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OSRD Report No. 2224

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OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT

National Defense Research Committee

Division 3

Section L

Contract OEMsr-418

California Institute of Technology, Pasadena, California

SUPPLEMENT TO ABRIDGED CATALOG

Rockets, Fuzes, and Launchers

10 October 1944  
17 September 1944

Approved for NDRC

Approved for Contract OEMsr-418

by M. Norton  
Technical Aide, Section L, Division 3

by E. C. Watson  
Official Investigator



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97	Comdr. C. M. Heberton, COMINCH, Navy Department
98	Commander in Chief, Navy Department (Assistant Chief of Staff, A/S Warfare)
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108	Chief of Naval Operations, Gunnery Training Section (Op-33-D) Navy Department
109	Chief Naval Air Operations Training Command, Naval Air Station, Jacksonville, Florida
110	Chief Naval Air Training, Naval Air Station, Pensacola, Florida
111	The President, Army Air Forces Board, Orlando, Florida (Attn: Col. C. F. Damberg)

The work described in this report is pertinent to the project designated by the War Department Liaison Officer as OD-162, 167, and to the project designated by the Navy Department Liaison Officer as NO-170, 192, 215.

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### Foreword

This "Supplement to the Abridged Catalog: Rockets, Fuzes, and Launchers," contains entries for developments which have been tested and found to be satisfactory and which have been practically completed. It is to be emphasized that inclusion in this catalog does not indicate that a rocket is available for service use. This pamphlet is for information only and is in no sense official with the Army or Navy.

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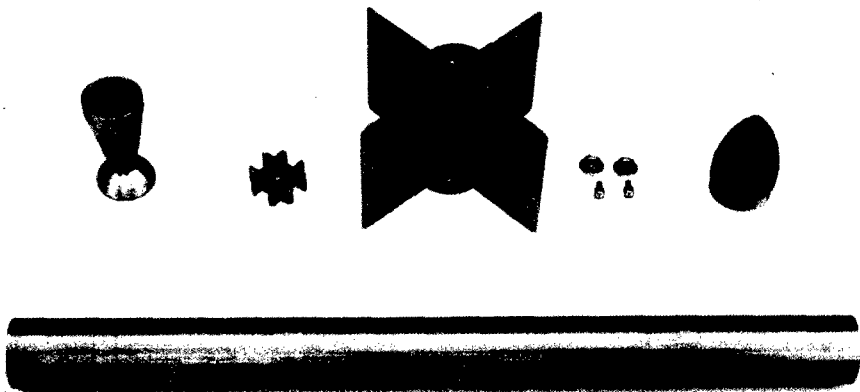
2.25TA001 or  
2.25TA002

-2-

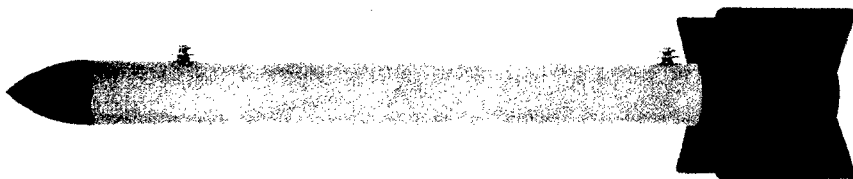
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ASSEMBLY NO.	2.25TA001 or 2.25TA002 (formerly 2.25 AR Model 1)
PURPOSE	For training pilots in forward firing: subcaliber for 3.5 AR.*
MOTOR	2.25 Mk 10 or Mk 10 Mod 1 with Mk 16 or Mk 16 Mod 1 (1.75 lb) grain
BODY	2.25 Mk 1 and mods or Mk 3 and mods
OVERALL LENGTH	29.2 in. with Mk 10 motor; 29.0 in. with Mk 10 Mod 1 motor
LOADED WEIGHT	11.9 lb
PAY LOAD	1.6 lb solid steel or zinc
VELOCITY	1170 ft/sec
MEAN LATERAL DISPERSION	In land firing: 24 mils (from Mk 4 launcher) In aircraft firing: 9 mils lateral 6 mils vertical
SERVICE TEMP. LIMITS	20° to 110°F
LAUNCHERS	1. Aircraft Rocket Launcher Mk 4 with adapters 2. Aircraft Rocket Launcher Mk 5 with adapter Mk 6
PACKING AND IDENTIFICATION	Motors: 4 per box (8" x 18" x 36", 60 lb) Marked "4 2.25 Motors Mk 10" Bodies: 24 per box (6" x 8" x 16", 50 lb) Marked "24 2.25 Bodies Mk 1"
REMARKS	38,000 rounds CIT production  BuOrd equivalent of Mk 10 Mod 1 motor is Mk 11; BuOrd equivalent of Mk 1 Mod 1 body is Mk 3.  * May also be used as subcaliber for 5.0 HVAR and British RP3.

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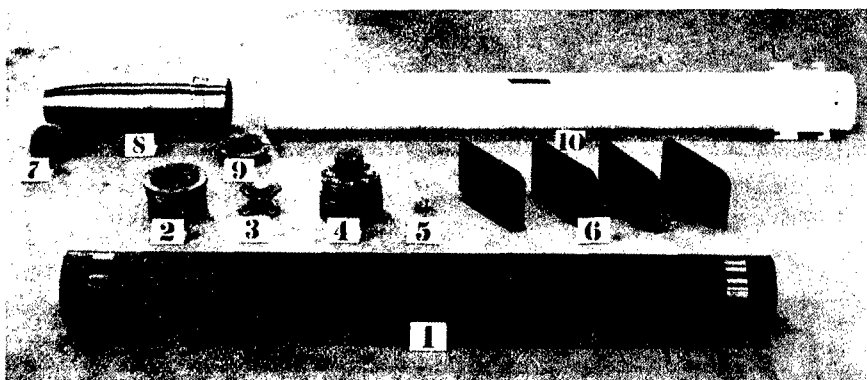
2.25TA001 or 2.25TA002. Disassembled: nozzle, grid, tail, lug buttons, 2.25 Rocket Body Mk 1 (or Mk 3), and motor tube for 2.25 Rocket Motor Mk 10 or Mk 10 Mod 1.



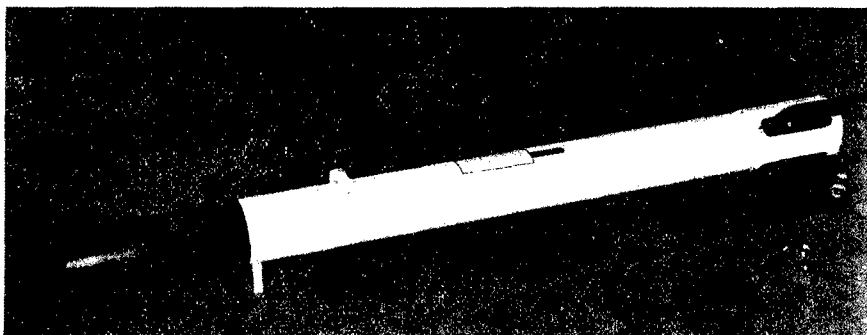
2.25TA001 or 2.25TA002. Assembled (except for electrical cord and plug), ready for loading into launcher.

ASSEMBLY NO.	2.25TA007 (formerly 2.25 AR Model 3)
PURPOSE	For training pilots in forward firing: subcaliber for 5.0 AR.
MOTOR	2.25 Mk 12 with Mk 17 (1.12 lb) grain
BODY	2.25 Mk 1, and mods or Mk 3 and mods
OVERALL LENGTH	29 in.
LOADED WEIGHT	11.3 lb
PAY LOAD	1.6 solid steel or zinc
VELOCITY	780 ft/sec
MEAN LATERAL DISPERSION	In land firing: 22 mils (from Mk 4 launcher) In aircraft firing: 4 mils lateral 8 mils vertical
SERVICE TEMP. LIMITS	20° to 120°F
LAUNCHERS	1. Aircraft Rocket Launcher Mk 5 (see p. 202 of UMC 42) 2. Shipboard Rocket Launcher Mk 30 Mod 0 (see p. 154 of UMC 42)
PACKING AND IDENTIFICATION	Motors with Bodies: 4 per box (29" x 17" x 7", 66 lb) Marked "4 - 2.25 RKT Motors Mk 12 4 - 2.25 RKT Bods Mk 1 Mod-"
REMARKS	Replaces Model 2 (heavy head). 130,000 rounds CIT production BuOrd equivalent of Mk 12 motor is Mk 13; BuOrd equivalent of Mk 1 Mod 1 body is Mk 3.

NAME	5.0 HVAR Model 13A
PURPOSE	Forward firing from aircraft against tanks, locomotives, gun emplacements, etc.
MOTOR	5.0 Mk 1 with Mk 18 (24-lb cruciform) grain
BODY	5.0 Mk 5 (or 5.0 Mk 5 Mod 1) with SAP nose
FUZE	Mk 159 base fuze (see p. 26 of Supplement)
OVERALL LENGTH	69 in.
LOADED WEIGHT	136.6 lb
PAY LOAD	48.2 lb; 7.9 lb TNT
VELOCITY	1375 ft/sec
SERVICE TEMP. LIMITS	-20° to 120°F
LAUNCHERS	<ol style="list-style-type: none"> <li>1. Aircraft Rocket Launcher Mk 4 (see p. 200 of UMC 42)</li> <li>2. Aircraft Rocket Launcher Mk 5 (see p. 202 of UMC 42)</li> <li>3. Shipboard Rocket Launcher Mk 30 Mod 0 (see p. 154 of UMC 42)</li> </ol>
PACKING AND IDENTIFICATION	<p>Motors: One per box (59" x 9" x 8", <sup>120</sup>75 lb approx.)  Marked "One 5.0 Motor Mk 1"</p> <p>Bodies: One per box (26" x 6" x 7", <del>62</del> lb)  Marked "5.0 Body Mk 5 Mod 1"</p>
REMARKS	<p>Current CIT model.</p> <p>Motor has 8 peripheral nozzles and central conical nozzle with copper disk which blows out at pressure of 2400 lb/in.<sup>2</sup></p> <p>BuOrd issue with 5.0 Motor Mk 2, 5.0 Body Mk 6, and Mk 157 fuze is 5.0HE021.</p>

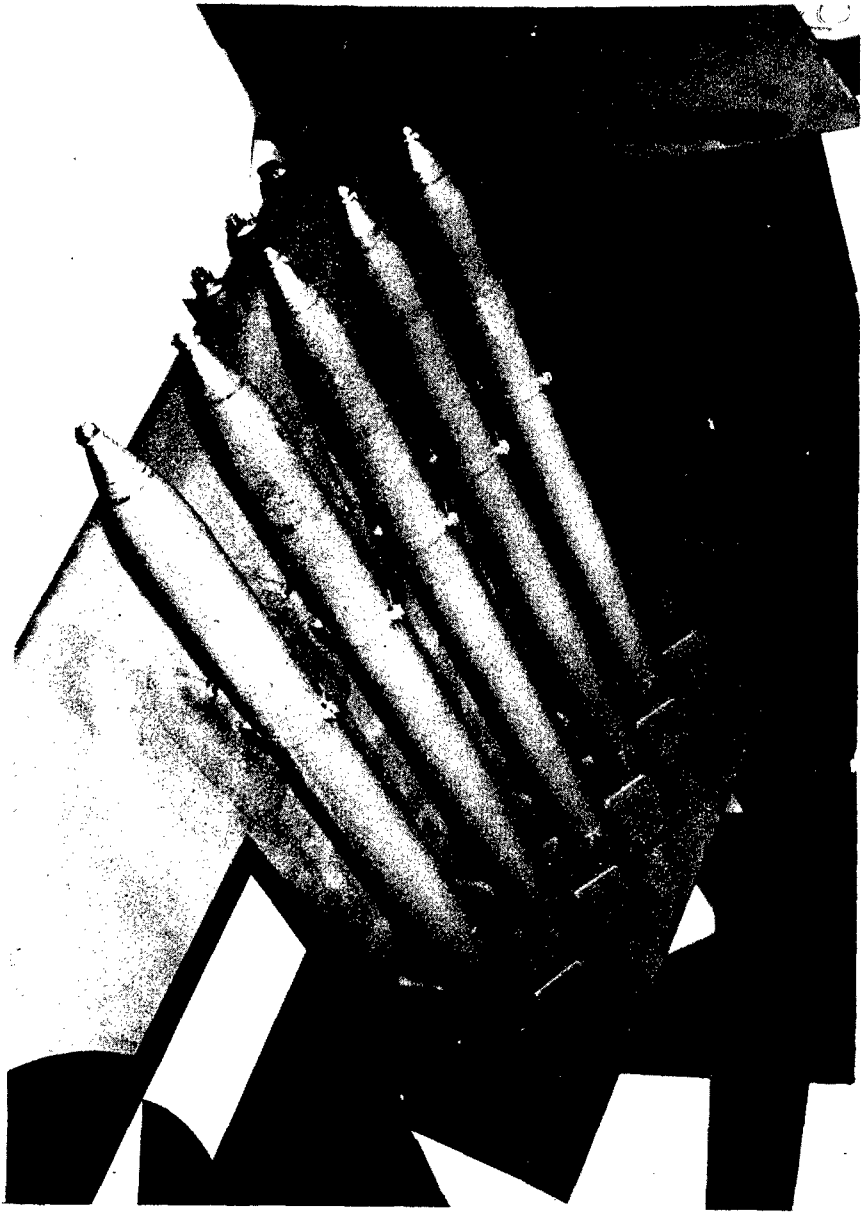


5"0 HVAR. Disassembled: (1) 5"0 motor tube before painting and welding-on of lug buttons and hooks for fins, (2) motor closure, (3) grid, (4) nozzle plate, (5) hook on rear stud of Mk 5 launcher, (6) fins, (7) nose adapter, (8) 5"0 Rocket Body Mk 5, (9) body closure (for use if bodies are shipped without base fuzes), (10) 5"0 Rocket Motor Mk 1.



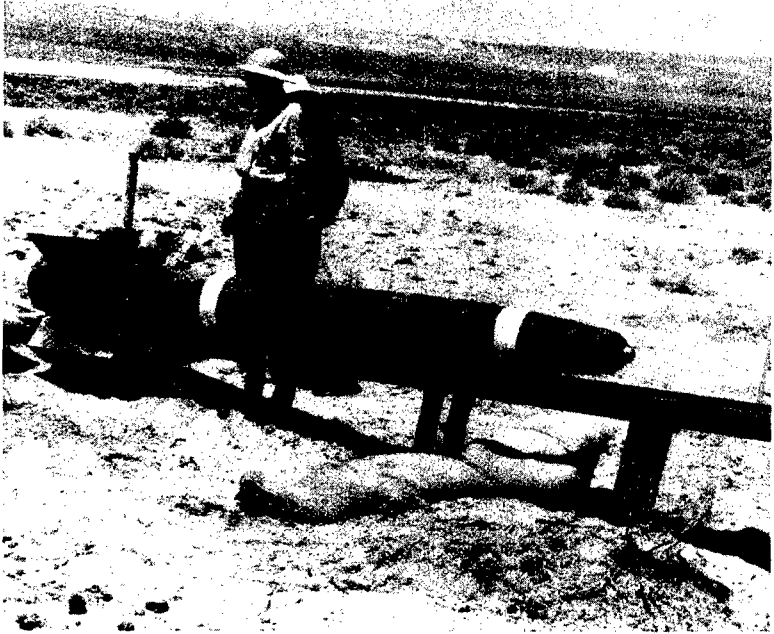
5"0 HVAR Model 13A, assembled.

NAME	5.0 HVAR Model 14A
PURPOSE	Forward firing from aircraft against tanks, locomotives, gun emplacements, etc.
MOTOR	5.0 Mk 1 with Mk 18 (24-lb cruciform) grain
BODY	5.0 Mk 5 (or 5.0 Mk 5 Mod 1)
FUZE	Mk 149 nose and Mk 159 base fuzes ( see p. 140 of UMC 42 and p. 32 of Supplement)
OVERALL LENGTH	69 in.
LOADED WEIGHT	136.6 lb
PAY LOAD	48.2 lb; 7.9 lb TNT
VELOCITY	1375 ft/sec
SERVICE TEMP. LIMITS	-20° to 120°F
LAUNCHERS	<ol style="list-style-type: none"> <li>1. Aircraft Rocket Launcher Mk 4 (see p. 200 of UMC 42)</li> <li>2. Aircraft Rocket Launcher Mk 5 (see p. 202 of UMC 42)</li> <li>3. Shipboard Rocket Launcher Mk 30 Mod 0 (see p. 154 of UMC 42)</li> </ol>
PACKING AND IDENTIFICATION	<p>Motors: One per box (59" x 9" x 8", <sup>120</sup>26 lb approx.) Marked "one 5.0 Motor Mk 1"</p> <p>Bodies: One per box (26" x 6" x 7", <sup>50</sup>62 lb) Marked "5.0 Body Mk 5 Mod 1"</p>
REMARKS	<p>Current model; differs from Model 13A only in fuzing.</p> <p>BuOrd issue with 5.0 Motor Mk 2, 5.0 Body Mk 6, and Mk 157 fuze is 5.0HE020.</p>



5"0 HVAR mounted in zero-length launchers on P-51D.

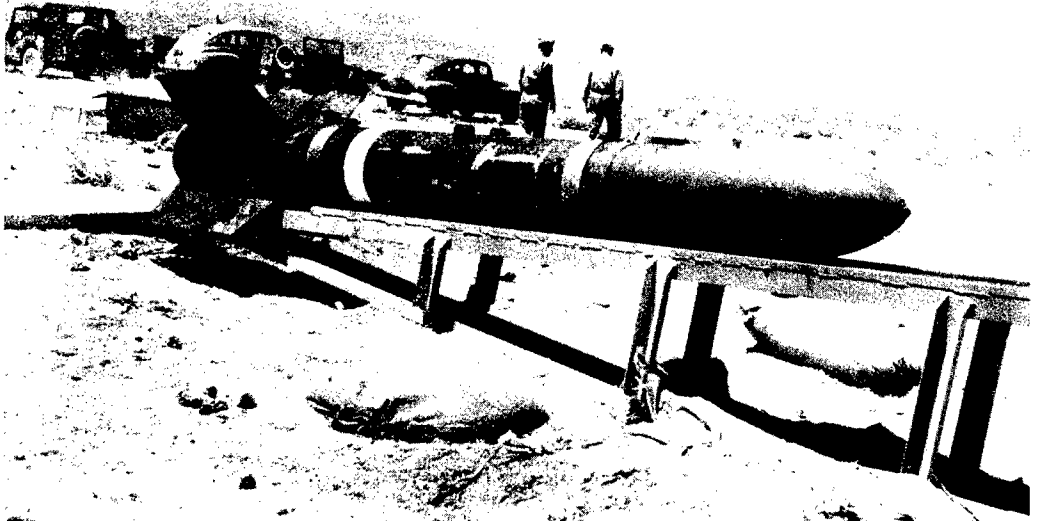
NAME	11.75 AR Model 2
PURPOSE	Forward firing from aircraft against shipping; has straight underwater trajectory.
MOTOR	11.75 Mk 1 with Mk 19 (4 4.2-in. X-form, 148-lb) grain
BODY	11.75 Model 2 (special nose fuze under development)
OVERALL LENGTH	129 in.
LOADED WEIGHT	<del>1200</del> 1280 lb
PAY LOAD	<del>500</del> 590 lb approx.; 150 lb TNT approx.
VELOCITY	<del>810</del> 880 ft/sec
SERVICE TEMP. LIMITS	0° to 100°F
SUITABLE LAUNCHERS	CIT Type 12 (with adaptations for particular aircraft)
REMARKS	Underwater deceleration coefficient (estimated) = $0.35 \times 10^{-2} \text{ft}^{-1}$ .



11.75 AR Model 2, assembled and loaded on launcher, ready for firing.

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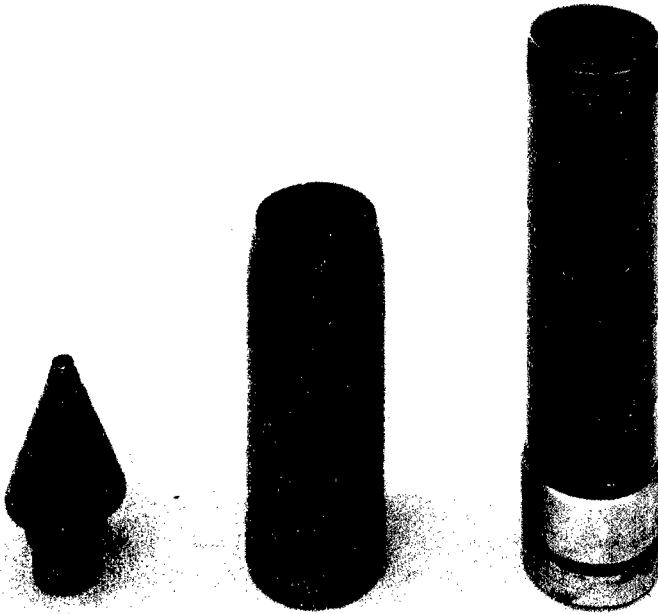
NAME	11.75 AR Model 3
PURPOSE	Forward firing from aircraft against shipping; penetration of concrete walls.
MOTOR	11.75 Mk 1 with Mk 19 (4 4.2-in. X-form, 148 lb grain)
BODY	11.75 Mk 1 (Model 3)
OVERALL LENGTH	123 in.
LOADED WEIGHT	<del>1290</del> <sup>1280</sup> lb
PAY LOAD	590 lb; approx. 150 lb TNT
VELOCITY	880 ft/sec
SERVICE TEMP. LIMITS	0° to 100° F
SUITABLE LAUNCHERS	CIT Type 12 (with adaptations for particular aircraft)
PACKING AND IDENTIFICATION	Motors: 1 per box (93" x 17" x 17", <del>880</del> <sup>750</sup> lb approx.) (fins packed in this crate) Bodies: 1 per crate (52" x 17" x 16", 630 lb approx.) Fuzes: Shipped in bodies



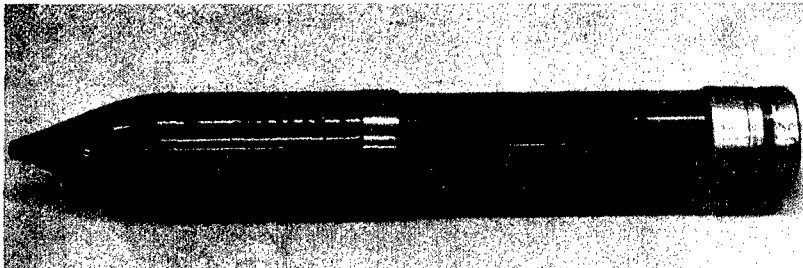
11.75 AR Model 3, assembled and loaded on launcher, ready for firing.

NAME	3.5 Spin-Stabilized Rocket Model <sup>24</sup> <del>23</del>
PURPOSE	Land use or support fire for landing craft.
MOTOR	3.25 Mk 13 Mod 0 with Mk 23 Mod 0 (2.5 lb) grain
BODY	3.5 Mk 13
FUZE	<del>T28 (M51 with Mk 29 flash tube and plastic cone, M21 auxiliary booster.)</del> MK 100 *
OVERALL LENGTH	24 1/2 in.
LOADED WEIGHT	24.0 lb
PAY LOAD	14.6 lb; 1.5 lb HE
VELOCITY	750 ft/sec
MAXIMUM RANGE AT SEA LEVEL	4300 yd
MEAN LATERAL DISPERSION	10 mils (0° QE)
MAXIMUM QE	54°
MEAN RANGE DISPERSION	70 yd (approx. for QE > 15°)
SERVICE TEMP. LIMITS	0° to 120° (preliminary)
LAUNCHERS	CIT Type 42B (single tube on machine gun mount)
PACKING AND IDENTIFICATION	
REMARKS	Development is substantially complete.

\* MK 29 Fuze, modified to incorporate optional .05 Sec. delay element. Used in conjunction with MK 44-2 Auxiliary detonator.



<sup>24</sup>  
3.5 SSR MODEL 23. Disassembled: ~~T28 nose fuze, 3.5 Rocket Body Mk 13 Mod 0, and 3.25 Rocket Motor Mk 13 Mod 0.~~

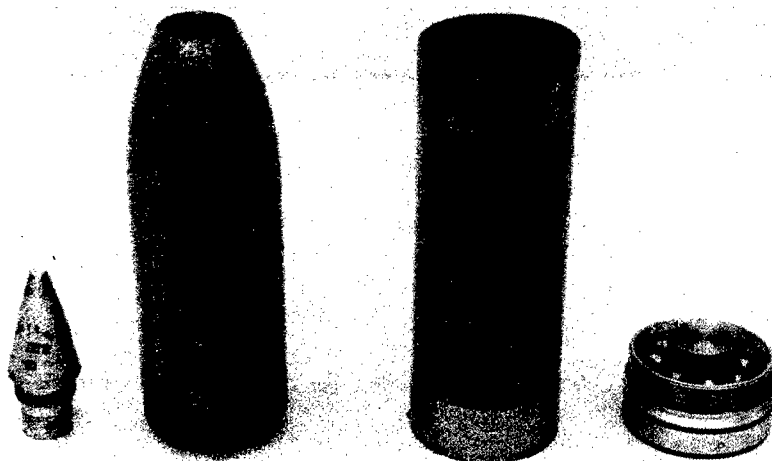


<sup>24</sup>  
3.5 SSR MODEL 23. Assembled, ready for loading into launcher.

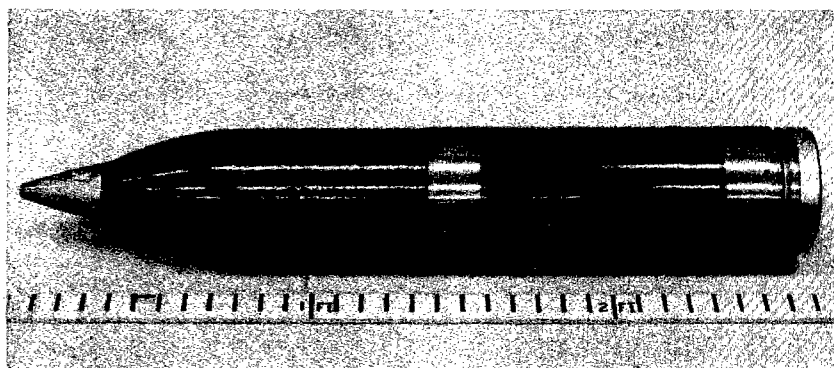
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34

NAME	5.0 Spin-Stabilized Rocket Model <del>25</del> (High Capacity)
PURPOSE	General purpose; bombardment.
MOTOR	5.0 Mk 4 Mod 0 with Mk 22 Mod 0 (5.55 lb-cruciform) grain
BODY	5.0 Mk 10 Mod 0
FUZE	<del>M51A2 or</del> Mk 30 nose fuze
OVERALL LENGTH	31 1/2 in.
✓ LOADED WEIGHT	48.1 lb
PAY LOAD	27.5 lb; 10.2 lb HE
VELOCITY	840 ft/sec
MAXIMUM RANGE AT SEA LEVEL	5000 yd
MEAN LATERAL DISPERSION	10 mils (est.)
SAFE TEMP. LIMITS	0° to 120°F (preliminary)
MAXIMUM QE	55°
LAUNCHERS	CIT Type 44 (see p. 44 of Supplement)
REMARKS	External ballistics are expected to be substantially equivalent to 5.0 SSR Model 27. Target effects undetermined.

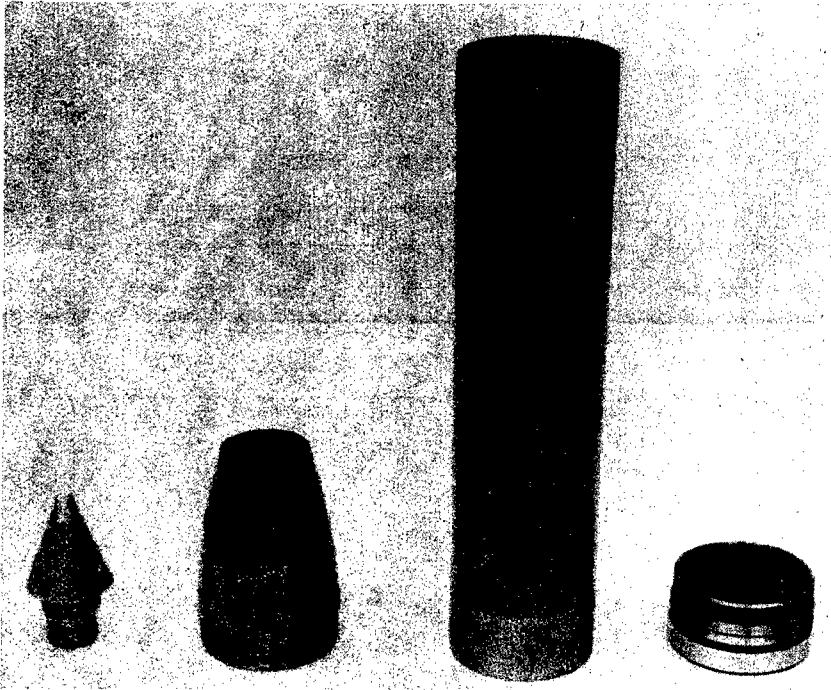


<sup>34</sup>  
5°0 SSR MODEL 25. Disassembled: ~~M51A2~~ nose fuze, 5°0 Rocket Body Mk 10 Mod 0, 5°0 Rocket Motor Mk 4 Mod 0, and nozzle plate.

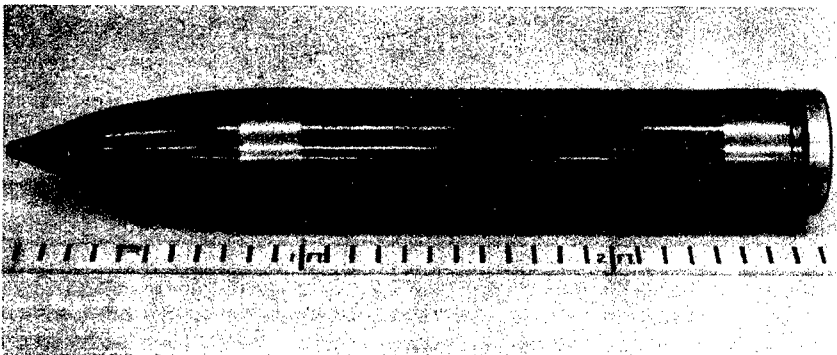


<sup>34</sup>  
5°0 SSR MODEL 25. Assembled, ready for loading into launcher.

NAME	5.0 Spin-Stabilized Rocket Model <del>26</del> <sup>20</sup> (Common)
PURPOSE	PT boat armament.
MOTOR	5.0 Mk 3 Mod 0 with Mk 21 Mod 0 (10.1-lb cruciform grain)
BODY	5.0 Model 23 - <i>Mk 7-0</i>
FUZE	<del>T28 (M51 with Mk 29 flash tube and plastic cone, M21 auxiliary booster)</del> nose fuze <i>Mk 100</i>
OVERALL LENGTH	28 in.
✓ LOADED WEIGHT	49.0 lb
PAY LOAD	19.1 lb; 2.8 lb HE
VELOCITY	1540 ft/sec
MAXIMUM RANGE AT SEA LEVEL	11,000 yd
MEAN LATERAL DISPERSION	10 mils
SERVICE TEMP. LIMITS	0° to 120° F (preliminary)
MAXIMUM QE	55° to 60°
LAUNCHERS	CIT Type 49A (see p. 48 of Supplement)
PACKING AND IDENTIFICATION	
REMARKS	Approximately 432 rounds have been fired experimentally in the field and 70 rounds have been fired from PT boats. It is felt that this round is substantially ready for submission to the services.



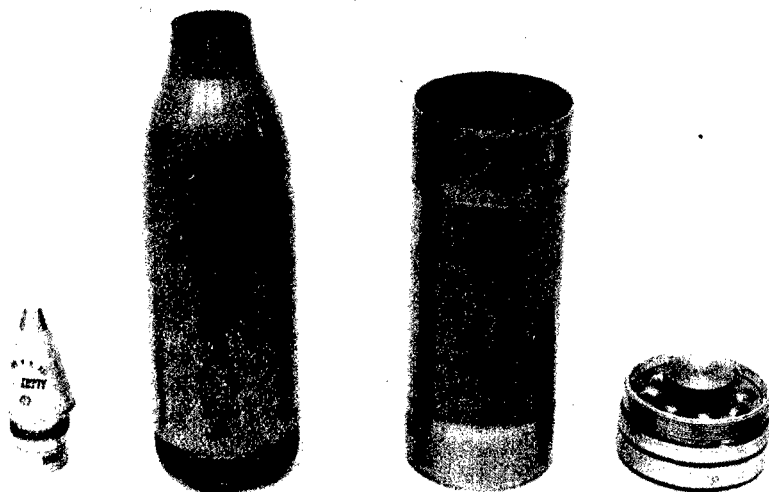
5\*0 SSR MODEL <sup>20</sup>~~26~~. Disassembled: T28 nose fuze, 5\*0 Rocket Body Mk 8 Mod 0, 5\*0 Rocket Motor Mk 3 Mod 0, and nozzle plate.



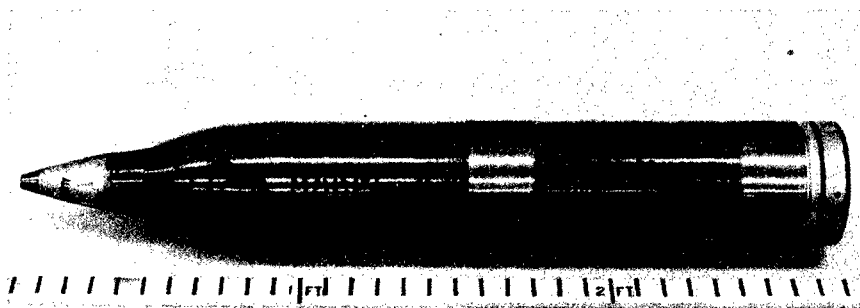
5\*0 SSR MODEL <sup>20</sup>~~26~~. Assembled, ready for loading into launcher.

5  
6

NAME	5"0 Spin-Stabilized Rocket Model <del>27</del> 33
PURPOSE	Chemical or smoke barrage.
MOTOR	5"0 Model 5 with 5.1-lb grain
BODY	5"0 Model <del>24</del> 27
FUZE	<del>M51A2</del> or Mk 30 nose fuze
OVERALL LENGTH	31 1/2 in.
LOADED WEIGHT	46.4 lb
PAY LOAD	26.2 lb; 12.0 lb WP
VELOCITY	840 ft/sec
MAXIMUM RANGE AT SEA LEVEL	5000 yd
MEAN LATERAL DISPERSION	10 mils
MAXIMUM QE	55°
SAFE TEMP. LIMITS	0° to 120°F (preliminary)
LAUNCHERS	CIT Type 44 (see p. 44 of Supplement)
REMARKS	Performance satisfactory with solid and liquid filler (sp. gr. 1.50 to 1.90) at QE up to 55°. 155 rounds have been fired experimentally. This round is substantially ready for submission to the services.  Obsolescent.



<sup>33</sup>  
5.0 SSR MODEL 27. Disassembled: M51A2 nose fuze, 5.0 Rocket Body Model 24, 5.0 Rocket Motor Model 5, and the nozzle plate.



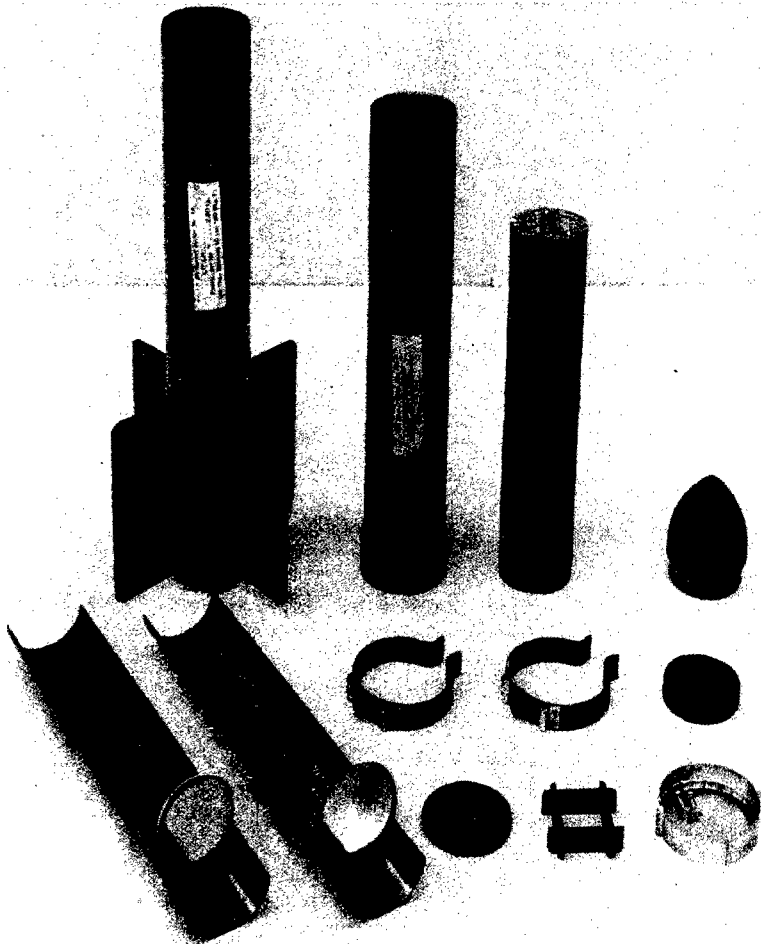
<sup>33</sup>  
5.0 SSR MODEL 27. Assembled, ready for loading into launcher.

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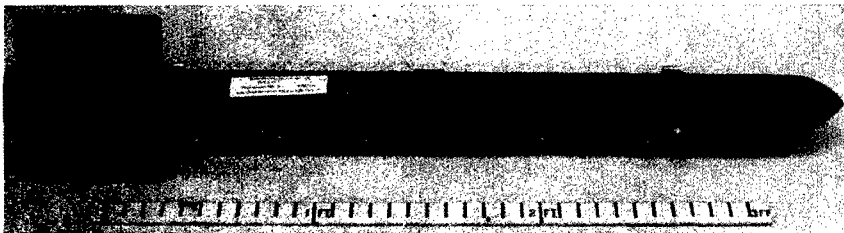
<b>NAME</b>	5.0 SSR Model 32 (Common)
<b>PURPOSE</b>	
<b>MOTOR</b>	5.0 Mk 3 Mod 0 with Mk 21 Mod 0 (10.1-lb cruciform) grain
<b>BODY</b>	5.0 Mk 8 Mod 0 with SAP nose
<b>FUZE</b>	Mk 36 base fuze
<b>REMARKS</b>	This rocket is expected to have the same external ballistics as the 5.0 SSR Model 26.

ASSEMBLY NO.	3.5SP010
PURPOSE	Ejection of "window".
MOTOR	3"25 Mk 12 with Mk 7 Mod 1 (2.80 lb) grain
BODY	3"5 Mk 10
FUZE	For ejector unit: 0.32 cartridge, dynamite fuze with 0.044 lb black powder.
OVERALL LENGTH	45 in.
LOADED WEIGHT	31 lb
PAY LOAD	13 lb ( <i>5 lb ejected</i> )
EJECTION: HEIGHT RANGE	900 yd (approx.) 1800 yd (approx.)
VELOCITY	680 ft/sec
SERVICE TEMP. LIMITS	10° to 120°F
LAUNCHERS	<i>3"5</i> <i>Mk 1</i> <del>Shipboard Rocket Launcher Mk 30 Mod 0 (see p. 154 of UMC 42)</del>
PACKING AND IDENTIFICATION	
REMARKS	On BuOrd request approximately 12,000 have been made. Incidence of failure in recent field and static firings is less than 3 per cent.  This motor is similar to the 3"25 Rocket Motor Mk 2.

*Reference OP 1165*



3.5SP010. Disassembled: 3"25 Rocket Motor Mk 12, 3"5 Rocket Body Mk 10, filler, wooden ogive (nose), half shells and end caps, lug bands, felt pad, front motor seal, grid, and thread protector.



3.5SP010. Assembled, ready for loading into launcher.

ASSEMBLY NO.	3.5SP028
PURPOSE	Ejection of "window".
MOTOR	3"25 Mk 14 with Mk 7 Mod 1 (2.80 lb) grain
BODY	3"5 Mk 14
FUZE	For ejector unit: 0.32 cartridge, dynamite fuze with 0.044 lb black powder.
OVERALL LENGTH	44 in.
LOADED WEIGHT	31 lb (approx.)
PAY LOAD	14 lb
EJECTION: HEIGHT RANGE	700 yd 2000 yd
VELOCITY	700 ft/sec
SERVICE TEMP. LIMITS	10° to 120° F
LAUNCHERS	<i>3"5 Rocket Launcher Mk 1</i> <del>Shipboard Rocket Launcher Mk 30 Mod 0</del>
PACKING AND IDENTIFICATION	Two complete rounds (unassembled) per box.
REMARKS	Approximately 12,000 have been made.  Outward appearance same as shown on p. 25, except that nose is made of metal and is hemispherical.

*Reference - OP 1165*

**FUZE** Mk 157 and Mk 157 Mod 1 Base Fuze

**WEIGHT** 3.0 lb

**WHERE USED** 5<sup>4</sup>0 Aircraft Rockets } (see pp. 22-33 of UMC  
Mk 157 42)  
7<sup>4</sup>2 Demolition Rockets } (see pp. 92, 93 of UMC  
42)  
11<sup>4</sup>75 Aircraft Rockets Mk 157 Mod 1 (*temporary*)

**ARMING** By gas pressure from burning propellant. Complete arming is delayed until the end of burning.

**FIRING** Inertia-firing upon impact. Fixed delay of 0.02 sec in detonator.

**SENSITIVITY** In 5<sup>4</sup>0 Aircraft Rocket, fires on steel plate, 3/8 in. thick, for angles 0<sup>0</sup> - 30<sup>0</sup> to the normal.

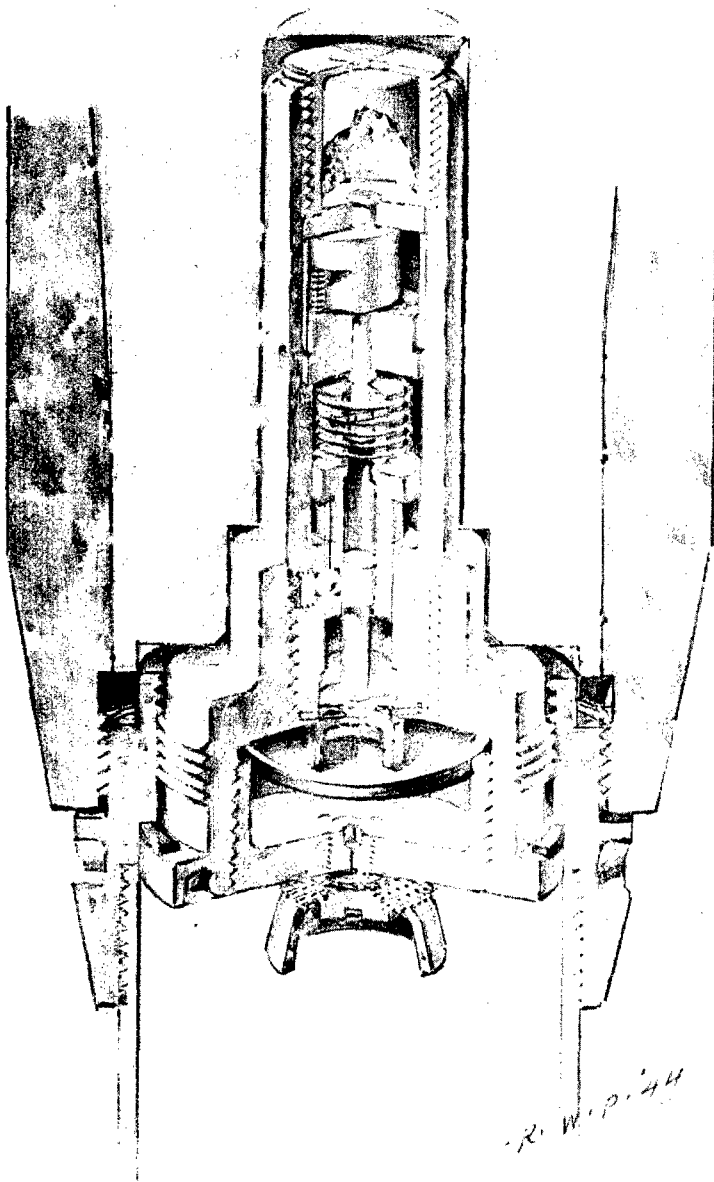
**ARMING DISTANCE** Slightly greater than burning distance of rockets: 250 to 575 ft (approx.) for 5<sup>4</sup>0 Aircraft Rockets, and 35 to 65 ft for 7<sup>4</sup>2 Demolition Rockets.

For the 11<sup>4</sup>75 Aircraft Rockets using Mk 157 Mod 1: 300 to 670 ft (approx)

**REMARKS** Uses inlet cup and screen to filter gas which enters arming chamber (as in Mk 146).

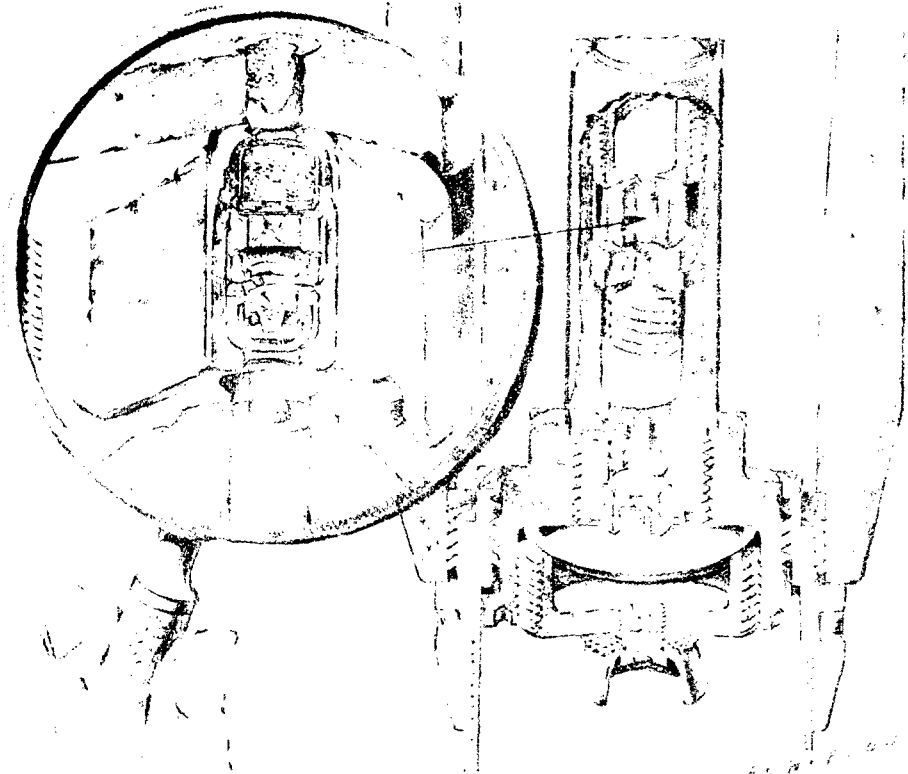
Mk 157 Mod 1 differs from Mk 157 in that fuze head is made of stronger steel and the outside threads are twice as long.

Current BuOrd issue.



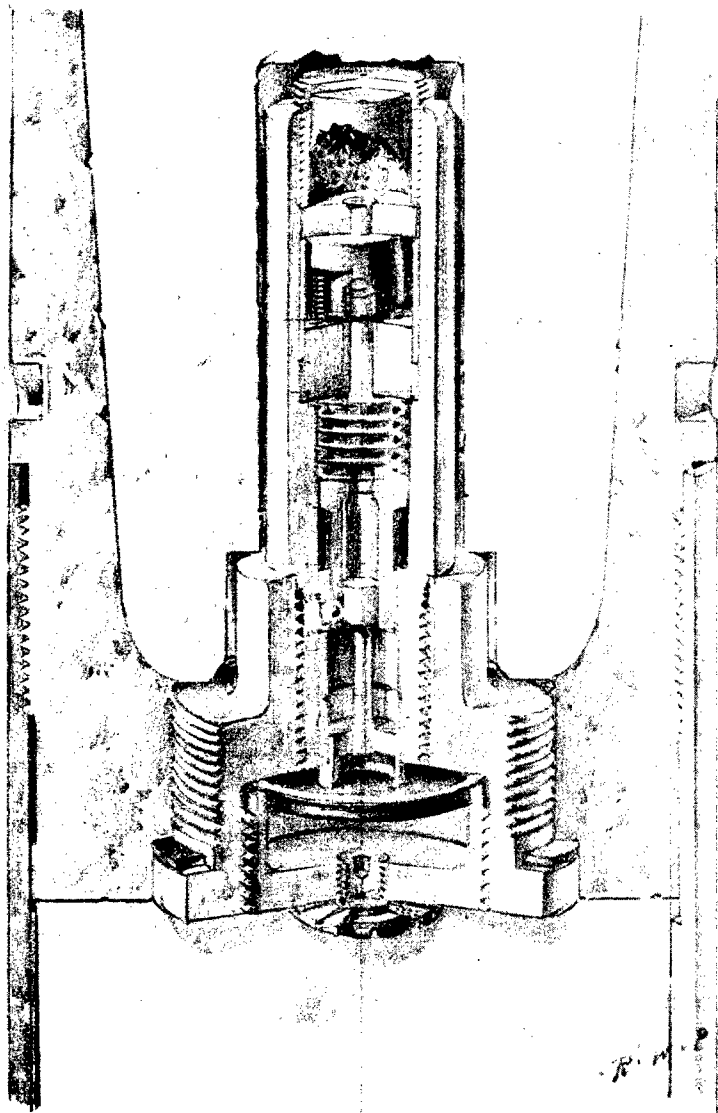
Mk 157 fuze, unarmed, assembled in base of 5.0 Rocket Body Mk 1. The shear wire locks the arming plunger. The locking ball, retained by the arming plunger, locks the firing pin in place. The firing pin engages the shutter and holds it in the unarmed position with the detonator to one side.

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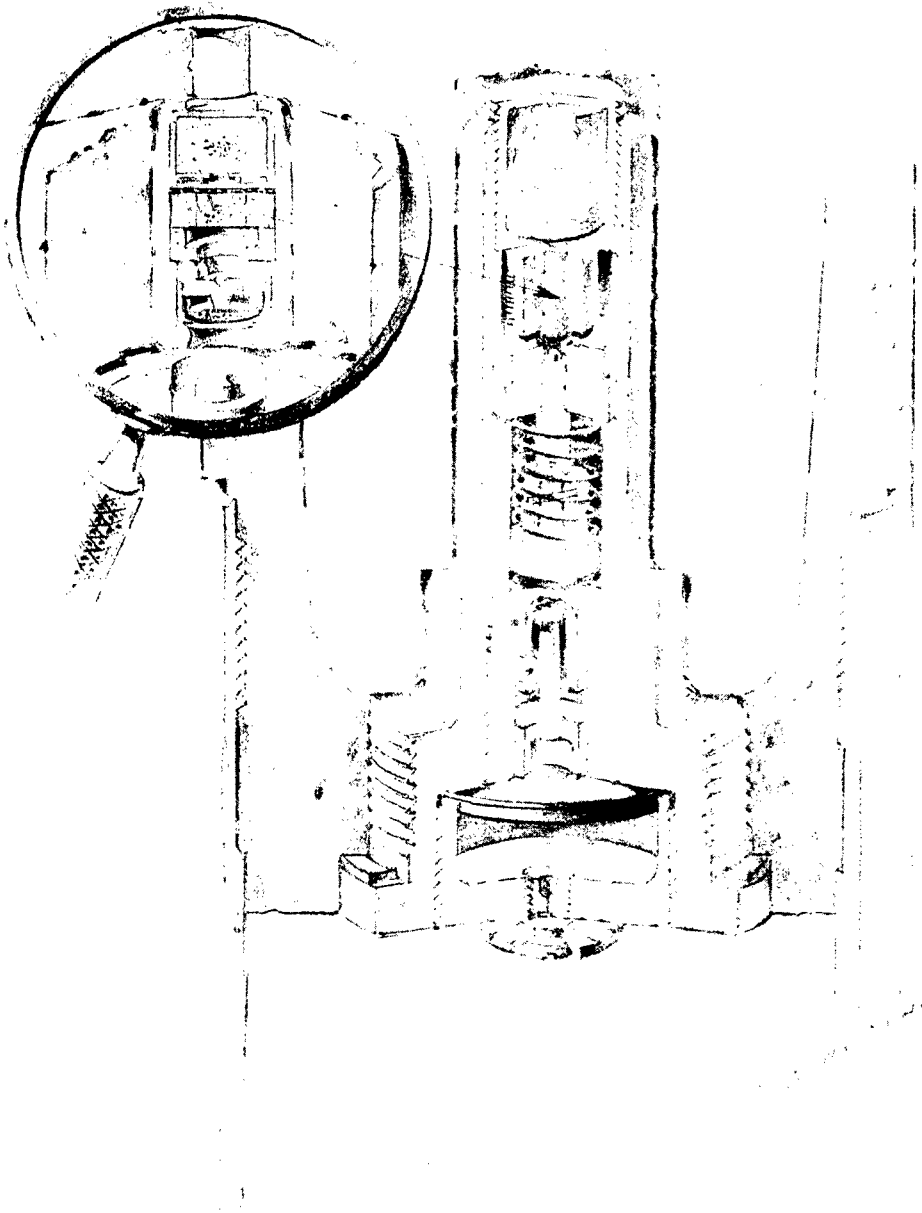
Mk 157 fuze, armed, assembled in base of 5"0 Rocket Body Mk 1. The motor pressure in the pressure chamber has collapsed the diaphragm, forcing the arming plunger forward and shearing the shear wire. Release of the locking ball has enabled the firing pin to be withdrawn from the shutter by the forces of the firing spring and acceleration. The shutter has been rotated into the armed position, aligning the detonator with the firing pin and lead-in. On impact, inertia of the firing pin body will drive the firing pin against the primer of the delay detonator and fire the fuze. The fixed delay element in the detonator gives a firing delay of 0.02 sec after impact.

FUZE	Mk 159 Base Fuze
WEIGHT	3.0 lb
WHERE USED	High-velocity aircraft rockets for forward firing from plane or land launchers. 5"0 HVAR Model 13A (see p. 6 of Supplement) 5"0 HVAR Model 14A (see p. 8 of Supplement)
ARMING	By gas pressure from burning propellant. Partial arming delayed until middle of burning. Complete arming is delayed until end of burning.
FIRING	Inertia-firing upon impact. Fixed delay of 0.015 sec in detonator.
SENSITIVITY	Fires on steel plate, 3/8 in. thick, for angles 0° - 30° to the normal.
ARMING DISTANCE	520 to 1090 ft (approx.)
REMARKS	Higher motor pressure and longer burning time required to arm than for Mk 157. Inlet cup and screen used in Mk 146 and Mk 157 here replaced by inlet washer.  BuOrd production.



Mk 159 fuze, unarmed, assembled in base of 5"0 Rocket Body Mk 6 Mod 0. The shear wire locks the arming plunger. The locking ball, retained by the arming plunger, locks the firing pin in place. The firing pin engages the shutter and holds it in the unarmed position with the detonator to one side.

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Mk 159 fuze, armed, assembled in base of 5"0 Rocket Body Mk 6 Mod 0. The motor pressure in the pressure chamber has collapsed the diaphragm forcing the arming plunger forward and shearing the shear wire. Release of the locking ball has enabled the firing pin to be withdrawn from the shutter by the forces of the firing spring and acceleration. The shutter has been rotated into the armed position, aligning the detonator with the firing pin and lead-in. On impact, inertia of the firing pin body will drive the firing pin against the primer of the delay detonator and fire the fuze. The fixed delay element in the detonator gives a firing delay of 0.015 sec after impact.

LAUNCHER	Mk 30 Mod 0 (Shipboard 6-rail)
ROCKET	3.5 and 5.0 AR "Window" Rockets 5.0 HVAR (because of weight, only 4 at a time)
DESCRIPTION	Six 7.5-ft T-slot rails, forming three I-beams, bolted parallel to each other on the horizontal leg of an inverted "L" cantilever supporting assembly. Vertical leg fastened to ship's deck and side. Launcher swings inboard for loading and outboard for firing. Aiming in lateral direction accomplished by turning ship.
WEIGHT	450 lb (nominal)
USE	Area bombardment from shipboard.
MOUNT	Side and deck of medium-sized craft and large ships.
QUADRANT ELEVATION	0° to 90° in 5° intervals.
FIRING CONTROL BOX	Mk 9 Firing Panel or Mk 21 Magneto Firing Key.
FIRING RATE	1/2-sec interval for ripple salvo. Singly or in pairs as desired.
REMARKS	This launcher differs from Type 31C (see p. 154 and Errata Sheet of UMC 42) only in length of rails.

LAUNCHER CIT Type 46 for 5"0 AR

ROCKET 5"0 AR (see pp. 22-33 of UMC 42)  
5"0 HVAR (see pp. 6 - 8 of Supplement)  
"Window" Rockets (see pp. 24-26 of Supplement)

DESCRIPTION Six T-slot rails similar to Shipboard Rocket Launcher Mk 30.

WEIGHT Empty, 520 lb *share bombardment*

USE On PT boats for ~~close-range attacks~~.

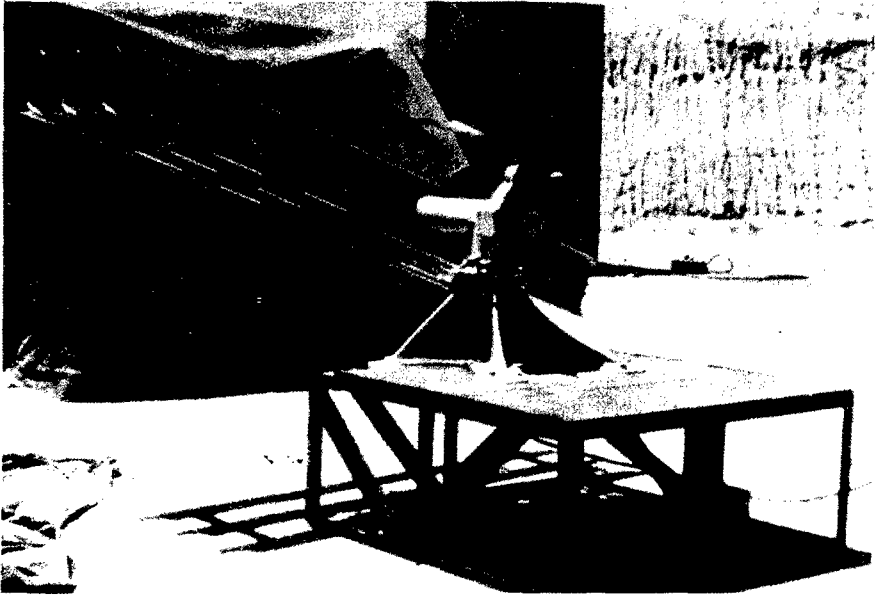
MOUNT One on starboard and one on port side of PT boats.  
*four" " "four" " " "LCI*

QUADRANT  
ELEVATION Any angle, since launcher can be turned 360° about its horizontal supporting shaft.

FIRING  
CONTROL BOX Mk 13 Firing Panel. May be fired singly or in pairs.

FIRING RATE Approximately 2 per second singly or 4 per second in pairs.

REFERENCES



CIT TYPE 46 LAUNCHER for 5.0 AR, showing elevating mechanism.

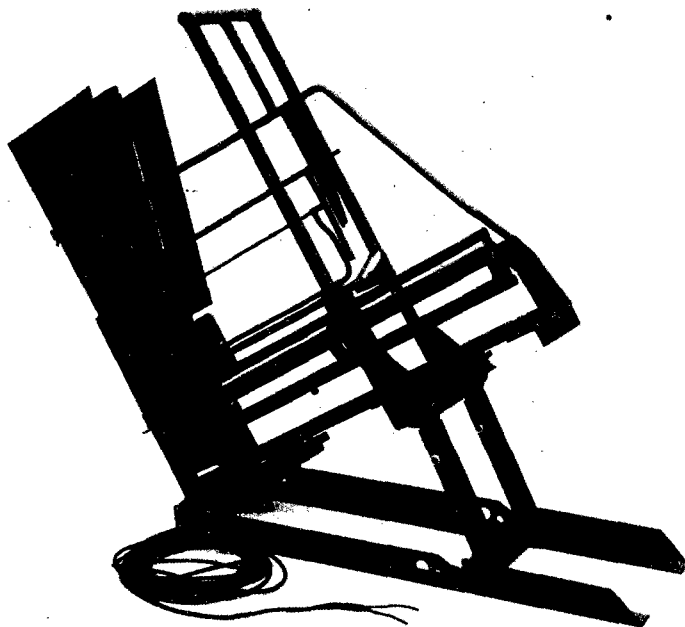


CIT TYPE 46 LAUNCHER, ready for firing 5.0 AR.

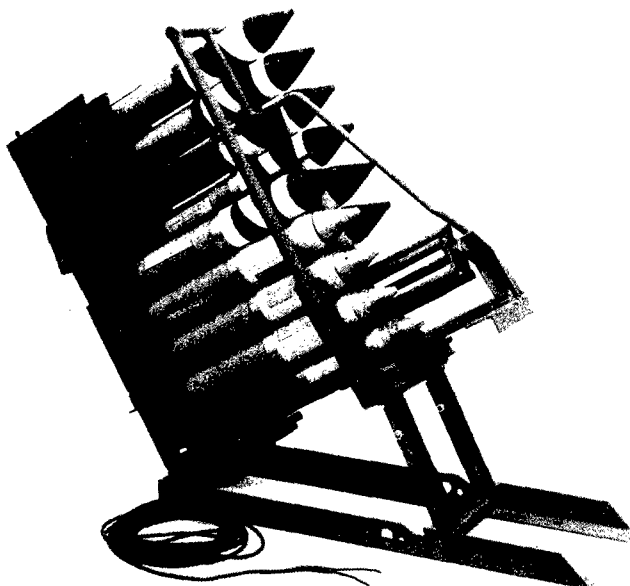
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<b>LAUNCHER</b>	Type 34D
<b>ROCKET</b>	3.5 SSR
<b>DESCRIPTION</b>	Gravity-feed automatic-reloading launcher somewhat similar to the Mk 7. Nine-round main magazine fed by six-round supplementary magazine through two-piece gate. Separation of rounds by five-rod irreversible reel which rests directly on the round and prevents blast from disturbing rounds above.
<b>WEIGHT</b>	90 lb
<b>USE</b>	Barrage
<b>MOUNTS</b>	<p><u>Boats</u> May be used outboard on LCVP, LCV, and LCI; on stern deck of LCVP; on side or stern deck of LCM 3 and LCS; and in cargo space of LCVP and LCM 3.</p> <p><u>Army Trucks</u> May be used outboard on 1/4-ton 4 x 4 truck; in cargo space of 3/4-ton 4 x 4, 1 1/2-ton 6 x 6, and 2 1/2-ton 6 x 6 truck.</p> <p><u>Amphibians</u> May be used in cargo space of DUKW and LVT-R; on stern deck of LVT.</p>
<b>QUADRANT ELEVATION</b>	0° to 50°
<b>FIRING CONTROL BOX</b>	Mk 9 or Mk 11 Mod 1
<b>FIRING RATE</b>	Approximately 4 per second
<b>REFERENCES</b>	

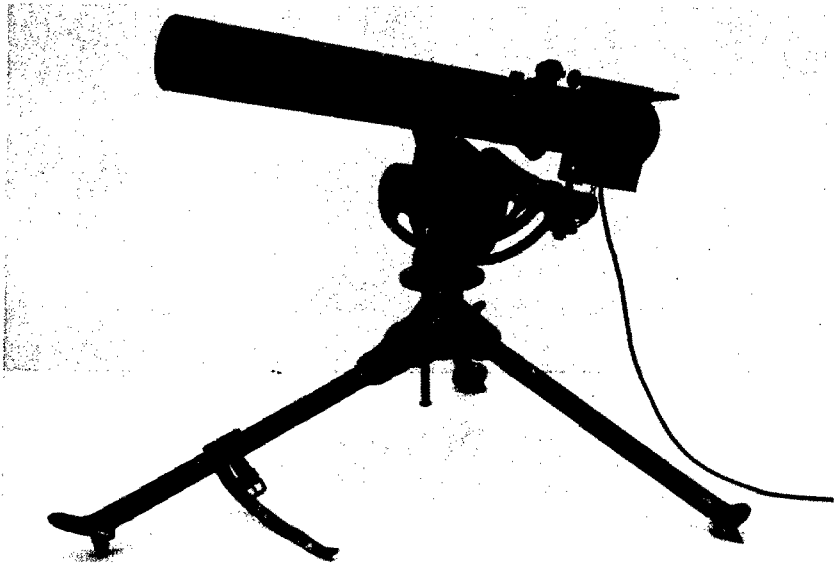


CIT TYPE 34D LAUNCHER, unloaded.

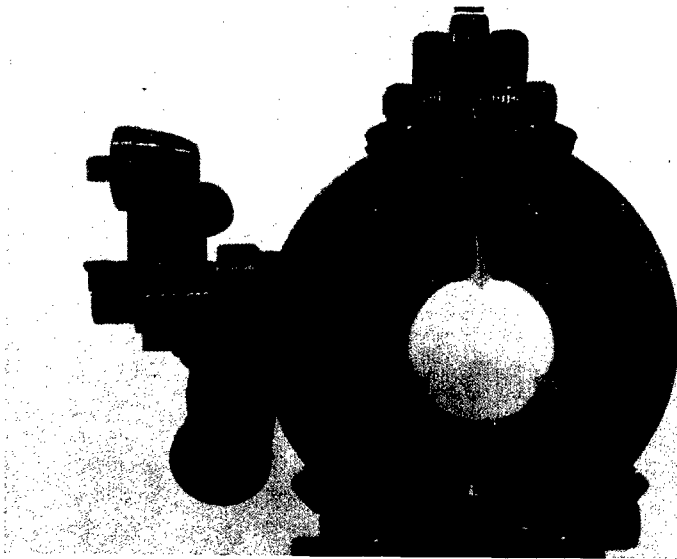


CIT TYPE 34D LAUNCHER, showing supplementary magazine full and main magazine only partly full.

LAUNCHER	CIT Type 42B for 3.5 SSR
ROCKET	3.5 SSR
DESCRIPTION	4.5 OD steel tube 36 in. long having three internal formed stainless steel guide rails spaced 120° apart. Upper guide rail on the vertical center line of the launcher barrel.
WEIGHT	26 lb
USE	Single shot firing at <del>point targets</del> . Because of light weight, useful in rough terrain to supplement 75-mm pack howitzer.
MOUNT	M1917A1 machine-gun tripod.
QUADRANT ELEVATION	-5° to 60°
FIRING CONTROL BOX	Mk 22 Magneto Impulse Key
FIRING RATE	<del>10</del> <sup>15</sup> rounds per min
REFERENCES	

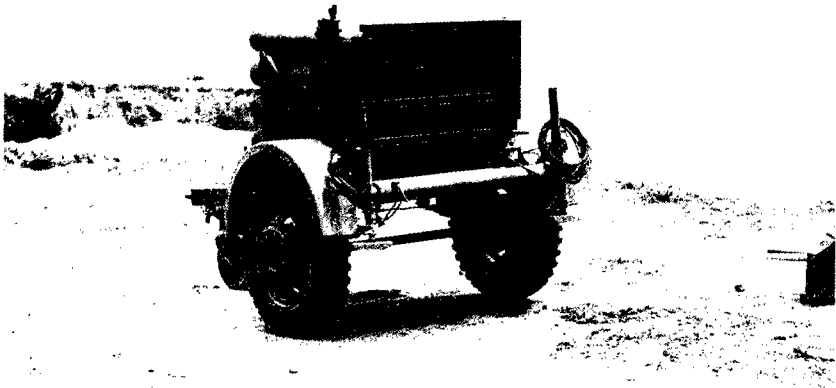


CIT TYPE 42B LAUNCHER, in firing position.

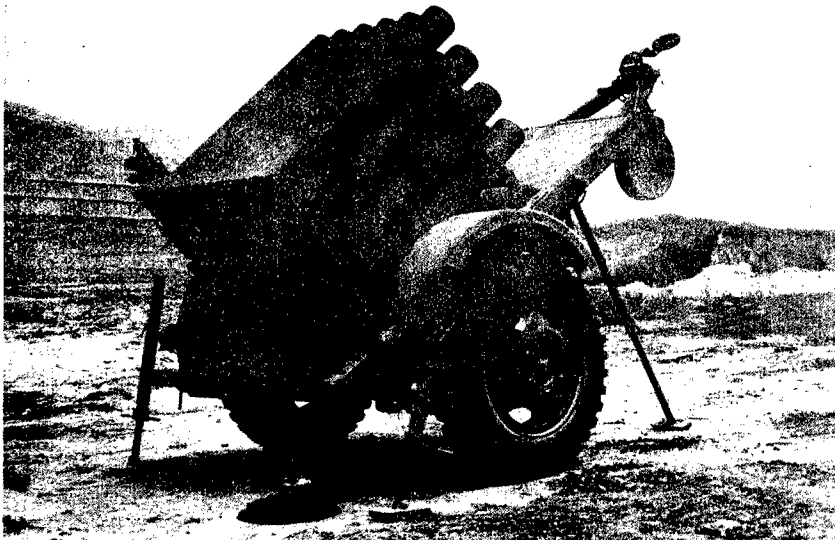


CIT TYPE 42B LAUNCHER, showing the three internal guide rails.

LAUNCHER	CIT Type 44 for 5.0 SSR ammunition
ROCKET	5.0 SSR (see pp. 16-22 of Supplement)
DESCRIPTION	Twenty-four 48-in. barrels, trailer-mounted. Internal formed guide rails in barrels similar to the Type 42B. Running gear of standard 1-ton Army cargo trailer.
WEIGHT	Trailer and launcher without ammunition, 2460 lb; fully loaded 3660 lb.
USE	Area barrage using chemical or general purpose HE-loaded 5.0 SSR.
MOUNT	Army cargo trailer, modified.
QUADRANT ELEVATION	15° to 45°
FIRING CONTROL BOX	Army engineer 10-cap blasting generator.
FIRING RATE	24 rounds in 10 sec
REFERENCES	



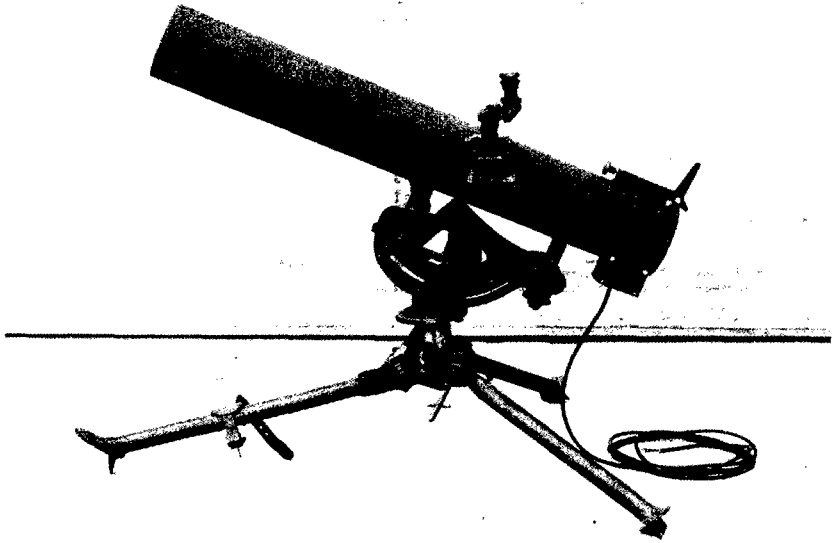
CIT TYPE 44 LAUNCHER in traveling position.



CIT TYPE 44 LAUNCHER in firing position.

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LAUNCHER	CIT Type 47 for 5.0 SSR
ROCKET	5.0 SSR (see pp. 16-22 of Supplement)
DESCRIPTION	6.0 OD steel tube 42 in. long having three internal formed stainless steel guide rails spaced 120° apart; upper guide rail on the vertical center line of the launcher barrel.
WEIGHT	38 lb for unloaded barrel; 53 lb for machine-gun tripod.
USE	<del>Single shot firing at point targets.</del>
MOUNT	M1917A1 machine-gun tripod.
QUADRANT ELEVATION	-5° to 60°
FIRING CONTROL BOX	Mk 22 Magneto Impulse Key
FIRING RATE	10 rounds per min
REFERENCES	



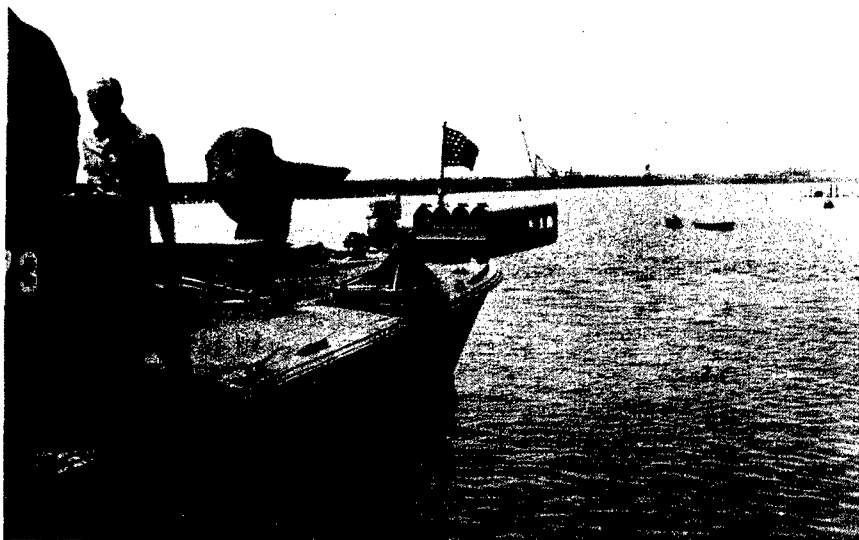
CIT TYPE 47 LAUNCHER, sight attached.



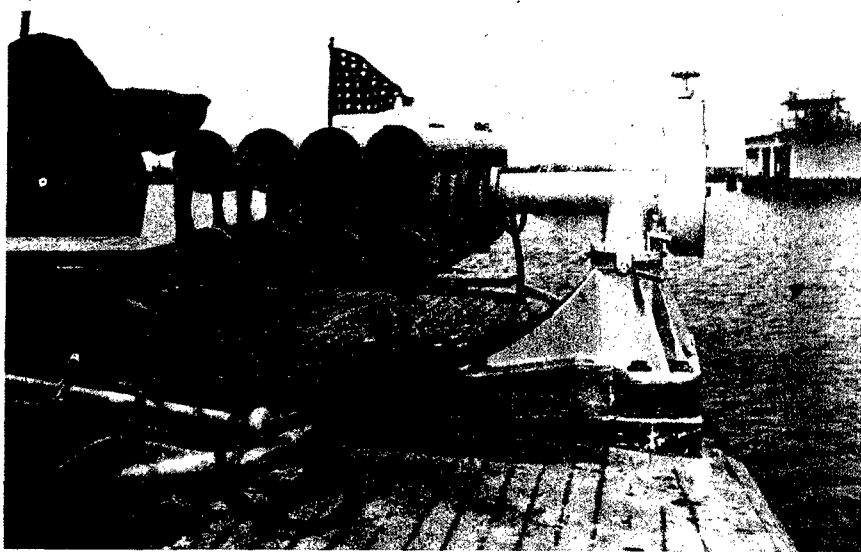
CIT TYPE 47 LAUNCHER, showing breech end.

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<b>LAUNCHER</b>	CIT Type 49A for 5"0 SSR
<b>ROCKET</b>	5"0 SSR (see pp. 16-22 of Supplement)
<b>DESCRIPTION</b>	Eight 48-in. launcher barrels each with three internal stainless steel guide rails spaced 120° apart around the axis of the barrel. One row of four barrels below the horizontal supporting shaft and the other above.
<b>WEIGHT</b>	Unloaded, 740 lb; loaded, 1140 lb.
<b>USE</b>	On PT boats for close-range attacks.
<b>MOUNT</b>	One on starboard and one on port side of PT boats. <i>Four " " "four" " " "LCI</i>
<b>QUADRANT ELEVATION</b>	Any angle, since launcher can be turned entire 360° about its horizontal supporting shaft.
<b>FIRING CONTROL BOX</b>	Mk 13 Firing Panel. May be fired singly or in pairs.
<b>FIRING RATE</b>	Approximately 2 per second singly or 4 per second in pairs. Favorable conditions permit reloading in about 90 sec.
<b>REFERENCES</b>	<ol style="list-style-type: none"> <li>1. Abridged Catalog Entry, CIT Launcher Type 49, August 10, 1944 (CIT/JEC 14)</li> <li>2. Rocket Firing from PT Boats, September 7, 1944 (CIT/JEC 18).</li> </ol>



CIT TYPE 49A LAUNCHER, outboard for firing.



CIT TYPE 49A LAUNCHER, stowed inboard.

LAUNCHER	CIT Type 12 Aircraft Rocket Launcher for F4U-1D with 11.75 AR
ROCKET	11.75 AR
DESCRIPTION	Displacement type launcher consisting of two parallel swinging yokes mounted beneath fuselage of F4U-1D airplane. Rocket is launched parallel to flight path of airplane after swinging downward and forward from original position. Round is fired just before being released from latches at lower end of displacement yokes. Prior to release, round is supported by a Mk 51-7 bomb rack especially installed in the aircraft for this purpose.
WEIGHT	Complete unloaded installation approximately 200 lb.
USE	Aircraft firing of 11.75 AR from F4U-1D
MOUNT	Beneath fuselage of the aircraft.
QUADRANT ELEVATION	Rocket held approximately parallel to datum line of aircraft. Angle of dive determines angle of fire.
FIRING CONTROL BOX	Switchbox located on cowl in pilot's compartment, supplied with 24-volt power from bomb-arming switch also on cowl. Firing accomplished by pressing special push button switch mounted near throttle on left side of compartment.
FIRING RATE	Single round is fired when push button is pressed. Delay between dropping and firing is approximately 1 sec.
REMARKS	Installation tested on several F4U-1D aircraft. Drag of launcher with round estimated at 25 knots for 300 knots IAS.
REFERENCES	



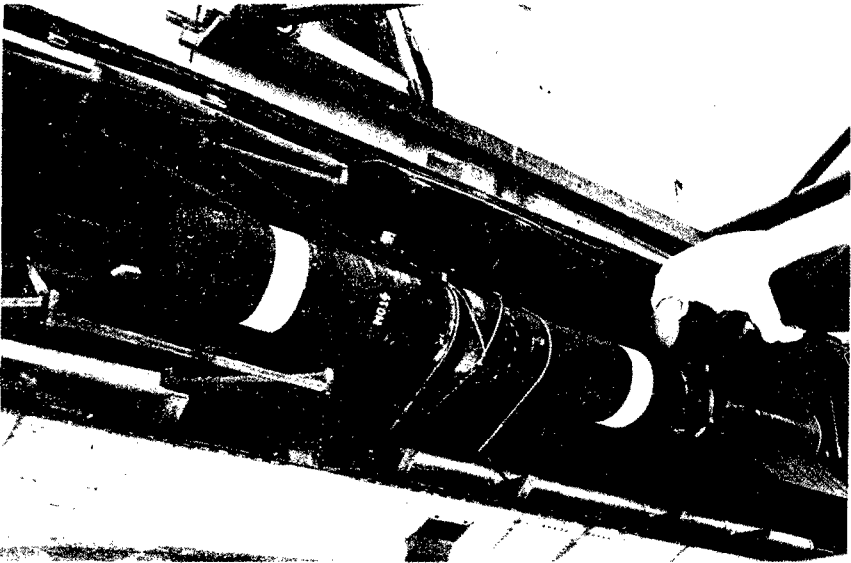
CIT TYPE 12 AIRCRAFT ROCKET LAUNCHER for F4U-1D, with  
round in place.



CIT TYPE 12 AIRCRAFT ROCKET LAUNCHER for F4U-1D, with-  
out round.

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LAUNCHER	CIT Type 12 Aircraft Rocket Launcher for TBF with 11.75 AR
ROCKET	11.75 AR
DESCRIPTION	Displacement type launcher consisting of two parallel swinging yokes mounted in bomb bay of TBF airplane. Round is launched parallel to flight path of airplane after swinging downward and forward out of bomb bay. Rocket is fired just before it is released from latches at lower end of displacement yokes. During flight round is supported in the same manner as a torpedo by a standard Grumman bomb sling.
WEIGHT	Complete installation approximately 150 lb.
USE	Aircraft firing of 11.75 AR from TBF aircraft.
MOUNT	Bomb bay
QUADRANT ELEVATION	Rocket held approximately parallel to datum line of aircraft. Angle of dive determines angle of fire.
FIRING CONTROL BOX	Switch is located in pilot's compartment and supplied with 24-volt power through master arm switch on panel. Firing accomplished by pressing bomb button on pilot's control stick.
FIRING RATE	Single round
REMARKS	Launcher tested on TBF-1 and TBM-1C aircraft. Bomb bay doors may be closed while rocket is being carried in flight.
REFERENCES	



CIT TYPE 12 AIRCRAFT ROCKET LAUNCHER for TBF 11"75 AR  
ammunition in position.



CIT TYPE 12 AIRCRAFT ROCKET LAUNCHER  
for TBF, showing empty installation.