

37MM GUN, ANTITANK, M3

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37mm GUN, ANTITANK M3

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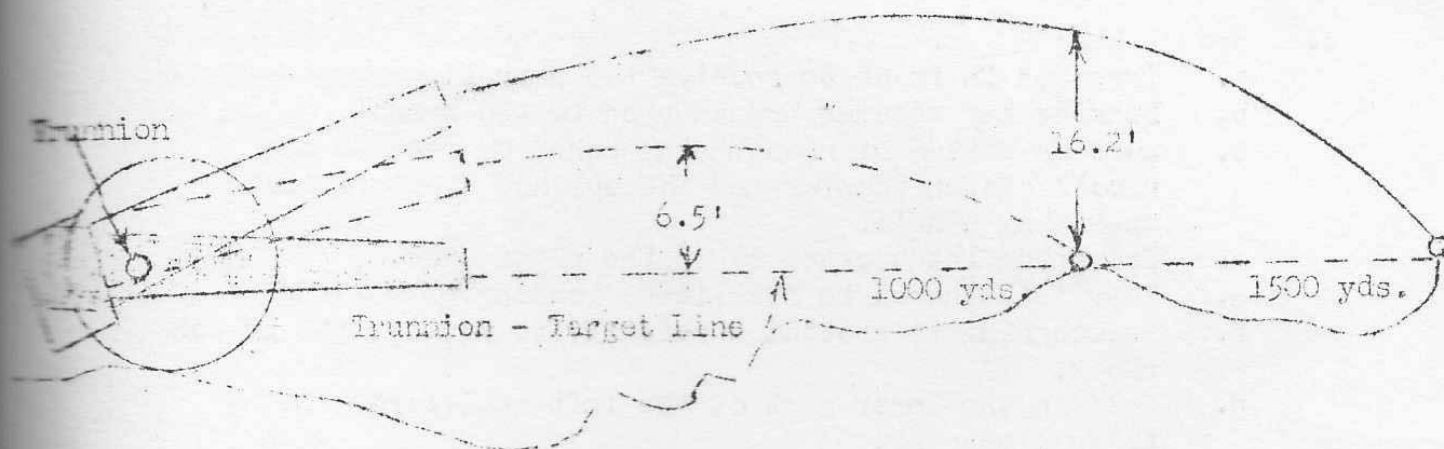
File Numbers

W-250	Characteristics and Description	pages 1-3
251	Nomenclature, Disassembling, and Assembling.	" 4-7
252	Mechanical Functioning	" 8-11
253	Care and Cleaning	" 12-16
254	Malfunctions	" 17-18
204	Ammunition	" 19-23
259	Subcaliber Equipment	" 24-26
257	Telescope Sight M6, Bore Sighting and Alignment of the Telescope Holder	" 27-31
258	Fire Orders	" 32-33
255	Service of the Piece	" 34-39
256	Laying for Range, Laying with Lead, Laying for Range with Leads	" 40-41
256	Tracking	" 42
255	Estimation of Ranges, Leads, and Speeds	" 43-44
258	Safety Precautions	" 45-46
258	Zeroing In on 1000" AT Range	" 47-48
258	Courses on 1000" AT Range	" 49-52
260	.50 cal. Firing	
261	Service Firing	
262	G.T.'s	

CHARACTERISTICS AND DESCRIPTION OF 37-MM GUN, ANTITANK M3
ON MOTOR CARRIAGE M6 (FARGO)

I. Characteristics of 37mm Gun, antitank M3 on motor carriage M6.

1. Single shot.
2. Flat trajectory - maximum ordinate at 1000 yds: 6.5 ft.
- maximum ordinate at 1500 yds: 16.2 ft.



MAXIMUM ORDINATE IS HIGHEST POINT IN
TRAJECTORY ABOVE TRUNNION - TARGET LINE

3. Drop, wedge type breechblock.
4. One-man control, - gunner lays, traverses, elevates, and fires.
5. Crew of four men - gun commander (platoon leader or platoon sergeant), gunner #1, assistant gunner #2, (radio operator), driver #3.
6. Useable rate of fire - 10-25 aimed shots per minute, depending on training of crew, their efficiency and visibility.
7. Total weight of gun and pedestal mount - 724 lbs.
8. Traverse - 360 degrees on M6 motor carriage.
9. Elevation - 15 degrees. Depression - 10 degrees.
10. Normal recoil - 20 in., maximum recoil - 20.5 in.

II. Description, 37mm Gun on M6 Motor Carriage.

1. Barrel

- a. One piece forging.
- b. Rifle bored, 12 lands, 12 grooves.
- c. Threaded to screw into breech ring.
- d. Two bearings support barrel and align it in the yokes of the sleigh.
- e. Front bearing, near middle of barrel, keys in the yoke and keyways in the flange prevent rotation of the barrel.
- f. Breech face of the barrel is recessed to form extractor pockets.
- g. Notches on muzzle for crosshairs for bore sighting.

2. Breech Ring

- a. Threaded in front to receive the barrel.
- b. Locking key secures breech ring to the barrel.
- c. Lugs on bottom of breech ring bored to receive the recoil piston coupler and the splined shaft of the operating handle.
- d. Operating latch catch is on the right side.
- e. Rear is U-shaped to facilitate loading.
- f. Breech ring is slotted vertically to receive the breech block.
- g. Hole in the lower part of the left wall forms the trigger bearing.
- h. A counter bore in the lower part of the inside left wall receives the tripper.

III. Sleigh

- a. Built-up steel construction.
- b. Mounts the gun in its yokes.

IV. Recoil Cylinder

- a. Houses the Hydro Spring Recoil Mechanism.
- b. Provided with slides to guide the sleigh during recoil.
- c. Shoulder guard bolted to recoil cylinder.
- d. Travelling lock hook on underside near the rear.
- e. Recoil indicator screw on right side just in front of shield.

V. Trunnions

The trunnions of the 37mm gun, antitank, M3 are made in two sections. Each section is fitted to the recoil cylinder on a keyway. The section is centered on the keyway by two dowel pins and held by three screws. The two sections are joined at the top over the tube by a single dowel pin and held by two bolts. The trunnions are supported by the trunnion studs bearing in the trunnion seat. The trunnion studs are held in the trunnion seat by the trunnion cap and are secured by two bolts that are locked by a locking wire. This mechanical arrangement supports the weight of the gun on the mount and allows for elevating and depressing the tube.

VI. Traversing and Elevating Mechanisms

The traversing and elevating mechanisms are composed of a system of gears enclosed in their respective gear housings and operated by an elevating knob on the left and a traversing wheel on the right.

A traversing release clutch enables the gun to be traversed freely when the clutch handle is pulled to the rear.

VII. Telescope Mount M19

1. Bracket bolted to the top carriage.
2. Parallelogram linkage system which transmit the elevating and depressing motion of the gun to the sight mount.

VIII. Characteristics of Motor Carriage M6

1. Maximum speed - 55 m.p.h. (manufacturer's specification)
2. Maximum pay load - 1800 lbs. (gun, crew, ammunition, and equipment).
3. Total weight with combat load---7500 lbs. (approximately).
4. Weight with gun alone---6350 lbs.
5. Over all length---14 ft., 9.5 in.
6. Over all width---7 ft., 10 in.
7. Over all height (to top of shield)---7 ft.
8. Range on one tank full (24 gals.), 3/4 throttle---approximately 300 mi.
9. Turning radius---Right...23.25 ft., Left...22.75 ft.
10. Tire pressure---40 lbs.

IX. Description, 37MM Gun Motor Carriage, M6

1. Make
 - a. Dodge, 3/4 ton truck.
2. Engine
 - a. 6 cylinder
 - b. Develops 101 H.P. at 3200 R.P.M.
 - c. L-Head.
3. Drive
 - a. 2 or 4 wheels
 - b. 4 speeds forward, one reverse.
4. Stowage Facilities
 - a. Pail holder - right front fender.
 - b. Two Scabbard holders - right and left side of dash board.
 - c. Grenade box holder - right running board.
 - d. Strap to hold 4 blanket rolls - right running board.
 - e. 4 ammunition boxes (24 rd. cap.) - 1 at each corner of the truck bed.
 - f. Shovel holder - right side of truck bed.
 - g. Pick mattock holder - behind bucket seats.
 - h. Rammer staff holder - tail gate.
 - i. Axe holder - left side of truck bed.
 - j. Ration box - left running board.
 - k. Gasoline can holder - right running board.
 - l. Water can holder - left running board.
 - m. Vehicle tools under seat.
 - n. Sight case bracket - left shield.
 - o. Gun tool box - right shield.
 - p. 2 rifle holders - left shield.
 - q. Bracket on lower shield - first aid box.
5. Pedestal Mount M25
 - a. Floor plate bolted to truck bed.
 - b. Pedestal welded to floor plate.
 - c. Flange type braces.

NOMENCLATURE, DISASSEMBLY, AND ASSEMBLY, 37MM GUN ANTI-TANK, M3

I. Disassembling the 37MM Gun Anti-tank, M3

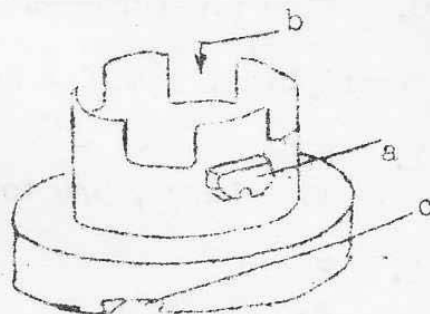
A. Checking the bore:

1. Open the breech
2. Look through the bore
3. Close the breech
4. Push down firing plunger, firing the piece, so that firing pin guide assembly will go forward, disengaging sear lug and cocking lug from ~~interrupted shoulder~~ on retainer.

Scalloped Edges

B. Removal of the RETAINER.

1. Push in on retainer and rotate it 1/4 turn and then remove it.
2. Note:
 - a. Retainer lugs
 - b. Scalloped Edges
 - c. Slot



C. Remove the FIRING SPRING

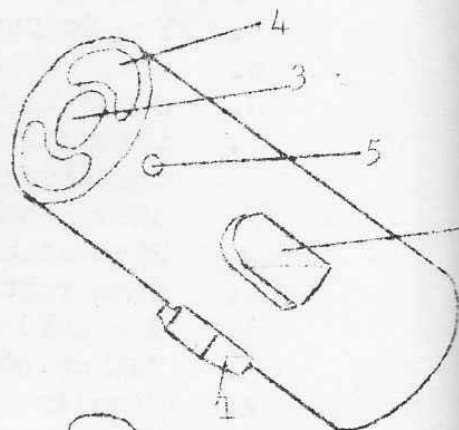


- ### D. Remove the FIRING PIN GUIDE ASSEMBLY: To do this place one hand under the firing pin guide assy. housing, then with the other hand push the cocking lever smartly forward so as to force the firing pin guide assembly out and into the hand you have under its housing.

1. Note:

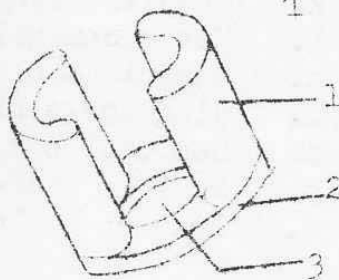
a. Firing Pin Guide

1. Sear Lug
2. Cocking Lug
3. Firing Pin Recess
4. Stop Recess
5. Guide Pin Recess



b. Stop

1. Prongs
2. Base
3. Firing Pin Recess



c. Retracting Spring

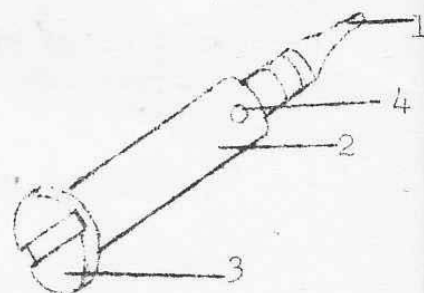


d. Guide Pin



e. Firing Pin

1. Striker
2. Shaft
3. Head
4. Guide Pin Recess



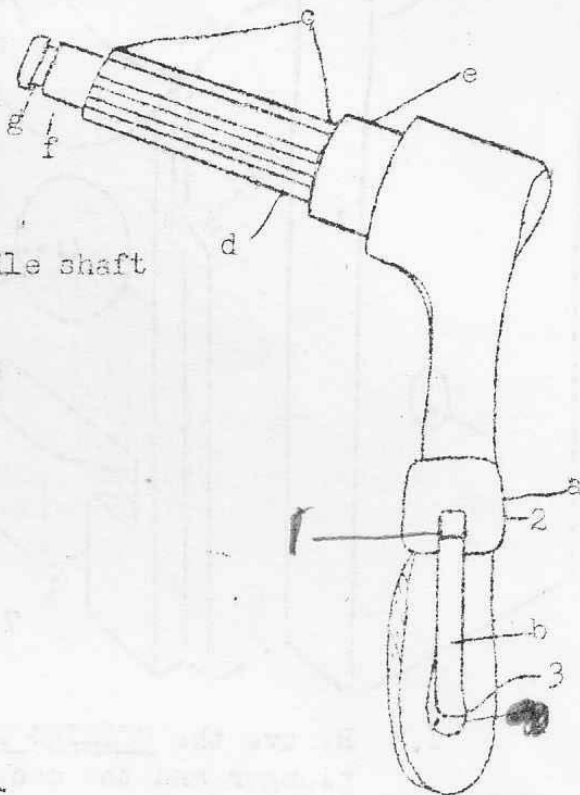
- E. Remove the OPERATING HANDLE DETENT by rotating it forward and removing it.



- F. Using your right hand, remove the OPERATING HANDLE ASSEMBLY to the right, making sure that you support the Crank and the Breechblock Assembly with the left hand.

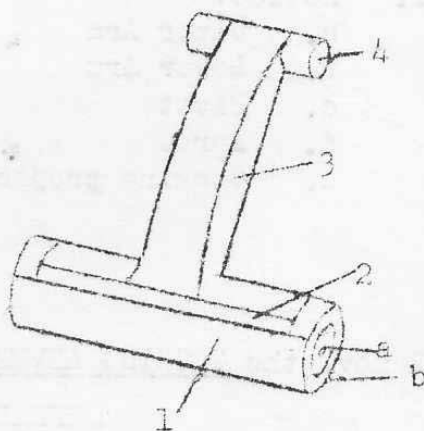
1. Note:

- a. Operating handle lever.
- b. Operating handle latch.
 1. Toe of latch
 2. Latch pin
 3. Latch Spring
- c. Operating Handle Shaft
- d. Splines on operating handle shaft
Large Male Spline
- e. Large Bearing
- f. Small Bearing
- g. Coller



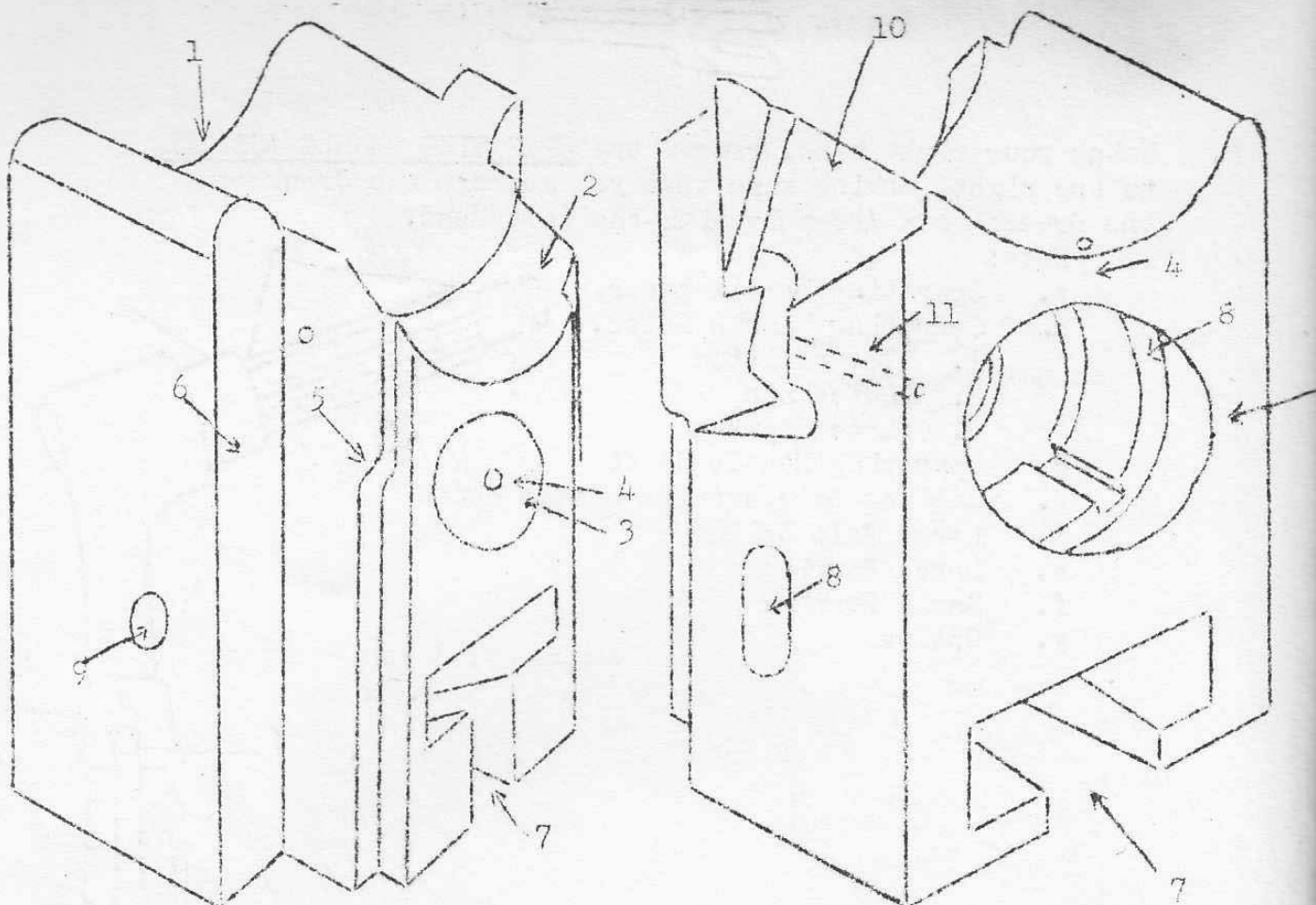
- G. On the OPERATING CRANK notice the ...

1. Hub
 - A. Female splines
 - B. Large Female Spline
2. Crank Stop
3. Curved Crank Arm
4. Trunnions



- H. On the BREECHLOCK notice the

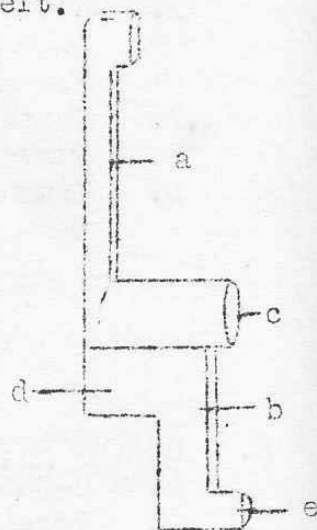
1. U-Cut
2. Forcing Bevel
3. Breechblock Bushing
4. Firing Pin Well
5. Extractor Cam Shoulders
6. Breechblock Guides
7. Inclined T-Slot
8. Sear Recess
9. Sear Counterbore
10. Cocking Lever Recess
11. Cocking Lever Plunger and Spring Recess
12. Firing Pin Guide Assy. Housing
 - a. Firing Spring Retaining Pin
 - b. Interrupted Shoulders
 - c. Sear Lug Groove
 - d. Cocking Lug Groove



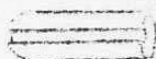
I. Remove the COCKING LEVER by depressing the cocking lever plunger and the cocking lever plunger spring, with one hand and withdraw the cocking lever to the left.

1. Notice:

- a. Upper Arm
- b. Lower Arm
- c. Pivot
- d. Apron
- e. Cocking projection



J. Remove the COCKING LEVER PLUNGER



K. Remove the COCKING LEVER PLUNGER SPRING



L. Remove the SEAR RETAINING PIN by placing breechblock face down and with left fore finger press the sear to the right so that the Sear Retaining Pin protrudes beyond the sear counterbore.

M. Remove the SEAR to the left.

1. Notice:

- a. Sear arm
- b. Camming Surface on Sear Arm
- c. Sear Notch
- d. Shoulder
- e. Sear Retaining Pin Recess

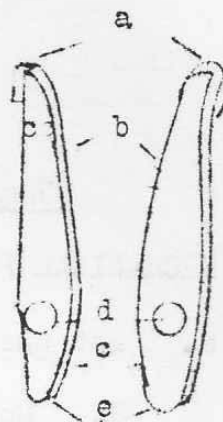


N. Remove the SEAR SPRING

O. Remove the RIGHT AND LEFT EXTRACTORS

1. Notice:

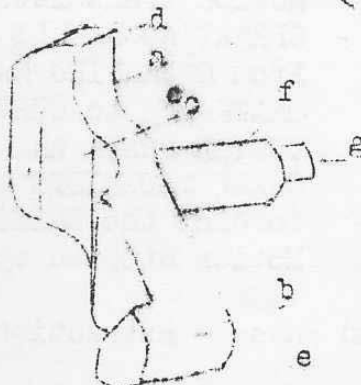
- a. Lips
- b. Upper Arm
- c. Lower Arm
- d. Pivot Bearing
- e. Rounded Cam



P. Remove the TRIPPER

1. Notice:

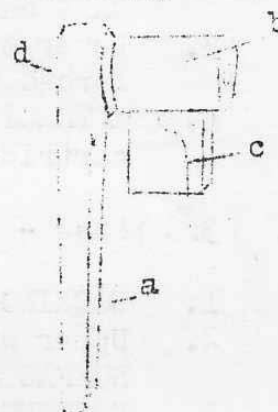
- a. Upper Arm
- b. Lower Arm
- c. Sear Cam Groove
- d. Camming Surface
- e. Safety Lug
- f. Tripper Shaft
- g. Tit on Shaft



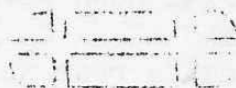
Q. Remove the TRIGGER by depressing the trigger plunger and trigger plunger spring then withdraw the Trigger to the left.

1. Notice

- a. Trigger Arm
- b. Hub
- c. Apron
- d. Sslot



R. Remove the TRIGGER PLUNGER



S. Remove the TRIGGER PLUNGER SPRING



11. ASSEMBLING THE 37MM GUN ANTITANK, M3

A. Assemble in the reverse order of Disassembly

B. In order to fully seat the Firing Pin Guide Assy. and thereby permit the easy installation of the Firing Spring and Retainer, press down on the Firing Plunger as you insert the Firing Pin Guide Assy.

C. ALWAYS COCK THE PIECE AND FIRE IT AFTER ASSEMBLING TO CHECK THE FACT THAT THE PIECE HAS BEEN REASSEMBLED CORRECTLY AND THAT IT WILL FUNCTION PROPERLY.

111. POINTS TO REMEMBER:

A. When disassembling piece, lay removed pieces in a regular order on as clean a spot as possible.

B. During nighttime, place disassembled parts in your pocket to avoid loss.

C. Wipe parts dry before oiling. Oil over moisture is no protection.

TANK DESTROYER SCHOOL
Weapons Department
Camp Hood, Texas

37mm Gun, Antitank, M3, Mechanical Functioning

I. MECHANICAL FUNCTIONING of 37mm GUN, ANTI-TANK, M3.

a. 1st phase - opening of breech

1. Motion transmitted through OPERATING HANDLE to OPERATING HANDLE SHAFT.
2. From OPERATING HANDLE SHAFT to CRANK HUB.
3. CRANK HUB to CURVED CRANK ARM.
4. CURVED CRANK ARM to CRANK TRUNNIONS.
5. CRANK TRUNNIONS move down and to rear in T-slot forcing the BREECHBLOCK down.
6. Motion stopped by CRANK STOP striking BREECH RING LUGS.

b. 2nd phase - extraction

1. BREECHBLOCK lowered.
2. EXTRACTOR CAM SHOULDERS OF BREECHBLOCK strike. ROUNDED CAMS on lower arm of EXTRACTORS. EXTRACTORS work on pivots.
3. Lower extractor arms are forced to front, upper arms forced to rear.
4. EXTRACTOR LIPS -- on upper arms, seated -- in front of cartridge rim extracts and ejects shell case.

c. 3rd phase - cocking

1. COCKING LEVER carried down with BREECHBLOCK.
2. Upper arm of COCKING LEVER CAMMED FORWARD BY ROUNDED CAM SURFACE on left inside rear wall of BREECH RING RECESS.
3. COCKING LEVER being pivoted, forward camming action on upper arm of COCKING LEVER forces lower arm of COCKING LEVER to the rear compressing the COCKING LEVER PLUNGER and COCKING LEVER PLUNGER SPRING.
4. COCKING LUG on FIRING PIN GUIDE ASSEMBLY is engaged by the COCKING PROJECTION on the lower arm of the cocking lever, and the FIRING PIN GUIDE ASSEMBLY is forced to the rear.
5. The FIRING SPRING is compressed between the BASE of STOP and RETAINER.
6. SEAR LUG on FIRING PIN GUIDE ASSEMBLY in motion to rear cams SEAR to right compressing sear spring.
7. SEAR LUG clears SEAR SHOULDERS, SEAR moves back to left in front of SEAR LUG under action of compressed SEAR SPRING.
8. FIRING PIN GUIDE ASSEMBLY with FIRING PIN held in cocked position.

d. 4th phase - closing the breech

1. OPERATING HANDLE MOVED FORWARD and up, rotating OPERATING HANDLE SHAFT.
2. Rotary motion transmitted through to OPERATING HANDLE SHAFT to CRANK.
3. TRUNNIONS on CRANK move up and forward in the T-SLOT forcing the BREECHBLOCK up.
4. Upward motion of BREECHBLOCK stopped when TRUNNIONS of CRANK hit the rear end of barrel and OPERATING HANDLE LATCH engages OPERATING HANDLE LATCH CATCH.

e. 5th phase — forcing the round into the chamber.

1. Round is inserted into the chamber, and is positioned slightly to the rear by the LIPS of the ~~EXTRACTORS~~.
2. As the ~~BREECHBLOCK~~ is raised the ~~FORCING BEVEL~~ hits the rim of the cartridge case and cams the round completely into the ~~CHAMBER~~.

f. 6th phase — return of the cocking lever.

1. As the BREECHBLOCK is raised the UPPER ARM of the COCKING LEVER clears the cam surface of the rear wall of the BREECH RING.
2. LOWER ARM of COCKING LEVER moves forward under action of compressed COCKING LEVER PLUNGER SPRING and COCKING LEVER PLUNGER.
3. Path is clear for COCKING LUG on FIRING PIN GUIDE ASSEMBLY when FIRING PIN GUIDE ASSEMBLY moves forward.

g. 7th phase — Firing

1. FIRING PLUNGER pushed forward.
2. FIRING CONTROL DISC forced forward against upper arm of FIRING CONTROL LINK.
3. Lower arm of FIRING CONTROL LINK rotates to rear on pivot.
4. Lower arm of FIRING CONTROL LINK connected to FIRING CONTROL EYE by PIN secured by COTTER KEY.
5. FIRING CONTROL EYE screwed into FIRING CONTROL PLUNGER which is attached to FLEXIBLE CABLE.
6. STEEL FIRING CABLE moves to rear pulling FIRING MECHANISM PLUNGER forward, compressing FIRING MECHANISM PLUNGER SPRING.
7. Lower arm FIRING MECHANISM LEVER pulled forward, upper arm of FIRING MECHANISM LEVER forced to the rear on a pivot.
8. TRIGGER ARM forced to rear by upper arm of FIRING MECHANISM LEVER in its movement to the rear.
9. When FIRING PLUNGER is released the compressed FIRING MECHANISM PLUNGER SPRING causes all parts of the firing mechanism to return to normal position.
10. FIRING PLUNGER must be released after firing before breech can be opened.
11. FIRING MECHANISM LEVER HANDLE is used to operate TRIGGER without FIRING CONTROL PLUNGER.

h. 8th phase — firing mechanism

1. TRIGGER ARM forced to rear by upper arm of FIRING MECHANISM LEVER, motion transmitted through TRIGGER HUB TO TRIPPER SHAFT, upper arm of TRIPPER moves forward.
2. TRIPPER ARM cams SEAR to right releasing SEAR LUG on FIRING PIN GUIDE from SEAR SHOULDER.
3. FIRING PIN GUIDE ASSEMBLY is moved forward by compressed FIRING SPRING.

i. 9th phase — retraction of firing pin and guide.

1. The STOP strikes the inside rear surface of BREECHBLOCK BUSHING.
2. FIRING PIN and FIRING PIN GUIDE carried forward by inertia, FIRING PIN emerges from FIRING PIN WELL in BREECHBLOCK BUSHING and strikes primer of shell.
3. FIRING PIN RETRACTOR SPRING compressed in last motion forward.
4. Forward motion stopped by impact of FIRING PIN with primer.

5. FIRING PIN RETRACTING SPRING retracts FIRING PIN slightly to rear of front face of BREECHBLOCK BUSHING.
6. FIRING PIN must be retracted to prevent damage to FIRING PIN when BREECHBLOCK is lowered.

j. 10th phase - recoil

1. Recoil is hydrospring type.
2. Action of powder gases on BREECHBLOCK at instant of discharge causes the gun to recoil about 20 inches. Gun is coupled to RECOIL PISTON.
3. Recoil is resisted, speed of recoil is regulated, and rearward action stopped by the action of the recoil mechanism attached to the gun by the COUPLER and COUPLER KEY.
4. Two main forces resist the rearward movement of the RECOILING MECHANISM in the recoil cylinder. These two forces are:
 - i. Two COUNTER-RECOIL SPRINGS in the rear part of the RECOIL CYLINDER are compressed on recoil.
 - ii. The recoil oil which follows two courses forward during the rearward movement of the RECOIL PISTON.
 - a. The PISTON VALVE is forced open against the action of the PISTON VALVE SPRING. Oil flows forward through PORTS in the PISTON HEAD which are uncovered as the PISTON VALVE moves away from the PISTON HEAD.
 - b. Oil flows through PORTS in the forward HOLLOW END of the PISTON ROD and out around the TAPERED BUFFER on the RECOIL CYLINDER HEAD.
 - c. As the gun moves to the rear the hole around the TAPERED BUFFER becomes larger allowing more oil to flow forward.
 - iii. Combination of resistances of COUNTER-RECOIL SPRINGS and the restriction of the flow of oil slow and bring to a stop the rearward movement of the gun. This is accomplished without shock to the gun.

k. 11th phase - counter recoil

1. Recoil being stopped, the parts of the gun and recoil mechanism that acted in recoil are returned to normal position by expansion of the compressed COUNTER-RECOIL SPRINGS against the PISTON BRACKET.
2. Piston Valve, under expansion of the compressed VALVE SPRING closes the PORTS in PISTON HEAD.
3. The oil follows one course in counter-recoil.
4. Oil flows rearward through HOLLOW END of the PISTON ROD and out through PORTS to rear.
5. Movement stopped by TAPERED BUFFER entering HOLLOW END of PISTON ROD.
6. The TAPERED BUFFER closes the HOLLOW END of the PISTON ROD slowly and allows gun to return to battery without shock.

II. SAFETY FEATURES OF THE 37mm GUN, ANTITANK, M3

a. RECOCKING

1. Another mechanical function of the 37mm gun is recocking. This may be done manually by rotating the upper arm of the COCKING LEVER forward without lowering the breechblock.

b. FEATURES

1. The safety lug on the lower arm of the tripper performs two (2) safety functions.
 - (a) The piece cannot be fired until the breechblock is fully closed, due to the fact that the safety lug on the lower arm of the tripper is in front of the breechblock when the breechblock is not fully closed. Thus, the breechblock itself prevents the tripper from rotating to trip the sear.
 - (b) When the breechblock is fully closed it does not prevent the tripper from rotating. When the firing plunger is pressed, the upper arm of the tripper rotates forward to trip the sear. At the same time, the lower arm with the safety lug on it rotates to the rear so the safety lug is now under the breechblock locking the breechblock in place at the instant of firing. As long as pressure is applied to the firing plunger, the breechblock is locked in place; therefore, to lower the breechblock it is necessary to release the firing plunger.
2. In addition, the cocking projection on the lower arm of the cocking lever performs a safety function. Early in the downward movement of the breechblock, the cocking projection engages the cocking lug and remains in its path until the breechblock is closed. This eliminates possibility of having the firing pin move forward to strike the cartridge due to premature release of the sear or other malfunction on the part of the sear to hold the mechanism cocked until the breechblock is fully closed.

TANK DESTROYER SCHOOL
Weapons Department
Camp Hood, Texas

CARE AND CLEANING of 37mm GUN, ANTITANK, M3

I. Care and Cleaning of 37mm Gun, Antitank, M3

A. A Tank Destroyer crew is responsible for the Preventive Maintenance of their Destroyer.

1. PREVENTIVE MAINTENANCE is DETAILED, SCHEDULED INSPECTION plus CORRECTIVE ACTION.

B. The importance of Care and Cleaning of Equipment.

1. To keep the Destroyer in fighting condition at all times.
2. To be able to fire accurately at all times.

C. Reasons for Cleaning.

1. POWDER FOULINGS will absorb moisture and hasten rust in barrel and impair accuracy.
2. DIRT and GRIT from travelling, muzzle blasts, etc., settle on bearing surfaces and in combination with lubricants form a CUTTING or ABRASIVE COMPOUND. For this reason it must be wiped off before firing.
3. Gears which elevate and traverse the gun must be kept well-lubricated to prevent excessive wear. Too much play is disastrous to accuracy.
4. Sighting lens must be kept clean to give a clear and accurate sight picture.

D. When to Care for and Clean the 37mm Gun, Antitank, M3

1. IN GARRISON - gun must be cleaned and oiled after every drill period and thoroughly cleaned and oiled once a week.
2. BEFORE FIRING -
 - a. Thoroughly cleaned and inspected.
 - b. Recoil Oil in recoil mechanism is checked and filled.
 - c. Tube is removed from slides and is cleaned and oiled.
3. DURING LULLS IN FIRING
 - a. Swab out bore with water to cool it.
 - b. Check recoil oil, firing mechanism, and so forth.
4. AFTER FIRING -
 - a. Clean three successive days after firing.
 - b. Slides and guides are again cleaned and oiled.

II. CLEANING, LUBRICATING, AND PRESERVING MATERIALS

A. CLEANERS

1. Paper, lens, tissue:
Used in wiping clean all optical lenses and equipment.
2. Burlap, jute.
For cleaning and oiling gun bores, and for covering gun during standy conditions.
3. Sponge, natural.
For general cleaning of outer surfaces of gun; i.e., shield, pedestal, etc.

4. Waste, cotton, (two grades)
 - a. Colored; for general cleaning of guns and outer material.
 - b. Waste, white, for general cleaning of finished surfaces, i.e., bores, breechblocks, etc.
5. Soap, Castile.
A natural soda soap for cleaning outer surfaces of gun, i.e., shield pedestal, upper carriage.
6. Soda Ash
Used in solution of 1/2 pound to 1 gallon of water, hot, if available.
Bore is swabbed until no more powder fouling exists, then rinsed with fresh water, dried thoroughly, and oiled.
7. Solvent, Dry Cleaning
Used for cleaning outer surfaces of gun that have become grease-stained; and in preparation for application of compound, rust preventive.
DO NOT USE GASOLINE
8. Plain hot water when nothing else is available.
9. Compound, leather cleaning
For all leather

B. ABRASIVES:

1. Cloth, Crocus.
 - a. Coarsest abrasive to be used by line personnel on finished surfaces.
2. Cloth, emery, in 5 degrees of coarseness.
 - a. No. 00, is finest. Used for polishing, and removing rust from finished surfaces, i.e., breechblocks, etc., by authorized ordnance personnel only.
 - b. No. 0 used for cleaning finished steel surfaces, other than those above, where slight deterioration has occurred.
 - c. No. 1/2. Used on iron and steel surfaces where reasonably heavy deterioration has occurred.
 - d. No. 1 (medium). For removing rust from unfinished surfaces. Tanks, tractors, etc.
 - e. Cloth, No. 3 (coarse). Used for removing rust, burrs, from unfinished surfaces preparatory to painting, where deterioration is extreme.

C. LUBRICATION:

1. Grease, O.D. No. 00
Used in gear cases under Arctic Climatic conditions.
2. Grease, O.D. No. 0
Used in gear cases in temperate climatic conditions.
3. Grease, O.D. No. 1
Used in gear cases in tropical climatic conditions.
4. Oil, Engine, sae 10
Used for general lubrication and as a temporary rust preventive.

5. Oil, Engine, sae 50
Used for general lubrication and as a temporary rust preventive.
 6. Oil, Engine, sae 50
Used as a temporary rust preventive.
- D. OIL, RECOIL, HEAVY.
For recoil cylinder of 37mm gun.
Use light recoil oil for weather consistently below freezing.
- E. PRESERVATIVES:
1. Oil, neat's foot
For preserving all leather. Applied from unfinished side, after first cleaning with compound, leather cleaning.
 2. Compound, Rust Preventive, Heavy.
For protection of finished surfaces during dead storage. May be heated and articles dipped. INFLAMMABLE!
 3. Compound, Rust Preventive, light.
Used primarily for short time protection of finished surfaces. Applied by brush or dipped.
 4. Primer, synthetic, rust inhibiting.
For use on base metal as a base coat.
 5. Enamel, red, water resistant.
Used for circling oil fitting, and paint-grease, cups, and fittings. Eliminates searching for same.
 6. Enamel, synthetic, lusterless.
For painting vehicular numerals, etc.
 7. Enamel, olive drab, lusterless.
Used for top coat on all ordnance material.

III. FILLING AND CHECKING RECOIL CYLINDER

A.

1. Depress muzzle to maximum.
2. Loosen recoil cylinder plug (rear).
3. Fill oil gun. Purge of air by up-ending oil gun. Keep constant but slight pressure on piston, till air bubbles cease to emerge.
4. Remove plug and insert oil gun.
Pressure on piston is retained until fully inserted.
5. Elevate muzzle to maximum elevation and remove cylinder head plug.
6. Force oil into cylinder until it emerges from cylinder head hole.
7. Continue to force oil through slowly until no air bubbles are seen.
8. Replace cylinder head plug.
9. Depress muzzle to maximum.

10. Remove oil gun.
11. Replace recoil-cylinder plug.

IV. REMOVING THE GUN AND SLEIGH FROM THE RECOIL MECHANISM, AND CLEANING SLIDES AND GUIDES.

A.

1. Remove coupler key.
2. Two men on breech end, and one on muzzle end slide tube and sleigh to rear and remove.

CAUTION: Fingers should be inserted into muzzle of tube to prevent getting them crushed between tube and recoil mechanism.

3. Clean slides and guides with white waste.
4. Observe surfaces of above for corrosion or scratches.
5. Smooth with crocus, if necessary.
6. Clean and oil surfaces lightly using sae No. 10 or 30.
7. Replace tube, using care that rails are not scarred in the process.
8. Replace coupler key.
9. Don't tighten coupler key nut too tightly. Locking threads on nut make it unnecessary.

V. INSPECTION OF THE 37mm GUN, M3.

A.

1. General appearance is noted. Inspection is then governed by the relative importance of parts or assemblies.
2. Bore and chamber observed for cleanliness, and condition of the lands noted.
3. Breechblock; Check smoothness of operation. Disassemble and check for freedom from corrosive stains, worn, broken and dirty parts.
4. Check extractors, tripper, and trigger.
5. Breech ring: condition of walls.
6. Firing control mechanism and firing mechanism: smoothness of operation. Note degree of wear.
7. Traversing mechanism: note response of gun in traverse. Proper lubrication is proven by ease of operation. Look for undue backlash.
8. Traversing mechanism: LEVER ROD HANDLE: note promptness with which traversing gears become free, and re-engage.
9. Elevating mechanism: movement must be fluid, not binding. Look for undue backlash.

10. Sight mount: attention is given to the locking nuts and link tube differential screw. Check adjustment of telescope holder. Check bore sight.
11. Travelling lock: note freedom of lock, particularly the plunger.
12. Recoil Mechanism: Inspect for oil leakage, inspect condition of sleigh and slides, check coupler key, exercises recoil mechanism once a month by manually pulling gun back into recoil and then allowing gun to return to battery.
13. Check gun book for proper entries.
14. Check gun lubrication charts:
Note: Charts are not issued; they are made by units.

TANK DESTROYER SCHOOL
Weapons Department
Camp Hood, Texas

37mm GUN, ANTITANK, M3 - IMMEDIATE ACTION AND STOPPAGES

I. Definitions.

- a. A stoppage is any unintentional cessation of fire.
- b. Immediate Action is the procedure used for the prompt reduction of usual stoppages.

II. Stoppages.

a. Prevention

- 1. Stoppages will be reduced to the minimum if the gun commander, gunner, and loader have a practical working knowledge of the weapon and apply the points which should be observed before firing.

b. Causes and Types of Stoppages

1. Breech cannot be opened.

- a. Failure to release pressure on the FIRING PLUNGER after firing.
- b. Dirt in FIRING MECHANISM PLUNGER.
- c. Weak, missing, or broken TRIGGER PLUNGER SPRING.
- d. Weak or broken FIRING PIN RETRACTING SPRING.

2. Gun fails to extract or eject empty cartridge case.

- a. Failure to open BREECH smartly.
- b. Defective or dirty ammunition.
- c. Broken or worn EXTRACTORS.
- d. Dirty CHAMBER.

3. Failure to load.

- a. Obstruction in CHAMBER.
- b. Bulged and dirty round.

4. Gun fails to fire.

- a. Broken or burred FIRING PIN.
- b. Weak or broken FIRING SPRING.
- c. Broken TRIGGER ARM.
- d. Defective FIRING CONTROL MECHANISM and FIRING MECHANISM.
- e. Defective cartridge primer.
- f. Gun not completely in battery.
- g. Weak or broken sear spring.

37mm Gun, Antitank M3
IMMEDIATE ACTION

Gun fails to fire

Check to see if gun has returned completely to battery

:	:	:
If it has returned		If it has not returned
:		:
Relay and attempt to fire		Push into battery by hand
three more times, using both		:
means of actuating the trigger		:
:		:
Gun still fails to fire		:
:	Cannot be pushed	Can be
AFTER TWO MINUTES*	into battery	pushed into
:	:	battery
:	Unload	:
Open Breech	:	Reload, relay
:	Check slides	and fire.
:	:	:
Breech will	Breech will	Drain tablespoonful
not open	open	of oil from recoil
:	:	cylinder.
:	:	:
Release	Remove	Push into battery
pressure from	round.	:
FIRING PLUNGER	:	Reload, relay, and
or check firing	Reload, re-	fire.
mechanism plunger	lay and fire.	
:		
Breech will still not open.		
:		
Remove firing pin guide and replace.		
:		
Attempt to fire.	Remove ammunition.	
:	:	
:	:	
Round ejects	Round fails to eject	
:	:	
Reload, relay,	Close breech and open smartly.	
and fire.	:	
	Gun still fails to eject.	
	:	
	Remove cartridge case, using	
	cartridge case extractor or	
	screwdriver to pry out or by	
	rammer staff to force out.	

NOTE: If application of the above procedure does not remedy the stoppage, the gunner, the assistant gunner, or both together examine the mechanism of the gun in order to locate and remedy the trouble.

* In peacetime this procedure will be strictly adhered to, but in combat the existing situation will govern.

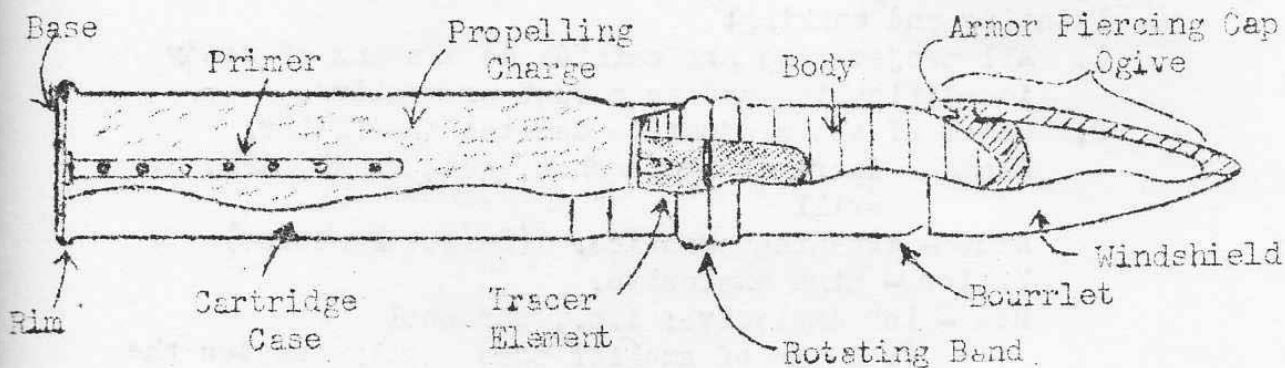
TANK DESTROYER SCHOOL
Weapons Department
Camp Hood, Texas

37mm GUN, ANTITANK, M3

AMMUNITION

GENERAL:

1. A ROUND OF AMMUNITION consists of the projectile and all the components necessary to propel it from the piece and, in the case of high explosives, to burst it at the desired point.
2. NOMENCLATURE, and FUNCTIONS OF THE VARIOUS PARTS OF A PROJECTILE.



- a. Windshield - streamlines the projectile.
- b. Ogive - to further streamline the nose of the shell and to lend stability to projectile in flight.
- c. Bourrelet - is the forward bearing surface. This centers the nose of the projectile in the bore.
- d. Body - that portion of the projectile between the bourrelet and the rotating bands.
- e. Rotating band - a soft metal band pressed into a groove in the body and machined to a diameter slightly larger than that of the bore. Its functions are:
 1. To impart rotation.
 2. To center the rear of the projectile in the bore.
 3. To prevent the escape of gasses past the projectile.

3. PROPELLING COMPONENTS:

- a. Primer - a device that initiates explosion.
 1. In fixed ammunition the primer serves as both a primer and igniter.
 2. The component parts of a primer are:
 - Body
 - Diaphragm
 - Black Powder
 - Flanged Head
 - Firing Plug
 - Cup
 - Composition Pellet
 - Paper Disc
 - Anvil
 3. They contain a detonator known as Primer Mixture and an igniter of Black Powder.

b. Propelling Charge - burning of this powder generates gasses whose pressure propels the projectile from the tube.

1. Composed of Flashless Non-Hydroscopic Powder (FNH)
2. An ideal propellant is one that is:

- Flashless
- Smokeless
- Noiseless
- Noncorrosive and nonerrosive
- Progressive in burning, with a maximum pressure at the muzzle.
- Safe and stable under all conditions of manufacture and storage.
- Cheap and easy to manufacture.
- Of nonstrategic materials.

4. MARKING, PACKING, TRANSPORTATION, STORAGE, AND CARE OF AMMUNITION.

a. Painting and marking:

1. All projectiles are painted as a means of ready identification and as a rust preventive.
2. Color of the projectile denotes the filler.
 - Black - inert or solid shot, such as AP, APC, or drill
 - Blue - training practice. (Target Practice)
 - Yellow - high explosive.
 - Red - low explosive; i.e., shrapnel
(red tip of smaller arms merely denotes the fact that the cartridge has tracer)
 - Gray - chemical
 - White - illuminating
3. Markings - Each component of a round is marked in a contrasting color to show:
 - Caliber and type cannon used
 - Model of projectile
 - Filler, if projectile is a shell
 - Lot number of projectile
 - Lot number of the propellant and the manufacturer
 - Packing date
4. Containers - are marked in the same manner as the ammunition with the addition that all fibre containers have their tops sealed on with an adhesive of a color similar to the color of the projectile therein
5. Packing boxes - are marked for shipment with all the above information plus an Ammunition Data Card that is placed inside. Each box has wide identification bands stencilled on each end and across the top in a color that corresponds to the projectiles packed within.
 - Yellow and green bands stencilled on the box are indicative of tracer ammunition in the case of small arms, otherwise tracer ammunition can be identified by words to that effect that are clearly stencilled on the box.

b. Storage:

1. In garrison:
 - Stored by boxes and piled so that each box secures proper ventilation.
 - Remember that heat and moisture are the prime enemies of ammunition.
2. In the field:
 - Do not open containers until ready for use.
 - Pile with dunnage between rows.
 - Place main dump under cover.
 - Cover with paulins both over and under to avoid sun and moisture.

Place main dumps well to rear and flanks
of position.

c. Transportation:

1. Rail and water shipments are generally not our concern.
2. By truck, be sure to observe the following precautions:
 - Cover the metal floors of truck
 - Check trucks before loading for
 - faulty wiring
 - faulty brakes
 - faulty gas tank and gas lines
 - Check to see that truck is equipped with a fire extinguisher and that same is full.
 - Check to see that warning flags and other identification markers are provided.
 - Do not allow smoking in or about the vehicles.
 - When loading or unloading make sure brakes are set and motor shut off.

d. Care and Handling:

1. Handle carefully. Don't throw, drop, drag, or tumble
2. Never use bale hooks.
3. Don't open containers until ready to use the contents.
4. Never disassemble loaded components.
5. Inspect each round prior to its use.
6. Protect each round from the effects of chemicals
7. Save Ammunition Data Card until all ammunition that it covers has been expended. This will save further injuries from same lot, by withdrawal of like rounds.
8. Be sure that you know the procedure for both Misfires and Prematures. See AR 750-10 and AR 45-30 respectively.

e. NEVER HANDLE DUDS.

Duds are unexploded shells whose contents often explode at the slightest movement. If in doubt as to whether a projectile is a shell or a solid shot, LEAVE IT ALONE.

B. DISCUSSION OF ARMOR PIERCING AMMUNITION AND THE CLASSIFICATION AND CHARACTERISTICS CHART.

1. Classification and characteristics:
(See chart on reverse.)

2. Armor Piercing and Armor Piercing Cap.

Much of the information regarding this type of ammunition is in the developmental stages and as a result the data is for the most part either restricted or confidential or both.

Suffice it to say the Caliber Board in conjunction with the using arms are constantly at work developing new and remodeling old types of ammunition to meet the ever changing needs.

At present there is in production for our needs a new type APC Shot with a small hollow portion of the body that will be filled with Amatol and fitted with a new Base Detonating Fuze, thereby producing not only an armor penetrating projectile but one that will explode and shatter after penetration.

C. AMMUNITION CHARACTERISTICS.

1. Muzzle Velocity.

AP Shot	2600 ft/sec.
HE Shell	2750 ft/sec.
APC Shot	2900 ft/sec.

2. Terminal Velocity at 1000 yd.
AP Shot 2088 ft/sec.
APC Approx. 2400 ft/sec.
3. Bursting Radius of 37 HE Shell
HE Approx. 5 yd.

CLASSIFICATION & CHARACTERISTICS
OF AMMUNITION ISSUED FOR 37mm GUN M3, M5, M6

TYPE	DESIGNATION	PROJECTILE		MATERIAL	FORGED OR CAST	PROPELLANT		PRIMER		FUZE DESIG- NATION	FUZE TYPE	PRICE	PACKING, MARKINGS, REMARKS
		WT. LOADED & FUZED	CHARGE			NOMINAL KIND	WEIGHT	SIZE	DESIG- NATION				
APC	M51B1	1.92 lb.	None	STEEL	HEATTREATED DROP FORGED**	8.1 oz FNH	20 gr	M23A2	None	None	None		20 rds. to a box, in individual fibre contain. Packing box can be readily identified by its descriptive stencilling and heat black identification band on all sides
APC	M74	1.92 lb.	"	BAR STOCK HEATTREATED STEEL	BAR STOCK HEATTREATED	8.1 oz FNH	20 gr	M23A2	"	"	"	\$5.11	Packed and identified in same manner as APC
TPC	M51	1.92 lb.	"		BAR STOCK **	6.6 oz FNH	20 gr	M23A2	"	"	"	\$3.19	Packed in same manner, the identification band, box as well as the projectile itself are blue. Markings on the projectile are in white.
HE	M63	1.61 lb.	FLAKE TNT	STEEL	BAR STOCK	7.8 oz FNH	20 gr	M23A2	M58	B.D.	B.D.	\$4.32	Packed in same manner as above but projectile is yellow and so are the identification bands.

@ - 50,000 unheattreated shot was manufactured for TP
Future requirements will be met by supplying std, AP

** - Has built in tracer

TANK DESTROYER SCHOOL
Weapons Department
Camp Hood, Texas

37mm GUN, ANTITANK, M3 - SUBCALIBER EQUIPMENT

M6 Subcaliber rifle mount
.22 and .30 rifles for M6 mount
37 subcaliber shell cal. .22

1. DESCRIPTION - M6 subcaliber

- a. The mount consists of a long tube which extends the full length of the 37mm gun barrel, a breech housing which acts as a rear bushing for the mount, and a firing support assembly which will receiver either the caliber .30 or the caliber .22 subcaliber rifle. The mount is positioned and retained in place in the barrel of the 37mm gun by means of a fiber pad, a bronze spacer and a nut which screws on the long tube at the muzzle end. The extractors of the 37mm gun keep the mount from rotating.

2. PURPOSE -

By firing relatively inexpensive caliber .30 or caliber .22 ammunition from the subcaliber device mounted on the 37mm gun to:

- a. Provide training in Tank Destroyer marksmanship and technique of fire, to develop coordination by the gun crew along with skill in laying, tracking, and firing on moving targets.
- b. Conserve 37mm ammunition which is urgently needed elsewhere these days.
- c. Economy. The difference in cost of small arms ammunition and 37mm ammunition is great.
- d. Permit some firing from the 37mm gun on ranges whose area or layout will not admit the firing of regular 37mm service ammunition.

3. INSTALLATION OF THE MOUNT M6:

- a. Open the breech fully.
- b. Insert long tube of device completely through the 37mm gun barrel.
- c. Push breech housing of long tube into 37mm gun breech with the cuts on its sides in line with the extractors of the 37mm gun.
- d. Place fiber pad and bronze spacer over protruding muzzle end of long tube.
- e. Retain the mount in place by screwing the nut on the threaded muzzle end of long tube.

4. TO INSTALL SUBCALIBER RIFLE (CALIBER .30 M1903A2)

- a. Remove floor plate, follower spring, and follower from subcaliber rifle.
- b. Remove front and rear trigger guard screws from subcaliber mount.
- c. Remove trigger guard.
- d. Insert rifle muzzle with brass bushing into subcaliber mount breech housing until rifle is completely seated with bolt up.
- e. Insert trigger guard assembly in firing support assembly.

- f. Swing firing support assembly into its closed position, checking to make sure that the trigger trip of sub-caliber mount is ahead of rifle trigger.
- g. Replace front and rear trigger guard screws.
- h. Replace follower, follower spring, and floor plate.

5. TO DISASSEMBLE CABLE AND FITTINGS OF 37mm GUN.

- a. Remove cotter key and pin which connects firing control link to firing control eye on cable head.
- b. Raise the firing control link.
- c. Unscrew the firing control eye.
- d. Using a small socket head set screw wrench, unscrew the set screw which locks the cable tubing flange into the sleeve.
- e. Remove cable tubing flange and firing control plunger of the 37mm gun towards the front.

6. TO INSTALL CABLE AND FITTINGS OF SUBCALIBER MOUNT.

- a. Insert cable tubing flange and firing control plunger of M6 subcaliber mount upward into the sleeve.
- b. Lock the cable tubing flange in place by tightening the set screw.
- c. Replace the firing control eye.
- d. Lower the firing control link.
- e. Replace pin and cotter key.
- f. Check by manipulating the firing plunger.

7. TO REMOVE SUBCALIBER RIFLE FROM THE MOUNT (caliber .30, M1903A2).

- a. Remove floor plate, follower spring, and follower from the subcaliber rifle.
- b. Remove front and rear trigger guard screws.
- c. Remove trigger guard.
- d. Swing firing support assembly downward until rifle trigger is cleared.
- e. Remove subcaliber rifle to the rear.

8. TO INSTALL SUBCALIBER RIFLE (CALIBER .22 M2A1)

- a. Remove floor plate and magazine.
- b. Proceed as in 4, 5, and 6 above.

(NOTE): Always check to see that the brass bushing is on the muzzle of the rifle before inserting it into the sub-caliber rifle tube.

9. DESCRIPTION AND USE OF 37mm SUBCALIBER SHELL CALIBER .22

The 37mm subcaliber shell caliber .22 is a machined brass shell of the same size as the 37mm service shell. A section of .22 rifle barrel is inserted through the center of the 37mm subcaliber caliber .22.

The section of .22 rifle barrel is offcenter throughout the entire length of the 37mm subcaliber shell caliber .22 to permit the firing pin of the 37mm to strike the rim fire .22 cartridge.

The .22 cartridge is placed in the rear of the 37mm sub-caliber shell caliber .22 before it is loaded in the 37mm. At the rear of the brass subcaliber shell, just in front of the rim, is a set screw recess. This set screw recess will always be at the top when loaded in the 37mm.

These brass 37mm subcaliber shell caliber .22 shells are not items of issue. They will be handled with care. They will never be allowed to strike the ground upon extraction or strike against the metal.

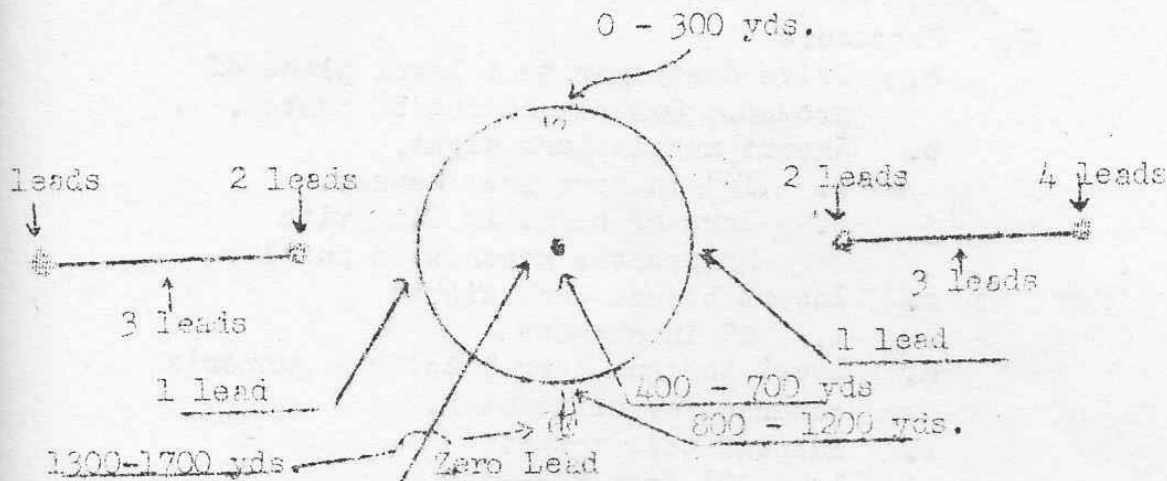
The cleaning of these shells will be done in the same manner as cleaning a service rifle.

A weak firing spring is used when firing the 37mm subcaliber shell caliber .22 shell.

TANK DESTROYER SCHOOL
Weapons Department
Camp Hood, Texas

37mm GUN, ANTITANK, M3 - TELESCOPE SIGHT M6
BORESIGHTING and ALIGNMENT OF THE TELESCOPE
HOLDER

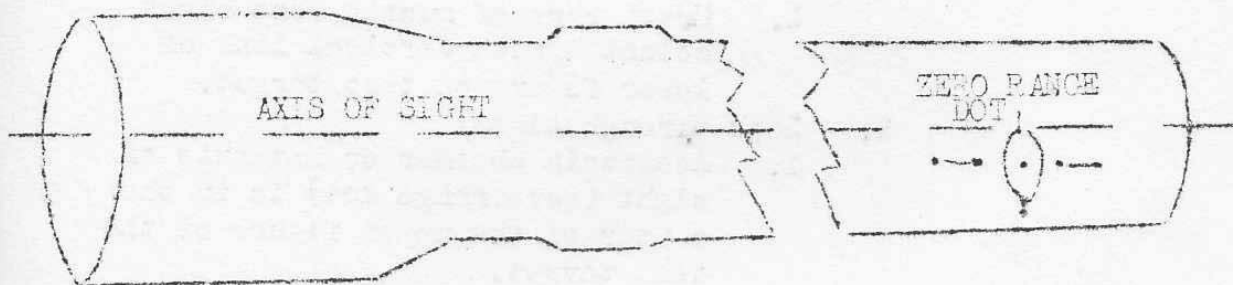
I. The telescope sight M6 - Diagram of reticule.



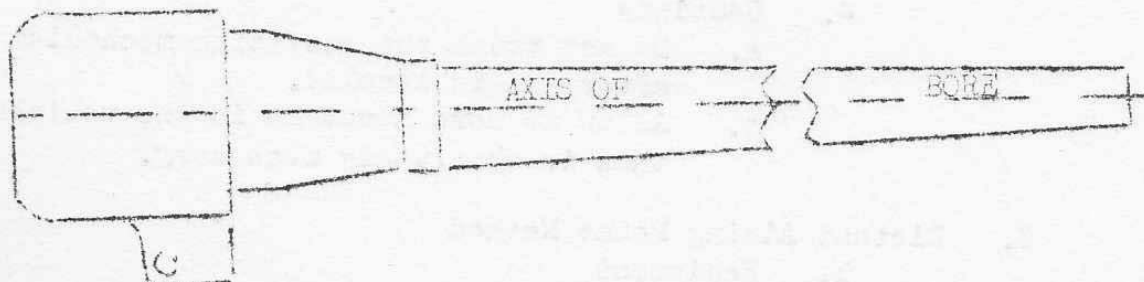
II. Bore Sighting

A. Definitions

1. Axis of the sight



2. Axis of the bore



3. Bore sighting consists of either
actually paralleling the axis of
the sight and the axis of the bore
or causing the axis of the sight
and the axis of the bore to intersect

at such a distance that for all practical purposes the two axes may be considered parallel.

B. Test Target Method of Bore Sighting

1. Equipment needed.
 - a. Test target
 - b. Target stand
 - c. Plumb bob
 - d. Gunner's quadrant or Clinometer
2. Procedure
 - a. Drive destroyer to a level piece of ground. Gun should not be canted.
 - b. Insert muzzle bore sight.
 1. $1\frac{1}{2}$ " in bore from muzzle.
 2. Bars of sight in line with horizontal notches on muzzle.
 - c. Insert breech bore sight
 1. 2" in chamber
 - d. Level the gun barrel using a gunner's quadrant or clinometer.
 - e. Suspend test target
 1. 80' from the gun
 2. Perpendicular to axis of bore
 3. Check with plum bob
 - f. Move test target
 1. Until bars of muzzle bore sight coincide with horizontal line of lower figure on test target
 - g. Rotate muzzle bore sight until bars are in line with vertical notches on muzzle of gun.
 - h. Move test target
 1. Until bars of muzzle bore sight coincide with vertical line of lower figure on test target.
 - i. Look through sight.
 1. Ascertain whether or not axis of sight (zero range dot) is in the center of the upper figure of the test target.
 - a. If it is, gun is boresighted.
 - b. If it is not, adjust sight mount until zero range dot is in the center of the upper figure of the test target.
3. Check
 - a. Check alignment of bore sight.
 - b. Check alignment of sight.
4. Cautions
 - a. Do not touch the elevating mechanism after gun is leveled.
 - b. Allow no more movement in the vehicle than is absolutely necessary.

C. Distant Aiming Point Method

1. Equipment
 - a. Gun grease
 - b. Thread
 1. Can be obtained from waste or cloth.
2. Procedure
 - a. Place destroyer on level ground

- b. Remove
 1. Retainer
 2. Firing Spring
 3. Firing Pin guide assembly
- c. Smear grease on the muzzle
- d. Place a thread in the vertical and horizontal notches on the muzzle and stick them in place with grease.
- e. Pick out a clearly defined distant aiming point, preferably over 1500 yards.
- f. Using firing pin well as rear sight and cross threads as front sight, line bore on the distant aiming point.
- g. Look through sight
 1. Ascertain if the axis of the sight Zero Range Dot is on the same point as the bore.
 - a. If it is, gun is boresighted.
 - b. If it is not, adjust sight until the Zero Range Dot is on the distant aiming point.

3. Check

- a. Alignment of bore sight
- b. Alignment of sight.

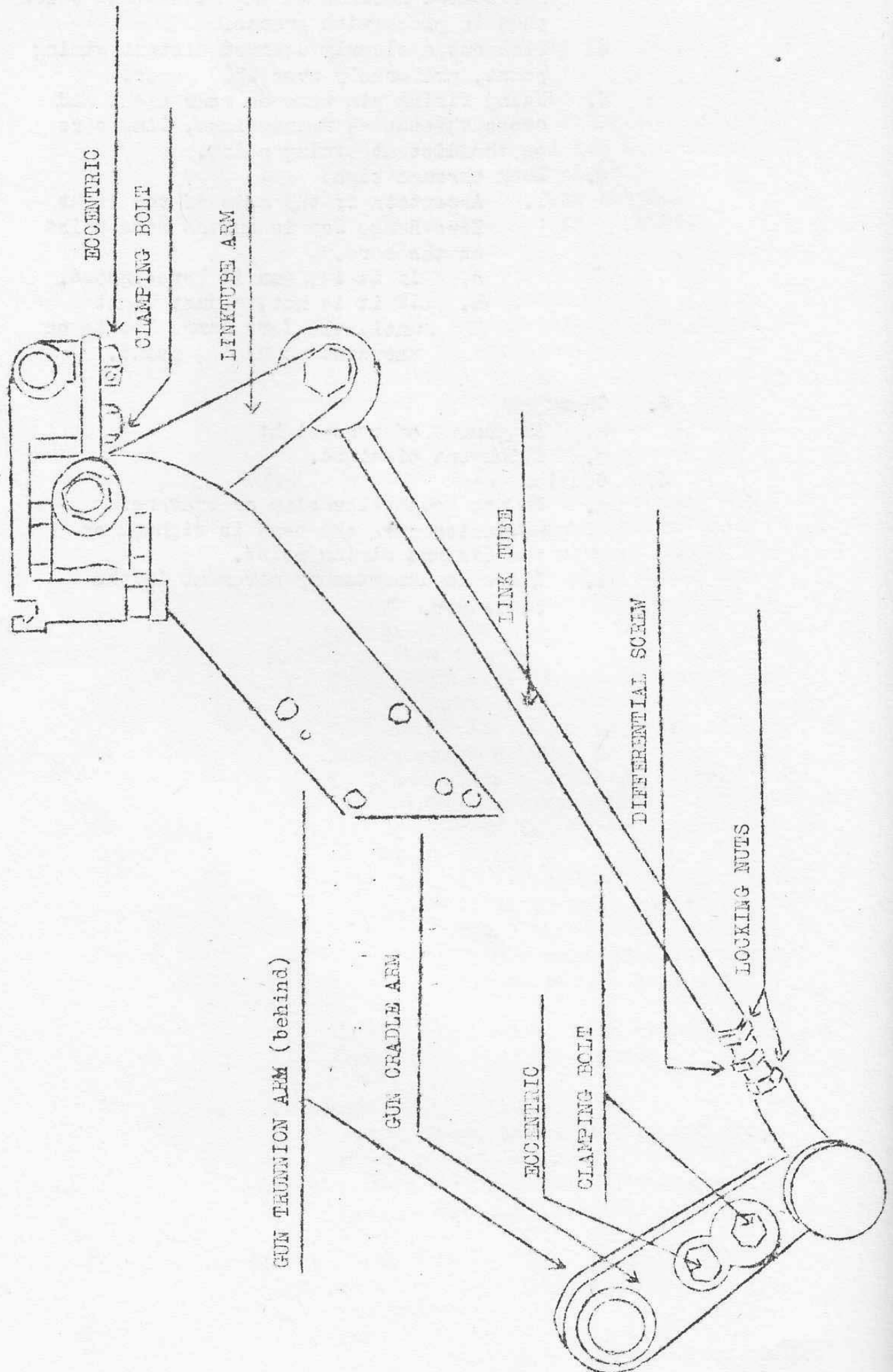
4. Caution

- a. Do not touch elevating or traversing mechanism once the bore is sighted on the distant aiming point.
- b. Allow no unnecessary movement in the destroyer.

37mm GUN, ANTITANK, M3

III. The Telescope Mount, M19

A. Diagram



IV. CHECKING AND ADJUSTING THE ALIGNMENT OF TELESCOPE HOLDER

A. Equipment

1. Gunner's quadrant or clinometer.
2. Crescent wrench.

B. Reason for adjustment.

1. To cause the axis of the sight to remain parallel to the axis of the bore when the gun is elevated or depressed.

C. Procedure to check alignment.

1. Set clinometer at zero and level gun barrel using clinometer.
2. Without moving gun, place clinometer on telescope holder. Read and record the angular difference between axis of bore and telescope holder.
3. Fully elevate and depress gun, and at each of these points take same reading as in (2) above.
4. If the readings at all three positions are the same, link tube is the proper length.
 - a. One mil is tolerance permitted at points of maximum elevation and depression.

D. To align telescope holder:

1. Level gun barrel using the clinometer.
2. Loosen bolt clamping gun cradle arm to gun trunnion arm, turn eccentric until gun cradle arm is aligned symmetrically with gun trunnion arm, retighten bolt.
3. Place clinometer on telescope holder, loosen locking nuts at lower end of link tube.
4. Turn differential screws near lower end of link tube to center clinometer bubble, retighten locking nuts.
5. Check as in C-3 and C-4 above.

E. If holder gains elevation at maximum elevation and loses elevation at maximum depression, the link tube is shorter than the distance between the trunnion and telescope holder shaft. To correct:

1. Level gun barrel using clinometer.
2. Loosen bolt clamping gun cradle arm to gun trunnion arm.
3. Turn eccentric moving the lower end of gun cradle arm forward a small amount.
4. Tighten clamping bolt, level telescope by lengthening link tube with differential screw. Tighten locking nuts.
5. Check as prescribed above, and repeat until correct.

F. If holder loses elevation at maximum elevation and gains at maximum depression the link is longer than the distance between the trunnion and telescope holder shaft. To correct:

1. Level gun barrel using clinometer.
2. Loosen bolt clamping gun cradle arm to gun trunnion arm.
3. Turn eccentric, moving the lower end of the gun cradle arm to the rear a small amount.
4. Tighten clamping bolt, level telescope by shortening link tube with differential screw. Tighten locking nuts.
5. Check as prescribed above.

TANK DESTROYER SCHOOL
Weapons Department
Camp Hood, Texas

37mm GUN, ANTITANK, M3 and M4 and M6 MOUNT

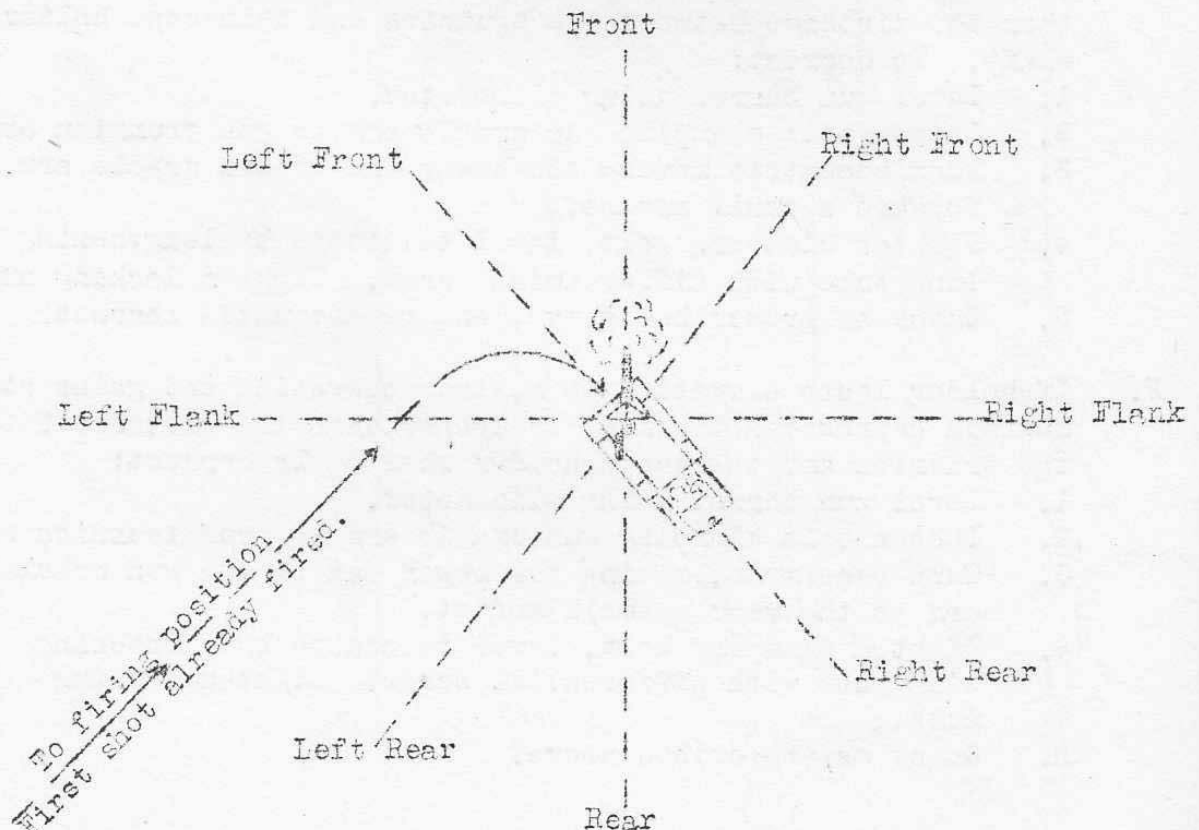
MARKSMANSHIP

I. Fire Orders:

- a. Fire orders are those orders issued by the gun commander to bring fire on the targets.
- b. Fire orders are in two classes:
 1. Initial fire orders
 - a. Those orders given to get the first shot off on each target.
 2. Subsequent fire orders
 - a. Those orders issued to correct the fire.
- c. The following fire orders are recommended by this department when engaging targets with T.D. weapons.

INITIAL FIRE ORDERS

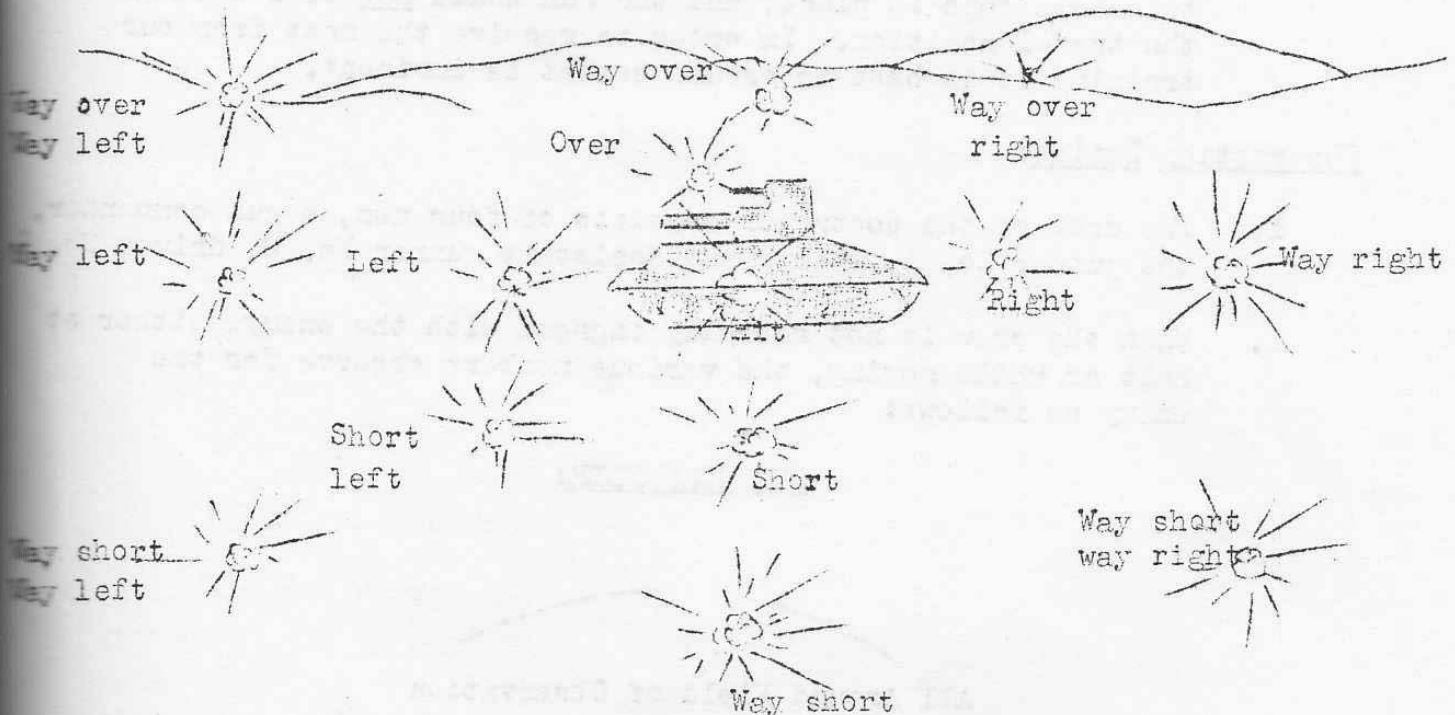
1. Type of ammunition
(Given only when it is desired to use ammunition other than A.P. If A.P. is to be used, omit this element of the fire order.)
2. Direction of the target
 - a. "Front" is always the direction the tube is pointing.



3. Target:
(Leading Tank, 3rd Tank, Right, etc.)
4. Range:
(600, 400, 1200, etc.) - Range is always nearest hundred yards.
5. Lead:
(One lead, four leads, zero leads, etc.)
The announcement of the lead will ordinarily be considered by the Gunner as the Gun Commander's command to open fire when on the target.
6. Fire Control:
(At my command, etc.) - Used only when the Gun Commander wishes for some reason to withhold the fire, otherwise it is omitted.

SUBSEQUENT FIRE ORDERS

After the first round, the Gun Commander will sense the shot, leaving the necessary corrections up to the Gunner. The following terms will be used in sensing shots.



(The term "Way" is used when the Gun Commander feels that the correction will involve a change of more than one range or lead graduation of the sight reticule.)

EXAMPLES

Initial Fire Orders:

1. H.E., RIGHT FRONT; RIGHT LANDING BARGE;
600, ZERO LEAD, AT MY COMMAND.
2. RIGHT FRONT, LAST TANK, 500 ONE LEAD.

Subsequent Fire Orders:

1. SHORT, WAY LEFT.
2. LEFT.
3. WAY OVER, WAY LEFT.
4. HIT.

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SERVICE OF THE PIECE

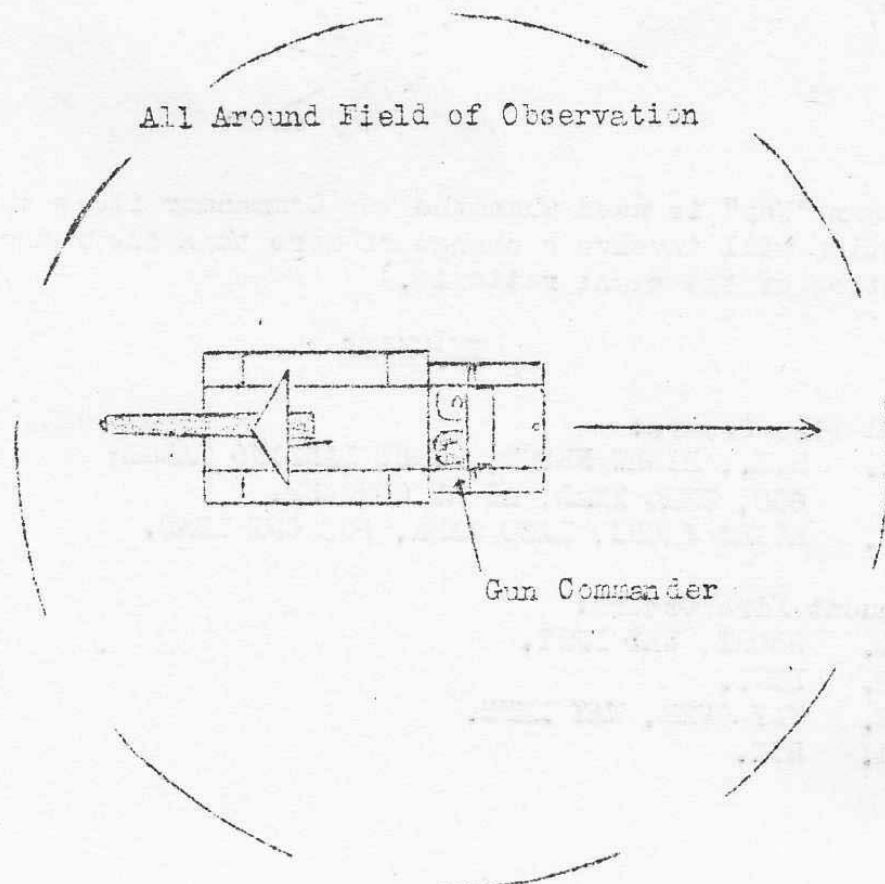
In General:

1. Service of the piece consists of all the duties and positions of each member of the crew before, during, and after firing.
2. Each member of the crew has specific duties to perform. Each duty must be performed correctly at the right time for team work in firing.
3. Service of the piece, or gun drill, as it is often called, is only a guide, a means of training to facilitate teamwork in combat. In combat, more than likely, initiative on the part of a gun crew will add to or subtract from these duties.
4. If combat were imminent, the gun cover would be off, the windshield would be down and covered, the sight mounted with the telescope caps in place, and the gun would not be locked in the travel position. In order to receive the most from our training it is best to assume combat is imminent.

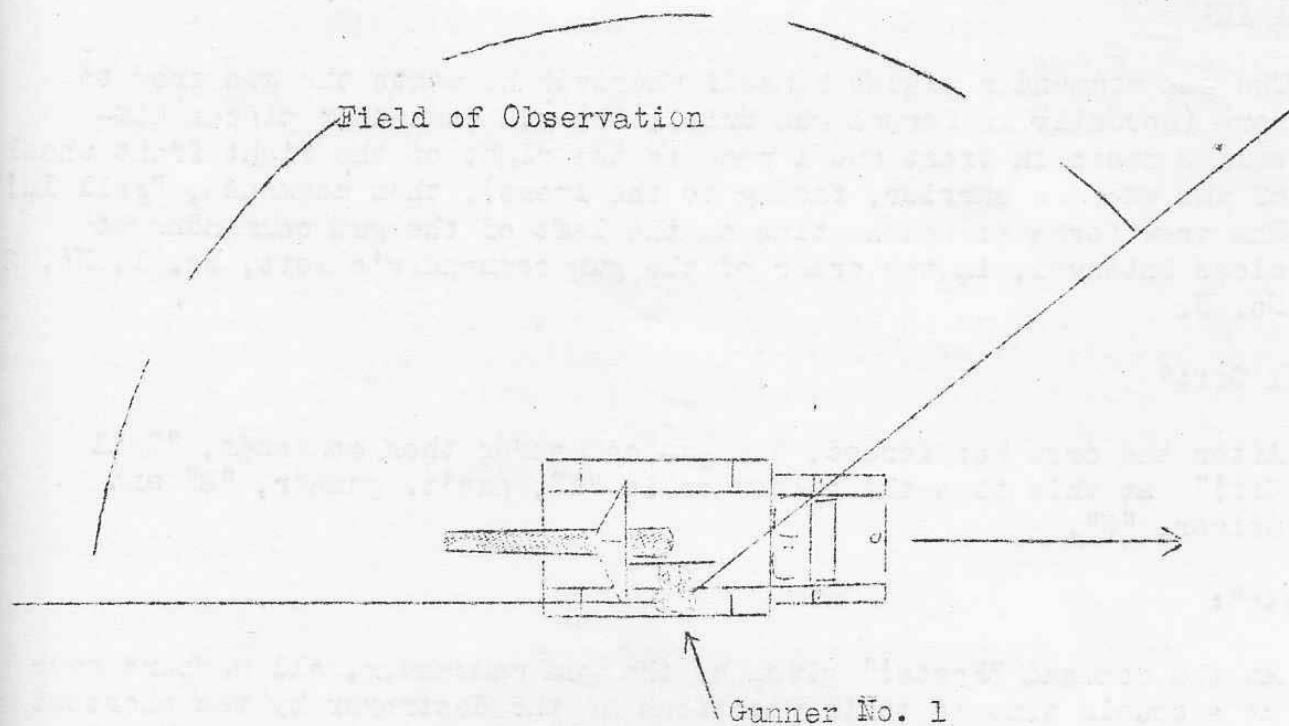
Observation Duties:

1. The crew of the destroyer consists of four men, a gun commander, the gunner No. 1, loader and assistant gunner No. 2, driver No. 3.
2. When the crew is not actually engaged with the enemy, either at halt or while moving, the various members observe for the enemy as follows:

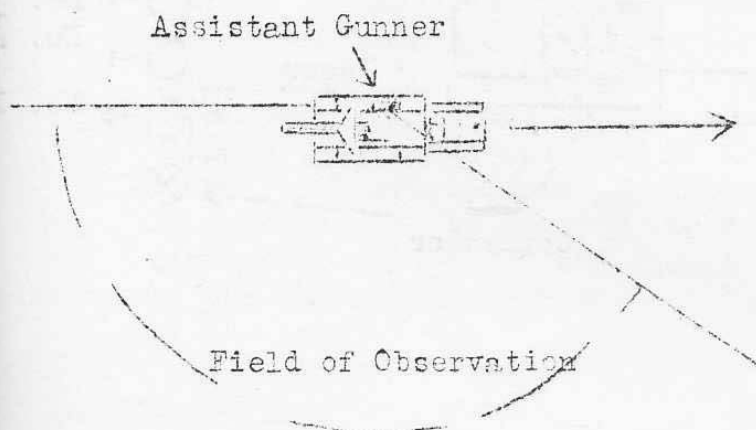
GUN COMMANDER:



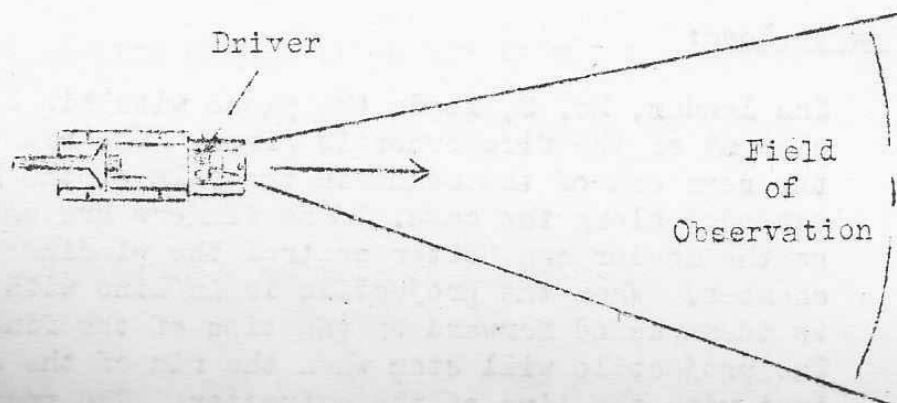
GUNNER NO. 1



ASSISTANT GUNNER - NO. 2



DRIVER NO. 3.



Primary observation duty of driver is to watch his road or direction of travel for tank mines, traps, etc. His secondary duty is observation for the enemy.

"Fall In:"

Destroy
The ~~gun~~ commander places himself wherever he wants the gun crew to form (normally in formal gun drill, the gun commander places himself 3 paces in front and 1 pace to the right of the right front wheel of the weapons carrier, facing to the front), then commands, "Fall In!" The crew forms at double time on the left of the gun commander at close interval, in the order of the gun commander's left, No. 1, No. 2, No. 3.

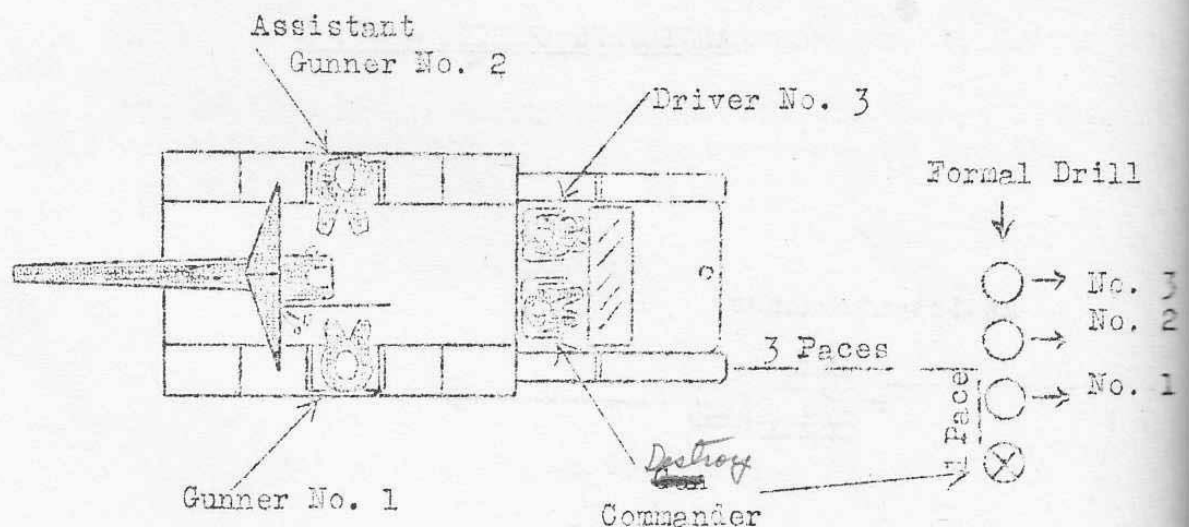
"Call Off:"

Destroy
After the crew has formed, the ~~gun~~ commander then commands, "Call Off!" At this time the gunner calls "1", ass't. gunner, "2" and driver, "3".

"Posts:"

Destroy
At the command "Posts!" given by the ~~gun~~ commander, all members move at a double time to their positions on the destroyer by the shortest route. (No's. 1 and 2 mount ahead of the Gun Commander and No. 3 on their respective sides so as to avoid any climbing over one another.)

POSITIONS ON CREW ON DESTROYER



Change Posts:

Destroy
At any time during gun drill the ~~gun~~ Commander may give the command, "Fall out, 1!" At that command No. 1 shifts to No. 3, No. 2 shifts to No. 1 position, and No. 3 becomes No. 2. Upon reaching their new positions, the 3 men automatically announce their new numbers, 1, 2, and 3.

How to Load:

The loader, No. 2, loads the piece with his left hand as the first element of the fire order is given. The round is loaded by grasping the rear end of the round in the palm of the hand with the fingers extended along the case. The fingers are extended along the case so the loader can better control the placing of the round into the chamber. When the projectile is in line with the bore, the round is then pushed forward by the tips of the fingers of the left hand. The projectile will stop when the rim of the cartridge comes in contact with the lips of the extractor. The round is forced into the

Opening the Breechblock:

The breechblock is opened with the right hand by a sharp slap toward the rear with a follow through of the hand. Do not grasp the operating handle with fingers and thumb. The operating handle goes to the rear in recoil with the tube. If the piece should go off as the breechblock is about to be opened, serious injury might result by grasping the operating handle.

Closing the Breechblock:

The breechblock is closed smartly by grasping the operating handle in such a manner that the thumb is extended along the forefinger, then giving the handle a sharp pull forward with the tips of the fingers only. The reason No. 2 should keep the thumb along the forefinger is that he may be injured in the same manner as explained in the preceding paragraph.

Duties of Crew:

Gun Commander:

1. Makes decisions concerning targets he wishes to engage. If vehicle is not moving he gives initial fire order to engage target. If vehicle is moving when he decides to engage a target, he calls, "Action!", pointing the target out to his crew. When the vehicle is brought to a halt he gives his initial fire order to engage target.
2. Observes the fire, senses, and gives subsequent fire orders.
3. Observes field of fire and watches for new targets.
4. Observes gun crew, changes them around as he sees fit.
5. Keeps himself informed on supply of ammunition by checking with No. 2.
6. When it is necessary to shift vehicle to prevent muzzle blast from damaging hood of vehicle, commands the driver to "Shift right" or "Shift left". Shifting right is accomplished by moving the vehicle forward and to the right far enough to allow a safe right traverse of the gun over the field previously interfered with by the vehicle hood. Shifting left is accomplished by backing the vehicle with the wheels cramped to the right, far enough to allow a safe left traverse of the gun muzzle over the field previously interfered with by the hood.

Gunner, No. 1.

1. Repeats initial fire order given him by gun commander.
2. Commences tracking.
3. Fires when ready, or upon command of gun commander, if fire control element is used.
4. Repeats subsequent fire orders given him by gun commander.
5. Makes adjustments on sight picture to correspond to subsequent fire orders.

Assistant Gunner, No. 2.

1. If "H.E." is announced in fire orders, repeats "H.E." and loads accordingly.
2. Loads immediately upon first element of fire order, when clear of recoil calls "Set".

3. Reloads piece at once after firing, calls "Up!" when piece is loaded and he is clear of recoil.
4. At command "Suspend Firing!" keeps piece loaded.
5. At command "Cease Firing!" clears gun, looks through the bore and announces "Bore Correct".
6. Swabs out bore, clears away empty shell cases when time permits.
7. Keeps accurate check on ammunition supply.

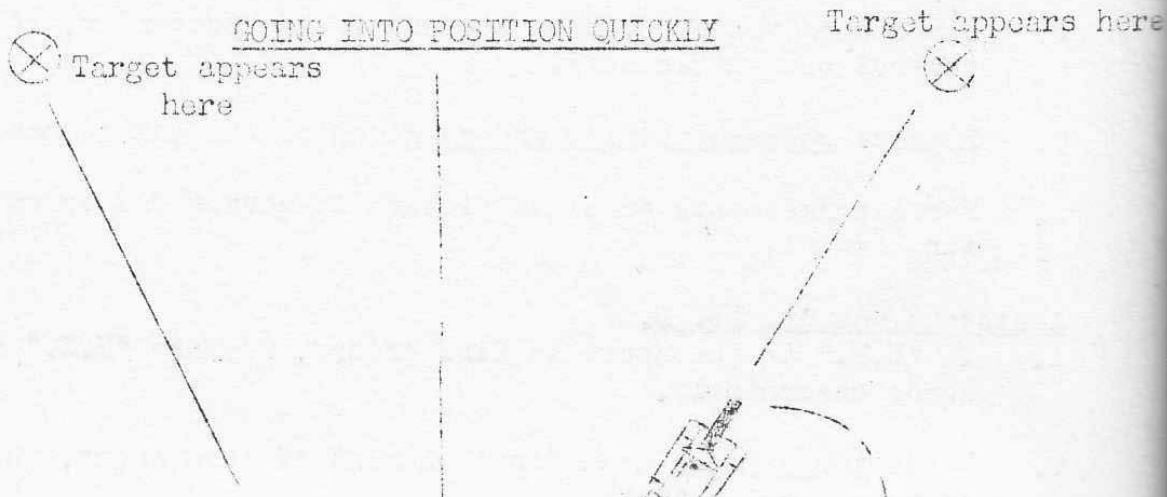
Driver, No. 3:

1. When target is sighted, if vehicle is moving, stops vehicle as quickly as possible so vehicle is pointing away from target. (Terrain of course will govern this).
2. When stopping vehicle, cramps front wheels to right, sets hand brake, puts gears in neutral, motor running, and checks to see that vehicle is in four wheel drive.
3. Puts down tail gate halfway and opens two ammunition chests nearest tail gate.
4. Moves vehicle forward on command "Shift Right!", backward on command "Shift Left!"
5. If duties do not require him elsewhere, hands ammunition from chest to No. 2.
6. Removes rammerstaff from tailgate and assembles it on command of gun commander.

Gun Positions:

The tactical situation will dictate how the destroyer is to be employed. It may be that the destroyer will be moved into a position where the crew will await the approach of the enemy. In that case the terrain will govern the choice of position. In general, the weapon should have a position which will expose it as little as possible, afford routes of advance and withdrawal, and yet accomplish the mission assigned.

Since this weapon is in the Reconnaissance Company, it stands to reason that likely targets will appear unexpectedly; that is, while the vehicle is moving. If no time is available to seek cover before firing -- and this will be the normal case -- the enemy should be engaged on the spot. To give the gun more stability, we recommend the vehicle be so parked that most of the targets to be engaged will be fired at when the tube is over the tail gate. When fired over the side of the vehicle, the recoil of the gun imports a slight roll to the vehicle due to the shock of recoil acting on the springs of the truck. Firing of the gun while the vehicle is moving gives very poor results as far as accuracy is concerned.



Striking the Enemy:

Any member of the crew who sights a target will call out, "Target!" and point it out to the other members of the crew. If the gun commander decides to engage the target he will call out "Action!" Which is the signal to halt the vehicle if it is moving. To the other members of the crew "Action!" means prepare to fire. After the command "Action!" by the gun commander, the fire order is given.

It is of particular importance to the driver to know the direction of the target if the destroyer is moving in order that he may halt the vehicle in the correct direction.

If, while in action, it is necessary to shift from one target to another, the gun commander will command "New Target!" followed by the appropriate fire order to engage the new target.

"Suspend Firing!" is the command given by the gun commander to stop the firing of the piece yet keep it loaded for instant action.

"Cease Firing!" is given by the gun commander when there are no more targets to be engaged.

To Move the Vehicle:

The preparatory command to move the vehicle is "Prepare to Move!" At this command tail gate is put up, ammunition chests closed, and gun is centered over tail gate.

The command to move the destroyer is "Move Out!" The crew of course take up their observation duties at this time.

Except over very rough terrain or when action is not imminent, the tube is normally carried in the horizontal position, traveling lock unhooked. This will speed up the crew's ability to strike the enemy.

In all cases when traveling "unhooked", No. 1 and No. 2 should support the gun by having at least one hand on the tube, shield, or shoulder guard. This will help relieve the shock on the gears of the gun at the same time enabling the men to brace themselves while travelling over rough terrain.

To Cock the Piece by Hand:

In the event of a misfire during combat the round would probably be ejected immediately and a new round loaded. If a situation should arise where time is available to recock the piece by hand, either No. 1 or No. 2 should do it, using the thumb and index finger or either hand, while standing clear of any possible recoil. PULL, don't push the cocking lever. Be especially careful when recocking with a misfire in the chamber.

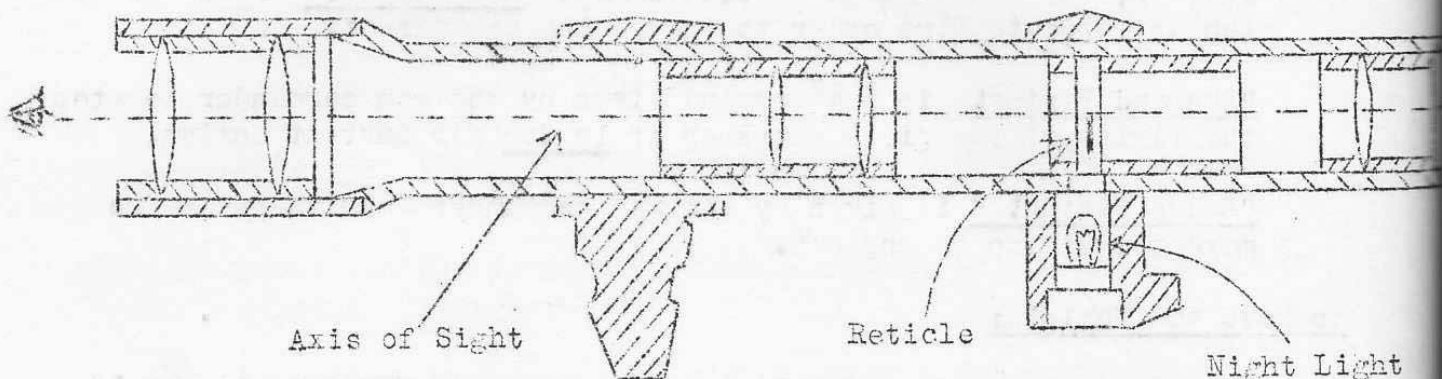
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Weapons Department
Camp Hood, Texas

37mm Gun, Antitank, M3 - Marksmanship

III. Laying for Range, Laying for Leads, Laying for Range with Leads.

A. Telescope Sight M6

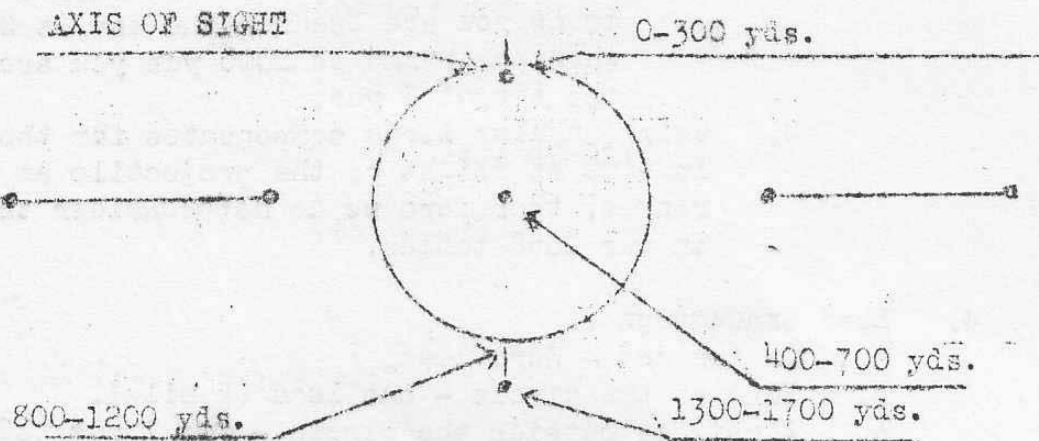
TELESCOPE SIGHT, M6



1. A one power telescope - no magnification.
2. Objective lense and eye piece lense ground to collect light.
3. Telescope tube consists of metal cylinder with two bands, front and rear. Front band has a clip on it, rear band has bracket. Clip and bracket locate telescope on telescope and secure on base M 19.
4. One objective lense in front of scope.
5. Two eye piece lense in rear of scope.
6. Two erecter lense between the bands.
7. Reticle, a piece of etched glass, in line with front band. Note top dot is passed through by axis of scope.
8. Sight base M 19 and clip both have windows to illuminate reticle.
9. Glass in window of clip to keep out dust.
10. Sight base contains #10 Mazda lamp to illuminate reticle for night firing and firing in hazy weather.
11. Cable and plug assembly connect lamp to two standard tubular flashlight batteries in battery compartment of tool chest. Tool chest provided with switch.

B. Laying for Range

1. Aiming point
 - a. Moving target - leading edge of target at top of tracks.
 - b. Stationary target - center of mass.
2. Range graduations
 - a. Top dot - Zero, 100 yds, 200 yds, 300 yds.
 - b. Center dot - 400 yds, 500 yds, 600 yds, 700 yds.
 - c. Bottom of the circle - 800 yds, 900 yds, 1000 yds, 1100 yds, 1200 yds.
 - d. Bottom dot - 1300 yds, 1400 yds, 1500 yds, 1600 yds, 1700 yds.
 - e. If a small change in range is desired lay high or low on the target as the case may be.



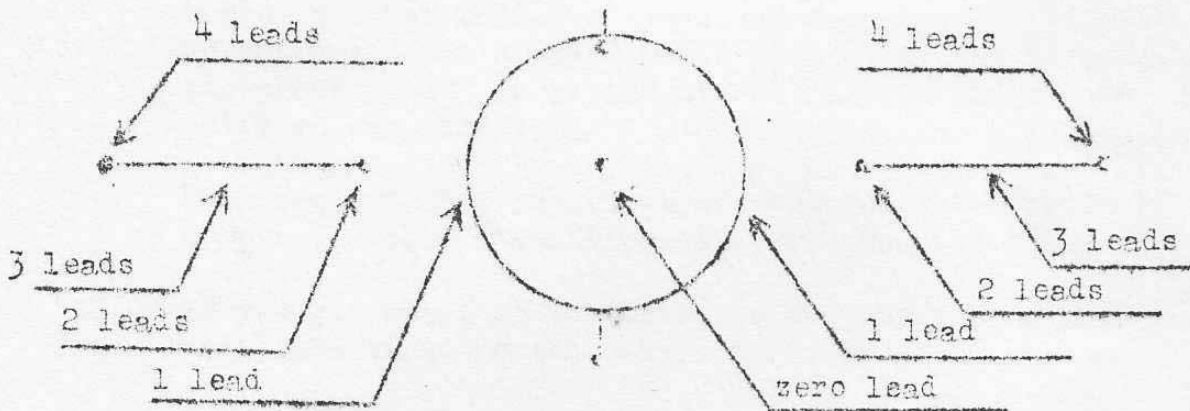
C. Laying for Leads

1. Why leads are necessary

- To cause projectile to arrive at a given point at the same time a moving target arrives at that point.

b. Example:

It takes the 37mm AP Shot approximately one second to travel 900 yds. In that time a target moving 30 mph has moved 44 feet. Therefore, the bore of the gun must be layed on a point 44 feet ahead of the target at the instant of firing in order that the projectile and target meet.



2. Lead Table.

Target Speed	Leads
Slow (0 to 10 mph)	0 or 1
Medium (10 to 20 mph)	2
Fast (20 to 30 mph)	3
Very Fast (Over 30 mph)	4

3. Type of Lead Used

a. Angular

- One lead equals 5 MILS (one mil is 1/6400 of a circle or .056 degrees).
- The greater the range the greater the linear distance the target is led, BUT THE ANGULAR LEAD REMAINS THE SAME.

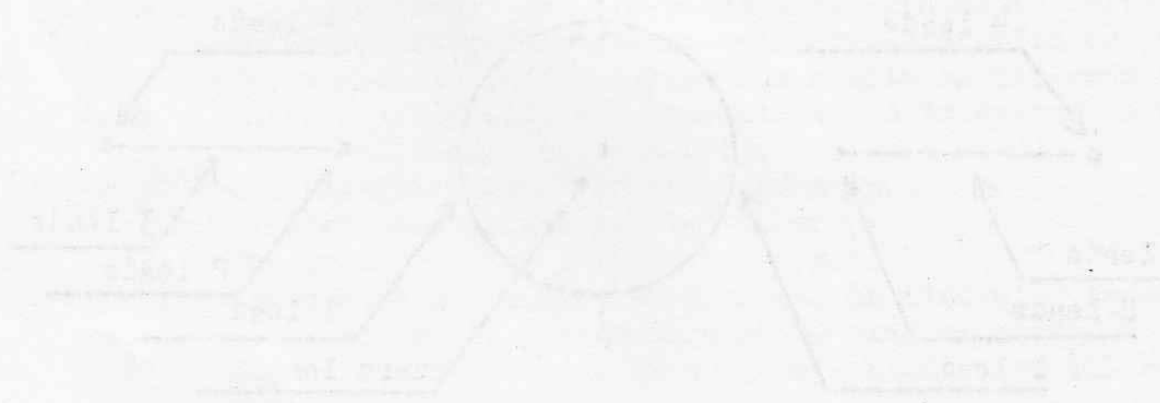
Example:

A lead of 5 mils, when the target is 500 yds, means you are leading the target $2\frac{1}{2}$ yds; when the range is 1000 yds you are leading the target 5 yds.

3. Using angular leads compensates for the difference in time of flight of the projectile at various ranges; therefore we do not consider the range in our lead tables.

4. Lead Graduations.

- a. Center dot - Zero lead.
- b. Edge of the circle - one lead (5 mils).
- c. First dot outside the circle - two leads (10 mils).
- d. Center of the line - three leads (15 mils).
- e. Outer dot - 4 leads (20 mils).



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37mm Gun, Antitank M3

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IV. Tracking

A. Definition of Tracking:

1. Tracking consists of keeping the tube traversing and elevating or depressing smoothly so that the proper point of the sight reticule is kept on the proper aiming point of a moving target.

B. Rules to Observe for Tracking

1. From the fire order determine and locate in the sight reticule the point which is to be placed on the proper aiming point on the target.
2. Traverse smoothly through the target from rear to front, gaining the proper elevation as you swing through to the proper lead.
3. Slow down your tracking as you swing through the target so that when you reach the proper lead you will be traversing at a speed which will allow you to maintain the proper point in the sight reticule on the aiming point on the target.
4. When you have the proper sight picture fire your shot. Keep on tracking smoothly while you are firing.
5. If you get ahead of the target slow your tracking GRADUALLY until the target catches up.
6. If you get behind the target speed up your tracking GRADUALLY until you catch up to the aiming point on the target.
7. Adjust next shot based on subsequent fire orders.

C. Common Faults in Tracking

1. Moving ahead of the target, stopping tracking, and waiting for the target.
2. Stopping elevating and traversing or both when firing.
3. Jerking the traversing handwheel in firing.
4. Gaining or losing speed in tracking too rapidly.

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Camp Hood, Texas

MARKSMANSHIP

V. ESTIMATION OF RANGES, LEADS, AND SPEEDS

A. Range Estimation

1. Range is seldom known before going into position.
2. Effectiveness of fire depends, in large measure, upon the accuracy of range estimation by the gun commander.

B. Methods Used in Tank Destroyer Units

1. Estimation by eye.
 - a. In ranges less than 500 yards use 100 yd unit and apply to range.
 - b. In ranges over 500 yards pick an object half way to the target and estimate range to this half way point. Multiply the resulting range by two to obtain range to target.
2. Other methods which may be used to obtain range.
 - a. Range finder (not accurate at short ranges).
 - b. Maps, when available.
 - c. Pacing at night to distinct objects that may be used to determine range.

C. Appearance of Objects

1. In some situations the terrain between the observer and the target may be hidden and unit of measurement method will not be accurate.
2. Whenever the appearance of objects is used for a basis for range estimation the observer must make allowance for the following conditions when they exist:
 - a. Objects seem nearer:
 1. When object is in bright light.
 2. When color or shape of object contrasts sharply with the background.
 3. When looking over water, snow, or a uniform surface such as a wheatfield or level pasture.
 4. When looking upward or over rising ground.
 5. In the clear atmosphere of high altitudes.
 6. When looking over a depression most of which is hidden.
 - b. Objects seem more distant:
 1. When looking over a depression most of which is visible.
 2. When there is poor light or fog.
 3. When only a small part of the object can be seen.
 4. When looking downward from a height.

D. Methods For Training Students to Estimate Range

Estimate Range

1. Place large numbered placards on range at measured distance from a known point (preferably in units of 100 yards).
 - a. Students should learn units of measure and practice application to unmarked terrain.
 - b. Have several students estimate the range to a target the exact range of which is known to the instructor. Average the estimations of the students and show that as a rule the average range estimations of several individuals is more accurate than the estimation

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Camp Hood, Texas

37mm Gun, Antitank, M3

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Safety Precautions

VI. Rules governing all firing of the 37mm Gun, Antitank, M3 with .22 cal. subcaliber, .30 cal. subcaliber, and service ammunition.

A. To maintain range discipline and prevent accidents and to secure maximum benefit from instruction and firing on the range the following rules will be observed by all persons when present on the 37mm Gun, antitank, M3 range.

1. When anyone notices any condition that will make firing dangerous he will call out in a loud voice "Cease Firing", and report the condition to the officer conducting fire.
2. The responsibility of maintaining range discipline rests with the assistant instructor and the student gun commander at the guns.
3. The following rules pertain to .22 cal. subcaliber firing on the 1000" AT range.
 - a. Before targets are marked they will be pulled to the center of the range. This permits marking of the targets while other guns on the line are being fired. Guns cannot be traversed to shoot across center of range on either side.
 - b. The assistant and student who has completed his run will mark the target. No one else will go forward to the target.
 - c. No one will be allowed to lounge around at the guns. If not a member of the gun crew, the student will be back of the gun and ALERT.
 - d. The 37mm subcaliber shell caliber .22 will not be allowed to strike the ground or any metal.
 - e. Targets will be operated by the students. All ranges will be policed and targets returned to target shed or tent after firing.
4. When the order, "Cease fire - clear guns" is given, all guns will be cleared. Breechblocks will be opened. All men at the gun will fall back 10' from the gun. If using the .30 cal. subcaliber the bolt will be opened.
5. No person will be in front of the shield until all guns are reported, "Clear".
6. Misfires will be reported to the officer conducting fire. He will either clear the gun or appoint someone to clear the gun.
7. Any malfunctioning of any material will be reported to the officer conducting fire immediately upon noticing the defect.
8. Any breach of range discipline will be reported at once to the officer conducting fire.

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Camp Hood, Texas

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VII. Zeroing:

A. General

1. The 600 yd. range dot is used in most 1000" firing to facilitate instruction and practice in taking leads.
 - a. Realism - We expect to engage targets at 600 yds.
 - b. Lead line - Horizontal axis of sight.
2. Inasmuch as the Zero Range Dot is the axial center of the M - 6 Sight, and not the 600 yd. Range Dot, we do not cause the axis of the sight to be parallel with the axis of the bore (or bore-sighting) when firing at 1000". What we actually do in zeroing at 1000" is to cause the Line of Site through the 600 yd. Range Dot to intersect the axis of the bore at 1000". Therefore, zeroing is not boresighting.
3. Zeroing for 1000" range firing is the only time we ever adjust our sight using anything other than the Zero Range Dot.

B. Targeting In of 37mm gun equipped with Subcaliber Mount M-6.

1. It is impractical to use cross threads in zeroing of 37mm gun equipped with M-6 mount because of the safety nut which projects beyond the muzzle of the tube, covering the Bore-sight Notches.
2. To Zero without cross hairs it is necessary to get the center of mass of the upper center tank outline on a line with the center of bore of the subcaliber rifle. This is comparatively easy due to the fact that the subcaliber rifle is only 0.22" or 0.30" at most in comparison to the approximate 1 $\frac{1}{2}$ " of the 37mm gun. The only caution necessary is to get the correct sight picture, which is merely sighting so that the aperture formed by the muzzle end is concentric with the aperture formed by the breech end when aligned on the target.
3. Zeroing of 37mm gun equipped with M-6 mount with either .30 cal. or .22 cal. is done in the following manner:
 - a. Bore-sight subcaliber rifle on center of mass of center black tank.
 - b. Without moving gun, adjust sight on same point on same target using the 600 yd. Range Dot.
 - c. Check:
 1. Bore alignment.
 2. Sight alignment.
 - d. Fire one round.

Gun should now be zeroed, that is, the strike of the bullet is in the same position in the center tank as is the 600 yd. Range Dot.

If the gun is not zeroed proceed as below:

- e. Readjust sight on a new aiming point on tank target which corresponds to strike of bullet on tank.

C. Zeroing of 37mm gun equipped with 37mm Subcaliber Shell
Caliber .22.

1. It is practical and almost necessary to zero the 37mm gun equipped with the 37mm subcaliber shell caliber .22 by the use of cross threads on the muzzle of the 37mm gun tube. This is in contrast to zeroing of the 37mm gun equipped with the subcaliber mount M6, which does not permit the use of cross hairs on the muzzle of the subcaliber tube.
2. In zeroing by either method the same thing is accomplished; viz, the 600 yd. Range Dot of the sight is in the same position on the tank target as the point of impact.
3. The bore of the 37mm subcaliber shell caliber .22 is off center so that the firing pin will strike the rim of the rim fire cartridge. The amount it is off center is .062" and for all practical purposes shall not be considered for zeroing.
4. Zeroing the 37mm gun equipped with 37mm subcaliber shell caliber .22 is done in the following manner.
 - a. Place cross threads on muzzle of gun, being careful to align them with the notches on the muzzle, and hold in place with rubber band or grease.
 - b. Align cross threads on center of mass of center tank by sighting through bore of cal. .22 (white patch in center of tank aids gunner in sighting).
 - c. Without moving gun, adjust the sight on center of mass of same target.
 - d. Check
 - a. sight alignment
 - b. bore alignment
 - e. Remove cross threads.
 - f. Fire one round. Gun should now be zeroed. If gun is not zeroed, proceed as below:
 - g. Without moving gun, readjust sight (still using 600 yd Range Dot) on new aiming point on tank which corresponds to strike of bullet on tank.

COURSE B.--Range: 1,000 inches.

Targets: For tables IV and, target A; for table VI, target B.

a. Instruction practice.--(Fire tables IV, V and VI three times.)

TABLE IV.--Parallel-level course

Number of rounds	Speed, inches per second	Seconds to traverse course	Lead	Direction of movement of target
5	12	41	0	L to R.
5	12	41	0	R to L.
5	16	31	1	L to R.
5	16	31	1	R to L.

TABLE V.--Parallel-hilly course

Number of rounds	Speed, inches per second	Seconds to traverse course	Lead	Direction of movement of target
5	12	41	0	L to R.
5	12	41	0	R to L.
5	16	31	1	L to R.
5	16	31	1	R to L.

TABLE VI.--Oblique course

Number of rounds	Speed, inches per second	Seconds to traverse course	Lead	Direction of movement of target
5	16	42	0	L to R.
5	16	42	0	R to L.
5	24	28	0	L to R.
5	24	28	0	R to L.

b. Record practice.--Fire tables IV, V, and VI of course B, once, under prescribed record firing conditions.

COURSE C.--Range: 1,000 inches. Targets: For tables VII and VIII, target A; for table IX, Table B.

a. Instruction practice.--(Fire tables VII, VIII, and IX three times.)

TABLE VII.--Parallel-level course

Number of rounds	Speed, inches per second	Seconds to traverse course	Lead	Direction of movement of target
5	16	31	1	L to R.
5	16	31	1	R to L.

TABLE VIII.--Parallel-hilly course

Number of rounds	Speed, inches per second	Seconds to traverse course	Lead	Direction of movement of target
5	16	31	1	L to R.
5	16	31	1	R to L.

TABLE IX.--Oblique course

Number of rounds	Speed, inches per second	Seconds to traverse course	Lead	Direction of movement of target
5	16	42	0	L to R.
5	16	42	0	R to L.

b. Record practice.--Fire tables VII, VIII, and IX of course C, once, under prescribed record firing conditions.

37mm DESTROYER

WORK SHEET

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TANK DESTROYER SCHOOL
Weapons Department
Camp Hood, Texas.

37mm Gun, M3 and Motor Carriage, M6

A GRADED TEST, based on questions listed below, will be given to all students at the close of the instruction on the 37mm Destroyer.

Some of the following statements may be true and some may be false. If you believe the statement to be true, place a (✓) in the "TRUE" column; if you believe the statement to be false, place a (✓) in the "FALSE" column.

	<u>TRUE</u>	<u>FALSE</u>
1. An insufficient amount of oil in the Recoil Cylinder may cause the Gun to slam in recoil and counter recoil	_____	_____
2. The breechblock can be removed only from the bottom of the breech ring recess.	_____	_____
3. The gunner uses his right hand to elevate the gun.	_____	_____
4. Two leads are equal to ten (10) mils.	_____	_____
5. If the lead is zero the lead element of the fire order will be omitted.	_____	_____
6. Coordination and accuracy in tracking can be developed by a close study of the Field Manual 25-70.	_____	_____
7. Leads are measured from the center of the target.	_____	_____
8. If we take one lead on a target 300 yards from the gun, we would take two leads on the same target 600 yards from the gun.	_____	_____
9. In a TD Unit range will usually be estimated by the Gun Commander.	_____	_____
10. The maximum recoil of the barrel of the 37mm gun is 20 inches.	_____	_____
11. "One man control" means that the Gun Commander lays, traverses, elevates, depresses and fires the gun.	_____	_____
12. The M6 motor carriage is a Dodge, 4 wheel drive, 3/4 ton weapons carrier.	_____	_____
13. The piston valve spring is fully compressed only on recoil.	_____	_____
14. The 37mm Gun is cocked in the downward motion of the breechblock.	_____	_____
15. The projection on the lower arm of the cocking lever is called the cocking projection.	_____	_____
16. The breech ring is held firmly to the tube by the coupler key.	_____	_____
17. The tripper cams the sear to the right releasing the firing pin guide assembly.	_____	_____
18. The 37mm Gun is cocked in the upward motion of the breechblock.	_____	_____

19. The officer conducting fire is the only one who may command, "Cease Firing".

20. The recoil oil does not speed the action of the gun in counter recoil.

21. The Assistant Gunner repeats all fire orders.

22. The projection on the lower arm of the cocking lever is the safety lug.

23. Range must be estimated before leads can be determined.

24. The M6 sight has a one power lens.

Complete the following statements using only one word or figure to each blank.

25. The two projections or studs located in the inside of the breech ring toward the front are called the _____.

26. The projections on the lower arms of the extractors are called the _____ while the projections on the curved arm of the crank are called _____.

27. The _____ on the firing pin guide assembly is positioned behind the _____ of the sear when the piece is cocked.

28. The first step in disassembly requires the operator to _____ in order to check the bore.

29. The firing pin guide assembly is composed of the following five separate parts:

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

30. The whole breechblock assembly, extractors, tripper, crank and operating handle could very easily jar loose and drop out of the gun while travelling if the _____ were not properly inserted and secured during the assembly of the piece.

31. The firing pin guide assembly is moved to a cocked position by the _____ on the lower arm of the cocking lever pressing down against the _____ of the firing pin guide.

32. The firing pin guide assembly is released and pushed forward by the firing spring due to the _____ camming the sear to the right sufficiently to allow the _____ to move forward past the sear shoulder.

33. The downward movement of the breechblock is stopped by the stopping surface of the crank striking the _____.

34. The upward movement of the breechblock is stopped by the _____ of the crank striking the breech end of the _____.

35. Two different elements or forces act against the power of the recoil of the gun during the firing of the piece. They are the _____ and the compression of the _____.

36. Only one element is used to counteract the force of the counter-recoil of the gun returns to battery after recoil. That element is the _____.

59. Leads are used so that the _____ will arrive at a given point at the same time that the _____ arrives at this same point.
60. In order to estimate range by eye the soldier is first taught to form a mental picture of a _____ yard length.
61. During recoil the recoil oil in the recoil cylinder flows to the front of the piston head through two different passages. They are:
1. The 3 openings in the piston _____.
 2. The 5 _____ in the piston _____.
62. The 4 notches on the muzzle of the gun are used for the purpose of affixing _____ which facilitates _____.
63. The _____ act as a fulcrum or pivot as the gun is elevated or depressed.
64. When loading, the Assistant Gunner closes the breech with his _____ hand keeping the palm of this hand towards the _____.
65. The forcing bevel, sear lug and tripper have in common the fact that they perform either all or some of their functions by a _____ action.
66. The two parts of a projectile which center it in the bore are the _____ and the _____.

67. Each of the numbers in the right hand column below may be correctly applied to only one of the statements in the left hand column. Indicate to which statement the number applies by placing the number (question number) preceding the statement before the appropriate number at the right.

1. Maximum ordinate at 1000 yards AP shot.	() 7500
2. Muzzle velocity of APC (ft. per sec.)	() 2750
3. Range of M6 Motor Carriage on fuel tank at 3/4 throttle (in miles)	() 2900
4. Maximum elevation of gun in degrees	() 16.2
5. Terminal velocity at 1000 yards of AP (ft. per sec.)	() 2088
6. Maximum ordinate at 1500 (in ft.) (AP)	() 340
7. Weight of carriage with combat load (lbs)	() 6.5
8. Traverse of gun in degrees	() 1800
9. Muzzle velocity of HE (ft. per sec.)	() 15
10. Maximum payload of M6 Carriage (lbs)	() 300

68. Each of the following parts or features in the right hand column below may be correctly applied to only one of the named parts or assemblies in the left hand column. Indicate to which part or assembly the statement applies by placing the number of the statement in the blank provided by the _____ column:

_____ Firing pin guide assembly	1. Extractor pivots
_____ Breech ring	2. Piston head
_____ Recoil mechanism	3. Cocking lug
_____ Firing control mechanism	4. Cocking projection
_____ Bore	5. Link
_____ Sight	6. Leads
_____ Cocking lever	7. On power

69. In the following subsequent fire orders there may be incorrect sensing. If you think they are incorrect, write the correct sensing to the right of each sensing.

- a. Too high. _____.
- b. Come up a little. _____.
- c. Hit. _____.
- d. Way off to the right. _____.
- e. Just under. _____.

sequence:

70. Machine gun, 600, zero leads, right flank, HE.

71. Leading tank, 3 leads, 800, right rear.

72. 600, zero leads, personnel in open, right flank, HE

In the following MULTIPLE CHOICE questions, place a check (✓) before the answer that you believe to be correct in completing the statement:

73. If the gun fails to fire but has returned to battery, your immediate action on the RANGE would be to:

- a. () Relay and attempt to fire three more times.
- b. () Put in a small amount of recoil oil in the cylinder.
- c. () Remove the shell immediately and dispose of it.

74. After firing, if the round fails to eject, your immediate action would be to:

- a. () Close the breech and open smartly.
- b. () Check the slides.
- c. () Push gun back into battery by hand.

75. After firing, the breech will not open. Your immediate action would be to:

- a. () See that pressure is released from the firing plunger.
- b. () Drain a little oil from the recoil cylinder.
- c. () Reload, relay and refire.

76. The purpose of using sub-caliber equipment is:

- a. () To save on cleaning materials.
- b. () To reduce the wear and tear on equipment.
- c. () To allow more actual practice in firing and servicing of the piece than would be possible with the amount of service ammunition available.

77. The process of aligning the AXIS of the sight and the AXIS of the bore on the same object (preferably over 1500 yards away) is known as:

- a. () Targeting in.
- b. () Boresighting on a distant aiming point.
- c. () Boresighting on a test target.

78. The AXIS of the sight and the LINE of sight coincide when the gunner looks at the target through the center of the rear lens and the:

- a. () Center dot of the reticle on the front lens.
- b. () Top dot of the reticle on the front lens.
- c. () Bottom of the circle on the front lens.

79. The 37mm Destroyer is in the firing position. To its right flank suddenly appears an enemy tank. The tank is 800 yards away and travelling directly towards the Destroyer at a speed of 30 miles per hour. The correct fire order is:

- a. () Right flank, Tank, 900, 3 leads.
- b. () Right flank, Tank, 800, zero lead.
- c. () Right front, Tank, 900, 3 leads.

80. The muzzle velocity of the AP shot is:

- a. ☐ 2600 fps.
- b. ☐ 2600 mph.
- c. ☐ 2600 yds per second.
- d. ☐ 2750 fps.

81. The tapered buffer is a component of the:

- a. ☐ Breechblock assembly.
- b. ☐ Elevating mechanism.
- c. ☐ Recoil Mechanism.
- d. ☐ Motor Carriage M6.

82. The HE shell is painted:

- a. ☐ Red.
- b. ☐ Black.
- c. ☐ Yellow.
- d. ☐ Blue.

83. After boresighting, correctly using the distant aiming point method, the axis of the bore and the axis of the telescope sight:

- a. ☐ Are parallel.
- b. ☐ Intersect at the gun.
- c. ☐ Intersect at 1500 yards.
- d. ☐ Intersect at point on which bore is sighted.

84. In filling the recoil cylinder, oil is forced in the recoil cylinder through the:

- a. ☐ Hole in cylinder head.
- b. ☐ Breechblock bushing
- c. ☐ Hole in breech end of the cylinder.
- d. ☐ Hole in right rear side of the cylinder.

85. Three leads equal:

- a. ☐ 5 mils.
- b. ☐ 10 mils.
- c. ☐ 15 mils.
- d. ☐ 6.5 mils.

86. The person who commands "Commence Firing" is:

- a. ☐ Range Officer.
- b. ☐ Post Commander.
- c. ☐ Officer conducting fire.
- d. ☐ Gun Commander.

87. A stoppage is:

- a. ☐ Rammer staff lost.
- b. ☐ Any unintentional cessation of fire.
- c. ☐ Out of ammunition.
- d. ☐ Motor carriage stuck in mud.

88. After firing the bore will be:

- a. ☐ Soaked in dry cleaning solvent.
- b. ☐ Cleaned with soda ash, rinsed, dried and oiled.
- c. ☐ Plugged to keep dirt out.
- d. ☐ rinsed with soft water.

89. Before firing the excess oil is wiped from the bearing surfaces of the gun:
- a. ☐ To prevent excessive heat.
 - b. ☐ To avoid smoke of burning oil that would give away your position.
 - c. ☐ To prevent dirt and dust from forming a cutting compound when mixed with oil.
 - d. ☐ To save oil that can be used later.
90. The traverse of the M3 on the M6 mount is:
- a. ☐ 180 degrees.
 - b. ☐ 260 degrees.
 - c. ☐ 288 degrees.
 - d. ☐ 360 degrees.
91. The terminal velocity of AP shot at 1000 yards is:
- a. ☐ 2600 feet per second.
 - b. ☐ 2.6 of cold armor.
 - c. ☐ 2088 feet per second.
 - d. ☐ 2750 yards per minute.
92. 37mm ammunition is packed in a wooden box containing:
- a. ☐ 25 rounds.
 - b. ☐ 20 rounds.
 - c. ☐ 30 rounds.
 - d. ☐ 40 rounds.
93. When the gun is not fully in battery, it cannot be fired because the:
- a. ☐ Firing pin will not reach primer.
 - b. ☐ Firing mechanism lever will not engage trigger arm.
 - c. ☐ Trigger arm is not long enough.
 - d. ☐ Safety lug is under the breechblock.
94. Too rapid recoil and shock at end of recoil are caused by:
- a. ☐ Too much recoil oil.
 - b. ☐ Recoil springs are too strong.
 - c. ☐ Recoil oil is too warm.
 - d. ☐ Not enough recoil oil in recoil system.
95. For guns in daily use, the oil cups should be filled:
- a. ☐ Every 500 miles.
 - b. ☐ Every 150 rounds fired.
 - c. ☐ Every day.
 - d. ☐ On 1000 mile check-up.
96. The 37mm Gun, M3 has:
- a. ☐ Smooth trajectory.
 - b. ☐ No trajectory.
 - c. ☐ Low trajectory.
 - d. ☐ Flat trajectory.
97. 37mm ammunition may be classified as:
- a. ☐ Fixed.
 - b. ☐ Semi-fixed.
 - c. ☐ Separate loading.
 - d. ☐ Medium fixed.

98. The 37mm Gun M3 is classified as a:

- a. () Howitzer.
- b. () Mortar.
- c. () Field gun.
- d. () Siege gun.

99. In the space below draw correctly the reticle of the Telescope Sight M6, labelling the range and lead graduations.

100. In the space below draw a M6 telescope sight reticle and place a tank outline on the reticle that would illustrate the following fire order: Tank moving from left to right. (Right flank, tank, 900, 2 leads)