRIPTION of PERTINENT COMPONENTS	TEST RESULTS	COMMENTS
12/6	CHECK STRENGTH OF ALUM LAUNCHER	49	AMB	ALL ALUM RATES & PINS FROM NOV. ON	TUBE STOOD UP	STRENGTH of .120" WALL ALUM.
	INCREASINGLY REDUCED	50	"	E.V. #1 USING .120" WALL ALUM LAUNCHER TUBE		LAUNCHER SUFFICIENT
12/12	FLIGHT TEST CHECK	51	+120	E.V.M #1 WITH DUMMY HEAD — FUZE 6 BALL STEEL INERTIA	FUZE FUNCTIONED	OVERALL: VELOCITY SATISFACTORY;
	ACCURACY WITH 6 & 8	52	+120	BOTH STEEL & ALUM MOTOR NOZZLE — 6 BALL ALUM INERTIA	"	ACCURACY WITH 8 FINS SHOULD
	FINS COMBINED	53	+120	INSERTS 6 & 3 FINS — 6 BALL STEEL INERTIA	"	BE GOOD FUZE: 6 BALL
	WITH FUZE FUNCTIONING	54	+120	6 BALL ALUM INERTIA	"	DESIGN APPEARS SATISFACTORY
	OF OLD DESIGN	55	+120	OLD INERTIA TRIG. SL. REDUCED	DUD	PENDING FURTHER TESTS.
	WITH REDUCED TRIGGERING	56	+120	AS 55	FUZE FUNCTIONED	MOTOR EM#1 HAS AMPLE
	SLEEVE AGAINST 6 BALL	57	+120	USED TO CHECK LAUNCHER	NO DEFORMATION of .1" AL TUBE	STRENGTH ALUM INSERTS
	DESIGN	58	+110	" " " "		O.K. 8 FINS PRODUCED STABLE
		59	+120	6 BALL AS 54	FUZE FUNCTIONED	FLIGHT UNDER BOTH TEMP.
		60	-20			WT. .100 ALUM WALL
		61	-20		MOTOR FAILED	of LAUNCHER to BE
		62	-20			REDUCED FOR NEXT
		63	-20		MOTOR FAILED	LAUNCHING TEST.
		64	-20			
		65	-20	AS 55	DUD	
		66	-20	CANCELLED	DRWG # A8244 FOR RESULTS ON 100yd	
		67	-20		TARGET STABILITY GOOD BEST WITH 8 FINS	
		68	-20	AS 55	FUSE FUNCTIONED	
12/20	FLIGHT TEST TO DETERMINE MIN THICKNESS OF ALUM LAUNCHER TUBE	69	+120	.060" WALL — E.M. #1 WITH DUMMY HEAD & FUZE	NO DEFORMATION OCCURED ON EITHER TUBE .040 IS CONSIDERED THE MIN. FROM THE STANDPOINT OF MACHINING	SUFFICIENT INFORMATION OBTAINED TO DETERMINE INNER SLEEVE SIZE
		70	+120	.090" WALL		

REVISIONS

DO NOT SCALE DRAWING

ALL DIMENSIONS APPLY AFTER PLATING

125 FINISH ALL OVER EXCEPT WHERE NOTED

BREAK ALL SHARP CORNERS .005—.010

STANDARD TOLERANCES
DECIMAL ±.005
FRACTIONAL ±1/64
ANGULAR ±1°
ALL DIA. ON SAME ℄ TO BE CONCENTRIC WITHIN T.I.R.
UNLESS OTHERWISE NOTED

HESSE—EASTERN, DIVISION OF FLIGHTEX FABRICS, INC.
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ROUNDS # 49 to 70

PROJ.	ASSY DWG
SCALE	REF DWG
MAT'L.	

BY		2/21/
CH'K'D		
ENG'R		
APP'D		

B 8263 REV. 0

SECRET

SECRET

DATE	PURPOSE OF TEST	ROUND #	TEMP	DESCRIPTION OF PERTINENT COMPONENTS	TEST RESULTS	COMMENTS
2/6	DYNAMIC PENETRATION TEST AT 100' USING TWO 3" ARMOR PL AT 0° OBLIQUITY	71		E.M.#1 WITH #1 LINER DOUBLE BALL FOR DESIGN	PENETRATED 1ST PL ONLY	PENETRATION RESULTS CONFIRM STATIC PENETRATION TEST. ROD REQUIRES FURTHER WORK IN ORDER TO ESTABLISH [illegible]
		72			DUD	
		73				
		74				
		75				
		76			DUD	
2/31		77				
2/6		78				
		79			DUD	

REVISIONS

DO NOT SCALE DRAWING

ALL DIMENSIONS APPLY AFTER PLATING

125 FINISH ALL OVER EXCEPT WHERE NOTED

BREAK ALL SHARP CORNERS .005—.010

STANDARD TOLERANCES
DECIMAL ±.005
FRACTIONAL ±1/64
ANGULAR ±1°
ALL DIA. ON SAME ℄ TO BE CONCENTRIC WITHIN T.I.R.
UNLESS OTHERWISE NOTED

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CAMBRIDGE 38, MASS.

ROUNDS # 71 to 79

PROJ.		ASSY DWG	
SCALE		REF DWG	
MAT'L.			

BY	[illegible]	2/24/58
CH'K'D		
ENG'R		
APP'D		

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