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AUSTRALIA

AUSTRALIAN MILITARY FORCES

TECHNICAL INTELLIGENCE SUMMARY

No. 15

JUNE, 1944.

Prepared by the General Staff Intelligence, and issued under the direction of the Commander in Chief, Headquarters, Australian Military Forces.

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AUSTRALIAN MILITARY FORCES

TECHNICAL INTELLIGENCE SUMMARY

JUNE NO. 15 1944

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JAPANESE EQUIPMENT

TYPE 100 RIFLE GRENADE DISCHARGER

1. GENERAL

This new type grenade discharger was recovered in SOLOMON Islands area. It appears to have been designed for use with 7.7 mm Type 99 Rifle. Tests revealed however, that it can also be used with 6.5 mm Type 38 Rifle. The unusual feature is that no special ammunition is needed as ordinary ball rounds are used to discharge the grenade. This feature would enable the rifle to be carried with discharger attached for instant normal use or as a grenade discharger. The improved type or "Kiska" hand grenade is used, as types 91 and 97 grenades will not fit into the discharger. None of the known types of signal flares can be used.

2. DESCRIPTION (Figs 1-3)

The discharger has an overall length of 8¾ ins and weighs 1 lb 9 ozs.

It is composed of four parts:-

(a) barrel, (b) cartridge tube, (c) body, (d) attaching clamp.

(a) Barrel: Consists of a one piece cylindrical tube 4½ ins long with an internal diameter of approximately 1¾ ins, and walls 3/32 in. thick. The barrel appears to have been constructed from a very high grade steel. The rear end of the barrel is necked down to approximately 1¼ ins and is threaded with a standard right hand thread for ⅜ in, to allow it to be screwed into the body. The interior is smoothly finished.

(b) Cartridge Tube: This is constructed from the same grade of steel as the barrel and is highly polished on the internal and external surfaces. It is 4-3/16 ins long, with an internal diameter of 5/16 in. The rear end also has a right hand thread for approximately ⅜ in. to allow it to be screwed into the body in the same manner as the barrel.

(c) Body: Consists of a rectangular steel block approximately 5 ins long, 1¼ ins wide and 1 in. thick. The raised housing at the front end is drilled and threaded to allow the discharger barrel and cartridge tube to be screwed into place when the discharger is assembled. The rear end of the body is slotted to allow it to be slipped over the rifle muzzle. A gas port approximately ¼ in. in diameter is drilled through the top of the housing and is covered by a sliding cap. It is thought that when the discharger is used with 6.5 mm type 38 rifle, this port is closed to utilize the full amount of the gas generated; but when used with 7.7 mm type 99 rifle with the consequent increased powder charge, the port is left open to allow part of the gas to escape.

(d) Attaching Clamp: This is composed of two half circular pieces of thin sheet steel, shaped to fit around the outside of the rifle barrel and inside the discharger body. These two parts are held together, on one side only, by a strong flat spring which is riveted to the clamp. The spring has a downward projecting ear at each end, to which is hooked the chain used in attaching the discharger to the rifle.

3. OPERATION

(a) Fitting: The clamp is attached around the muzzle of the rifle behind the foresight. The slotted rear end of the body then slides over the clamp. It is thought that the chain, attached to the clamp, is then hooked over the bayonet lug. Part of the chain was missing from the discharger examined, but in the firing test, it was found that unless the discharger was secured to the rifle, the gas pressure would blow it off.

(b) Firing: The safety pin of the grenade is withdrawn and the grenade is inserted into the discharger with the fuse pointing towards the front end of the rifle. The fuse is not struck before inserting the grenade into the discharger as it is armed by force of setback due to the explosion of the propelling charge, causing the weighted striker to move back against the primer cap. The rifle is aimed and the ball round fired. As the bullet passes through the cartridge tube of the discharger, portion of the propelling gas is diverted upwards into the discharger through a connecting gas port between the cartridge tube and the discharger barrel. This gas strikes the bottom of the grenade and expels it from the discharger.

4. FIRING TESTS

The tests were conducted with 7.7 mm Type 99 and 6.5 mm Type 38 (long, medium & short) rifles. The grenades were fired from each rifle at angles of 30 and 45 degrees respectively, the angles being checked by gunner's quadrant.

No. of Grenades fired	Rifle Used	Angle of Elevation - degrees	Range Yards
1	Type 99 7.7 mm	30	132
1	" " "	45	118
1	Type 38 6.5 mm (long)	30	102
1	" " " "	45	97
1	" " " (medium)	30	111
1	" " " "	45	103
1	" " " (short)	30	117
1	" " " "	45	108

It can be seen from these figures that the 6.5 mm Type 38 Short-Rifle gives a slightly longer range than either the medium or long rifles of the same type. This is due to the fact that the expanding gases have a shorter distance to travel before they impinge against the bottom of the grenade. The average range with 30° and 45° elevation was 106 yds with 6.5 mm rifle and 125 yds with 7.7 mm rifle. The following characteristics were observed during the tests:-

(a) The rifle could easily be fired from the shoulder as there is very little recoil.

(b) The grenade is plainly visible and can be seen turning over during flight.

(c) Smoke from the grenade fuse is visible during flight.

(d) The report of the rifle is slightly muffled.

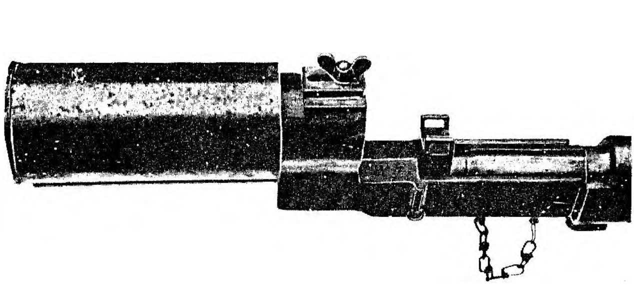
(e) The grenade detonates with a sharp cracking report.

Of the eight grenades used in the tests, seven functioned perfectly. The eighth grenade failed to detonate due to a faulty primer cap. Five of the grenades were fired into the sea and all were observed to function perfectly. They struck the water, sank and then detonated with a very muffled report, throwing up a column of water approximately 12 ft high.
The effect of the grenades against hard sandy soil is very slight as craters examined were about 3 ins deep and approximately 2 ft in diameter.
During the tests the discharger was attached to a Cal .30 M1903 Springfield Rifle and three grenades were fired, using ball cartridge Cal .30 M2. The grenades were thrown approximately 25 to 30 yds further than those discharged from Type 99 7.7 mm Japanese Rifle. On the third shot, the discharger ruptured at the junction of the cartridge tube and discharger body. The cartridge tube was split at the point where it screws into the body, and was bent downward at about 15 degrees from the discharger barrel. This is thought to be due to the increased pressure resulting from the larger powder charge employed.

(SOURCE:- USAFISPA)

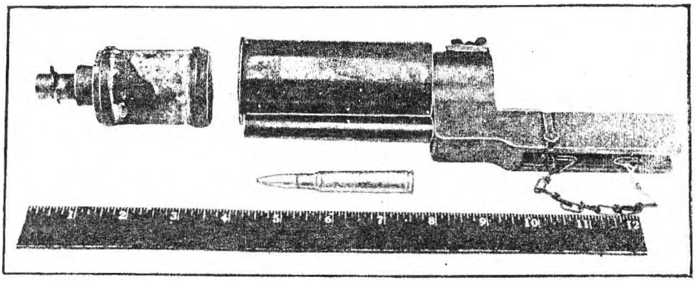
TYPE 100 RIFLE GRENADE DISCHARGER

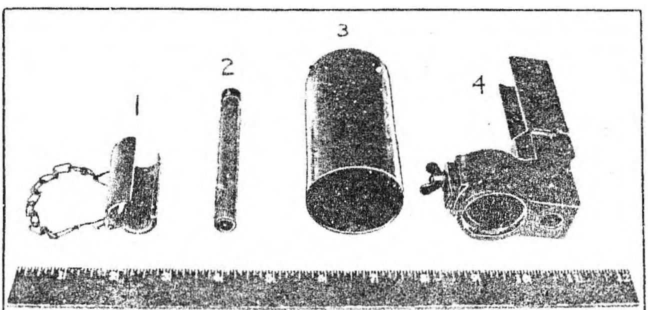
FIG I



TYPE 100 RIFLE GRENADE DISCHARGER

FIG 2





1. Clamp
2. Cartridge tube
3. Discharger Barrel
4. Body

FIG 3

WOODEN & INVERTED BALL AMN. FIRING TESTS

1. GENERAL

Small quantities of 6.5 mm rounds fitted with crudely shaped soft wood bullets, regularly turned wooden bullets and inverted ball ammunition have been recovered in the Solomon Islands area. It is known that wooden bullets are used with weapons such as Spigot Type Grenade Discharger and Hollow Charge Grenade Discharger.

2. TESTS

The respective rounds were fired to determine the tactical use and accuracy. Type 38 long rifle was used against a target 15¾ ins long and 15¼ ins high.

Results:

(a) Wooden Bullets (Fig 1).

Round No.	Range	Effect
1	25 yds	Miss
2	"	Miss
3	"	Miss
4	15 yds	Struck target sideways 4 ins from centre of bulls eye.
5	"	Miss
6	"	Struck target sideways impact 4 ins from centre of bulls eye.

(b) Inverted Ball Ammunition (Fig 1).

Round No.	Range	Effect
1	25 yds	Hit sideways on upper left hand corner of target.
2	"	Miss
3	"	Slight tendency to corkscrew.
4	"	Miss
5	"	Hit in centre of target and showed tendency to corkscrew.

3. CONCLUSION

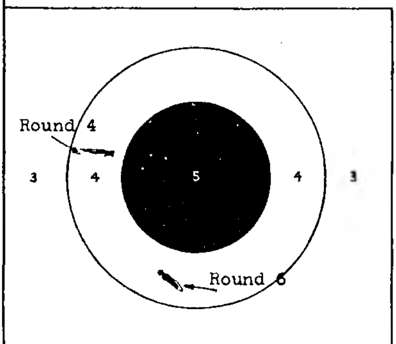
It can be seen that the sole use of wooden bullets as anti personnel ammunition, even at very short ranges would be ineffective due to erratic ballistic qualities and material of the missile.

It is estimated that use of the inverted ball ammunition for 6.5 mm rifle would have much greater destructive effect than that of the conventional ball due to the corkscrewing action and to the soft lead centre. This could be used with some degree of accuracy at only comparatively short ranges, probably not over 25 yds.

(SOURCE:- USAFISPA)

WOODEN & INVERTED BALL AMN

FIRING TESTS FIG I.

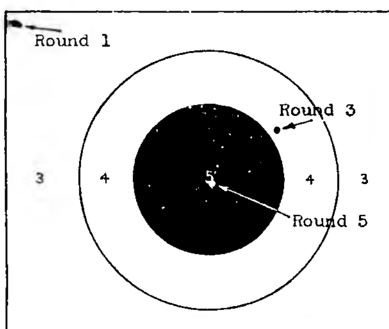


WOOD BULLETS 6.5 mm.

3 Misses at 25 yds.
2 Hits, 1 Miss at 15 yds.

INVERTED BALL AMN
6.5 mm

3 Hits, 2 Misses at 25 yds.



FIRING TESTS - TK/A AMN

1. GENERAL

(a) The tests were conducted with a view to ascertain the effect of ammunition embodying the Hollow Charge principle. The latest date of manufacture of 75 mm Hollow Charge Shells recovered is October 1943. For comparison purposes a similar series of tests was also conducted with the 75 mm gun in USM4 Medium tank. Hollow Charge Rifle grenade was also used during the tests.

(b) A further series of tests was carried out to determine the effects of Japanese 37 mm Tk A Gun and Type 99 Magnetic AP mine.

2. TARGETS

(a) The main targets for tests described in para 1(a) above were two USM3 Light tank hulls (face hardened), placed at right angles to line of fire. The sides were 1 in. thick and turrets 1-1/4 ins thick. In addition, laminated armour was made by welding three doors from engine compartments each 1 in. thick, on the sides, giving a total thickness of 4 ins. The face hardened sides of the first and third pieces were outward and the second piece was inward. Naval high tensile hull plate was also used. A laminated shield 4 ft. long 3 ft. wide and 3 ins thick was constructed from six 1/2 in. steel plates.

(b) The target used in tests para 1(b) above consisted of USM3 Light tank with face hardened armour.

3. RESULTS (Figs 1 - 11)

(a) Jap 75 mm Type 41 Mountain Gun: Consolidated reports of tests and comparison with US 75 mm Medium tank gun are shown in Table 1.

(b) Jap Hollow Charge Rifle Grenade (Figs 1, 2, 3, 5) The grenades were fired from a rifle grenade adapter on a long 6.5 mm type 38 Rifle, at a range of 20 yds with rounds (i) to (v) and 100 yds with round No (vi) Cartridges used were improvised with wooden bullets and paper wads.

(i) Fired with reduced charge in cartridge - Results; dud.
(ii) Struck sides (1 in. armour) - Clean penetration 3/8 in. to 1/2 in. in diameter and removed a punching.
(iii) Penetrated 1-5/8 ins of 4 ins. laminated armour (Fig 2).
(iv) Penetrated 2-1/2 ins of 4 ins laminated armour (Fig 2).
(v) Struck turret (Fig 5) - Complete penetration of 1-1/4 ins armour with hole 3/8 ins in diameter at front and 5/8 ins diameter at rear. The angle of impact was at least 15 degrees. Small

9503/A

marks from metal splatter could be seen on inside of turret, 18 ins from point of penetration.

(vi) Paper bullet used with full charge range 100 yds. Grenade passed over the target in erratic flight with precession around the centre.

(c) Jap 37 mm Tk/A Gun (Fig 11): Results of tests are incorporated in Table 2. These are in addition to report in AMF Tech Int Sum No. 3.

(d) Jap Type 99 Magnetic Tk/A Mine (Fig 11): In tests conducted at Aberdeen Proving Ground against homogeneous armour, it was found that this mine would completely perforate 1 in. armour but not 1-1/2 ins of armour unless additional explosive was used. Two tests were made of single mines on 1 in. side armour of a M3 Light tank hull. In each case a section of the armour as large as the mine was blown into the tank with great force. In one instance, the piece of armour blown from the sponson side struck the side and ricocheted back 150 yds. Placed on 1-1/1 ins turret armour, a single mine broke in the armour, leaving a hole about 2 ins in diameter. No armour was thrown into the tank in this case but damage in the turret interior would have been severe.

4. CONCLUSIONS

The 75 mm Type 41 Mountain Gun would be effective against light tanks at ranges encountered in South Pacific area, using any type of ammunition. Hollow Charge and AP HE round easily penetrated the turret and side armour. HE rounds sheared rivets, damaged turret race, destroyed track and suspension and ruptured sponson and top plates.
It is noteworthy that AP HE rounds exploded where it struck armour, although all rounds that hit the ground were duds. The short delay base detonating fuses of AP HE rounds functioned perfectly on penetration of the armour, the shells bursting just after penetration. Both instantaneous and short delay Type 88 fuses were used with Hollow Charge Shells; the instantaneous fuse was found to cause the greater penetration of armour. The steel cartridge cases used in the Hollow Charge shells functioned satisfactorily. The obturation was good, they extracted easily after firing and no cracks were noted in the walls of the cases. The exterior of some of the cases was badly rusted and had to be scraped before use.
As regards 37 mm Tk/A Gun, results indicated that it would be effective against 1-1/2 ins of armour at 100 yds or against 1 in. face hardened armour at ranges up to approximately 500 yds. As in case of homogeneous armour the type 99 magnetic mine is effective against face hardened armour up to but not including 1-1/2 ins.

(SOURCE:- AC of S, G-2, USAFISPA)

TABLE 1

FIRING TESTS JAPANESE 75MM TYPE 41 MOUNTAIN GUN AND US 75MM M4 MEDIUM TANK GUN

Fig No.	Round No.	Range	Ammunition & Fuse	Target	Penetration	Size of Hole	General Remarks
(a)	Japanese 75 mm Type 41 Mountain Gun:						
3	1	100	Hollow Charge Instantaneous	Side of tank 1 in. armour	Complete	1-1/2 ins diameter	Cut up bogies, ruptured sponson plates and punched hole in engine room with projectile fragments.
4	2	"	Hollow Charge Short delay	4 ins laminated section	-	1-1/4 ins diameter at top. 1-7/8 ins deep.	Hole was 1-1/4 ins diameter throughout first plate. Lamination reduced effect to approximately 1/4 in. diameter of hole in second plate.
4	3	"	Hollow Charge Instantaneous	Same hole as made by round No. 2	-	Widened hole and deepened it to 2-1/2 ins	Loosened welds holding doors on the side. (Stainless steel rods were used in the welds)
4	4	"	" "	4 ins laminated plate	-	1 in.diameter	Step down in hole diameter occured at face of second plate but not as great as for round No.2.

TABLE 1 (Continued)

Fig No.	Round No.	Range	Ammunition & Fuse	Target	Penetration	Size of Hole	General Remarks
4	5	100	AP, HE	4 ins laminated plate	-	-	Made a slight dish in the plates.
(b) 75 mm gun in US M4 Medium Tank:							
-	6	100	APC M61	Side of tank near bottom	Complete	-	Went in one side and out the other and ricocheted over the hill
1	7	"	"	4 ins laminated plates	-	-	Broke off section of all three attached plates and tore plates off tank. Deflected and penetrated side of sponson, came out at bottom of sponson, penetrated side again near the tracks and left tank through the bottom.
1 & 5	8	100	HE - Instantaneous	Turret	-	-	Turret dented - broke in top plates and lifted turret to certain extent - set fire to tank.
1	9	"	HE - Short delay	Side of tank below sponson	-	-	Blew out large section of side.
1 & 5	10	"	APC M 61	Turret	Complete - Both sides of Turret	-	Angle of impact approximately 5 degrees.
(c) Japanese 75 mm Type 41 Mountain Another undamaged turret and hull used as target.							
5	1 & 11	100	AP, HE	Turret	Complete	-	Shell burst inside turret.

TABLE 1 (Continued)							
Fig No.	Round No.	Range	Ammunition & Fuse	Target	Penetration	Size of Hole	General Remarks
6	12	100	HE - Delay	Turret	-	-	Little damage - bent down top of tank armour leaving space between turret race and top of armour.
6	13	"	HE - Instantaneous	Side plate	-	-	Sheared rivet heads.
6	14	"	AP HE	Turret	Complete		Hit at approximately 30 degrees. Burst inside turret and started fire. Blew off pistol port on other side of turret.
6	15	"	HE - Delay	Side of tank	-	-	Blew off track and return roller in centre. Blew out bottom plates of sponson. Force continued upwards breaking tank top plates.
-	16,17, 18	300	AP, HE	Tank	-	-	Three misses - two short one long - all ricocheted over hill. Base detonating fuses failed to function on impact with ground
1	19	300	AP,HE	Side armour	Complete	-	Impact at 5 to 10 degrees and burst inside tank.
-	20	"	HE - Instantaneous	" "	-	-	Blew off rear bogies and idler
(d)	Japanese 75 mm Type 41 Mountain Gun Tests against Navy Hull plate.						
7 & 9	1	-	HC - Instantaneous	3 ins laminated Navy Hull plate	Complete	1-1/4 ins diameter at point of entry.	

TABLE 1 (Continued)							
Fig No.	Round No.	Range	Ammunition & Fuse	Target	Penetration	Size of Hole	General Remarks
7 & 9	2	-	HC - Short Delay	3 ins laminated Navy Hull plate	Not complete	Cone shaped hole 1-1/2 ins in diameter at point of entry and 1-3/4 ins deep	
8 & 9	3	-	AP.HE	"	Complete	Clean penetration	Sufficient velocity remained after penetration to allow shell to strike earth behind plate and ricocheted 100 yds back and 50 yds up a hill. The BD fuse failed to function.
10	4		HE - Instantaneous	"	-	-	Caused slight indentation on front of plate. No penetration.

TABLE 2. - JAPANESE 37MM TK/A GUN - A.P. FIRING TESTS

Round No.	Range	Angle of Impact	Target	Penetration	General Remarks
1	100 yds	Approx normal	M3 Lt Tank - side	Penetrated 1 in. Armour	Detonated inside
2	"	" "	M3 Lt Tank - turret	Penetrated 1-1/4 ins armour and detonated	Partial penetration inside turret opposite entry.
3	"	" 60° from normal	" "	-	Gouged out armour to depth of 1/2 in., ricocheted and detonated.
4	"	" 25°	" ""- side	-	Detonated outside - Piece of armour 1 in. in diameter was punched out of side.
5	"	" 20°	M3 Lt Tank - side	penetrated 1 in. side armour	Detonated inside tank
6	350 yds	Normal	" "	-	No penetration - hole 1 in. in diameter punched in armour

Several other rounds fired at 350 yds range missed the target. Some rounds struck the bogie wheels and detonated. Damage would not have disabled the tank. All rounds detonated even when striking soft ground at acute angles. Fragmentation was poor in all cases.

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FIRING TESTS - TK/A AMN

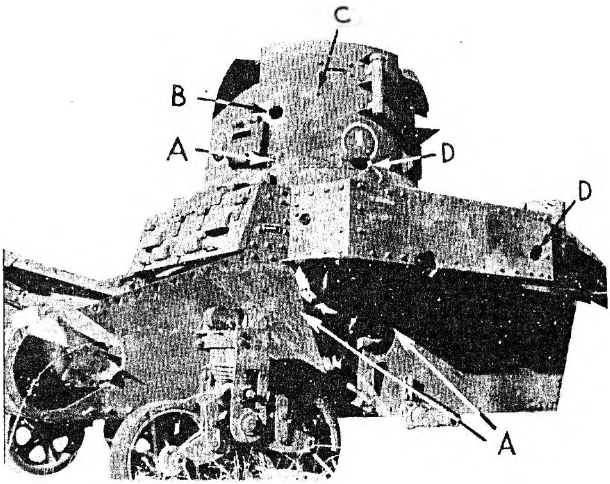
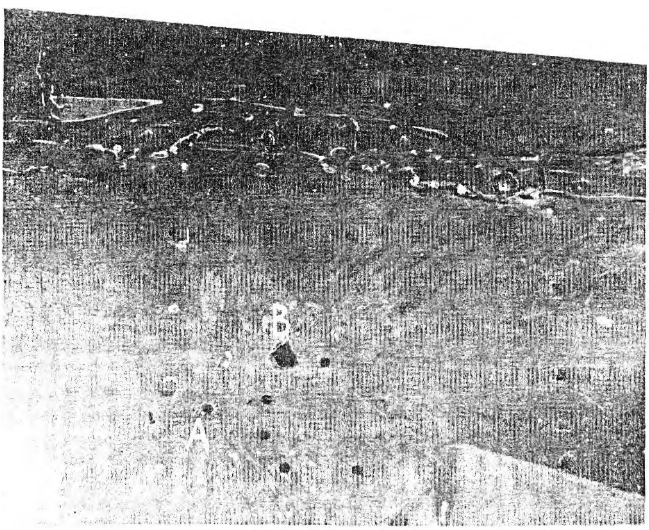


FIG 1 US M3 Light Tank Hull, showing effects of 75 mm Tank Gun, 75 mm Type 41 Mountain Gun, and Hollow Charge Rifle Grenade.
(A) HE (US). (B) APC (US). (C) HC Grenade (Jap). (D) AP HE (Jap).

FIG 2 Effects of Jap Hollow Charge Rifle Grenade on 4" Laminated Armour.

FIRING TESTS - TK/A AMN

FIG 3 Result of 75 mm Hollow Charge Shell (B), and Hollow Charge Rifle Grenade (A), against 1" Side Armour. Note how shell blew in bottom plates of Sponson.



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FIRING TESTS - TK/A AMN

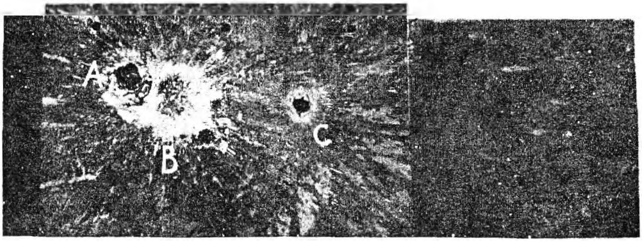


FIG 4 Result of Hollow Charge and AP HE against 4" Laminated Armour. (A) HC, 2 rounds, (B) AP HE, (C) HC Inst.

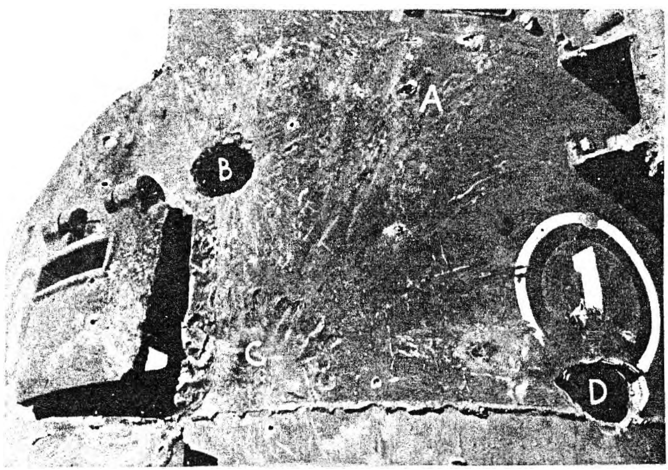
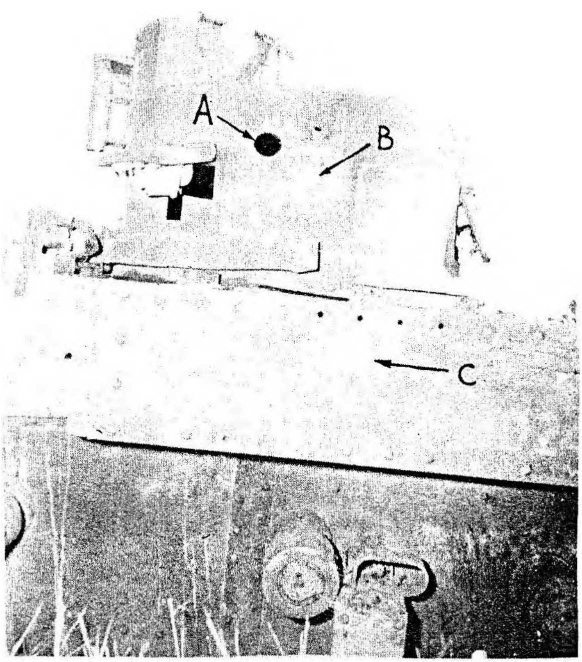


FIG 5 Turret showing effects of US Tank Gun, and Jap Ammunition. (A) Jap HC Grenade. (B) US APC. (C) US HE. (D) Jap AP HE.

FIRING TESTS- TK/A AMN

FIG 6 Effect of Type 41 Mountain Gun Ammunition against side and turret. (The track of this hull was blown off by a Jap HE Shell.
(A) AP HE. (B) HE. (C) HE.



FIRING TESTS - TK/A AMN

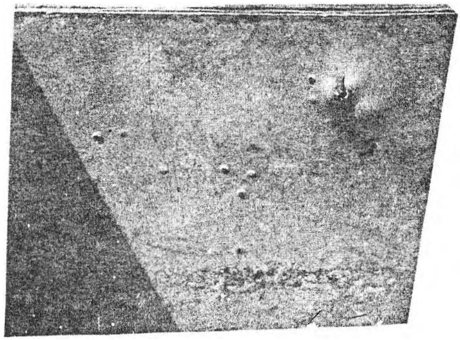


FIG 7 Rear view of Hull Plate showing effects of HC Shells with Instantaneous and Short Delay Fuses.

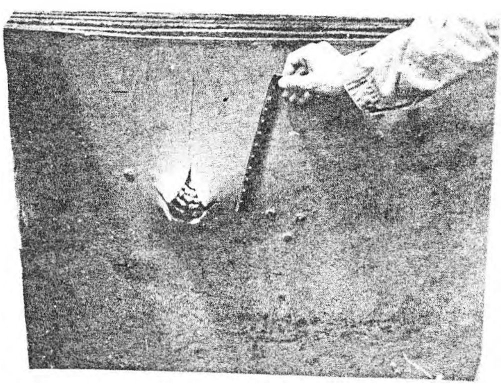


FIG 8 Exit of 75 mm AP HE Shell from 3" Hull Plate.

FIRING TESTS - TK/A AMN

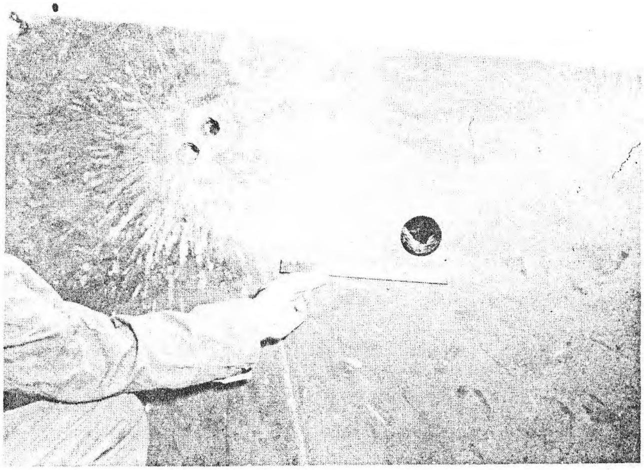


FIG 9 Complete penetration by 75 mm AP HE Shell in 3" Hull Plate.

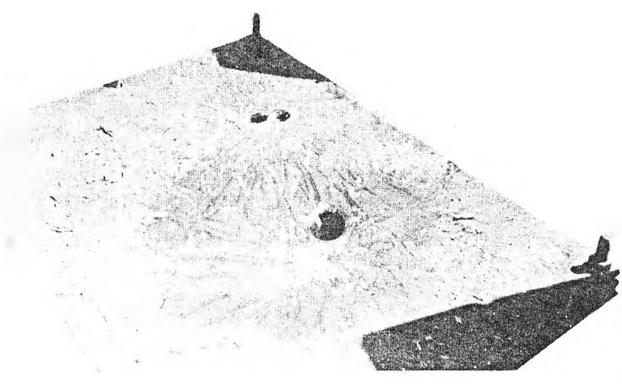
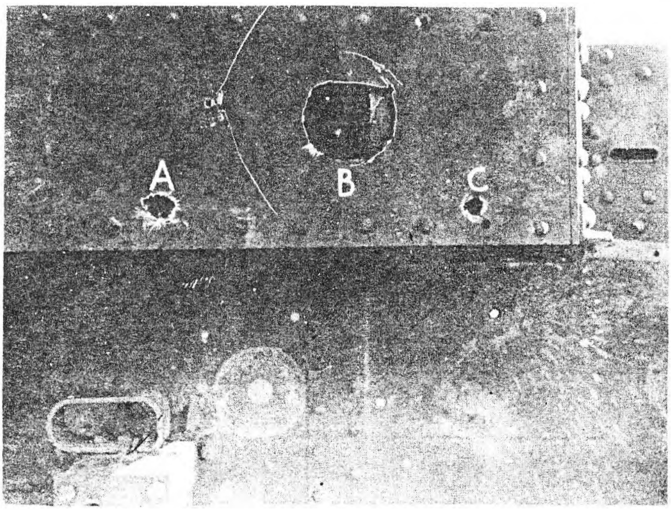


FIG 10 Slight indentation of Hull Plate caused by 75 mm HE Shell with Instantaneous Fuse. (Same plate as used in Figs. 7, 8, & 9.)

FIRING TESTS - TK/A AMN

FIG 11 Effects on US M3 Light Tank Hull.
(A) Penetration by 37 mm Tk/A Gun.
(B) Perforation by Type 99 Magnetic Mine.
(C) Perforation with penetration by 37 mm Tk/A Gun.



70 MM MORTAR TYPE BARRAGE SHELL

FIRING TESTS

Addendum to reports in AMF Tech Int Sum Nos. 6 & 11

1. GENERAL

Tests carried out revealed that the shell travels to an approximate height of 1700 ft before the canister and bomb tubes are ejected. It was also discovered that the bomb tubes do not detonate when the parachutes open as was previously believed but are apparently intended to detonate when the parachute cord is struck by a fast moving object such as a part of an aircraft.

2. TESTS

A total of five rounds were fired at an elevation of approximately 75 degrees. One round failed to eject the canisters from the shell due to failure of delay train ignition. The smoke of the black powder delay train, which ignites the expelling charge, is plainly visible during flight. The shells were noisy in flight and burst in the air, ejecting the canisters which in turn ejected the bomb tubes after a very short delay.
All inert components drifted on parachutes to the ground, close to the firing position, the heaviest section, viz. the shell case, taking about 30 seconds. In only one instance did a bomb detonate in flight. The bomb tubes drifted slowly to earth and landed about 1/2 mile from point of firing at intervals of approximately 30 yds. One of the bomb tubes detonated perfectly when a pull of 15 to 20 lbs was exerted on the parachute cord.
The following details of the tests were noted. The figures given for altitude of burst may vary up to 5% due to the use of improvised equipment.

Round No.	Altitude of Burst	Time of Flight of Projectile	Time of drop of Bomb Tubes
1	1520 ft	-	-
2	1700 ft	7 seconds	-
3	1680 ft	8-1/5 "	2 mins 32 secs
4	1660 ft	7-4/5 "	2 mins 40 secs

Round No. 3 did not burst until after it had reached the height of its trajectory and had started to drop, thus accounting for the increased time of flight. The time of drop is given for the first tube to hit the ground. An interval of several seconds existed between tubes in each instance. From this data it has been estimated that the muzzle velocity of the weapon was 350 ft per second and that the bomb tubes drop at a rate of approximately 10.8 ft per second.

3. CONCLUSION

It would appear that this weapon could be effective against low flying aircraft if used in sufficient quantity to produce a barrage of floating bomb tubes

(SOURCE:- USAFISPA)

75 MM TYPE 2 HOLLOW CHARGE A P SHELL

1. GENERAL

This ammunition externally resembles that used with 70 mm Battalion Gun. It is distinguished from other shells of the same calibre by its shorter length and separate screwed-in head. This shell is nose fused and is used as AP due to the shaped bursting charge.

2. DESCRIPTION (Figs 1-3)

The shell is in two sections:- (a) the head, (b) the body. These sections screw together with a right hand thread and are locked by a grub screw. The weight of the shell complete is 3628 gms (8 lbs) and empty is 3100 gms (6 lbs 13 ozs.)

(a) Head: This is made of an alloy of the zinc-base die casting type. Other metals are present in the following proportions -

Aluminium -- -- --	3%
Magnesium -- -- --	NIL
Copper -- -- --	0.05
Lead -- -- -- --	0.05 (x)
Cadmium -- -- --	0.008
Tin -- -- -- --	0.014
Iron -- -- -- --	NIL

(x) The maximum limit for lead in British Service Specifications is 0.007%.
It is considered that in humid climates this alloy on account of its high lead content would be subject to rapid inter-crystalline corrosion, resulting in weakness, dimensional distortion and cracking.
The head has a maximum diameter of 74 mm and is 66 mm long. It is threaded externally at its base (66.5 mm outside diameter, 1.4 mm pitch, right hand) to fit the shell body, and internally at its nose to receive the fuse (23.5 mm outside diameter, 2 mm pitch, left hand). Two diametrically opposite spanner flats are formed on the head to facilitate assembly. The head is hollow, being 58.5 mm internal diameter for a distance of 32.5 mm from the rear, beyond which the internal profile follows the external profile with a wall thickness of 5 mm until a transverse flat section containing the fuse hole is reached at a distance of 53 mm from the base. The fuse hole is closed by means of a moulded plastic transit plug with transverse key slots, with ideographs moulded into the head of the plug and translated as "left hand thread".

(b) Body: The cylindrical steel shell body is 184 mm long and 74 mm in diameter with a front band 74.5 mm diameter and 25 mm in length. A copper driving band 10 mm wide is attached to the body with its base 24 mm from the base of the shell. The driving band is 76.5 mm in overall diameter, and in profile has a square

base, a section 6.5 mm long parallel with the shell body, and a forward section 3.5 mm long which slopes in to the body.
The body is threaded internally at its mouth to receive the head, and has a shoulder below the threads. The cavity in the body is 61 mm in internal diameter for a depth of 134 mm, from which point it narrows to an approximately 42 mm diameter flat base, 166 mm from the mouth of the body. This shape is closely followed by the bursting charge.

(c) Bursting Charge: The explosive charge is cast into a shaped cardboard wrapping and is inserted into the shell body. There is an axial cavity in the charge with an exploder pellet at the base and a metal liner lining the remainder of the cavity. Fig 3 shows the external appearance of these components. The wrapped charge weighs 528 gms after removal of the liner.
The metal liner is enamelled black and is made in two parts, a flanged steel cone whose wall thickness decreases uniformly from the flange to the apex and a cylindrical aluminium tube of uniform wall thickness. The dimensions of the liner are:-

Total length -- -- -- --	126 mm
Diameter of flange -- -- --	65 mm
Internal diameter of mouth of cone -- -- --	50 mm
Thickness of flange -- -- --	1.9 mm
Thickness of wall of cone	
6 mm above flange -- -- --	1.47 mm
25 mm above flange -- -- --	0.97 mm
44 mm above flange -- -- --	0.51 mm
Internal included angle of cone -- -- -- -- --	27°
External included angle of cone -- -- -- -- --	30°

The two portions of the liner are securely joined in the following manner. The apex of the conical section is perforated to take the cylindrical tube. A circumferential rib is formed 72 mm from one end of the tube to act as a seating for the cone (Fig 3), and that part of the tube which projects inside the cone (about 8 mm long) is expanded against the internal wall of the apex.
The cardboard wrapping of the explosive block covers the sides and base, and also that part of the axial cavity which houses the exploder pellet. The wrapping, which is made of cylindrically rolled paper, has a wall thickness of 0.5 mm and an external diameter of 60 mm. For approximately 120 mm of its length the wrapping remains cylindrical, and it is then tapered away to a diameter of 42 mm. This is done by serrating the end of the cylinder and by securing the ends of the serrations over a cardboard washer which forms the base. A second cardboard washer covers the ends of the serrations and appears externally at the base. A cardboard cylinder 27 mm long and 18.5 mm internal diameter which passes through the washers at the base and is held by them within and co-axial with the wrapping, forms a pocket for the reception of the exploder pellet.

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The explosive charge is cast directly into the shaped wrapping, a former being used to shape the axial cavity which subsequently receives the metal liner. The explosive used is a mixture of Trinitrotoluene (T.N.T.) and R.D.X. (Hexogen or Cyclonite) in the approximate proportions of:- T.N.T. 60%, R.D.X. 40%. The exploder pellet, after insertion into the base of the charge, is prevented from moving forward by the inner end of the cardboard lining which is slightly constricted, and also by a small quantity of a shellac varnish on its walls. In this position there is a space between the base of the pellet and the base of the explosive charge which is filled by a cushion consisting of a disc of woven woollen cloth, a paper disc and a layer of paraffin wax. The flat base of the charge is then covered by a white paper cap which extends partially up the tapered wall.
The explosive charge, after insertion into the shell body, is held co-axial with it by means of paraffin wax, which forms a continuous coating over its base and a partial coating on its walls. The upper surface of the explosive charge is level with the shoulder at the mouth of the shell body, so that the flange of the metal liner rests over the shoulder. A thin wax-impregnated cardboard washer covers the flange of the liner and upon this screws the hollow head, thus locking the flange against the shoulder.
The markings stencilled in white paint on the wrapping of the explosive block are translated as:-

"Type 2. Armour Piercing Shell, Bursting Charge, July 1943."

The symbol for "u" is printed beside the date, in black ink, and the ideograph for "Fire" is printed in purple ink on the opposite side.

(d) Exploder Pellet: The exploder pellet is of the same type as that used in the Japanese 1/3 Kg. H.E. aerial bomb, but contains a greater weight of explosive. This indicates the use of a higher density of filling to eliminate set-back on firing.
The pellet consists of a cylindrical flat-bottomed aluminium body, Fig.4, 18.5 mm diameter and 25.5 mm long, into which is pressed 6.23 gm of R.D.X. (Hexogen or Cyclonite). A cylindrical cavity is formed centrally in the explosive to accommodate a flat-bottomed aluminium cup 16.5 mm long and 9 mm diameter, having a wide flange formed at its mouth which covers the surface of the R.D.X.
The cup is a reinforced type of detonator. In the base of the cup is 0.42 gm of Pentaerythritoltetranitrate (P.E.T.N.) and above this is pressed an inverted aluminium reinforcing cup with centrally perforated flat base, containing a disc of woven silk and a pressed layer of lead azide weighing 0.39 gm. The base of the reinforcing cup, after insertion, is 4 mm below the level of the flange, and is held in place by means of a cannelure rolled in the wall of the cup immediately above it.
Above the flanged cup is a cardboard washer, a disc of woven silk lacquered blue, and an aluminium washer with a central 6 mm diameter perforation. The mouth of the aluminium body is rolled over this washer to

complete the assembly.
The only markings are the symbol for "hi", stamped on the base of the body and on the flange of the cup, and the symbol for "wa", printed in purple ink on the base of the body.
The pellet is initiated by the flash from the nose fuse, which passes through the blue-lacquered silk disc and the silk disc in the reinforcing cup and ignites the lead azide. This detonates the P.E.T.N. which in turn detonates the R.D.X.

(e) Fuse: It is not known what nose fuse is used with this shell, but the Type 88 D.A. fuse fits the fuse hole. With this fuse there is an air gap of approximately 180 mm between the magazine of the fuse and the exploder pellet. Report by HQ USAFISPA on firing tests of the shell described herein states that both Type 88 Instantaneous and delay action fuses have been successfully used with this shell. These tests are reported separately in this Summary.

(f) Markings on Shell: The shell is painted black internally and externally, and has a 9 mm wide red band at the fuse hole and a 9 mm wide yellow band round the body, the lower edge of which is 71 mm from the driving band. Other markings, in white paint, include the plus - minus sign ±, indicating that the shell is up to the ballistic requirements in weight, the symbol for "ta", and the symbol for "wo" enclosed in a circle.

Stamped markings are:-

On the nose タ (ta), occurring twice, and "694"
On the body タ (ta), occurring twice, "694", and other characters which are translated as "Osaka Army Arsenal March 1943".
Fig 1 was taken from MEIU report to illustrate round complete with cartridge case.

(g) Cartridge Case: (Source:- M.E.I.U.)

The case for the Hollow Charge Shell contains a propellant and primer which are the same as used with "75 mm AP Shell" described in AMF Tech Int Sum No.7. The dimensions of the cases used with these two types of 75 mm rounds are also the same, the difference in the rounds being that the case used with the Hollow Charge projectile is made of steel instead of brass. Firing tests reported by USAFISPA indicate that this new type of case is satisfactory; no cracks were noted in the walls of the cases and the cases extracted easily after firing.
Markings on the case "18.9" stencilled in green indicate September 1943. On base of shell case is stamped date of manufacture, characters representing "Osaka Arsenal" and an illegible character which probably means "Iron".

(SOURCE:- MUNITIONS SUPPLY LABORATORIES
through MGO Branch & M.E.I.U.)

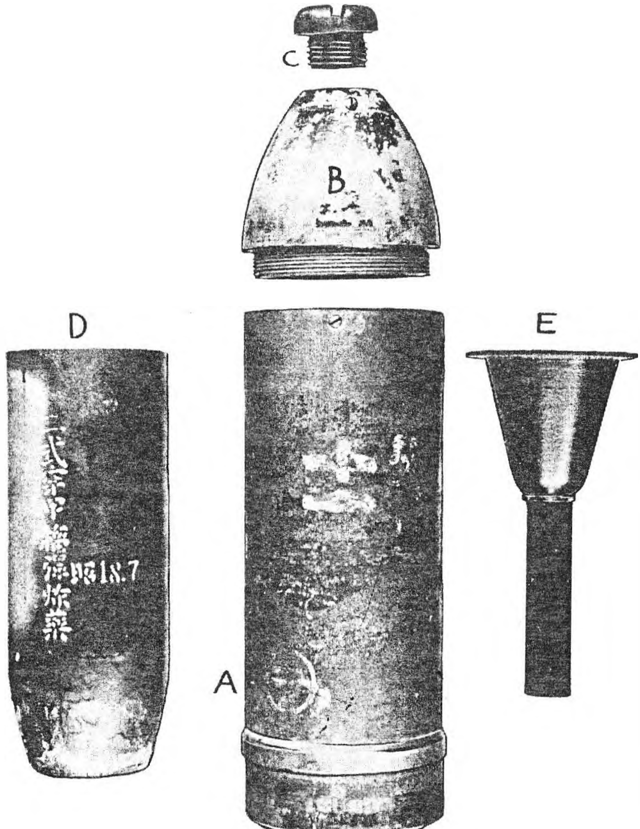
75 MM TYPE 2 HOLLOW CHARGE A P SHELL

FIG I COMPLETE ROUND

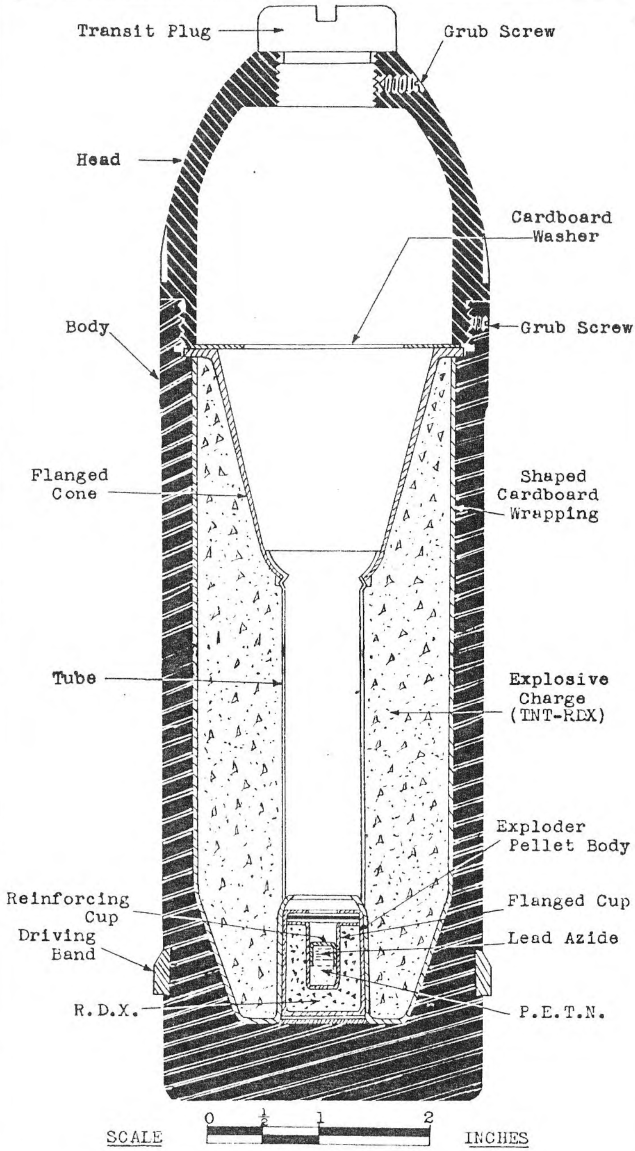
75 MM TYPE 2 HOLLOW CHARGE A P SHELL

FIG 2 COMPONENTS

(A) Body. (B) Head. (C) Transit Plug.
(D) Bursting Charge. (E) Lining of Charge.



75 MM HOLLOW CHARGE AP SHELL FIG 3



TAIL FUSE B-7(A)

1. GENERAL

This fuse was recovered in New Guinea. It is an army type tail impact fuse and can be threaded into the Japanese 250 Kg GP bomb. As an impact fuse, it is unusual in employing a spring loaded striker and trigger release system somewhat similar to the clock in the Japanese Navy aerial burst bomb and projectile fuses. The spring loaded striker gives more positive action on light impact.

2. DESCRIPTION (Figs 1-4)

Fuse consists of the vanes, upper fuse body, spacing ring, lower fuse body and the gaine.
The striker, springs, screws and nuts, anti-binding studs, trigger and three spacers are all made of steel.
All other parts are brass.

(a) Vanes: Consist of four blades, each with a round hole and are locked to the arming spindle by a set screw in the hub. A small anti-binding stud protrudes below the hub.

(b) Upper Fuse Body: Lower part of this portion of the fuse is threaded to match the fuse pocket. Above the threads is a flange to rest against the end face of the tail cone. The body above the flange is conical except for six wrench flats. In this conical section are two vertical holes for the safety fork. A small anti-binding stud on the top of the body engages the one on the vanes. The safety fork is of standard army shape with two prongs that fit down between the blades of the vane into the two holes in the body. The fork is tied in place by a piece of string attached to its top.
The arming spindle is a round shaft threaded at the top with right hand threads to attach to the vanes.
Finer left hand threads at the bottom fit into the inertia block. These are the only left hand threads in the fuse. The smooth space between the threads is broken by a flange at about the centre of the spindle.
In the unarmed position, the flange bears against the top of the spacing ring and serves to position the arming spindle so that the vanes are just close enough to the fuse body.
In the armed position, the flange prevents the spindle and vanes from falling out of the upper body.

(c) Spacing Ring: This ring serves to hold the inertia block down against the creep spring, reducing the distance the block has to move on impact. An 3/DD
extension, on top of the ring, is threaded externally to fit into the upper fuse body. The ring and extension are centrally drilled to accomodate the arming spindle. The ring has three vertical holes for the screws which attach it to the lower fuse body and two spanner holes on the side. The bottom of the ring contains a circular recess around the arming spindle hole to house the top of the inertia block.

(d) Lower Fuse Body: This part houses the firing mechanism and primer cap. It is a solid cylindrical block threaded at the bottom for the gaine adapter. Accomodation is also provided for striker, inertia block, inertia block key and three assembling screws. The individual parts which fit into the lower fuse body are - inertia block and creep spring, inertia block key and its spring and spring retaining screw, assembling screws, striker, firing spring, primer carrier and the gaine adapter.
The trigger and spring are mounted on the top of the lower fuse body.
The lower end of the cylindrical inertia block is stepped down to a smaller diameter to serve as a guide for the creep spring; the upper end contains a key slot. It is threaded internally from the top to take the arming spindle and fits on top of the creep spring into a hole equal to its larger diameter.
The inertia block key consists of a small pin with an enlarged head to bear against its spring. It is placed into the lower fuse body through a side hole so that its smaller end fits into the slot in the inertia block. A small spring is positioned behind it and compressed by the spring retaining screw which threads into the side hole flush with the lower fuse body.
Three assembling screws and cylindrical steel spacers position the spacing ring at the proper distance from the lower fuse body. The screws pass through the lower body from the bottom and protrude out the top. Three small nuts are used to hold the spacing ring against the spacers.
Lower part of the striker has a flange for the firing spring and the upper part is slightly flattened on the sides to fit into the smaller elongated top portion of the striker hole. A notch in this flattened portion engages the trigger; the upper shoulder of the notch is bevelled to exert a camming action against the trigger, tending to force it out of the notch. The firing spring fits around the striker in the enlarged lower portion of the striker hole.
The primer in a copper cup is crimped into a primer carrier. The carrier screws into the bottom of the striker hole. The gaine adapter is a brass ring threaded externally to screw into the lower body and internally to take the gaine. There are two spanner holes in the lower face.
The trigger is a flat irregularly curved key pivoted on a screw threading into the top of the lower body. One end bears against the trigger spring. The other end, in the cocked position fits in the striker notch and bears against the upper part of the inertia block, thus preventing the trigger from pivoting. The trigger spring is a piece of piano wire anchored at one end in a small hole in the lower body. It is bent around a small pin so that the other end fits against one end of the trigger and tends to make the trigger pivot.

(e) Gaine: This is a standard Army type similar to the A-2(a) gaine. It is a brass cup threaded externally at the top to screw into the gaine adapter. The lower portion contains the cyclonite sub-booster; a lead azide core is pressed into the top of this charge to serve as detonator. A small cup containing a black powder relay is threaded into the top of the gaine. Although no booster was found, presumably a booster charge in a brass cup threads into the lower body below the gaine adapter and fits around the gaine. The fuse is assembled by working the striker and trigger into the cocked position, inserting and keying the inertia block, and then securing the spacing ring in place with the assembling screws. The inertia block is thus partly depressed against the creep spring. The arming spindle and upper fuse body can then be attached and the vanes screwed to the arming spindle.

3. GENERAL DATA

Fuse Characteristics:

Weight of fuse complete -- -- --	713 gms
" " inertia block -- -- --	16 gms
" " striker -- -- -- --	1.8 gms
" " primer -- -- -- --	.30 gm
" " gaine complete -- -- --	13.95 gms
" " black powder relay -- --	.28 gm
" " lead azide detonator -- --	.27 gm
" " cyclonite sub-booster --	1.29 gms

Length of fuse over-all with gaine --	4-5/8 ins
" " gaine -- -- -- --	15/16 in.
" " fuse above fuse pocket threads	1-1/4 ins
" " fuse below fuse pocket threads (less gaine and booster container) -- -- -- --	3 ins
" " striker -- -- -- --	1-3/16 ins
" " inertia block -- -- --	15/16 in.

Diameter of fuse body above threads --	2 ins
Diameter of fuse body below threads --	1-7/16 ins
Diameter of gaine body -- -- --	7/16 in.

External threads of fuse body:	
Outside diameter -- --	1-13/16 ins
Length of threaded portion --	5/16 in.
Threads per inch -- --	8
External threads of gaine:	
Outside diameter -- --	5/8 in.
Length of threaded portion --	7/32 in.
Threads per inch -- --	36

4. MARKINGS

Stamped on the fuse body above the threads are characters meaning "Osaka Army Arsenal, July 1943". Painted in purple ink on the gaine is another set of characters being translated as "lead azide".

5. OPERATION

On release from the aircraft, the vanes rotate the arming spindle clockwise unscrewing it from the inertia block, which is keyed to prevent rotation. The flange of the arming spindle prevents spindle and vanes from coming completely off the fuse body.
On impact the inertia block moves down against the creep spring. As soon as the top of the block sinks flush with the top of the lower fuse body, the trigger

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is free to pivot under the influence of the trigger spring and the camming action of the striker notch. It pivots clear of the striker and permits the firing spring to fire the striker into the primer. The primer flash ignites the black powder relay on top of the gaine. The black powder flash sets off the lead azide detonator; the detonating wave initiated by the azide detonates the cyclonite sub-booster which in turn will detonate the booster.

6. REMARKS

This fuse with its spring-loaded striker makes for a dangerous UXB. Since the vanes do not fall away and the arming spindle may go back down into the fuse body on impact, it is never safe, in the case of a UXB, to assume that the fuse is unarmed. It should further be noted that separation of the spacing ring and lower fuse body, by permitting the creep spring to force the inertia block up and bring its smaller diameter opposite the trigger, allows the trigger to pivot and release the striker. No drastic action should be taken which might shear the assembling screws while the fuse is still in the bomb.

(SOURCE:- M.E.I.U.)

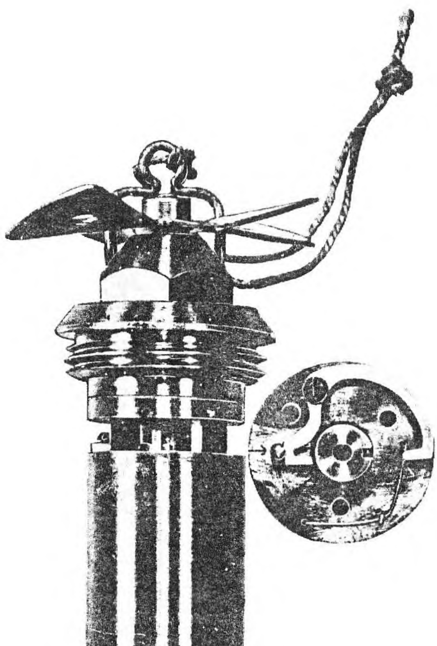
CORRIGENDUM

AMF Tech Int Sum No. 14 Pages 17-23, 7.7 mm (JUKI MG) Ammunition.

This should read 7.7 mm A/C MG Ammunition.

TAIL FUSE B-7(A)

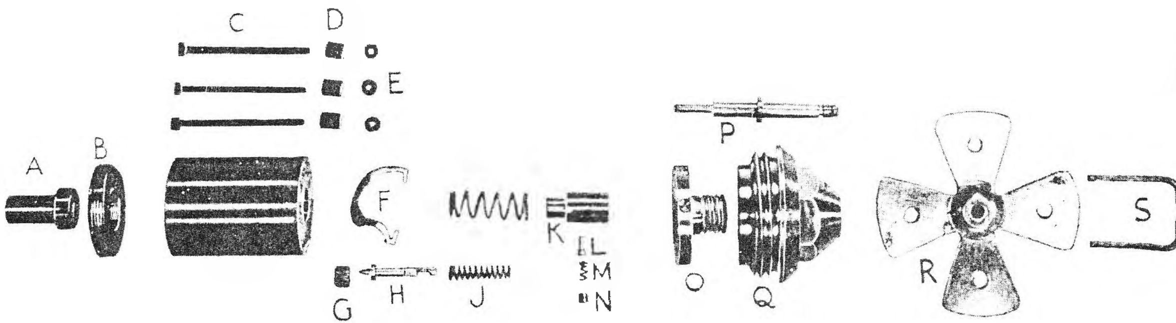
FIG I



TAIL FUSE B-7(A)

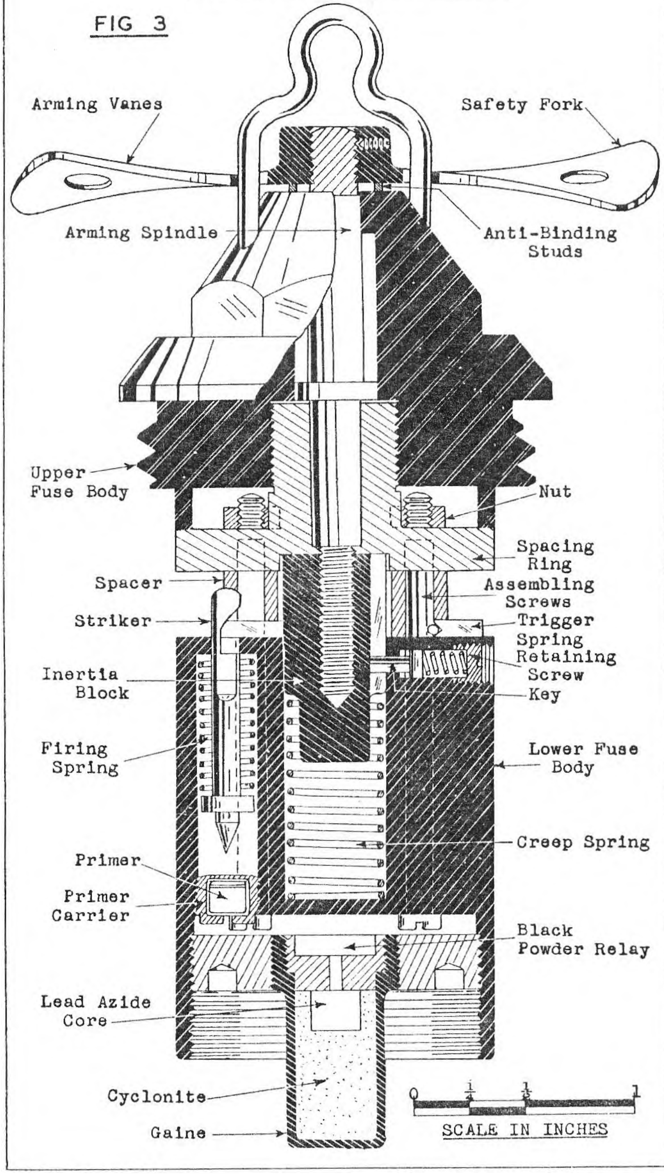
FIG 2 COMPONENTS

(A) Gaine. (B) Gaine Adapter. (C) Assembling Screws. (D) Spacers. (E) Nuts. (F) Trigger. (G) Primer Carrier. (H) Striker. (I) Creep Spring. (J) Firing Spring. (K) Inertia Block, (L) Key. (M) Spring. (N) Spring Retaining Screw. (O) Spacing Ring. (P) Arming Spindle. (Q) Upper Fuse Body. (R) Arming Vanes. (S) Safety Fork.



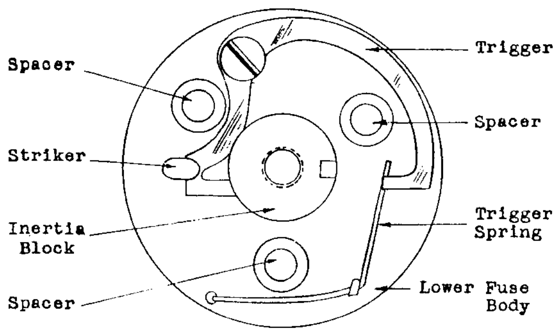
TAIL FUSE B - 7(A)

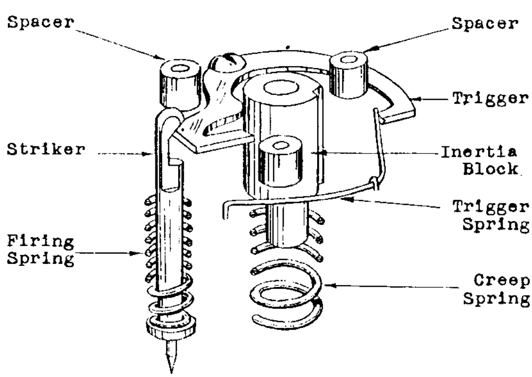
FIG 3



TAIL FUSE B-7(A)

FIG 4





TRIPLE BARREL SIGNAL PISTOL

1. GENERAL

The pistol was recovered in the Admiralty Islands area and is believed to be of naval design as the top of the firing mechanism is stamped with an anchor design. Report on Single Barrel Signal pistol appears in AMF Tech Int Sum No. 12, pages 34-36.

2. DESCRIPTION (Figs 1 - 3)

(a) Construction: It is made of steel with black baked enamel finish and is equipped with plastic grips. The three main parts are (i) barrel assembly; (ii) firing mechanism housing; (iii) the body.
The slightly tapered barrels are smooth bore and are marked with coloured stripes as follows:- Left barrel with a red marking, top barrel white and right barrel with a green marking.
The barrels can be fired only singly and are loaded with the various kinds of ammunition corresponding to the colour markings on the barrel. Leather carrying case for the pistol is equipped with shoulder strap and belt loops.

(b) General Data:

Weight of pistol --	-- 3 lbs 11 oz.
Length of barrel --	--102 mm
Bore diameter at muzzle	-- 26.8 mm
Bore diameter at breech	-- 28.4 mm

(c) Markings:

Top of firing mechanism housing	- Anchor
Serial Number -- -- --	3861
Patent Number -- -- --	93006

3. OPERATION

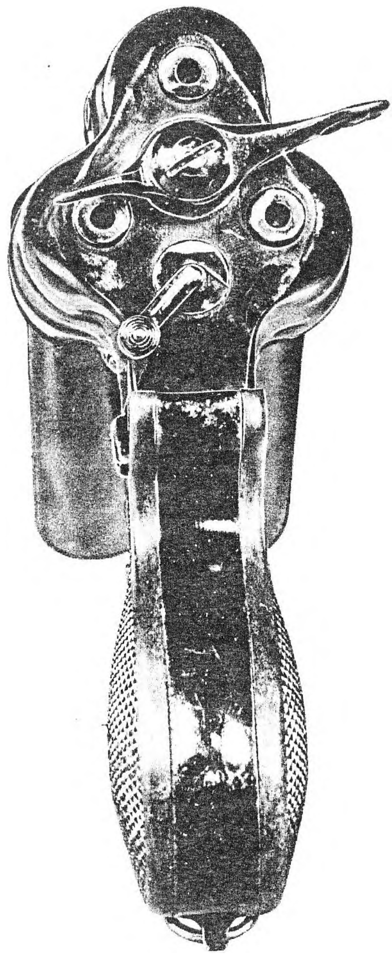
Pistol is opened for loading by pulling forward on the spring loaded release lever and forcing both ends of the pistol downwards - upward movement of the safety lever places the pistol in the firing position - downward movement of the lever renders the pistol safe - an anti-clockwise movement of the Cocking Lever cocks all three spring-loaded firing pins. Each firing pin has its own sear and movement of the barrel selector lever to the desired stop, directs the movement of the trigger to the proper sear, releasing the relative firing pin, thus firing the round in the selected barrel. The three stops on the barrel selector lever are as follows:- left and right hand stops for the left and right hand barrels respectively and the central stop for the top barrel.
During firing, the barrel assembly and firing mechanism recoil on the body against a recoil spring in the body.

(SOURCE:- USASOS)

TRIPLE BARREL SIGNAL PISTOL

FIG I

Back of Pistol, showing Cocking Lever and Barrel Selector Lever.



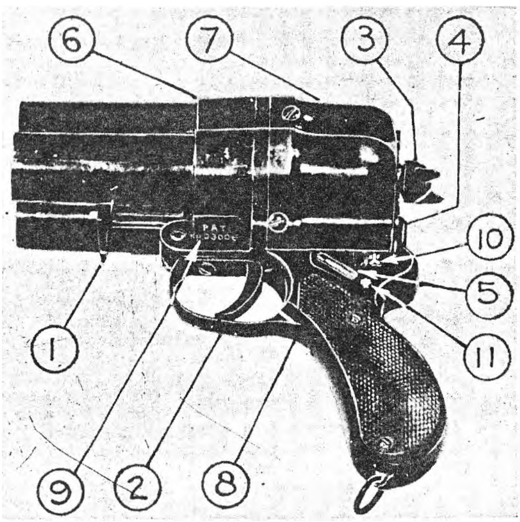
TRIPLE BARREL SIGNAL PISTOL

FIG 2

TRIPLE BARREL SIGNAL PISTOL

FIG 3

(1) Barrel Release Lever. (2) Trigger.
(3) Cocking Lever. (4) Barrel Selector Lever.
(5) Safety Lever. (6) Barrel Assembly. (7) Firing Mechanism Housing. (8) Body. (9) Patent Markings.
(10) 'FIRE' (11) 'SAFE'



50 MM TENTH YEAR TYPE 'A' FLARE

1. GENERAL

This flare was recovered in New Guinea in September 1943. According to the translation of the label on the container, it is used as a flare. However, considerable incendiary effect would be caused by the filling which burns with an intense white flame, emission of the flames being facilitated by four groups of ports in the body.

2. DESCRIPTION (Figs 1 - 3)

The flare consists of a brass case, hemispherical at the nose, containing the flare filling. The lower end of the case is closed by a base plate, into which screws a cylindrical propellant attachment.

(a) Case: The case is 22 S.W.G. brass increasing to 18 S.W.G. at the nose and is covered with clear lacquer. Four groups of ports, each of seven small circular holes pass through the case near the base. Each group is covered with a disc of metal foil and a disc of tissue paper. The casing is firmly attached to the base plate by crimping of the brass and by three screws. There is no copper driving band. The aluminium alloy base plate is pierced near its edge by two diametrically opposite holes lined with brass bushes containing delay pellets. The pellets are 3.5 mm in diameter and 15 mm in length. Between the inner surface of the base plate and the incendiary filling is a felt disc which is pierced by two holes opposite the delay pellets.
The ignition mixture pellets are immediately above the delay pellets and project about 5 mm into the main filling, with which they are in direct contact.

(b) Propellant: This consists of a steel casing which screws into the base plate and holds a 31 S.W.G. copper cup containing the propellant charge. Six gas escape ports pass through the sides of the steel casing.
A steel plug, holding the percussion cap, screws into the base of the propellant unit. The plug is centrally pierced by a firing pin hole.
The lower compartment of the cap contains a detonating composition and connects by two small flash holes with the inner compartment containing a black powder primer. The inner surface of the plug is sealed with waxed paper. A centrally perforated steel disc separates the primer from thepropellant charge. Two keyholes are provided on the sides and on the base of the propellant unit.

(c) Analyses:

(i) Flare Filling:

Potassium Nitrate	--	49%
Aluminium --	--	22%

Antimony Trisulphide	--	8%
Sulphur, wax, charcoal (by difference)	-- --	21%

(ii) Ignition Pellets:

Potassium nitrate	--	--	54.7%
Aluminium powder	--	--	18.7%
Wax + Sulphur	--	--	16.5%
Antimony Sulphide	--	--	5.8%

(iii) Delay Pellets:

Wax + Sulphur	--	--	45%
Potassium Perchlorate		--	35%
Carbon -- -- --		--	15%

Shellac (on outer layers of pellet)

(iv) Propellant Charge:

1.1 gms (17 grains) of grey brown flake nitrocellulose, each flake being approximately 1 mm square. The charge only half fills the copper container.

(v) Primer: 0.08 gms (1.2 grains) of a medium grained black powder.

Potassium nitrate	--	74%
Sulphur --	--	11%
Carbon (by difference)	--	15%

(d) Container: The flare is packed in a close fitting container of 24 S.W.G. tinplate with pressed and soldered seams. Cardboard discs are fitted inside the base and the lid of the container; a strip of adhesive tape seals the lid.

(e) General Data:

Total weight of flare	--	--	573 gms
Flare filling --	--	--	315 gms
Base plate --	--	--	64 gms
Brass case --	--	--	102 gms
Propellant unit --	--	--	92 gms
Overall length of flare	--	--	150 mm
Diameter of brass case	--	--	49 mm
Diameter of base plate	--	--	50 mm
Total length of propellant unit		--	31 mm
Diameter of propellant unit		--	26 mm

(f) Markings: The mark of the Tokyo Arsenal is stamped on the base plate. On the nose, base plate and propellant unit is stamped a small Japanese character "HI", probably an inspection mark. Translation of characters on paper label on lid is:- "Tenth Year Model Type A Flare May 1939 Tokyo Arsenal"

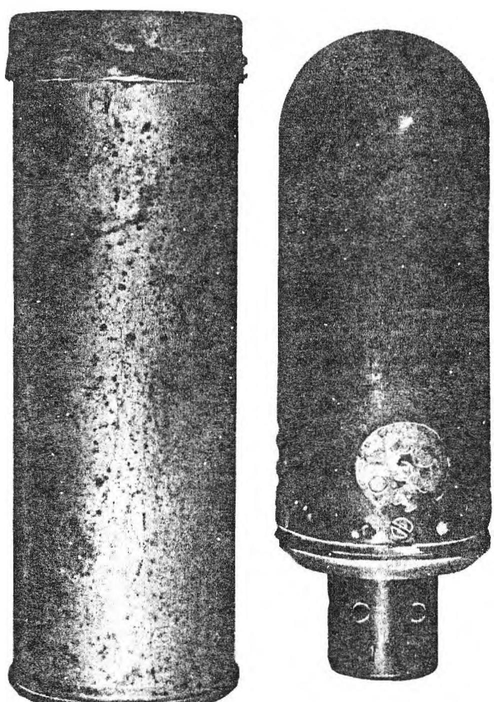
3. FUNCTION

The flash from the detonating composition passes through the flash holes in the percussion cap and ignites the black powder primer, which in turn ignites the propellant charge. The gases from the explosion of the latter burst through the copper cup and ports, propelling the flare and igniting the delay pellets. These initiate the ignition pellets and flare filling.

(SOURCE:- 2/1 AUST C.W. LABORATORY, R.A.E.)

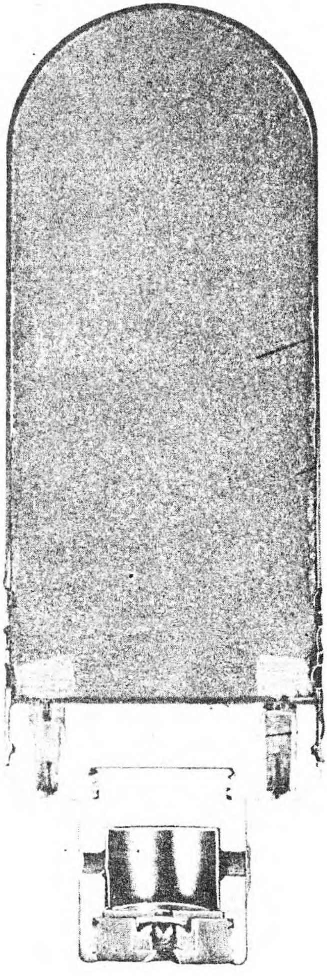
50MM TENTH YEAR TYPE 'A' FLARE

FIG I FLARE & CONTAINER



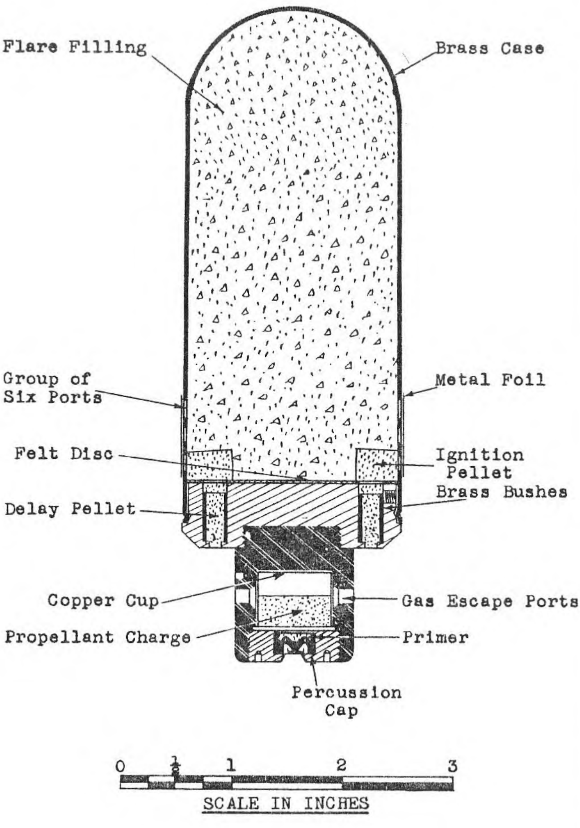
50 MM TENTH YEAR TYPE 'A' FLARE

FIG 2 SECTION VIEW



50 MM TENTH YEAR TYPE 'A' FLARE

FIG 3



1 KG SMOKE GENERATOR MODEL 4

1. GENERAL

This generator, recovered in New Guinea, was manufactured in 1940 by Naval Technical Laboratory.

2. DESCRIPTION (Figs 1 & 2)

(a) Construction: It is cylindrical in shape and is painted on the outside with a clear lacquer. The generator is constructed of 29 SWG tinned iron and the seams are all rolled, pressed and soldered. On the top of the generator is a lid pressed out of the same material. There is evidence that the lid was originally sealed to the generator with adhesive tape. On removing the lid the wooden striker block is exposed. This block appeared to have been originally coated on the upper surface with a striker composition. The under surface of the striker block is recessed to fit over the match head which is protected by a cellophane pad.
On the top of the generator, beneath the striker block, are stamped the number "34" and the letter "A".
In the centre of the top of the generator is a hole, diameter 15 mm, which is surrounded by a slightly depressed shoulder. Into this hole, and resting on the shoulder, is pressed and soldered a lead alloy dome shaped container. In the centre of its upper convex surface is a small circular hole through which the match head protrudes. The bottom of this container is enclosed by a layer of tissue paper, and the match head, which is approximately 7 mm long, extends down to this surface. Surrounding the match head in this container is the primer composition.
The ignition mixture is in a hemispherical tin container which is soldered into position under the match head and primer composition, and thus projects into the smoke mixture. On the side of the generator, near the top, are two oval smoke ports, 13 mm by 6 mm, which are sealed with tinned iron soldered on the outside.
General Data:

Total weight	-- --	1160 gms
Weight of Filling	--	990 "
Length	-- --	21.1 cm
Diameter	-- --	5.3 cm

(b) Smoke Mixture: This mixture is grey and moist, smelling strongly of carbon tetrachloride.
Analysis showed the composition to be:-

		Per Cent
Carbon tetrachloride) Hexachlorethane)	-- --	34.6
Zinc Oxide	-- -- -- --	36.7
Zinc	-- -- -- --	22.1
Zinc Chloride	-- -- -- --	1.2
Kieselguhr	-- -- -- --	5.4

(c) Match Head: The match head is a dark greenish grey material weighing 0.3 gm. Analysis gave the following approximate composition:-

Match Head	Per cent
Potassium Chromate	30
Antimony Trisulphide	50
Ferric Oxide (by difference)	20
Organic Binder	0.6

(d) Primer Composition and Ignition Mixture: These have the same qualitative composition. The primer composition weighs approximately 0.3 gm and contains the following:-

	Per cent
Potassium Chlorate	42
Aluminium	29
Ferric Oxide	28
Organic Binder	0.8
Antimony Trisulphide	trace

The ignition mixture is tightly packed and weighs approximately 2.8 gms. In the mixture a red and a metallic powder can easily be distinguished. Analysis showed a considerably lower percentage of potassium chlorate than in the primer composition:-

	Per cent
Potassium Chlorate	12.7
Aluminium	43.8
Ferric Oxide	43.0
Organic Binder	0.5
Antimony Trisulphide	trace

(e) Translation of Label: Label attached to lid of generator is translated:-

"1 Kg Smoke Generator, Revision 4
Manufactured December 1940
Naval Technical Laboratory."

Another label on the side of the generator is translated:-

Use and Handling of 1-Kilogram Smoke Generator

I. Use.

a. Remove Cap.
b. Light match head by striking with scratch board within cap.

II. Precautions in use.

a. Because of pyrotechnical emission, wear work gloves, and turn face away when igniting.
b. Do not subject to shocks until sufficient smoke is produced after ignition.
c. Do not shake up and down. There is danger of exudation of the carbon tetrachloride in the mixture if the smoke compound is strongly active.
d. Radius of smoke discharge is approximately 2 metres. Do not use smoke near inflammable objects because of the pyrotechnical discharge.
e. When producing smoke on ships, place in wash

buckets.

III. Precautions in storage.

a. Store in location of low temperature and humidity as much as possible."

3. FUNCTIONING TRIALS

One generator was tested. For 4½ minutes a greyish white smoke was discharged, mainly escaping through the centre hole in the top. The oval smoke ports opened but appeared to become blocked periodically. The progress of the burning of the smoke mixture could be followed by a blackening of the outside of the generator.

4. COMPARISON OF REPORTS

This model generator has also been reported by 42nd Chemical Laboratory and Munitions Supply Laboratory. Comparison of these results is shown in the following table:-

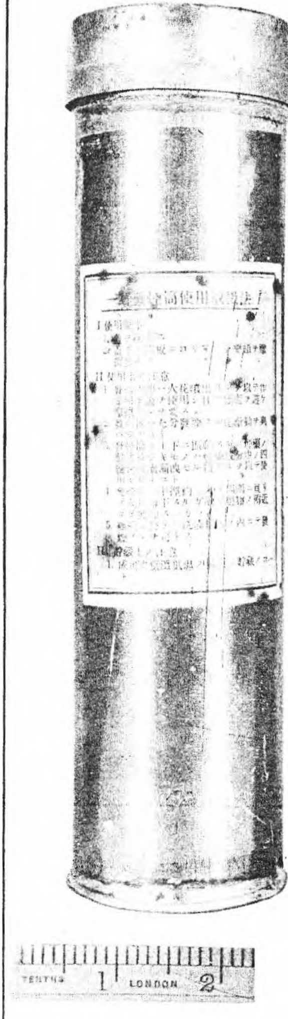
COMPARISON OF RESULTS OF EXAMINATIONS

	42nd Chemical Lab.Coy CMTR No.24	CD (Aust) Report No24	2/1 Aust CW Lab Folio 43
Date of manufacture	Dec 40	Dec 40	Dec 40
Total weight	880 gm	1074 gm	1160 gm
Weight of smoke filling	752 gm	936 gm	990 gm
Smoke mixture:-			
Carbon tetrachloride	35.7	32 (some HCE)	34.6 (some HCE)
Metallic zinc	28.3	27	22.1
Zinc oxide	30.2	34	36.7
Zinc chloride	1.6	2	1.2
Inert material	4.2	5 (Kieselguhr)	5.4 (Kieselguhr)
Ignition mixture:-			
Aluminium	-	47	43.8
Ferric oxide	-	41	43.0
Potassium chlorate	-	12	12.7
Organic binder	-	-	0.5
Antimony trisulphide	-	-	trace
Primer composition:-			
Aluminium	-	37	29
Ferric oxide	-	32	28
Potassium chlorate	-	31	42
Organic binder	-	-	0.8
Antimony trisulphide	-	-	trace

(SOURCE:- 2/1 AUST CW LABORATORY, RAE)

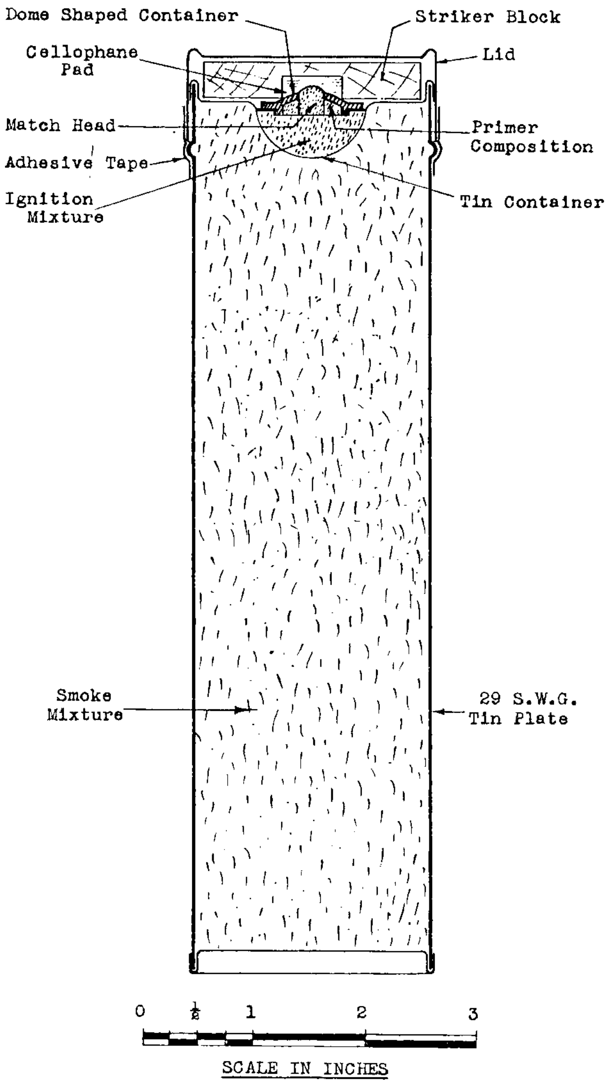
I KG SMOKE GENERATOR MODEL 4

FIG I TOP & SIDE VIEWS



1 KG SMOKE GENERATOR MODEL 4

FIG 2



RIFLE OIL

CHARACTERISTICS

Sample of Japanese rifle oil was found to have the following properties:-

Specific Gravity 60°F.	--	0.928
Viscosity - Centistokes at 70°F.	--	310
(Comparable with SAE 30 engine oil)		
Saponification Value - mg KOH/g	-- -- --	Less than 1
Ash %	-- -- -- --	Trace

Sulphur and phosphorus were found to be present in negligible quantities only. The oil does not contain compounds of the halogens or nitrogen.

None of the additives commonly blended with such oils were detected and it therefore appears that the sample is a straight mineral oil.

This would explain its poor performance in the corrosion tests.

(SOURCE:- MUNITIONS SUPPLY LABORATORIES)
through MGO Branch

DYNAMITE

1. GENERAL

Samples recovered in the Marshalls were very near the same composition as US commercial product 60% Blasting Gelatin.

2. DESCRIPTION (Fig 1)

It is made in individual dark brown sticks wrapped in paper. It is plastic and is thus capable of being moulded. When handled, it resembles an oily mass of putty.
Each stick is 1.06 ins in diameter and 4 ins long.
The carton in which the sticks are packed measures 8.25 ins in length, 4.5 ins in width and 3 ins in height.
Analysis of explosive is as follows:-

Nitroglycerine	47.4%
Potassium Nitrate	38.9%
Moisture	2.57%
Nitrocellulose	1.46%
Combustible Absorbent	9.52%
	99.85%

3. MARKINGS

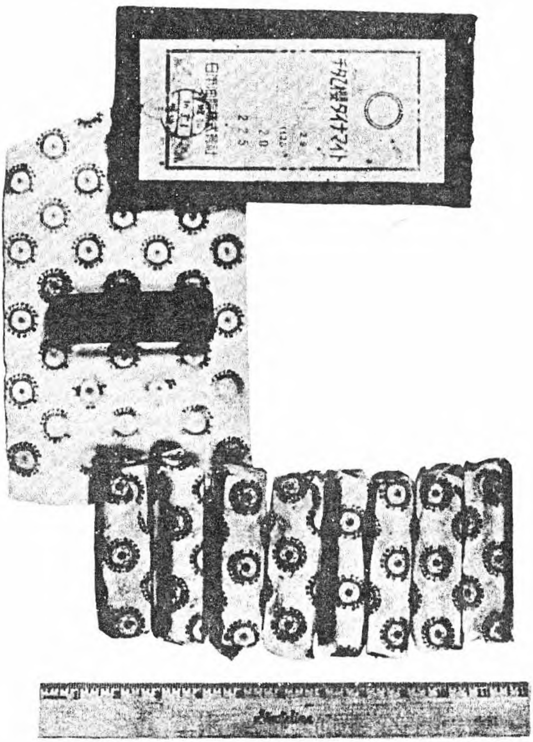
All characters on stick wrappers and the carton are in an orange colour on a white background. The date stamp on the carton is in black ink.
Translation of characters on carton is as follows:-

"Cherry Brand Dynamite
20 Sticks per carton
Weight of each stick 112.5 gms
Total weight of carton 2.25 kg
Manufactured 1 March 41
Japan Oil Co Ltd
(Dangerous if frozen)"

(SOURCE:- AC of S, G2 USAFISPA)

DYNAMITE

FIG I



TYPE 90 SPEED & COURSE ANGLE CALCULATOR

1. GENERAL

(a) This calculator was the subject of a report in LHQ Tech Int Sum No. 5, pages 72-79. The following amplification should be read in conjunction with Part C of that report, and is published in order to remove certain confusion that has arisen regarding theoretical principles governing the use of the apparatus.

(b) The speed calculation is based on a principle which is only an approximation. As a consequence of this fact, the results obtained are inaccurate most of the time (depending on the angle of approach and elevation of target), the maximum error being as great as 13%.

(c) The calculations are based on the assumption that the target is moving in a horizontal plane, keeping speed and direction constant. The instrument is therefore inapplicable for climbing and diving targets.

(d) In all references it has been stated that the speed is measured and expressed in seconds. This is correct in so far as the apparent, measured speed is concerned. The calculated speed, however, as finally obtained from the speed curve, is not expressed in seconds, but in metres per second. Apparently this fact has been overlooked and, as a result, the maximum speed beyond which the apparatus cannot make any indication has been determined as being 500 metres in 5 seconds, or 224 mph. This is incorrect.

2. LIMITATION OF MEASUREMENTS

(a) The greatest target speed that can be measured by the instrument is 180 metres per second, which is 402.6 mph. The minimum speed limit is 5 metres per second, or 11.2 mph. The special features of the calculator do not allow, however, applying the full range between 11 and 402 mph. for any position of the target with respect to the apparatus. This is a consequence of the principle of measurement on which the instrument is based. Briefly this principle is as follows: When observing a target through the telescope, the observer sees, besides the target, the cross hairs and the two concentric ellipses on the reticle of the instrument. The larger (smaller) ellipse is the projection of an imaginary circle of radius 500 metres (250 metres) at an altitude of 3000 metres above ground level and at an elevation of 45°. The speed measurement is made by observing the time required by the target to fly from the cross hairs to the circumference of the ellipse. This measurement is in fact a measurement of angular speed. The critical angle of observation (the angle formed between the rays passing through the cross hairs and the edge of the ellipse) remaining constant for constant angle of approach it is clear that for constant target