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AUSTRALIA

AUSTRALIAN MILITARY FORCES

TECHNICAL INTELLIGENCE SUMMARY

No. 16

JULY, 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
JULY NO 16 1944
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25 MM AA TK/A GUN

FIRE CONTROL MECHANISM

Addendum to reports in AMF Tech Int Sum No. 11.

1. FIRE CONTROL

Two types of fire control are known to be used with this weapon.

(a) The simplest types are the spindle and ring sights (Fig 1). The only unusual feature is a range scale in the rear spindle sight, which is probably used for range adjustment when firing against vessels. The four rings of the front sight are marked 100, 200, 300 and 400 kph, apparently being allowances for target velocities.

(b) The optical and computing sight system is shown in Figs 1-3 pages 44-46 AMF Tech Int Sum No.11. Fig 2 of this report shows in greater detail some of the computing elements of this mechanism. No data is available on the optical components of the mechanism. The two sight mounts are linked to move together. The fire control mechanism is essentially a system of cams and variable linkages which automatically compute and place on the sights, lead and superelevation, using data supplied by the operator.

The computing mechanism is based on the assumption that the ship or gun position will be the target of the aircraft and that it will pass over or near the gun position. The correct prediction cannot be made if the course of the aircraft does not carry it over the gun position.

On the front of the computing mechanism is a "Self-Speed" dial calibrated in knots from 0 to 45. The speed of the ship is set and the dial is locked in position by a lock-nut.
The angle of dive or climb is set on the dive indicator by manually tilting the representation of an aircraft fuselage to the proper angle. Angles of dive or climb from 0 to 50 degrees can be corrected for, in this mechanism. Speed and distance scales are also provided and can be seen in Fig 2. The inner scale is operated by the rear handle and is calibrated for slant range in metres from 500 to 3800 (approx 1600 to 12700 ft). The outer scale is operated by the upper handle and is calibrated for speed of target in kilometres per hour from 0 to 380 (approx 230 mph). The horizontal scale is for angle of approach and is graduated from 0 to 180 degrees both sides of centre. The angle of approach is set automatically. As the guns are rotated, the motion is transmitted to the computing mechanism through a collapsible rod. The angle of approach cannot be manually corrected; therefore, if the aircraft is flying on any course other than one which will carry it over the gun position, the wrong angle is automatically placed in the mechanism.

(SOURCE:- AC of S, G2, USAFISPA)

25 MM AA TK/A GUN

FIRE CONTROL MECHANISM

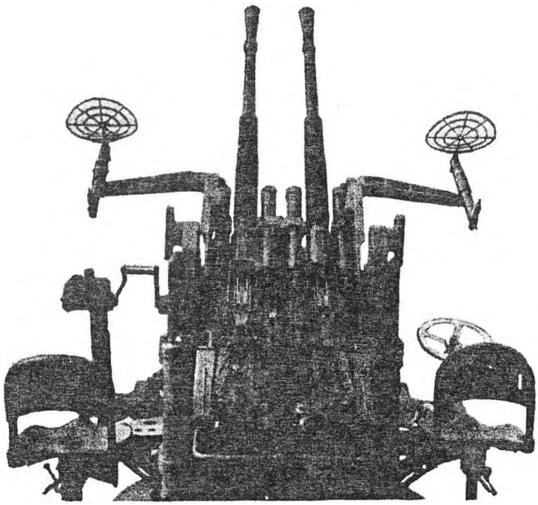


FIG 1 Spindle and Ring Sighting Gear.

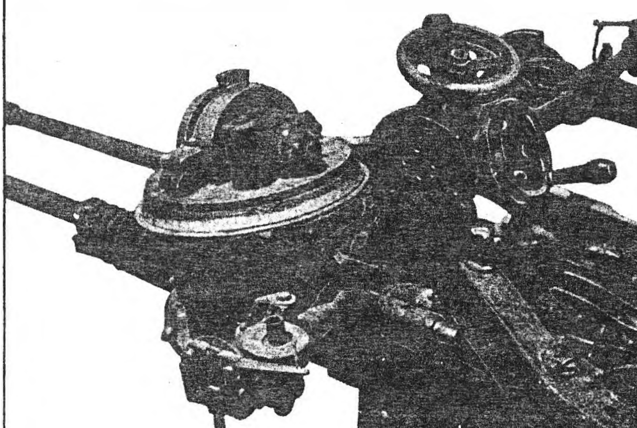


FIG 2 Fire Control Mechanism.

DUAL 40 MM AA GUN

Addendum to Report in AMF Tech Int Sum No.12, pages 3-7.

1. USES

Although this gun could be an effective Tk A gun when used with AP rounds, the location and emplacement of these guns in the Solomon Islands area indicated that they were not considered Tk A guns by the Japanese. These weapons were so deeply emplaced and so sited that their use as Tk A guns would be impossible. In addition, two of these guns were recovered from the vicinity of an air strip.

2. AMMUNITION SUPPLY

Several hoppers are supplied for each dual mounted gun. These hoppers are equipped with small wheels. The hoppers are wheeled up the ramps on each side of the gun, and snapped into place at the end of the ramps. The wheels on the hoppers are seen on page 5 of the above Summary (Fig 1) while a clear illustration of the ramp is shown in Fig 2 page 6 of the same Summary.

3. RANGE AND ALTITUDE SETTING DEVICES.

The central part of the fire control system shown in Fig 3 page 7 Tech Int Sum No. 12 is the small section containing the AA Distance Drum (calibrated in metres), the Horizontal Distance Scale located at the bottom of the Distance Drum housing, (calibrated in metres), and a small colour scale at the left of the AA Distance Drum. The AA Distance drum is geared to elevating mechanism of the guns so as to cause the drum to move from the top towards the bottom as the gun is elevated and in opposite direction on depression of the gun. A two-sided pointer moves along both Drum and Scale. Movement of the pointer is effected by rotation of the handwheel shown at the left of the AA Distance Drum in Fig 3 page 7 Tech Int Sum No.12. A number of lugs, mounted on the shaft of this handwheel prevents rotation beyond a certain point in either direction, thus eliminating gear jamming.
At the left side of the AA Distance Drum a small colour scale is divided into equal sized coloured segments, the colours from top to bottom being as follows - light blue (or white), red, dark blue, white, dark blue, green, maroon, light blue, green. A pointer, approximately same width as one coloured division, moves underneath this scale. The function of the scale has not yet been determined.
As the handwheel to the left of the drum is rotated, three visible motions occur; the fuse drum setting is changed, the pointer on the colour scale moves, and the double pointer on the Horizontal Range Scale and AA Distance Drum moves. When the handwheel is turned so that the double pointer moves to the left or towards decreasing ranges, the pointer of the colour scale moves downward and the setting on the fuse drum is decreased. It is possible that other motions are transmitted to

the main gear system housed in the section containing the rotating drum.

4. FUSE ADJUSTMENTS

In addition to the motion of the fuse setters caused by rotation of the range handwheel, two other mechanisms actuate the fuse setters. Firstly, elevation of the guns causes a movement of a gear segment which operates among the gears near the Fuse Correction Disc. Secondly, a manual fuse correction device permits correction of fuse settings from observed bursts. Fuse Correction Disc (Fig 1) can also be seen in the side of the circular section of the upright on the left of the ammunition ramp in Fig 2 page 6 Tech Int Sum No. 12.
The Fuse Correction Arm is graduated in intervals of 500 metres from 1000 to 4000 metres. The Fuse Correction Disc has curves calibrated for overs and shorts at intervals of 100 metres from 100 to 1000 metres which probably represent ranges. The observed error in burst is set on the curve opposite the range on the movable arm.

5. ADDITIONAL CORRECTION MECHANISM

(a) A large mechanism for leads and superelevation is located above the AA Distance Drum and is shown in Figs 2 & 3, pages 6 & 7 Tech Int Sum No. 12. This mechanism is connected to the sighting mechanism by a universal linkage. A series of gears is present around the full circumference as is seen in the above Fig 3. A large handle, which is not shown in the photographs, runs across the front of this mechanism, and enables the device to be rotated when pulled to the left or right, thus changing the lead on the sight mounts. Pulling the handle up or down causes motion towards the front and rear of the upper section on which the universal linkage is mounted, thus elevating and depressing the sights respectively.
In addition, rotation of the handwheel located to the right and below the AA Distance Drum causes elevation of this entire mechanism. The purpose of this is unknown; but it is possible that it is used for quick adjustment of sights for low flying aircraft, small vessels or to compensate for the roll of the ship on which the gun could be mounted.

(b) A small Correction Disc, located below the AA Distance Drum, is graduated from 0 to 150 and has a single Japanese character translated to mean "joint" or "connection". It is rotated by a small handwheel directly below the disc, causing an undetermined movement in the main gear mechanism housed behind the AA Distance Drum.

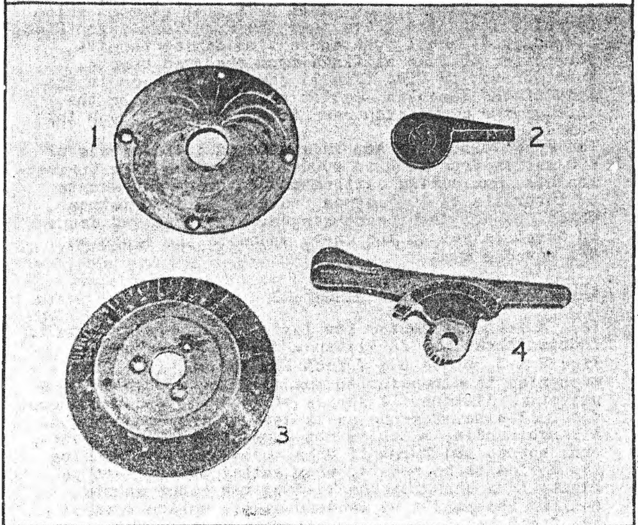
6. NIGHT LIGHTING DEVICE

Battery box with control panel is visible in Fig 1 page 5 Tech Int Sum No. 12. One of the light sockets can also be seen near the Correction Disc at the bottom of Fig 3 page 7 Tech Int Sum No. 12. This apparatus is not used for fire control.

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

DUAL 40 MM AA GUN

FIG I CORRECTION DEVICES



(1) Fuse Correction Disc.
(2) Fuse Correction Arm.
(3) Connection Disc.
(4) Angle of Dive Indicator.

TYPE 89 GRENADE DISCHARGER

FIRING ANGLE INDICATOR

Addendum to Report in AMF Tech Int Sum No.1 Pages 36-40.

1. GENERAL

This device is used to ensure that the discharger is held at the regulation angle of 45 degrees during firing.

2. DESCRIPTION (Fig 1 & 2)

Consists of a band of 1/16 in. steel 25/32 in. wide, attached to the barrel near the base, the band being clamped in position by bolt and nut 1/8 in. by 1/2 in. Triangular shaped lip on the band is contoured to fit the base of the barrel and is held in position by a 3/32 in. screw thus locking the indicator in place. The number stamped on the top of the steel band coincides with the number on the discharger.
When the indicator is in the correct position, a red line on the steel band corresponds with the sighting line on the barrel. A small indicator housing 1-5/32 ins in diameter and 1/2 in. wide is welded to the steel band. A slot, 7/8 in. long and 7/32 in. wide is cut in the side of the housing. A celluloid ring on the inside of the housing serves as a window for the slot. A horizontal red line in the centre of the window corresponds with a line on the outside of the indicator housing and thus forms the fixed firing angle.
The indicator consists of a triangular shaped hand with a small lead weight riveted to the bottom and which revolves on a threaded 1/8 in. shaft in the centre of the indicator housing. The indicator hand shows through the celluloid window and has a coating of luminous material for better visibility. The housing is enclosed by steel screw cap 1-1/4 ins in diameter.

3. OPERATION

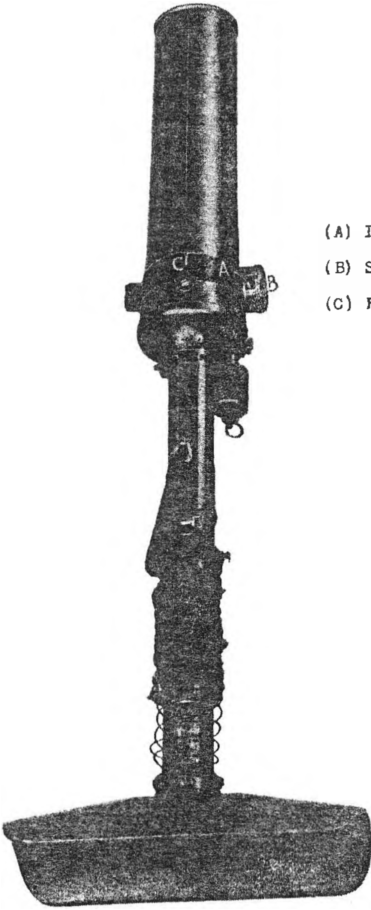
The red horizontal line on the celluloid window is centred on the luminated indicator hand. The grenade discharger is then at the correct firing angle of 45 degrees.

(SOURCE:- USASOS)

TYPE 89 GRENADE DISCHARGER

FIRING ANGLE INDICATOR

FIG I



(A) Indicator Window.

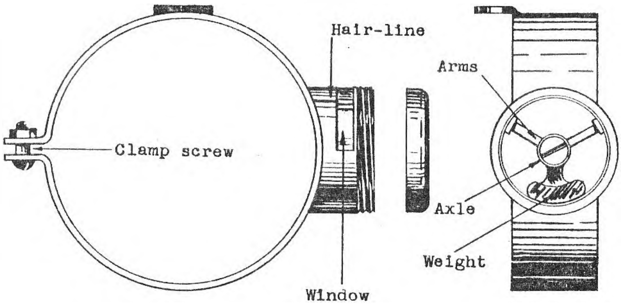
(B) Screw Cap.

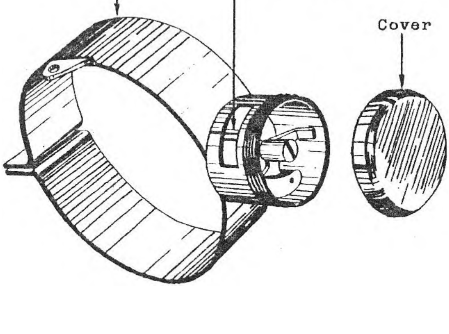
(C) Red Line on Steel Band.

TYPE 89 GRENADE DISCHARGER

FIRING ANGLE INDICATOR

FIG 2





1 ½ 0 1 2

Scale in Inches

12.7 MM (.50 IN) A/C AMMUNITION

Addendum to AMF Tech Int Sum Nos 7 & 9.

1. GENERAL

Further examples of this ammunition have been received assembled in a disintegrating belt having normal type, blued steel articulate links.

2. DESCRIPTION (Fig 1 - 8)

The rounds comprised HE/Incendiary (fused), HE/Incendiary (fuseless) and AP/Tracer rounds. Fig 1 shows the belt assembly containing only HE/I (fused) and AP/T rounds. The first two rows in this figure contain undamaged rounds built up by repetition of a unit of two AP/T and one HE/I (fused) rounds. The third row contains some damaged rounds in which the projectiles have been forced back into the cartridge case with consequent distortion and bending at the shoulders of the cases. The arrangement of types in the third row follows no regular system. The actual sequence of types in the belt as received is as follows, using letters A B & C for HE/I (fused), HE/I (fuseless) and AP/T rounds respectively CA, CCA, CCA, CCA, CCA, CCA, CCA, CCA, CCA, CCA, CCA, AAACAACABAACAACAA.
It is of interest to note that those HE/I (fused) rounds present up to the break in the regular sequence are dated either Nov or Dec 1942 while after this point they are dated either Feb or Mar 1943.
Distinguishing colour markings are situated at the junction of the projectile and case and are given together with dimensions as follows:-

	Colour	Length	Weight
HE/I (Fused)	White Band	10.7 cm	81.5 gms
HE/I (Fuseless)	Black Band	10.6 cm	79.5 gms
AP/T	White and Green Band	10.7 cm	83.8 gms

(a) Cartridge Cases: Semi-rimless brass cases have the following overall dimensions:-

Weight	37.5 gms (average)
Length	81 mm
Diameter of Rim	19.5 mm
" " Case above rim	18.25 mm
Diameter at Shoulder	16 mm

A brass percussion cap 6.5 mm in diameter and 3 mm deep is secured by ring punching in a cap chamber formed in the head of the cartridge case. The annulus is not lacquered.
The percussion cap contains 0.08 gms of a detonating composition covered by a metal foil lacquered in place, into which the Berdan type anvil deeply intrudes. An approximate analysis of the composition, which closely resembles British "A" mixture shows:-

Mercury Fulminate	36.4%
Antimony Sulphide	22.1%
Potassium Chlorate (by difference)	41.5%
	100.0%

Two flash holes connect the cap chamber with the main propellant chamber in the case.
The cases are crimped in different ways to each of the three types of projectile. In the HE/I (fused) rounds, three crimps are made into the lower cannelure of the shell, in a position 6 mm from the mouth of the case. The mouth is rolled into the upper knurled cannelure by six long almost contiguous crimps, and the junction sealed by white paint. In the AP/T rounds a similar procedure is followed, except that the three crimps into the lower cannelure of the projectile are situated 9 mm from the mouth of the case. Six, long, almost contiguous crimps hold the mouth of the case over the shoulder on the HE/I (fuseless) rounds, and the junction is sealed with a black paint.

(b) Propellant: The propellant is the same in all types and consists of approximately 8.8 gms of a tubular chopped graphited powder having the composition:-

Nitrocellulose	95.0%
Diphenylamine	1.6%
Dinitrotoluene (by difference)	3.1%
Graphite	0.3%
	100.0%
Moisture and Volatile Matter	1.0%

A strip of anti-fouling foil weighing 0.1 gms composed of 61.7% tin and 38% lead is present in each cartridge case.
The individual grains of powder vary in length between one and three mm and are 0.76 mm in diameter. The central perforation is 0.12 mm in diameter giving a web thickness of 0.32 mm.

(c) Projectiles:

(i) AP - Tracer: This projectile is 45 mm long, 13.08 mm in diameter and weighs 35.5 gms (average). It consists of an armour piercing core capped by a lead sleeve, pressed into an outer envelope.
The envelope was made from gilding metal of type 85% copper 15% zinc. D.P.H. ranged from 145 at the point to 110 at a position 3/4 in. from the base.
The core was made from a tungsten-chromium-vanadium steel including the following:-

Carbon	0.73%
Silicon	0.25%
Manganese	0.39%
Tungsten	1.94%
Chromium	0.60%
Vanadium	0.36%

The core had been hardened, probably by water quenching, the surface hardness ranging between D.P.H. Nos 660 and 810. The sleeve between the point of the core and the nose of the bullet had been made from antimonial lead containing 2.85% of antimony.
Two cannelures are present, the forward one is knurled and the rear one is pressed into a corresponding cannelure on the core. A brass washer, with a central 2.5 mm diameter perforation, covers the base of the core and is held by rolling the walls of the envelope. No markings were seen on the projectile.
A tracer composition with its primer is pressed into a

cavity in the rear of the core and is covered by a blue-lacquered silk disc. The priming composition is pressed with a conical shaped punch so as to present a deeply concave surface for ignition. The total weight of tracer and primer is 0.87 gms. The primer has the approximate composition:-

Barium Peroxide	72.8%
Magnesium Metal	20.9%
Wax, covering	4.4%
	98.1%

The tracer has the composition:-

Sodium Nitrate	45.6%
Magnesium Metal	19.5%
Aluminium Metal	10.2%
Wax, covering	2.0%
Calcium Carbonate	21.7%
	99.0%

The tracer burns for 4.5 secs with a yellow flame, following a preliminary green flash from the primer. The flame is only ½" to ¾" in length.

(ii) <u>HE - Incendiary (fuseless)</u>: The projectile is 51 mm long, 13.08 mm in diameter and weighs 32.6 gms. It consists of the body and nose both of the gilding metal type which screw together with a left hand thread subsequently stabbed. A shallow spanner hole is located on the nose. Fitted inside the nose is a hollow brass cup with a flanged base and cylindrical walls terminating in an ogival pointed end. The space between the nose and the cup is filled with 0.644 gms of a mixture of RDX (Cyclonite or Hexogen) and PETN, in equal proportions. The cup is filled with 0.987 gms of the same mixture, making a total of 1.631 gms of HE filling.
Inside the body is a steel sleeve closed at its lower end by a felt disc. Above this is lightly pressed 1.07 gms of an incendiary mixture with following composition:-

Barium Nitrate	51.5%
Magnesium) Alloyed	28.0%
Aluminium)	17.5%
Oily covering on Alloy	3.0%
	100.0%

The barium nitrate was in the form of small octahedral crystals which are larger than the alloy particles on the average. A brass screw plug with two wide circular flash holes screws down over the sleeve and is itself covered by a cloth disc on to which screws the filled nose. The rounded base of the body and the walls have a superficial copper coating as far as the prominent shoulder. Deformation when the shell is fired from a rifled barrel will be confined substantially to this section, as the nose section has a diameter of 12.65 mm. Deformation of the latter section, containing the HE filling, would almost certainly result in premature detonation. Chemical analysis showed both body sections, nose cup and screw plug to have been made from gilding metal of the 85% copper, 15% zinc type.

The hardness values of these components are; rear section DPH No. 110-150, nose section DPH No. 120 - 180, Nose Cup DPH No. 160 - 180, Screw plug DPH No. 130. The steel cylinder fitting into the rear section was made from a mild steel containing approximately 0.25% carbon. The steel was in the normalized and lightly cold drawn condition, the hardness being DPH No. 160.
The shell is apparently detonated by shock on impact and this in turn initiates the incendiary mixture. The effect of impact on the charge would be enhanced by the "nipping" of explosive between the envelope and inner cup while the setting forward of the inner brass cup may also be an important factor in causing full detonation. Both RDX and PETN are themselves sensitive to shock, and their figures of insensitiveness as measured in the Woolwich Direct Impact Machine are 45 and 40 respectively, as compared with TNT 115, Tetryl 70 and Picric Acid 100.

(iii) <u>HE - Incendiary (fused)</u>: The fused shell is 47 mm long, 13.03 mm in diameter, weighs 34.5 gms complete and is covered externally with a clear yellowish lacquer. The shell has an outer envelope approximately 1.14 mm thick which is continuous round the base. The explosive and incendiary charges are pressed into an internal steel sheath. The forward one of two cannelures is knurled. The inner sheath weighs 11.84 gms and is made from steel which includes the following:-

Carbon	0.54%
Manganese	0.5 %
Sulphur	0.04%
Phosphorus	0.02%

The DPH number of the sheath, which had been machined from bar stock, hardened and tempered, ranged from 360 to 390. The envelope is made from gilding metal containing copper 86.9% and zinc 13.1%. DPH of the envelope increases uniformly from 140 at the base to 160 immediately behind the screw thread. The hardness of the threaded portion is 130. It is concluded from hardness, microstructure and grain flow that the envelope has been given a mouth anneal after drawing. After insertion of the inner sheath the envelope has been swaged to thicken the wall at the position of the screw thread and to ensure contact of the envelope with the inner sheath. The screw thread had not been formed in the swaging process but had subsequently been machined.
Pressed into the base of the steel sheath is 1.02 gms of an incendiary composition having the same qualitative composition as the incendiary from the HE/I (fuseless) shell.

Barium Nitrate	51.5%
Magnesium) Alloyed	28.0%
Aluminium)	17.5%
Oily covering on Alloy	3.0%
	100.0%

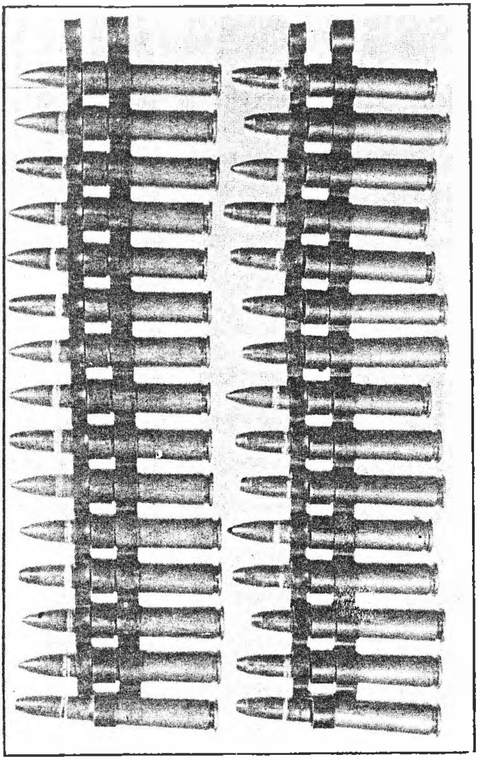
Above this is 0.4 gms of pressed RDX (Cyclonite or Hexogen). Into the upper surface of the explosive, which is level with the top of the sheath, is pressed a cylindrical pellet of lead azide weighing 0.15 gms. A tinfoil disc covers the composite surface.

The percussion fuse consists of a brass body and a brass nose attached to one another by coning the walls of the body into a machined tapered shoulder at the base of the nose. Two brass centrifugal collars held together by a circular steel spring are located in a cavity in the forward end of the body and are prevented from rotating about the axis of the fuse by a diametrical groove machined in the base of the nose in which they can slide laterally. A blued steel striker pin is held by the brass collars and kept co-axial with the fuse body by its head, which fits into a circular recess in the base of the nose, and its point which fits in a striker guide through the body. A recess in the under-side of the head of the striker pin takes a corresponding ridge formed on the collars and locks them together. An anodised duralumin striker head is situated in a cavity in the nose and is held in by a brass percussion diaphragm covered externally with lacquer. The shaft of this striker head passes through the base of the nose and rests on the head of the striker pin. Screwing into the base of the body is a brass screw plug. A copper sheathed detonator with perforated base rests on a cloth washer in this plug and is retained by rolling the walls of the plug over it. A metal foil disc covers the perforated base of the detonator shell, and above this is pressed 0.05 gms of a detonating composition containing mercury fulminate, potassium chlorate and antimony sulphide. A copper closing lid covers the composition.
The threading between the body and the plug is stabbed twice, and the base of the fuse is covered by a perforated cloth disc. The fuse is secured to the shell by cementing and stabbing the left-handed screw-thread. On firing the striker pin sets back and locks the two centrifugal collars. On deceleration the striker pin moves forward releasing the collars which separate under the action of centrifugal force thus freeing the striker pin and arming the fuse. On impact the striker head forces the striker pin back into the igniferous detonator, the flash igniting and detonating the lead azide, which initiates the explosive and incendiary fillings.
The chief markings on the fuses give the dates of manufacture, November 1942, December 1942, February 1943 or March 1943, and the place of manufacture "Tokio". A manufacturer's trademark occurs on each. The other markings are inspection stamps. which, on some fuses, include "EI", and on others "CH".

(SOURCE:- MUNITION SUPPLY LABORATORIES through MGO Branch)

12.7 MM (.50 IN) A/C AMMUNITION

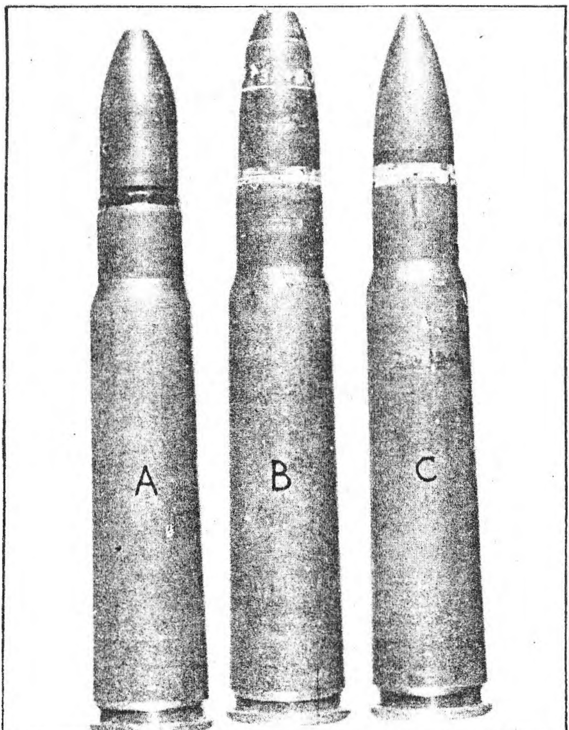
FIG 1



HE/Incendiary and AP/Tracer Rounds in Belt.

12.7 MM (.50 IN) A/C AMMUNITION

FIG 2



(A) HE/Incendiary (Fuseless).
(B) HE/Incendiary (Fused).
(C) AP/Tracer.

12.7 MM (.50 IN) A/C AMMUNITION

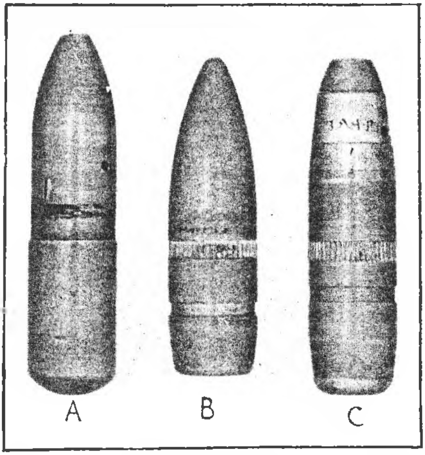


FIG 3 (A) HE/I (Fuseless). (B) AP/Tracer. (C) HE/I (Fused).

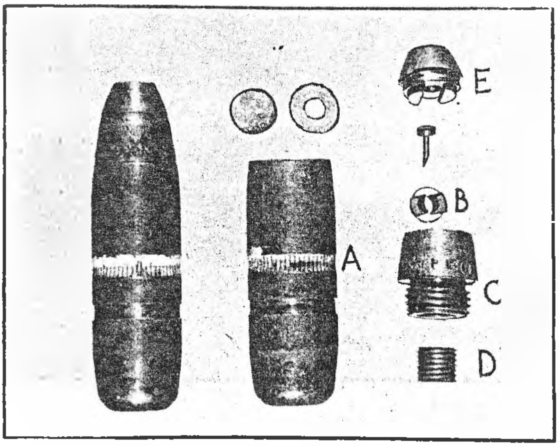


FIG 4 HE/Incendiary (Fused. (A) Outer Envelope. (B) Centrifugal Collar. (C) Fuse Body. (D) Screw Plug. (E) Nose.

12.7 MM (.50 IN) A/C AMMUNITION

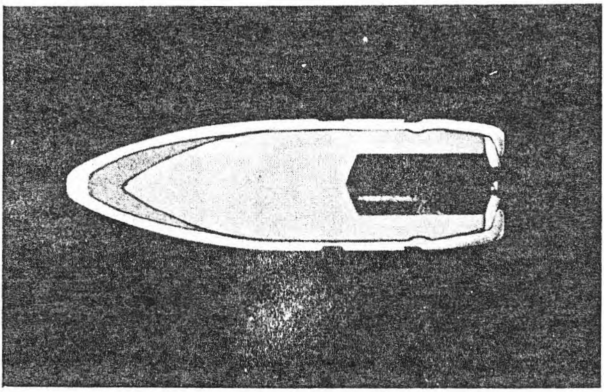


FIG 5 Section of AP/Tracer Projectile.

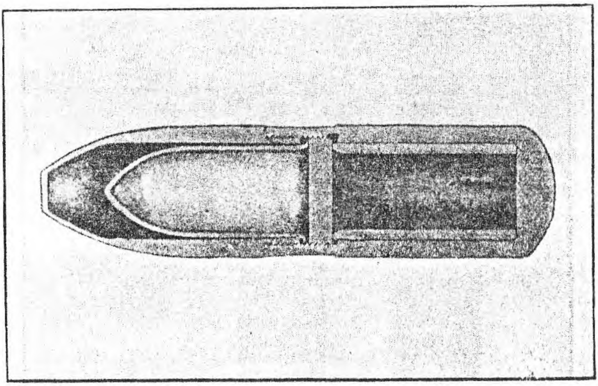
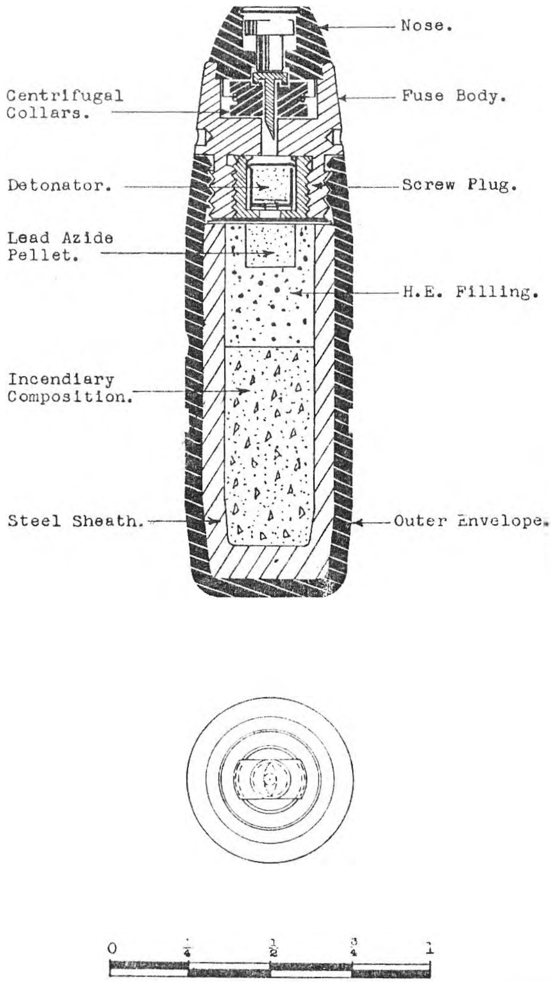


FIG 6 Section of HE/Incendiary Projectile.

12.7 MM (.50 IN) AC AMMUNITION

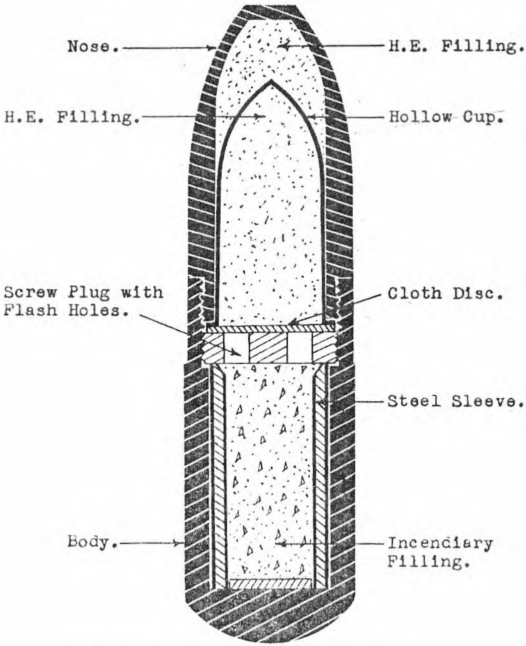
FIG 7 HE / INCENDIARY PROJECTILE (FUSED)



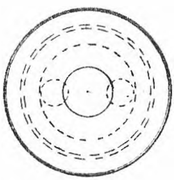
SCALE IN INCHES

12.7 MM (.50 IN) AC AMMUNITION

FIG 8



HE/INCENDIARY PROJECTILE (FUSELESS)



SCALE IN INCHES

90 MM HE MORTAR BOMBS

1. GENERAL

The bombs examined were of two types. The same type of filling was found in the two types of bomb which however differed in colour markings and lengths. The bombs were packed in boxes in pairs with transit plugs in position.
Two fuses, two primary and twelve secondary propelling charges were present in each box. The general design and method of filling are related to that of the 82 mm HE mortar bomb. The fuses used with these bombs are believed to be the same as those for 82 mm Mortar Bomb described in AMF Tech Int Sum No. 6.

2. DESCRIPTION (Figs 1 - 4)

The two types of bomb, which for the purpose of this report are designated long and short types of bombs, have the following weights and lengths:-

Short type:

Weight	11 lbs 7½ oz
" of explosive	1 lb 7 oz
Length	362 mm

Long type:

Weight	11 lbs 2¾ oz
" of explosive	2 lbs 5¾ oz
Length	404 mm

(a) Short Type (Figs 1-2): Parts of this bomb consist of a nose adapter, body and tail.

(i) Nose Adapter: This is 26.5 mm long and 51 mm maximum diameter. The base is threaded externally, 45 mm outside diameter with 1.8 mm left hand thread to screw into the bomb body. A truncated conical forward section terminates in a 32 mm diameter flat nose. An axial hole drilled through the adapter is threaded in two diameters to take the fuse at the nose with a 2 mm left hand thread 23.75 mm outside diameter and the exploder tube at its base with a 1.8 mm left hand thread 32.5 mm outside diameter. Two diametrically opposite recesses are machined at the nose to take a pin spanner. A grub screw is used to retain the fuse.
The exploder tube has an external diameter of 30 mm, internal diameter of 26 mm and is 84.5 mm long. The exploder pellet is a cylindrical cardboard wrapped block 25.5 mm in diameter and 68 mm long. A cylindrical fuse recess in one end is 24 mm deep and 14 mm in diameter. A cardboard washer over this end of the block and a felt disc over the other act as packing and bring the total length of the block to 72 mm. The wrapping is yellow and stamped on it in black ink are characters which are translated as "October 1942 ro Tetryl Picric Acid". The meaning of "ro" is not clear.

The wrapping contains three preformed pellets of explosive. Surrounding the fuse recess is a perforated pellet of tetryl which has been pressed in a heavily graphited mould, weighs 10.8 gms and is 24 mm long. Beneath this are two cylindrical pellets of pressed powdered picric acid, 18 mm and 24 mm long, weighing 29 gms in all. A pressed aluminium cup which fits into the exploder block forms a pocket in the adapter for the reception of the fuse.

(ii) Body: This component has an ogival nose 51 mm long (measured along the axis), terminating in a 51 mm diameter flat into which screws the adapter. The cylindrical bourrelet is 89.7 mm in diameter, 38 mm long and has four 2 mm wide V shaped grooves machined in it to form five gas check rings. At the base of the bourrelet is a slight shoulder behind which the body of the bomb is machined down to a diameter of 33 mm at a distance of 156 mm from the shoulder (measured along the axis). In profile this portion of the body exhibits a slight curvature and is in fact a long ogive. The shape of the cavity within the bomb roughly follows that of the exterior with a wall thickness of approximately 10 mm.
The filling of the bomb consists of 654 gms of cast TNT conforming substantially to the British specification for TNT Grade 1, and having a setting point of 80°C. The upper surface of the filling is 15 mm from the mouth of the bomb body and is covered by a felt washer.
A recess in the surface 30 mm in diameter and 79 mm deep, accomodates the exploder tube.

(iii) Tail: The tail unit screws on to the tail of the body and is retained by three stabbings. The tail consists of a steel tube 100 mm long, 34 mm in diameter with 6 mm walls. The primary propellant cartridge fits inside this tube and is retained by a screwed ring, 30 mm outside diameter 1.0 mm right hand thread. Twenty-four holes 5 mm in diameter are drilled through the tube in six vertical rows of four. Over every alternate row is spot-welded a steel bracket shaped to form two tail fins with retaining clips for attachment of the secondary propellant charges. In the base of each bracket, four holes are drilled to coincide with those in the tail tube. The overall diameter of the tail unit is 89.5 mm.

(iv) Markings and Surface Treatment: The metal parts of the bomb are chemically blackened. A red band 8 to 10 mm wide is painted at the nose on the adapter and a green band 15 mm wide is painted immediately in front of the bourrelet. A 20 mm white cross indicates that the bomb is from + 0.5% to + 1.5% above the specified standard weight. The date of filling is shown as 18.3, (March 1943). An ideograph surrounded by a circle is translated as "great" or "big" but may be an abbreviation for Osaka. Markings stamped into the steel of the body are translated as "Osaka Army Arsenal September 1941". "Osaka" is also stamped on nose adapter, nose of the body and the tail unit. The number

"406" is stamped into the body and nose adapter in adjacent places and the symbol "ta" is repeated five times in various places, apparently being an inspection mark.

(b) Long Type (Figs 1 & 3): The adapter and exploder system are the same as for the Short Type bomb.

(i) Body: This component resembles that of the shorter bomb except for difference in lengths of nose and rear sections. The lengths of these sections, measured along the axis, are 57 mm and 190 mm respectively while the length of the bourrelet is 38 mm and same as for short type bomb. The wall thickness varies from 5.6 mm to 6.3 mm. The cavity inside the bomb body is larger than the short type bomb due to increased length and decreased wall thickness. The filling consists of 1071 gms of cast TNT the upper surface of which is covered by a felt washer and is 14 to 19 mm below the mouth of the bomb body. A recess 31 mm in diameter and 79 mm deep in the surface of the filling accomodates the exploder tube.

(ii) Markings and Surface Treatment: The metal parts of the bomb are painted with a glossy black enamel. Painted at the nose on the adapter is a red band 10 mm wide and immediately in front of the bourrelet is a yellow band 10 mm wide. The white plus and minus signs indicate the weight of the bomb is within ± 0.5% of standard weight. The date, namely July 1943 is shown as "18.7". An ideograph in a circle is translated as "great" or "big" but as mentioned previously, may be an abbreviation for "Osaka".
Markings stamped into the steel translated are - "Nagoya February 1943". Bombs from another box had the metal parts blackened chemically. The red band of similar thickness was also present on the nose of these latter bombs but the yellow band in front of the bourrelet was 14 mm wide. A white "plus" sign was present and date of filling was indicated as "March 1943", and the place "Osaka Army Arsenal".

(c) Primary Propellant Charge: (Fig 4) Externally, the primary cartridge consists of purple paper tube 22.5 mm in diameter, rolled at one end over three closing discs and fitted at the other, into a drawn brass head of 25 mm maximum diameter. The copper percussion cap in the head is 7 mm in diameter. The cartridge weighs 36 gms complete and is 86 mm long. An annular bulge 5 mm wide and 23.25 mm in diameter is 29 mm from the forward end of the brass head.
The paper tube comprises an inner and outer cylinder, each of which is built up by rolling thin brown paper on a former. The inner cylinder is shorter and forms a shoulder at the mouth on which rest the closing discs.
The percussion cap consists of 0.3 gm of a detonating composition containing mercury fulminate, potassium chlorate and antimony sulphide, covered by a tin foil disc. A boxer type anvil, formed from pressed brass sheet and having a central flash hole, slips in above a brass cup in the copper percussion cap. The cup end

the anvil are retained in the copper cap by coning over the wall at the open end.
The cartridge is charged with 15.2 gms of powder having individual grains in the form of thin square and diamond shaped flakes approximately 1 mm by 1 mm by 0.25 mm.
The composition of the powder is as follows:-

Nitrocellulose	52%
Nitroglycerine (by difference)	33.7%
Dinitrotoluene	9.8%
Diphenylamine	0.9%
Potassium Nitrate	3.4%
Graphite	0.2%
Moisture and Volatile	0.3%

The three closing discs consist of 1 mm cardboard nearest the propellant, next is 3 mm black bakelite and the third is 2 mm cardboard.
The junctions between the closing disc and tube wall, tube and brass head and between copper cap and brass head are sealed with a nitrocellulose lacquer.
Markings on cartridges with bombs manufactured in Nagoya and Osaka indicated "January 1943" and "November 1942" respectively.

(d) Secondary Propellant Charge (Fig 4): Six secondary increments are provided for each bomb. Each charge is contained in a bag consisting of two sheets of blue lacquered silk stitched together at the edges, the seams being heavily coated with a nitrocellulose lacquer.
The sheets are 65 mm by 65 mm inclusive of two diametrically opposite projections 33 mm by 8 mm. The charge in each bag consists of 15 gms of a ballistite type of powder in the form of thin square and diamond shaped flakes approximately 1 mm by 1 mm by 0.25 mm.
The composition of the powder is:-

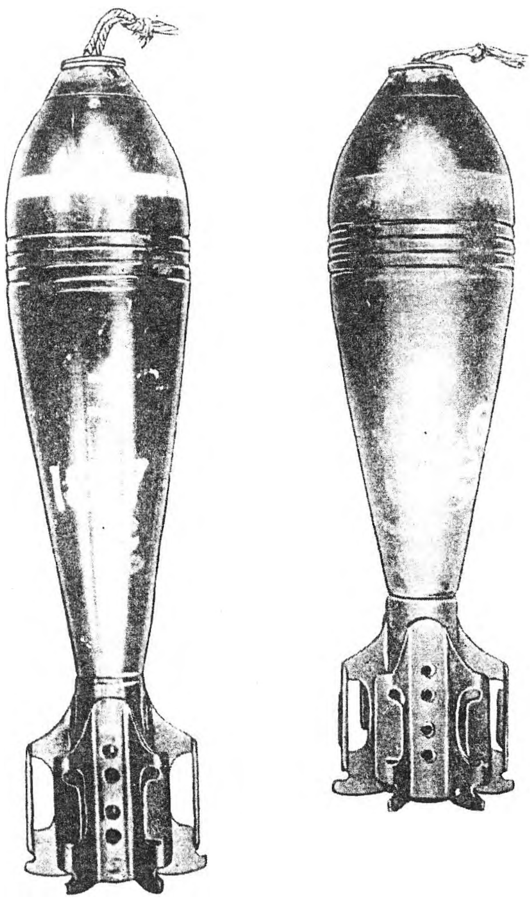
Nitrocellulose	57.45%
Graphite	0.15%
Nitroglycerine (by difference)	41.4%
Diphenylamine	1.0%
Moisture and Volatile	0.3%

The primary and secondary charges for each pair of bombs are packed in waterproof paper bags together with a small pin spanner for removing the screwed ring from the tails of the bombs. The bag is made of two thicknesses of brown kraft paper, bitumen bonded and is black externally. The open end of the bag is sealed with a paper-backed adhesive tape.

(SOURCE:- MUNITIONS SUPPLY LABORATORIES through MGO Branch)

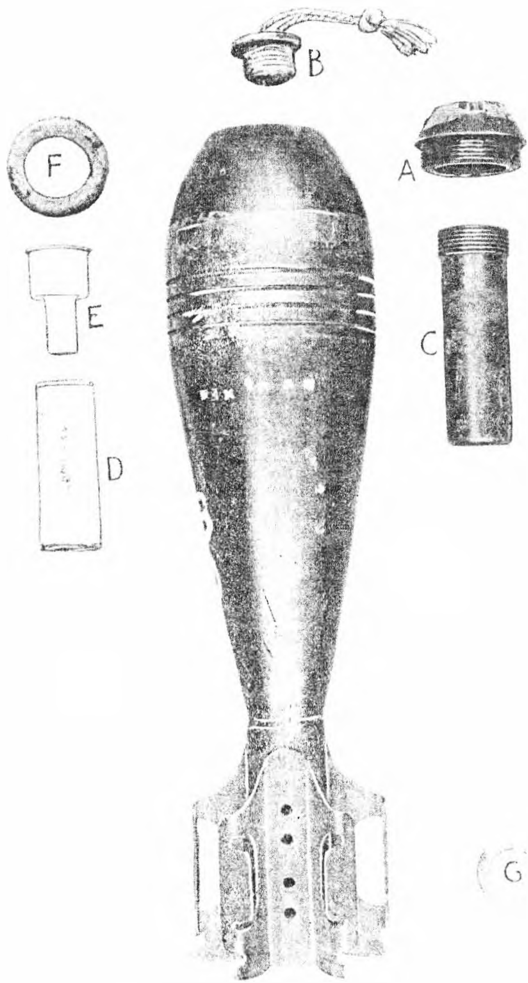
90 MM H E MORTAR BOMBS

FIG I Short and Long Types.



90 MM HE MORTAR BOMBS

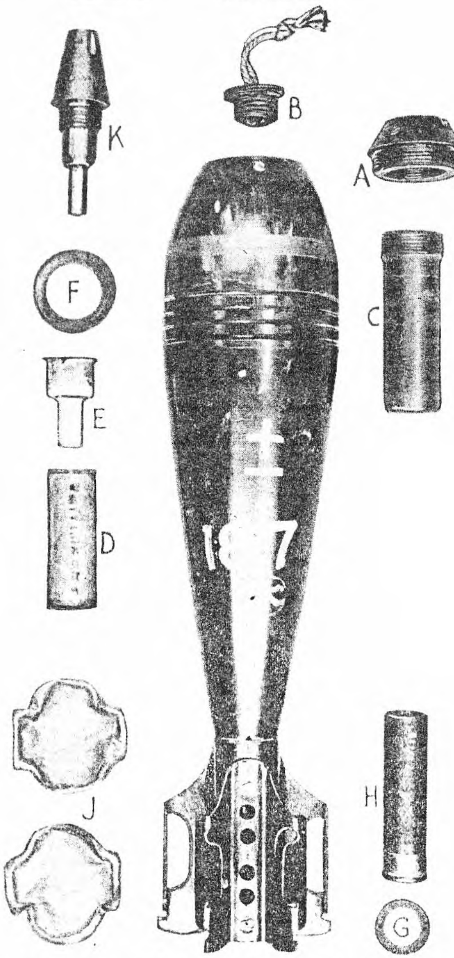
FIG 2 SHORT TYPE



(A) Nose Adapter. (B) Transit Plug.
(C) Exploder Tube. (D) Pellet. (E) Aluminium Cup.
(F) Felt Washer. (G) Retaining Ring.

90 MM HE MORTAR BOMBS

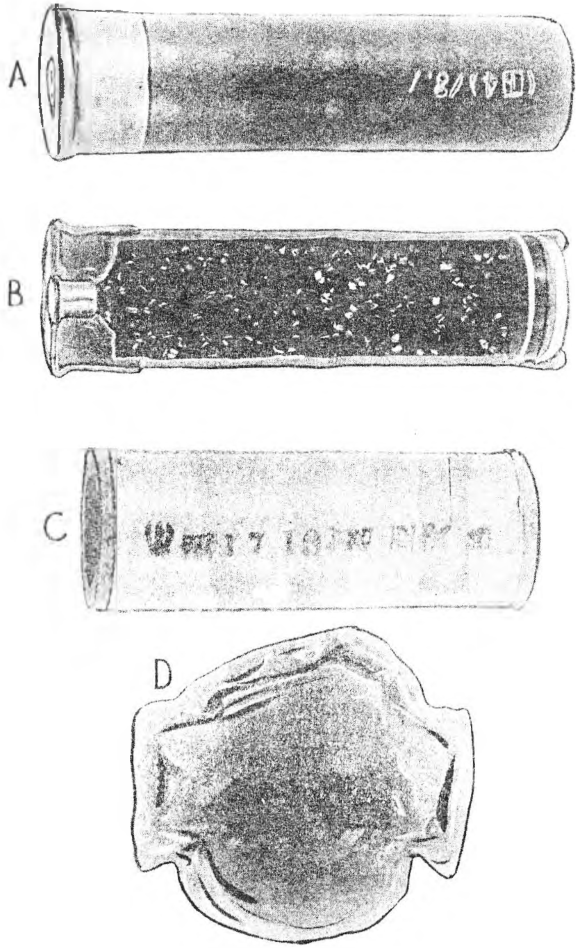
FIG 3 LONG TYPE



(A) Nose Adapter. (B) Transit Plug. (C) Exploder Tube.
(D) Exploder Pellet. (E) Aluminium Cup. (F) Washer.
(G) Retaining Ring. (H) Primary Cartridge.
(J) Secondary Charges. (K) Fuse.

90 MM HE MORTAR BOMBS

FIG 4



(A) Primary Cartridge. (B) Section of Primary Cartridge. (C) Exploder Pellet. (D) Secondary Charge.

$\frac{1}{2}$ KG HE CLUSTER BOMB

1. GENERAL

The bombs, recovered at an airstrip in New Guinea, were not found in a cluster. However, they are constructed in such a manner that the nose of one fits into the tail of another. This arrangement prevents the fuse vanes from turning and saves space; one bomb fused is $5\frac{1}{4}$ ins long and two fused bombs together are only $9\frac{1}{2}$ ins long.

2. DESCRIPTION (Figs 1 - 4)

(a) Bombs: Bomb consists of a drawn steel cup body with cast steel nose welded in place. Sheet steel tail 2-15/16 ins wide, and 2 ins long consists of four fins spot welded to the base of the body with $\frac{3}{8}$in.steel struts. The bomb is coloured black with a 9/16 in. yellow band $\frac{1}{2}$ in. forward of the base and a $\frac{1}{2}$ in. red band around the nose. The type of suspension is unknown but it is assumed that a cluster container is used.
All samples recovered were in sealed boxes of 25 bombs and were filled with coarse sand. Traces of the original filling consisting of a cyclonite mixture were still present after the filling had been steamed out. Translation of the box label reads: "East Research Laboratory Army (To) 3 Ammunition, Quantity 25." Each bomb is stamped "Osaka Army Arsenal, November 1939".
General Data:

Length overall	--	--	$4\frac{3}{4}$ ins
" of body	--	--	$2\frac{3}{4}$ ins
Diameter of body	--	--	$2\frac{1}{8}$ ins
Thickness of wall	--	--	3/64 in
Weight of filling	Unknown	(estimated approx 7 oz)	
Total weight of bomb	Unknown	(estimated approx 16 oz)	
Charge - weight ratio		--	Approx 56%

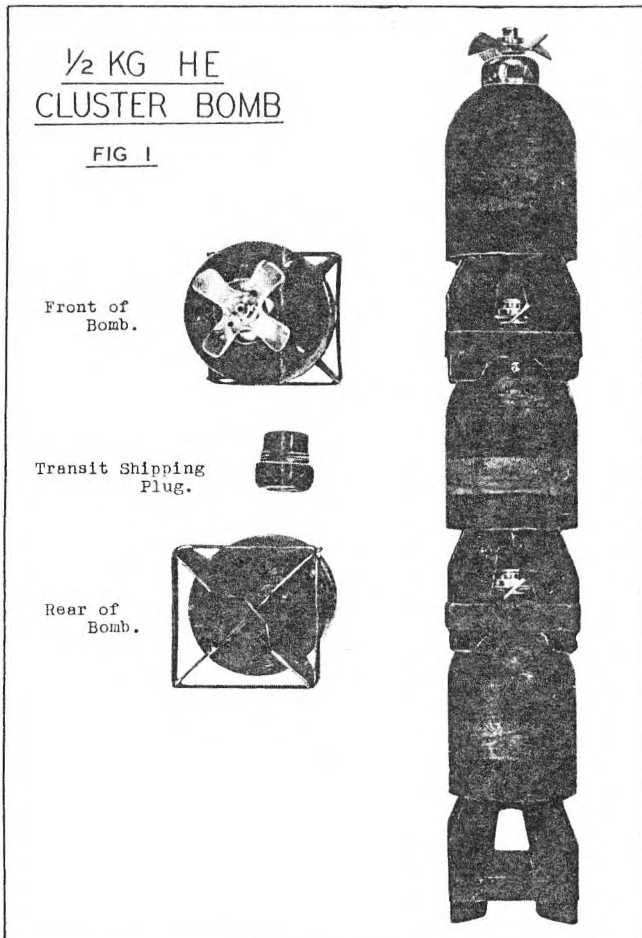
(b) Fuse: Instantaneous impact nose fuse type A-6(a) of coventional army design is constructed of brass with exception of the steel spring and firing pin and copper shear wire and nose cap. The fuse is screwed into the nose of the bomb and secured by a grub screw. The explosive train consists of a primer flash cap, two relay pellets of black powder and cyclonite gaine with lead azide core. The fuse is armed by $4\frac{1}{4}$ turns of the arming vanes. In operation, the steel firing pin is held in the brass body by a soft copper shear wire. The vane hub screws down on the portion of the firing pin that extends above the fuse body. The vanes are prevented from falling away in flight by a screw. On impact the firing pin cuts the shear wire and overcomes the anti-creep spring to pierce the primer. Two black powder relay pellets cause the lead azide core of the gaine to detonate the surrounding cyclonite.

General Data:

Markings (translated) - "Osaka Army Arsenal December 1943"
Colour - Natural brass.

Overall length (less safety fork)	--	2-7/16 ins
" width (vanes) --	--	1-9/16 ins
Outside diameter at threads	--	13/16 in.
Threads per inch --	--	16

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

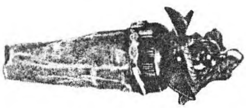


½ KG HE CLUSTER BOMB

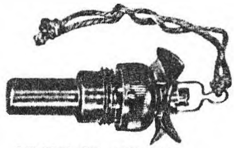
FIG I

½ KG HE CLUSTER BOMB

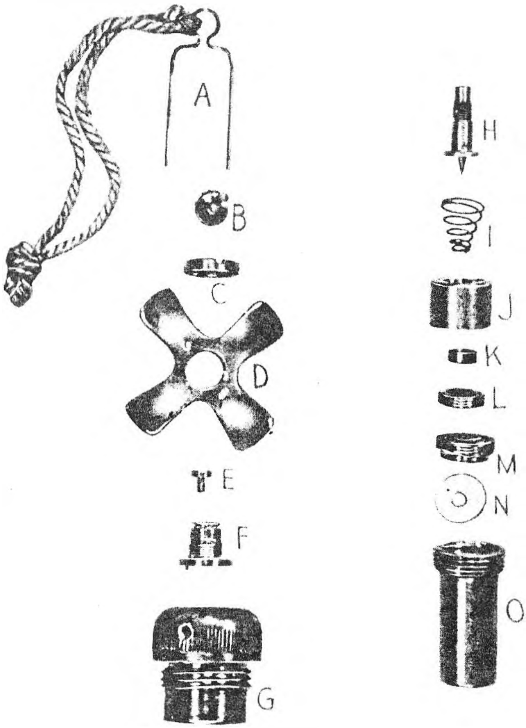
FIG 2 COMPONENTS OF A - 6 (a) FUSE.



FUSE AS SHIPPED



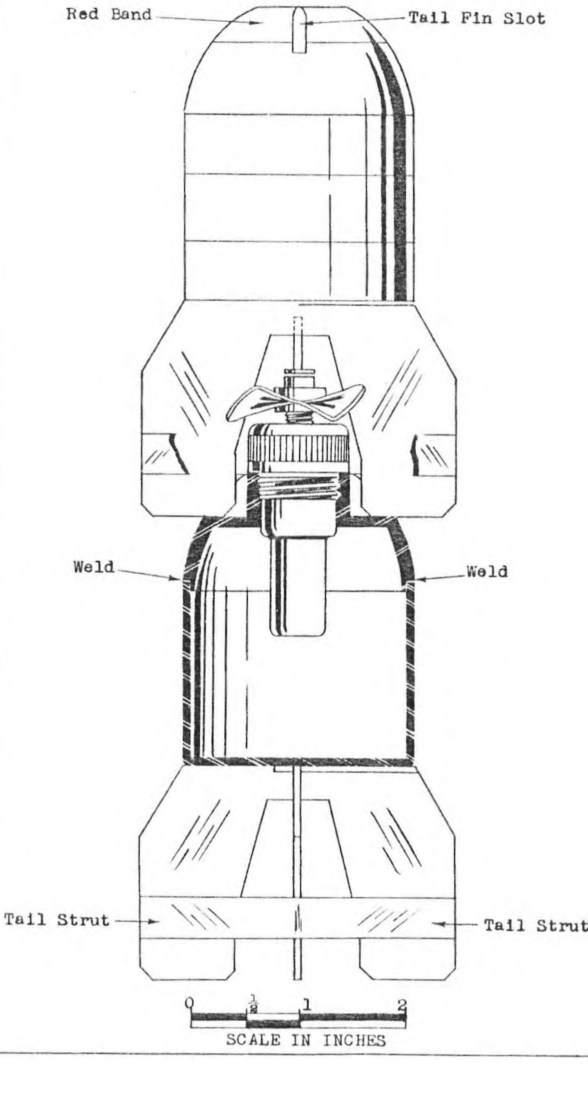
READY TO INSTALL



(A) Safety Fork. (B) Closing Washer. (C) Vane Collar. (D) Arming Vanes. (E) Screw. (F) Hub. (G) Fuse Body. (H) Firing Pin. (I) Creep Spring. (J) Cap Carrier. (K) Primer Cap. (L) & (M) Relay Pellets. (N) Washer. (O) Gaine.

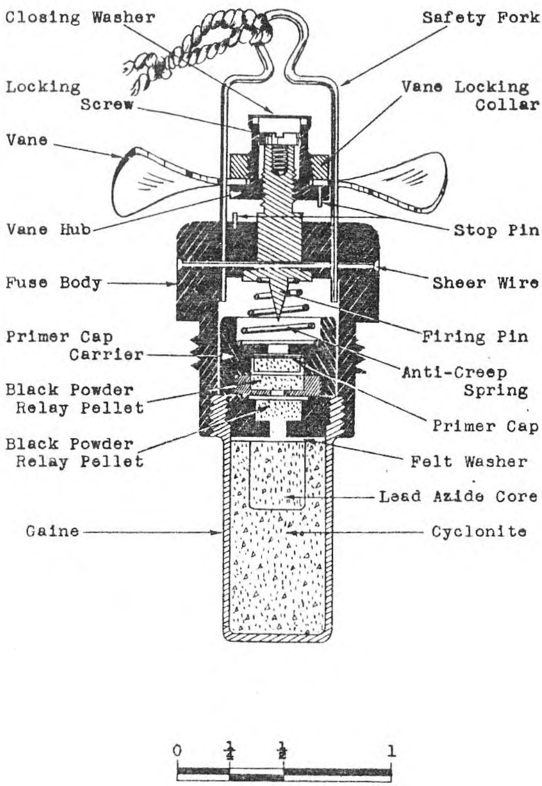
½ KG HE CLUSTER BOMB

FIG 3



½ KG HE CLUSTER BOMB

FIG 4 A-6 (A) NOSE FUSE



SCALE IN INCHES

AA PARACHUTE BOMB

1. GENERAL

This device is designed for use against aircraft. It consists of a small bomb suspended from a parachute by 164 ft of thin steel wire rope. The impact of an aircraft striking the cable causes the bomb to whip up and wrap the cable around the machine. The bomb then evidently hits the aircraft and detonates.
The fuse is an impact type designed to detonate the bomb at any angle of impact except directly on the nose of the fuse. The bomb has a high loading factor and blast damage at point of impact should be considerable.
It can be launched by hand directly from an aircraft by removing the top of the can in which it is packed. The loaded container weighs in all 1730 gms (3 lbs 13 ozs) and the complete bomb assembly 1248 gms (2 lbs 12 ozs).

2. DESCRIPTION (Figs 1-4)

(a) Bomb: It consists of a simple cylinder closed at both ends, the walls and base being made in one piece with a smaller extension drawn out from the base to accomodate the base plug.
The nose end is closed by a disc welded on to the walls and a protruding threaded collar welded on to the disc. The base plug has two screw threads of different diameters. The smaller thread on the forward end takes a keep ring which is also threaded on from the inside of the bomb to hold the plug in position. The larger diameter thread protrudes from the base and takes the cable attachment. The nose collar is threaded to take the fuse.
The main filling is a cast mixture of cyclonite 40% and T N T 60%.
General characteristics are:-

Weight complete without fuse	397 gms
" empty	156 gms
Loading factor	60.7%
Overall length	4-13/32"
Diameter	2-1/2"
Wall thickness	3/32"
Fuse pocket threads:	
Length of threaded portion	1/4"
Outside diameter	1-3/16"
Threads per inch	24
Threads	All right hand.

The bomb is black overall with a red band around the nose collar which indicates a HE filling. Markings stencilled in white at the middle of the body indicate "February 1943".

(b) Parachute Assembly: This consists of a cable attachment, the cable, reel, auxiliary parachute and the main parachute.

(i) Cable Attachment: A swivel is designed to permit the bomb to spin without fouling the cable. The cable leads into an inverted steel cup which threads on to the base plug and attaches to a steel bearing. Steel balls in the upper part of the cup permit the bearing to rotate freely within the cup.

(ii) Cable: Consists of a steel wire rope, 1/16 in. in diameter, 6 x 7 right hand lay, 164 ft. long attached at one end to the cable attachment and at the other end to the reel.

(iii) Reel: This part consists of two tinned steel discs. The cable is coiled around fingers attached to the upper disc. The outer end is anchored to the upper disc and the lead from the centre of the coil is fixed to the cable attachment. The discs are then joined by tin strips to complete the reel. The fingers lock the cable lead until the bomb is released. The weight of the bomb on the cable then bends the fingers inwards thus allowing the cable to feed out freely from the centre of the coil.

(iv) Auxiliary Parachute: Attached to the top of the reel by nine 15 in. silk threads is a silk parachute 13-1/2 ins diameter unfilled. The reason for this parachute between the main parachute and the bomb is not understood.

(v) Main Parachute: This parachute and its 13 shrouds are also silk; the diameter unfilled is 3 ft. 1/2 in. and the shroud length is 3 ft. 1-1/2 ins. The shrouds are attached to a cord leading out of the top of the auxiliary parachute by 8-1/2 ins of double bungee rubber cord.

(c) Container: The bombs are carried in individual aluminium cans which are split down the sides and hinged on the bottom. Plastic compartments inside the can accomodate the bomb, reel and parachutes. The can is held together by a threaded cap sealed with wax paper during storage.
Markings on the can indicate "March 1943, Tokyo Army Arsenal".

(d) Fuse: This is a type of all-ways action fuse modified to have one blind side. The principal components of the fuse are the fuse body and nose cap, striker, primer carrier, arming vane and spindle and the gaine.

(i) Fuse body is made of a light alloy and is cylindrical in shape. The upper portion slopes inward to a neck which is externally threaded to screw into the bomb. The inside conforms to the shape of the exterior except that the top is closed below the neck which is threaded internally for the gaine with a flash hole connecting with the interior of the body. The lower end of the body is internally threaded to take the nose cap. There is a slight boss in the centre of the inside surface of the cap and two spanner holes on the outside. There are also two spanner holes in the cylindrical portion of the body and two threaded holes for the arming pin and safety pin housing. The latter is a brass screw with an elongated head containing two sets of holes, so that the safety pin can be inserted from either of two alternate angles.

(ii) The striker is a brass cylinder with an enlarged domed head at one end and a steel striker point at the other. Three slight grooves along the striker body act as air vents. The arming spindle fits through a transverse hole near the head; one end of the hole has a larger diameter to house the threaded section of the arming pin.

(iii) The primer carrier consists of a sleeve and a dome-headed screw, both of brass. The sleeve houses a steel creep spring and is closed near one end except for a small hole as passage for the striker point. The screw threads into this end. The primer, in a copper case, fits in a hole at the end of the screw and bears against the separation in the sleeve. A small hole behind the primer connects with two transverse holes in the screw head to provide flash channels.

(iv) The arming vane is a light metal alloy oval disc with a hole in the centre and a slight extension at one end bent over to form a hinge for the arming spindle. At the other end, the outer edges are bent in opposite directions to cause the vane to rotate in an anti-clockwise direction. The arming spindle is a brass pin with an enlarged threaded section and an enlarged head at one end. A smaller brass pin fits transversely through the head and through the hinge on the vane and connects the spindle to the vane.

(v) The gaine and its threads are slightly larger than the usual Army type. It is practically identical with that used in the A-6(a) fuse for the 1/2 Kg Cluster Bomb. The extra weight is presumably to allow a greater charge of cyclonite since the gaine also acts as a booster in these small bombs. The base of the gaine is filled with pressed cyclonite and wax. A lead azide core is pressed into the top of this charge and a brass cup containing a black powder relay threads into the top of the gaine.
The fuse is assembled by first slipping the creep spring and then the striker into the primer carrier. These parts are then held in a horizontal position and lowered into the lower part of the fuse body in such a position that the transverse hole in the striker lines up with the threaded arming spindle hole in the body. The internal diameter of the lower body is great enough to permit the striker and primer carrier to be held apart by the creep spring just enough for this hole in the striker to remain outside the carrier sleeve. The spindle, which is already hinged to the vane, can then be inserted through those holes and threaded in, thus preventing the striker and carrier from moving closer together. The vane is folded back over the safety pin housing and locked by the safety pin. The nose cap is threaded on to

close the fuse body.

(vi) Markings on the nose cap of the fuse indicate "February 1943 - Tokyo".

(vii) General details of the fuse are:-

Weight of fuse complete -- --	115.7 gms
" " striker -- -- --	9.35 gms
" " primer carrier -- --	11.13 gms
" " primer -- -- --	.23 gm
" " gaine complete -- --	17.5 gms
" " lead azide detonator --	.27 gm
" " cyclonite booster -- --	2.54 gms
Length of fuse overall with gaine	2-1/8 ins
" " gaine -- -- -- -- --	1-1/16 ins
" " fuse above fuse pocket threads--	1-1/16 ins
Diameter of fuse body -- -- -- --	1-3/4 ins
" " gaine body -- -- --	1/2 in.
External threads of gaine:	
Length of threaded section	1/4 in.
Outside diameter -- --	5/8 in.
Threads per inch -- --	24
Threads - -- -- -- --	All right hand.

3. ACTION

The container lid is unscrewed, the safety pin removed and the bomb is released. As it falls, the arming vane rotates and unscrews the arming spindle after ten revolutions. The vane and spindle then fall away and leave the striker and primer carrier free, these latter parts being held apart only by the creep spring. Any force of inertia directly in the axis of the striker and carrier will force one part against the other and fire the primer.
Inertia in any other horizontal axis will cause both parts to slide toward one side of the fuse. The act of moving into the narrower space exerts a camming force on the domed ends and drives striker and carrier together to fire the primer.
If the parts are moved toward the base of the fuse, they will slide on the inward slope of the upper body and be squeezed together to fire. The flash of the primer blows through the flash holes in the carrier and the hole in the body to the relay on top of the gaine. The flash of the relay sets off the lead azide and its detonating wave initiates the cyclonite which in turn detonates the main filling.
Inertia causing the parts to move toward the nose will not cause firing because the boss on the nose cap bears against the striker and carrier in their normal position and prevents movement towards the nose. This means that the nose of the fuse forms a blind side which, it is believed, will permit the bomb to strike the ground without exploding.

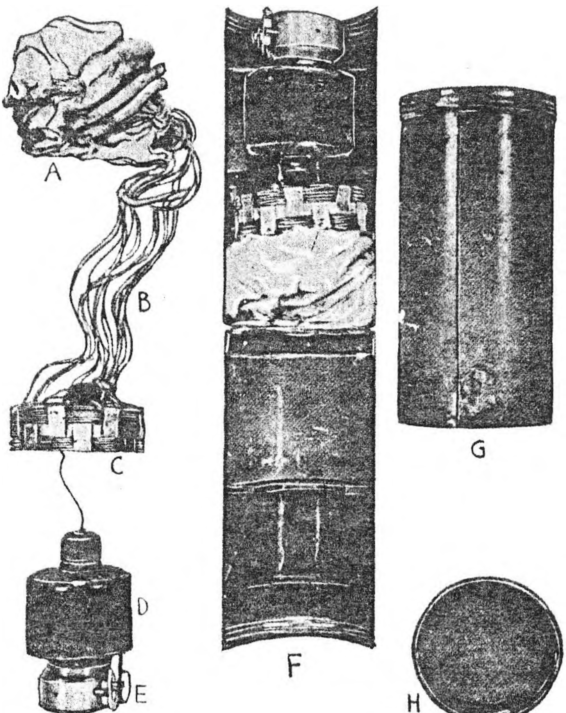
4. REMARKS

Since the fuse is designed so that it will not fire when bomb strikes on its nose, such bombs may be found in an unexploded condition without in any way having failed to function as designed. Consequently highly sensitive and dangerous UXBs can be expected as the creep spring holding the firing mechanism apart is quite weak.

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

AA PARACHUTE BOMB

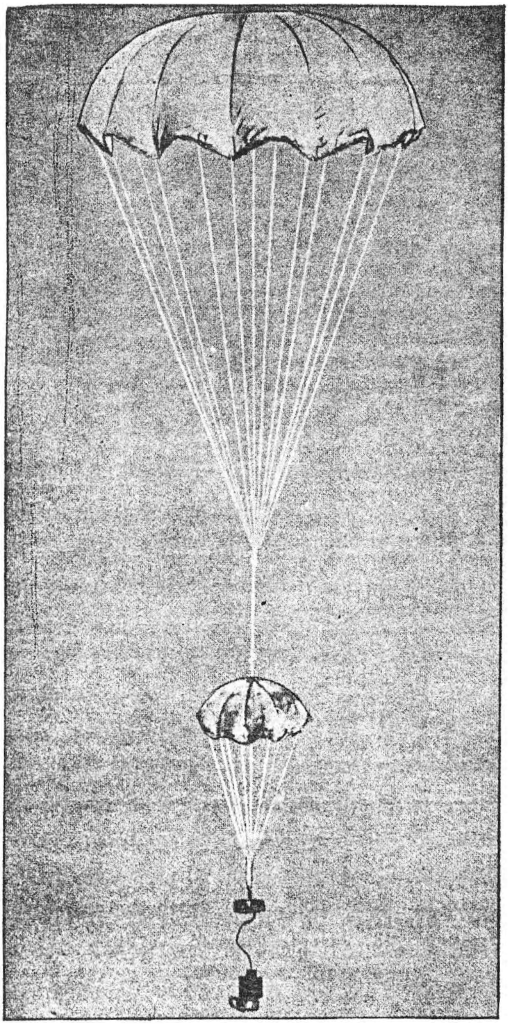
FIG I



(A) Parachute. (B) Shrouds. (C) Reel & Cable.
(D) Bomb. (E) Fuse. (F) Bomb Container Open.
(G) Bomb Container Closed. (H) Screw-on Cap.

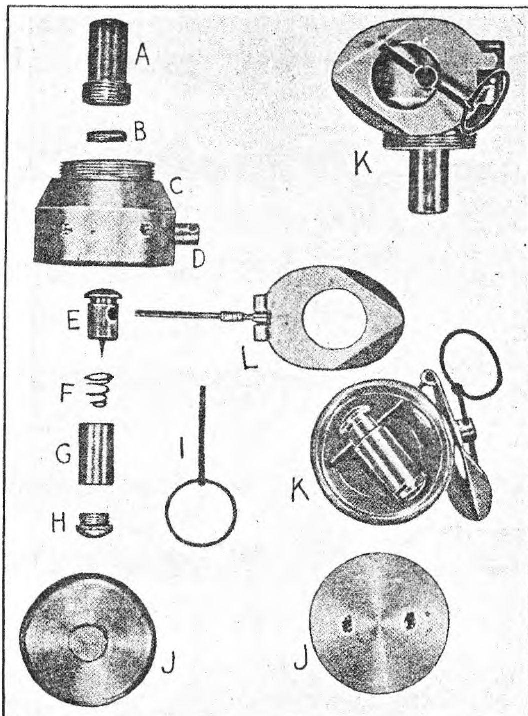
AA PARACHUTE BOMB

FIG 2



AA PARACHUTE BOMB

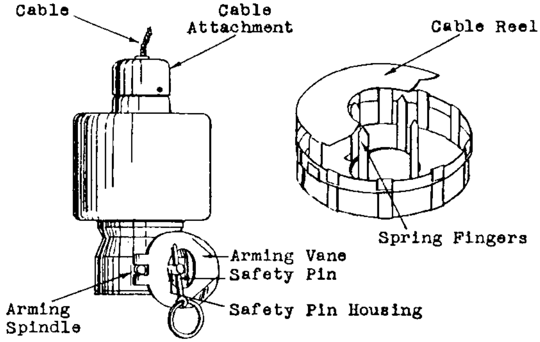
FIG 3



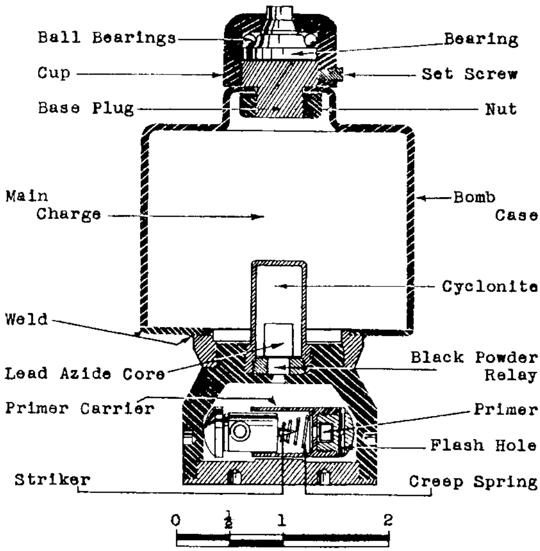
(A) Gaine. (B) Relay Cup. (C) Fuse Body. (D) Safety Pin Housing. (E) Striker. (F) Creep Spring. (G) Primer Carrier. (H) Primer. (I) Safety Pin. (J) Nose Cap. (K) Fuse in Umarmed Position.

AA PARACHUTE BOMB

FIG 4



SKETCHES NOT TO SCALE



SCALE IN INCHES

12 KG PARACHUTE FLARE BOMB

1. GENERAL:

This type of flare was recovered at Hollandia, Dutch New Guinea. It is equipped with a new type aerial burst fuse with an auxiliary impact firing feature and is designated D-5(a). It is initiated electrically as it leaves the aircraft.

2. DESCRIPTION (Figs 1 & 2).

Consists of a black parallel sided cylinder of 18 gauge cold rolled steel with a conical shaped nose. It is $34\frac{1}{8}$ ins long and is equipped with an army type carrying band with folding lug bolted around the case 13 ins from the nose. Four fins are spot welded along the after two fifths of the container and protrude 7/8 in. from the body.
Internally the flare consists of two sections; the flare composition container and the parachute with the necessary container.
These two parts are joined by 53 ins of 1/8 in. rope.
Flares are packed two per black wooden box.

(a) Flare Composition and Container: This is contained in an aluminium painted sheet steel cylinder with a lap rolled seam; one end is closed by a steel plate. The cylinder walls are rolled over and riveted to this plate. The wire rope connected to the parachute is also attached to this plate by means of a lug riveted in place. The plate is protected from the heat by a thin layer of asbestos.
The other end of the container is flanged over a wooden plug. Between this plug and the flare composition is a wire screen disc 5/32 in. thick filled with black powder. This serves both to ignite the composition and to expel it from the case.
The composition is silvery grey and appears to be a hard pressed mechanical mixture of powdered magnesium, asbestos flakes and other ingredients to account for its weight.
The burning time of the composition, outside its container was one minute and twenty seconds. When suspended vertically and inside the container, the burning time would probably be increased to about three minutes. The burning colour was greenish white and the action was very violent.

(b) Parachute and Container:

The light weight white silk parachute is 18 ft 2 ins in diameter (unfilled) and has 16 peripheral shrouds and 1 central shroud each 13 ft 9 ins long.
The container is a split cylindrical fibre housing with wooden closing plugs at each end.

(c) General Data:

Diameter of body -- -- -- --	4-3/16 ins
" " tail -- -- -- --	6-1/16 ins

Diameter of flare composition	--	3-7/8 ins
Length of tail -- --	--	11-3/4 ins
" " composition container	--	15-1/2 ins
" " flare composition	--	14-5/8 ins
Thickness of wall -- --	--	1/16 in.
Weight - overall -- --	--	26 lbs 5 ozs
" - outside container	--	6 lbs 6 ozs
" - flare composition	--	15 lbs 1 oz.
" - Parachute --	--	1 lb. 7 oz.
Charge/Weight ratio --	--	57%

(d) Markings: The outside container is marked with characters and figures which are translated as "Tokyo August 1943".

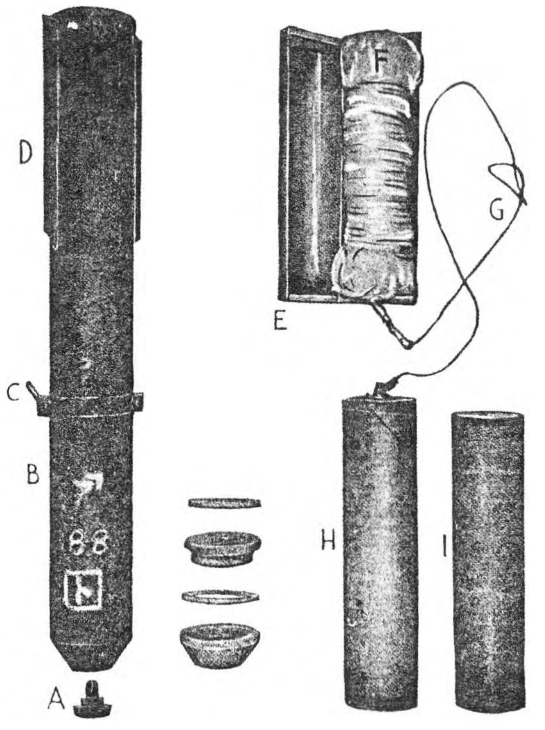
3. OPERATION

When the fuse initiates the black powder disc, the resultant flash ignites the flare composition. The expanding gases cause both the parachute and the composition container to be expelled to the rear of the flare container. The parachute housing falls away allowing the parachute to be opened. While carried in the aircraft, a safety wire is passed through two eyelets at the tail end of the outside container preventing the parachute from coming out until the flare has fallen free of the safety wire. It is possible that a tail plate, also held in the safety wire, is missing.

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

12 KG PARACHUTE FLARE BOMB

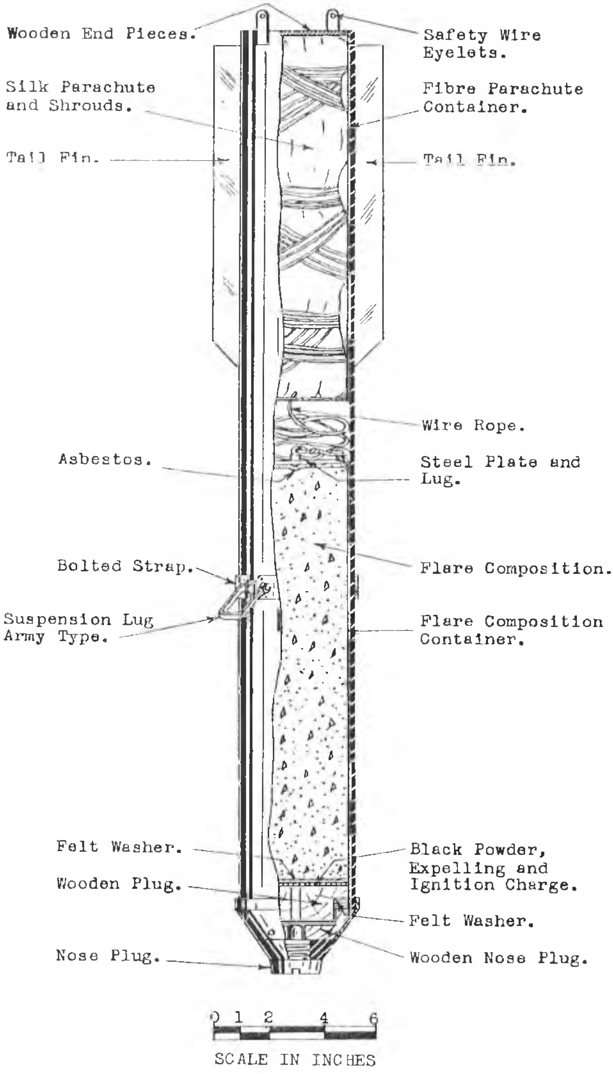
FIG I



(A) Shipping Plug. (B) Outside Container. (C) Lug. (D) Fins. (E) Parachute Housing (Open). (F) Silk Parachute. (G) Wire Rope Cable. (H) Sheet Steel Container. (I) Flare Composition.

12 KG PARACHUTE FLARE BOMB

FIG 2



32 KG INCENDIARY BOMB

1. GENERAL

The bomb examined closely resembles the bomb described in AMF Tech Int Sum No. 8, pages 41-48. The main difference between the two bombs is in the incendiary insert.

2. DESCRIPTION (Figs 1-7)

(a) Casing: The two sections of the casing are the tail and body which are screwed together after filling. The cylindrical barrel of the bomb is made of rolled 3.5 mm steel sheet, welded along its seam and machined internally and externally. At its forward end the barrel is welded to a steel nose, the junction being machined smooth. At its rear end the barrel is internally threaded to receive the tail, which is secured with two diametrically opposite grub screws. Two U-shaped suspension lugs are provided in diametrically opposite positions at the point of balance and in the same longitudinal plane as the grub screws; the lugs are welded to circular steel plates 50 mm diameter attached to the barrel by four rivets.
The steel nose is approximately hemispherical, has a flat base and is solid except for a deep fuse cavity threaded at its forward end to take the nose fuse. A grub screw situated 12 mm from the nose engages in these threads and serves to lock the fuse in position. The fuse cavity extends to within 5 mm of the base of the nose, leaving a septum which is drilled centrally and threaded to take a 278 mm length of 27 mm steel pipe. This pipe screws in from the interior of the barrel and forms an axial container for part of the bursting charge. The rear end of the pipe projects 16 mm past the rear end of the barrel.
The tail of the bomb is conical, and is built up of three sections. At the forward end is a shaped coupling ring, threaded to screw into the barrel and welded at its rear to a sheet steel cone. Four blind spanner holes are provided in this ring to facilitate the screwing-in of the tail. A second ring is welded to the rear of the cone, and is threaded internally to receive the tail fuse, which is locked by a grub screw engaging in the threads. The tail is machined internally and externally so that no welds show. A shoulder is formed inside the forward coupling ring and holds a circular steel base plate 133 mm diameter and 2 mm thick having a central perforation 27.5 mm diameter. The plate is secured to the shoulder by four small bolts.
Four fins are attached to the tail cone by five spot welds on each, and the rear half of each fin (projecting past the termination of the tail cone) is bent through 23 degrees to impart rotation to the bomb. The fins are braced by four struts of circular cross section 4.8 mm in diameter, flattened at each end and attached to the fins by a rivet and a spot weld at each

end.
The casing of the bomb is painted blue-grey with silver band 55 mm wide at the nose and at the tips of the tail fins 30 mm wide. Two diametrically opposite 1 mm wide red lines run the length of the bomb from the base of the silver band at the nose to the end of the tail cone, and are in the plane at right angles to that of the suspension lugs. The interior of the body of the bomb i.e. barrel, nose, screwed pipe and forward side of steel base plate, is painted with a dark chocolate-coloured paint, under which, on the barrel, is a red priming coat. The interior of the tail, including the rear side of the base plate, is coated with a glossy black enamel.
Markings on barrel and tail consist of a character and figures "84", printed in black paint. Character is translated as "air". The number "84" and a locating mark are stamped into the metal on each side of the joint between the barrel and the tail, to the rear of one of the grub screws. The character for "air" is also stamped in a circle on the circular plate of the suspension lug together with a naval anchor. Stamped on the base plate near one of the securing bolts is the number "84" with number "8" stamped near the diametrically opposite bolt.
The weights and dimensions of the bomb and its components are:-

Weight complete with transit plugs --	72 lb. 9 oz.
Weight without transit plugs -- --	70 lb.13 oz.
Weight empty casing without transit plugs -- -- -- -- --	31 lb. 1 oz.
Weight explosive filling -- -- --	3 lb. 5 oz. (1498 gms approx)
Weight filled incendiary insert --	36 lb.
Weight empty insert -- -- --	28 lb.12 oz.
Weight white phosphorus -- -- --	7 lb. 4 oz.
Overall length -- -- -- -- --	622 mm
Length of nose and barrel -- -- --	343 mm
Diameter of barrel - External -- --	147 mm
Internal -- --	140 mm
Thickness of barrel wall -- -- --	3.5 mm
Internal depth of barrel -- -- --	256 mm
Diameter of flat at nose -- -- --	57 mm
Diameter of nose fuse cavity -- --	80 mm
Depth of nose fuse cavity -- -- --	44 mm
Diameter of tail fuse cavity -- --	43 mm
Diameter across fins -- -- --	147 mm
Diameter across fin tips -- -- --	168 mm

(b) Transit Plugs: Transit plugs are provided in nose and tail fuse cavities. The nose plug consists of a black steel body, hollowed at its base to receive a lacquered wooden former. This is shaped to simulate the base of the fuse and attached detonator, and is held in the plug by two brass wood-screws. Beneath the head of the plug is a thick oil-impregnated leather washer. There are no markings on the plug.
The tail plug consists of a brass body hollowed at its base to receive a lacquered wooden former, which is shaped to simulate the base of the fuse with standard gaine and is secured by two brass wood-screws. Six blind tommy-bar holes are drilled into the head of the plug, and beneath the head is a thick oil-impregnated washer. Stamped into the flat head of the plug

are a naval anchor and an inspector's approval stamp.

(c) Explosive Filling: The explosive filling of the bomb consists of three preformed blocks of explosive, wrapped in paper and coated with paraffin wax. Two of the blocks, cylindrical in shape, are housed in the exploder tube. The first, at the forward end, consists of loosely powdered picric acid, and weighs 15.6 gms complete. It is 78 mm long, 18 mm diameter, and has an axial cavity 63 mm deep and 9.5 mm diameter at one end to take the detonator of the nose fuse. The block is prevented from moving forward into the nose fuse recess by a wooden ring which is forced into the forward end of the steel tube.
The second block is cylindrical shaped cast picric acid, and fills the remainder of the tube, projecting 10 mm beyond the rear end of the tube. It is 205 mm long and 17 mm diameter and weighs 79.1 gms complete. Before assembly in the bomb the two blocks are wrapped in a long cylindrical cloth bag, which is drawn in at the forward end. The fabric has a 2 x 2 "Shalloon" twill weave, and is made from wool fibre of staple length 63 - 76 mm.; the fabric is sewn together with three fold silk threads.
On the base of the smaller block is stamped in black ink "No. 76". Written in red pencil on the side of the larger block and on the outer cloth wrapping is "No. 62 78 g.". "78 g." apparently refers to the weight of explosive. There are no printed labels on the blocks.
The main explosive filling in the bomb is a large block of cast picric acid 136 mm long, 116 to 117 mm diameter which fills the tail. For a distance of 25 mm the block is cylindrical (at the end adjacent to the base plate) and it then tapers to a 60 mm diameter base. A cavity 21 mm diameter and 13 mm deep is formed centrally in the forward end to receive the end of the rear cylindrical block. In the base is a deep cavity to take the tail fuse and gaine extending to within 8 mm of the forward cavity. Written in red pencil on the side of the block is "No 70 1388". This probably indicates the weight of explosive, the wrapped block weighing 1403 gms. A mottled grey-coloured bag of the same shape as the block covers the forward end (with the exception of a perforation over the forward cavity) and the sides, and is drawn up round the base of the block. The bag is made from unmercerised cotton fabric, and is sewn with three fold yellow silk thread. The fabric has a twill weave and the nap is raised as in flannelette. The average fibre length of the cotton is 13 - 19 mm. The block after assembly in the tail is securely held by the circular steel plate. When the tail and body of the bomb are screwed together, the rear end of the steel tube projects into the central perforation of the steel base plate, and the rear end of the longer cylindrical block fits into the cavity in the forward end of the tail filling.

(d) Incendiary Insert: The incendiary filling is held in a sealed cylindrical sheet metal container, which slips into the barrel of the bomb and is padded at each end by a washer of felted horsehair. Three cardboard packing pieces are wedged at evenly spaced intervals between the container and the barrel to prevent side play. The container has an axial tube

open at each end, to accommodate the exploder tube attached to the nose of the bomb.
The container, which is made throughout of 19 S.W.G. steel sheet, is 137 mm diameter, 271 mm overall length and weighs 36 lbs complete. The circular base plate with a turned up edge slips inside the end of the container and is welded in position. The axial tube is 269 mm long and 31 mm internal diameter and is welded at one end to the edges of a circular hole formed in the base. The upper 25 mm of the container is reduced to a diameter of 117 mm by the provision of a shoulder, the plane of which is at right angles to the axis of the cylinder. The outer edge of the shoulder is turned down to fit into the cylinder and the inner edge is turned up to receive a cylinder of smaller diameter which forms the neck of the container. The two joints so formed are welded. A circular cover is turned down at its outer edge to slip over the top of the neck. A perforation in the centre of the cover, the edge of which is turned down, receives the upper end of the axial tube. The cover is soldered to the container and to the axial tube. Two filling holes 18 mm diameter in the cover are sealed by soldered circular plates. In one of these plates a central 2 mm diameter vent hole is closed by solder.
The container is painted externally with a dark chocolate-coloured paint, and internally with a shell-ac type of varnish.
Inside the container are 168 steel pellets arranged in 21 rows of eight, surrounded by and filled with white phosphorus. Around the outer wall of the container and fitting beneath the shoulder are fourteen pellet assemblies. Seven longer pellet assemblies surround the central tube. Slackness between the assemblies is taken up by two 3.8 mm diameter steel packing rods. A slanting flat is ground on the upper end of each tube of the longer assemblies.
After insertion of the pellet assemblies into the container, the cover is soldered on, and the white phosphorus poured in through the filling holes. (This operation is probably conducted under warm water.) The filling holes are subsequently sealed. Due to a crack having developed in the solder round the cover, about 90 gms of white phosphorus had leaked out and was found between the barrel and the container when the bomb was opened. The total weight of phosphorus in the bomb is 7 lb. 8 oz.
The pellet assemblies consist of lengths of steel pipe in which are cut 2 mm transverse slots leaving single 5 mm wide connections between the segments. Inside each tube are eight steel dumb-bell shaped pellet cores whose total length equals the length of the tube. Two spots of solder, diametrically opposite on the exposed faces at each end of the tube, retain the cores during assembly, but most of these junctions had been broken before the examination.
The core segments are machined from bar, and have four evenly spaced channels cut in the peripheries of their heads, through which the phosphorus reached the interior of the pellets during filling and later escapes during burning. The force of explosion is relied on to break the pellet assemblies into segments without dislodging the cores.

After removal of the phosphorus under warm water most of the cores slipped out of the tubes as the latter were being withdrawn from the container owing to the defective solder spotting at the ends of the pellet assemblies. On subsequent checking it was found that, although there were sufficient cores for all the longer assemblies, there were three cores too few to fill all the shorter assemblies. In their place had been substituted rolled tinplate cylinders 30.5 mm long. As none of the pellet assemblies withdrawn intact contained a tinplate cylinder it was not possible to determine the positions of these in the assemblies. Dimensions and weights of pellet assemblies:-

	Longer Assemblies	Shorter Assemblies
Length -- -- -- -- -- --	264 mm	238 mm
Weight -- -- -- -- -- --	592 gms	543 gms
Diameter of tube - External --	24 mm	24 mm
Internal --	20 mm	20 mm
Length of each tube segment --	31 mm	28 mm
Length of pellet core -- --	33 mm	29.7 mm
Length of tinplate cylinder --	-	30.5 mm
Diameter of head of core -- --	19 mm	19 mm
Diameter of shaft of core --	10 mm	10 mm
Length of shaft of core -- --	19 mm	15.5 mm

3. ACTION

The bomb is designed for use with a mechanical time tail fuse to give an air-burst. When detonated, the picric acid filling disrupts the pellet assemblies, and throws the individual phosphorus-filled pellets downwards and outwards. The nose fuse is designed to detonate the bomb on impact with the ground should the tail fuse not function.

4. COMPARISON

The chief differences between this bomb (A) and the previously reported bomb (B) are:-

	BOMB A	BOMB B
Incendiary Pellets	1. 168 in number arranged 21 rows of 8. 2. Pellets not made individually. 3. Pellets of two sizes	1. 198 in number arranged in 22 rows of 9. 2. Pellets made individually and soldered together. 3. Pellets of one size.
Container of Incendiary insert	Top of cylindrical container reduced in diameter.	Container without reduction in diameter.
High Explosive	No descriptive label	Label present.
Tail	1. Welds machined 2. Fins secured with	1. Welds not machined. 2. Fins secured

	Bomb A	Bomb B
Tail (Contd)	5 Spot welds on each. 3. Rear end of fins bent through 23°.	with 4 spot welds on each. 3.Rear end of fins bent through 30°

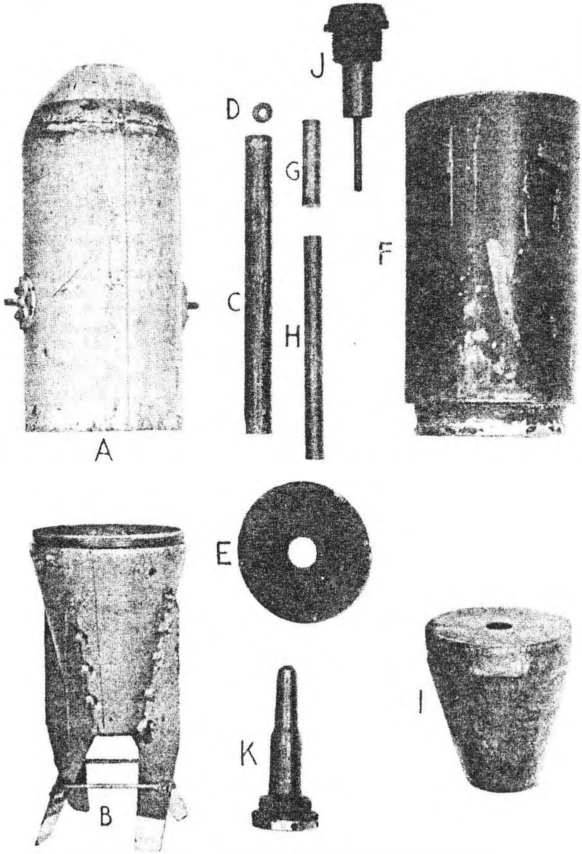
(SOURCE :- MUNITIONS SUPPLY LABORATORIES through MGO Branch)

32 KG INCENDIARY BOMB

FIG I

32 KG INCENDIARY BOMB

FIG 2 COMPONENTS



(A) Barrel & Nose. (B) Tail. (C) Exploder Tube.
(D) Wooden Ring. (E) Steel Plate. (F) Incend. Filling.
(GHI) Explosive Fillings. (J) Nose Transit Plug.
(K) Tail Transit Plug.

32 KG INCENDIARY BOMB

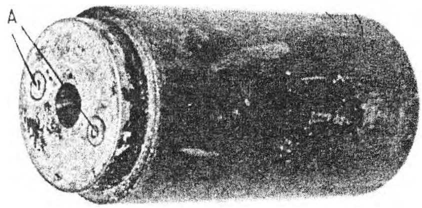


FIG 3 INCENDIARY INSERT. (A) Soldered Plates over Filling Holes.

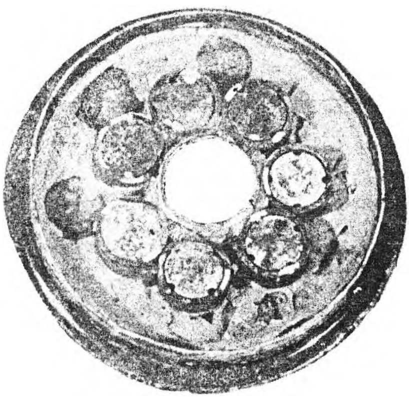


FIG 4 Incendiary insert after removal of Cover.

32 KG INCENDIARY BOMB

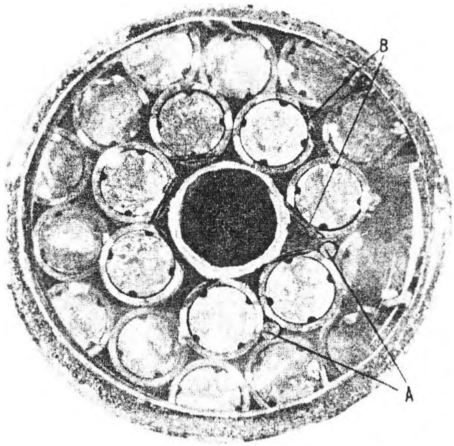


FIG 5 Incendiary insert after removal of the cover and the phosphorous filling.
(A) Steel Packing Rods. (B) Slanting Flats on longer pellet assemblies.

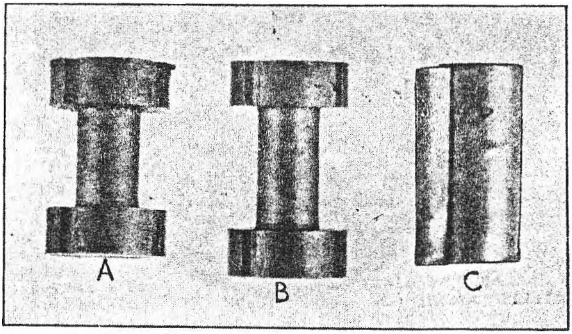
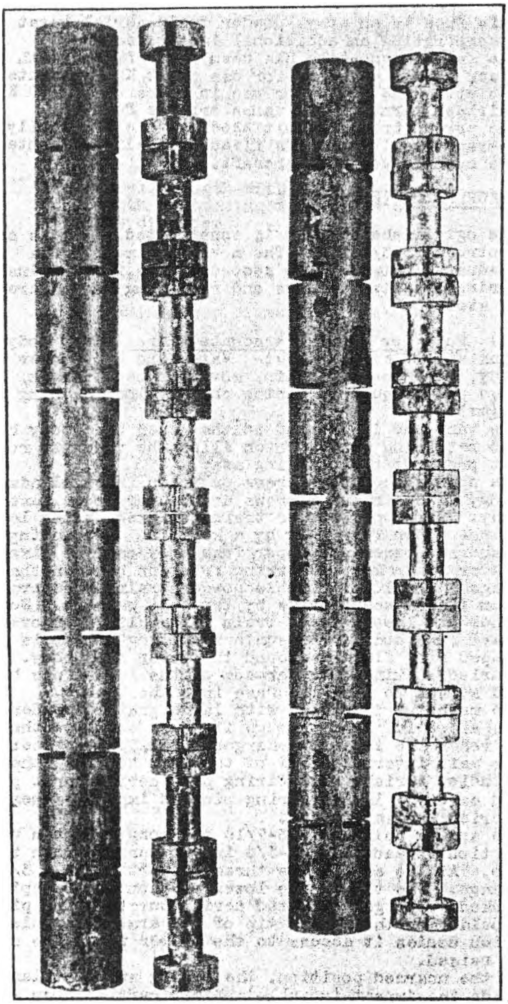


FIG 6 (A) Core from Shorter Pellet Assembly.
(B) Core from Longer Pellet Assembly.
(C) Rolled Tin Plate Cylinder from Shorter Pellet Assembly.

32 KG INCENDIARY BOMB

FIG 7 Long and Short Pellet Assemblies removed from Tubes.



D-5(A) NOSE FUSE

1. GENERAL

This fuse is an army, powder train aerial burst type incorporating an additional impact feature.
The fuse in question has been found filled with a black powder magazine for use in 12 Kg Parachute Flare and with a HE gaine for use in bombs up to 100 Kg.
Thirteen turns of the vanes arm the fuse.
The powder train is initiated by an electrically operated squib which is fired by a sliding contact as the bomb leaves the aircraft.

2. DESCRIPTION (Figs 1 - 4)

The ogival shaped fuse is constructed of brass and protrudes 3-3/4 ins. The movable time ring is graduated from 3 to 40 seconds. The firing pins, springs, spring-washers and retaining screws are made of steel.

(a) Fuse for Use in Parachute Flare: Fuse body consists of eight parts:- Vanes and hub, upper fuse body, fixed powder train, movable powder train, lower fuse body, squib retaining collar, locking ring and magazine.
The vane hub is secured to the upper fuse body by two retaining screws which allow the vanes to rotate but prevents them falling away.
The upper fuse body screws on to an internal adapter ring, which in turn screws around the lower fuse body. The upper powder train is fixed, being locked to the upper fuse body by a key pin. Two spring steel washers between the upper fuse body and the fixed powder train keep a working friction between the powder rings. The lower movable powder train is separated from its adjacent parts by two felt washers. Both the upper and lower powder train rings slip down over the lower fuse body. The squib retaining collar is an "L" shaped ring fitting around the lower fuse body. The knurled locking ring threads on the lower fuse body and serves to lock the fuse into the bomb.
The magazine is filled with large grained powder and has a 3/8 in. hole through its base to allow the flash to reach the ignition charge of the flare proper.
The main internal parts of the fuse comprise the arming spindle, aerial burst firing pin, aerial burst primer and carrier, impact firing pin and impact primer, carrier and safety arm.
The arming spindle is 3-7/16 ins long with the upper portion threaded for 1-3/4 ins to turn through the vane hub. At the end of the threaded portion is a 3/4 in. flange. The tip of the lower portion of the spindle is forked. The gas operated aerial burst firing pin shoulders on the forked tip of the arming spindle which denies it access to the primer until the spindle is raised.
In the unarmed position, the arming spindle flange holds the impact (movable) primer carrier down and away

from its fixed firing pin by bearing against the safety arm of the carrier.

The electrical components consist of an electric squib and sliding contacts. The squib is 5/8 in.long with two 5 ft. insulated single stranded copper wires attached and fits into the lower fuse body.

The sliding contacts are fixed to a rod 4-3/4 ins long which is a non-conducter of electricity. External brass contacts on one end are each connected to a stranded wire 18 ins.long. The wires then pass through the rod and are attached to the two leads from the squib. A cord 40 ins long is also attached to the end of the contact rod, the other end of the cord being fastened to the flare. The rod is evidently plugged into the aircraft so that the two contacts are inboard of the corresponding female contacts on the aircraft.

Dimensions:

Overall length with magazine -- --	5 ins
Length protruding from flare body --	3-9/16 ins
Body diameter -- -- -- -- --	2 ins
Diameter of vanes -- -- -- --	2-3/16 ins
Diameter, lower fuse body threads --	1-3/16 ins
Threads per in. -- -- -- -- --	13
Magazine length -- -- -- -- --	1-3/16 ins
Magazine body diameter -- -- --	11/16 in.
Magazine diameter at threads -- --	7/8 in.
Threads per in. -- -- -- -- --	24
Overall weight (fuse)-- -- -- --	1 lb.15 oz.

(i) Markings & Packing: The fuses are packed in separate cans, 20 per box with the sliding contacts in one end of the box. Markings on the box and can lids are translated "Type 1 Bomb Nose Time - Impact Fuse."
Characters on the fuse translated are "July 1943 Tokyo Army Arsenal."

(ii) Action: Before dropping, the safety pin is removed after the arming wire is inserted through the vanes, the time setting is made and an electric switch closed.
As the flare leaves the aircraft, the sliding contact rod is pulled out by the cord and passes through the contact points on the aircraft. The squib is thus fired and the powder train initiated. The spindle is then raised up to the armed position by thirteen turns of the vanes.
When the powder train has burned, the gas generated by the initiating pellet drives the firing pin forward against the creep spring and into the primer. A flash pellet then relays this to the black powder magazine.
If the aerial burst feature fails or impact occurs between the arming time and before the aerial burst feature operates, the fuse will function by the auxiliary impact firing feature. In the armed position, the arming spindle flange is raised sufficiently to allow the movable impact primer carrier to move forward. On impact, it moves against its spring and impinges on the fixed firing pin.

(b) Fuse fitted with HE Gaine: This fuse is identical with the former except that it is fitted with the HE gaine in place of the black powder magazine and the

impact firing feature is absent. The lead azide and cyclonite gaine is fitted with the aid of an adapter ring.
The dimensions are:-

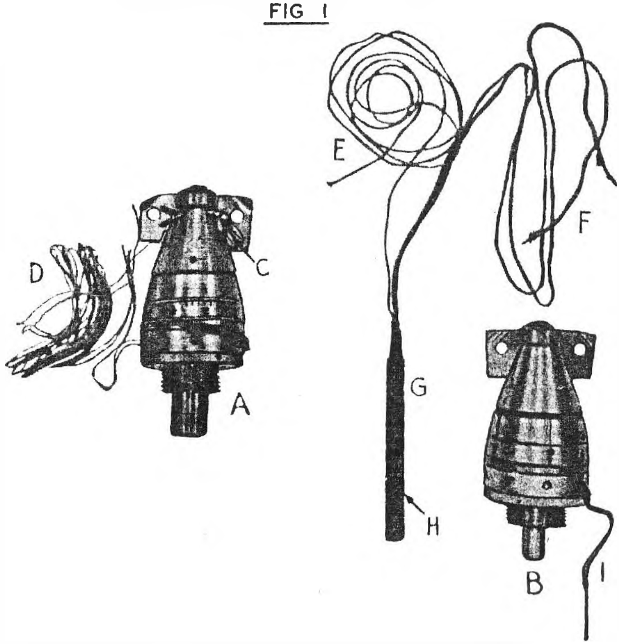
Diameter of adapter ring	-- -- --	7/8 in.
" " gaine body --	-- -- --	7/16 in.
" " " threads	-- -- --	5/8 in.
Threads per inch	-- -- -- -- --	36

The fuse, sliding contact, leads and squib were packed together in a larger can. The electrical components were connected.
Translation of characters on the lid of the can is:- "Type 1 Bomb Nose Time Fuse" and on fuse body - "November 1943. OSAKA Army Arsenal".
While the former fuse definitely fits only the flare, this fuse fits either incendiary or HE bombs. As no impact feature is incorporated, it is believed to be used in HE bombs so that the tail fuse will function should the aerial burst fuse fail.

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

D-5(A) NOSE FUSE

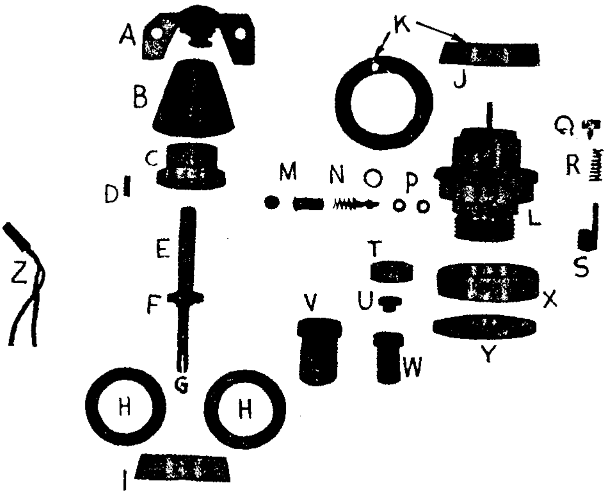
FIG 1



(A) Flare Fuse. (B) Bomb Fuse. (C) Safety Pin.
(D) Squib Leads. (E) Cord. (F) Electric Leads.
(G) Contact Rod. (H) Contacts. (I) Squib.

D-5(A) NOSE FUSE

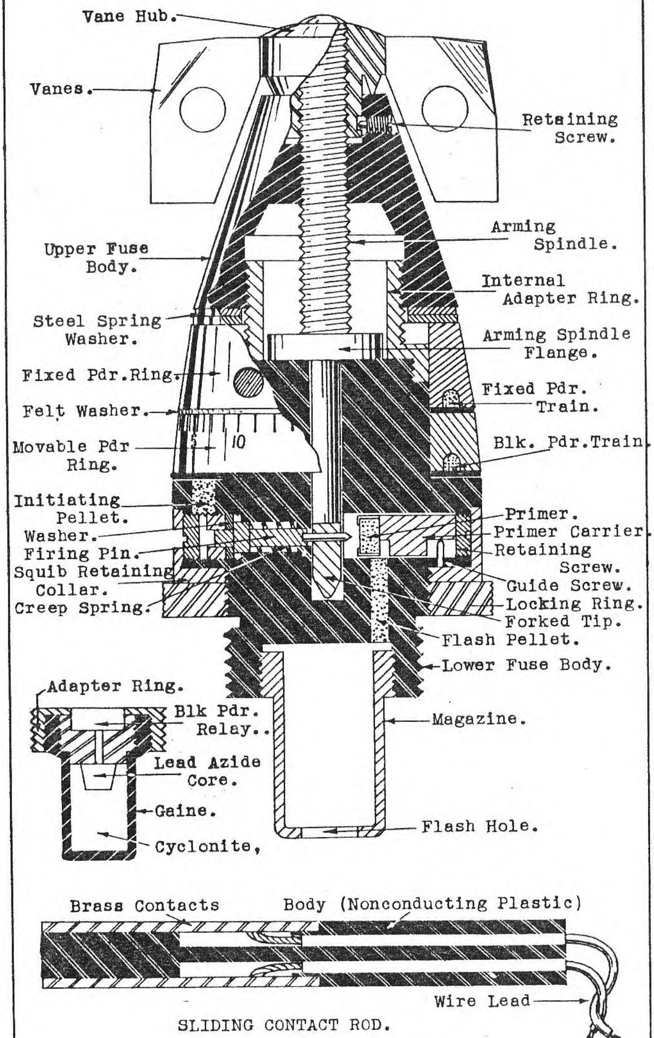
FIG 2



(A) Vanes & Hub. (B) Upper Fuse Body. (C) Internal Adapter ring. (D) Key Pin. (E) Arming Spindle. (F) Flange. (G) Forked Tip. (H) Spring Washers. (I) Fixed Powder Train. (J) Movable Powder Train. (K) Felt Washers. (L) Lower Fuse Body. (M) Primer Carrier. (N) Creep Spring. (O) Aerial Burst Firing Pin. (P) Washers. (Q) Impact Firing Pin. (R) Creep Spring. (S) Impact Primer Carrier & Safety Arm. (T) Adapter Ring. (U) Black Powder Cup. (V) Magazine. (W) HE Gaine. (X) Squib Retainer Collar. (Y) Locking Ring. (Z) Squib.

D-5(A) NOSE FUSE

FIG 3

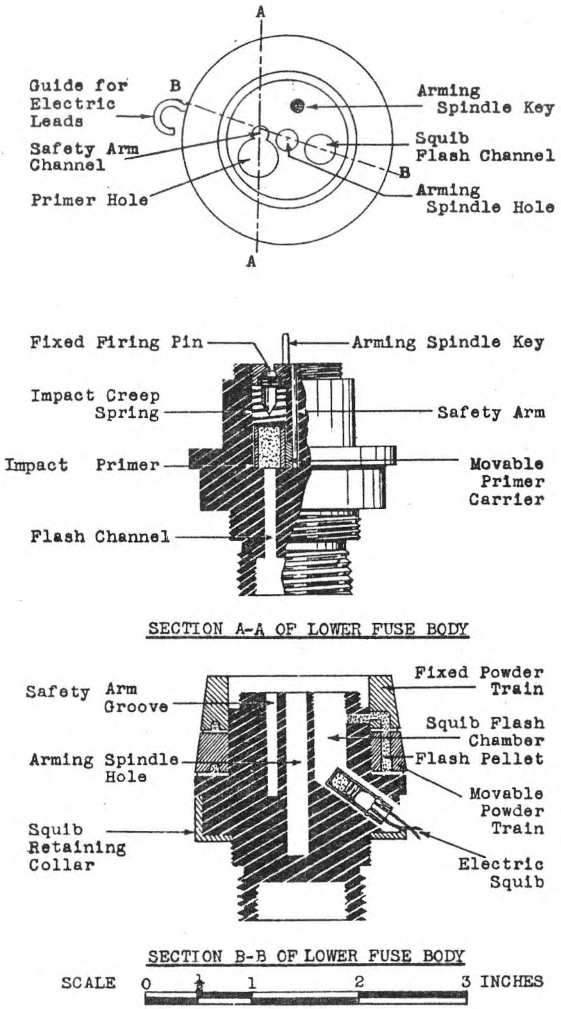


SLIDING CONTACT ROD.

SCALE :- FULL SIZE.

D-5(A) NOSE FUSE

FIG 4



MAGNETIC AP MINE TESTS

1. GENERAL

Fourteen tests were carried out against various types and thicknesses of armour. The mine used has been described previously in AMF Tech Int Sum No. 5 pages 88-91.

2. TESTS AND RESULTS

(a) The first phase of the tests was carried out against homogeneous armour plate.

Round No.	Plate Thickness	Results	Fig. No.
1	1/2 in.	Complete Perforation	1 and 3
2	" "	"	2 and 3
3	1 in.	"	4 and 5
4	"	"	5
5	1-1/2 ins	No penetration - plate bulged	6
6 Two Mines Stack-ed	1 in.	Complete Perforation	7
11 Two Mines Stack-ed.	1-1/2 ins	"	8

The above tests revealed that single mines produced complete perforations of plate up to one inch in thickness but only dented 1-1/2 ins plate.
Two mines, one placed on top of the other produced complete perforation of 1-1/2 ins homogeneous armour plate.

(b) In the second phase of the tests, the mine was used against light and medium tank tracks.

Round No.	Type of Tank and Track	Position of Mine	Results	Fig.No.
7	Light tank Rubber track	Under centre of track flush with ground	Track bro-ken. Bent bogie wheel	9
12	Medium tank Steel track	Centred un-der track flush with ground	Track sev-ered on one side, bogie wheel bent - one guide block blown off	10
13	" "	Two mines side by side - centred	Track severed on one side, bogie wheel	11

Round No.	Type of Tank and Track	Position of Mine	Results	Fig No.
13 (contd)		under track flush with ground.	bent, two guide blocks blown off. Suspension casting cracked, one suspension bolt sheared.	

Phase 2 tests showed that single mines bent a bogie wheel and completely severed a rubber track of a light tank; bent a bogie wheel and partially severed a steel track on a medium tank. Two mines bent a bogie wheel, cracked a suspension casting and partially severed a steel track on a medium tank.

(c) The third phase of the tests was made on a half-track vehicle.

Round No.	Position of Mine	Results	Fig. No.
10	On ground under centre of vehicle	Windshield, steering wheel, radiator, floor plates and sundry instruments broken, crank case punctured, transmission jammed in reverse. Engine would still run.	12

From this test it is concluded that a single mine placed on the ground beneath the centre of such a vehicle would effect serious and extensive damage.

(d) The fourth series of tests was carried out on the hull of a medium tank.

Round No.	Position of Mine	Results	Fig. No.
8	Cover of driver's hatch	Complete perforation.	13 & 14
9	Top door to engine compartment	Complete perforation. Engine seriously damaged	15 & 16
14	Rear door to engine compartment	" " "	17 & 18

The above tests showed that a single mine would completely perforate the driver's hatch cover and also the armour protecting the top and rear of the engine compartment of a medium tank with consequent damage to the engine.

(SOURCE:- ABERDEEN PROVING GROUND MARYLANDS)

MAGNETIC A P MINE TESTS

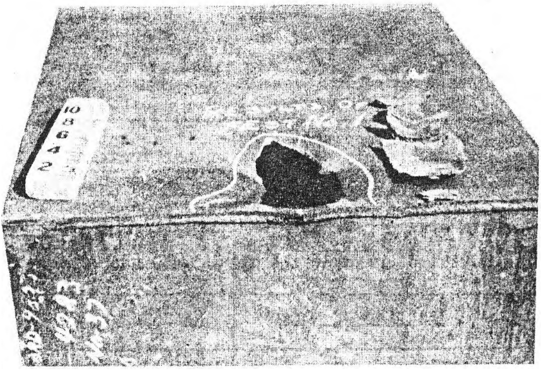
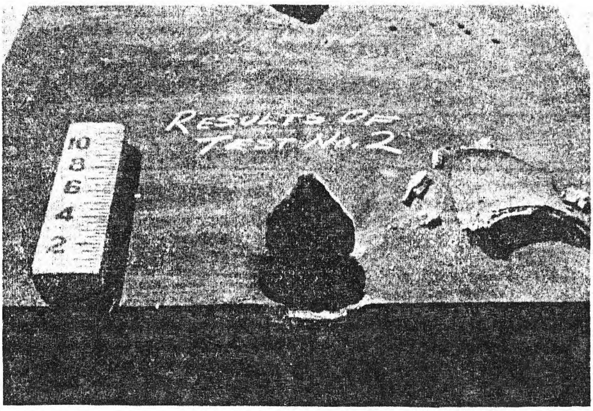


FIG I

Results of Test 1. ½ in. Homogeneous Armour.



Test No.2 - ½ in. Homogeneous Armour.

FIG 2

MAGNETIC A P MINE TESTS

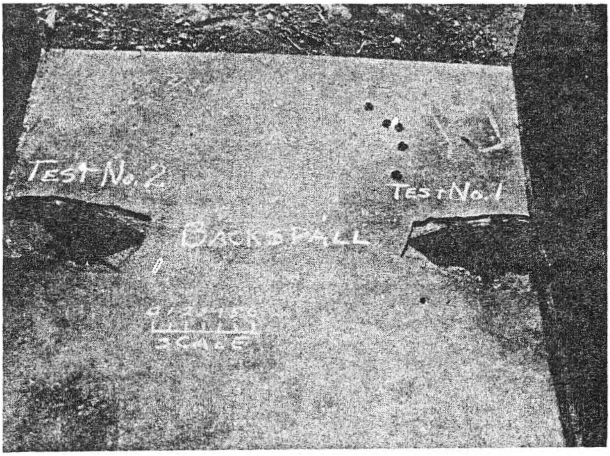


FIG 3 Tests 1 & 2. ½ in. Homogeneous Armour.

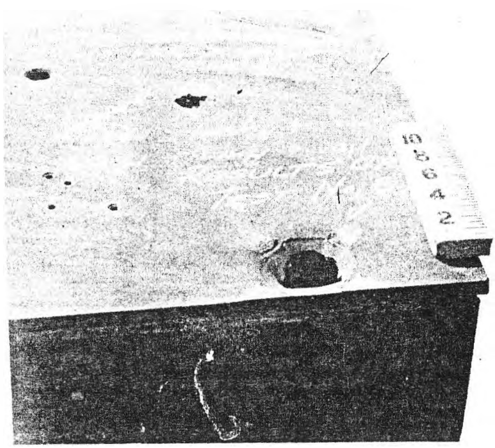


FIG 4 Test No 3. 1 in. Homogeneous Armour.

MAGNETIC A P MINE TESTS

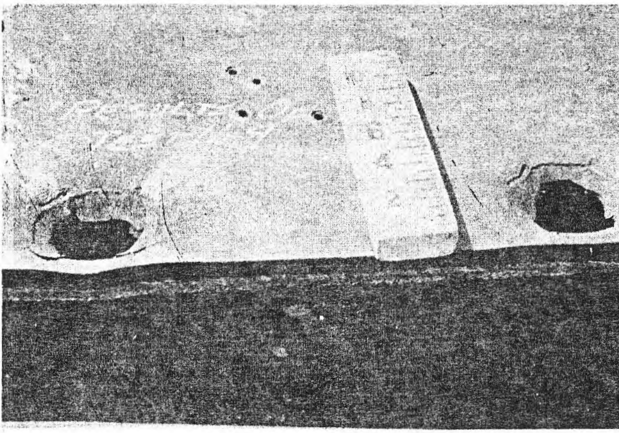


FIG 5 Tests 3 & 4. 1 in. Homogoneous Armour.

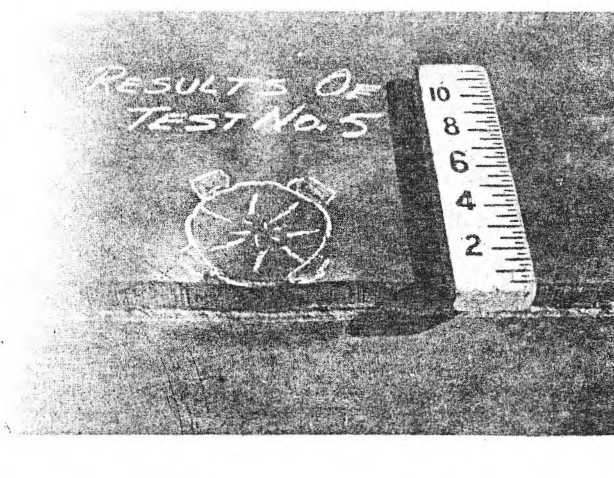


FIG 6 Test 5. 1½ in. Homogeneous Armour.

MAGNETIC A P MINE TESTS

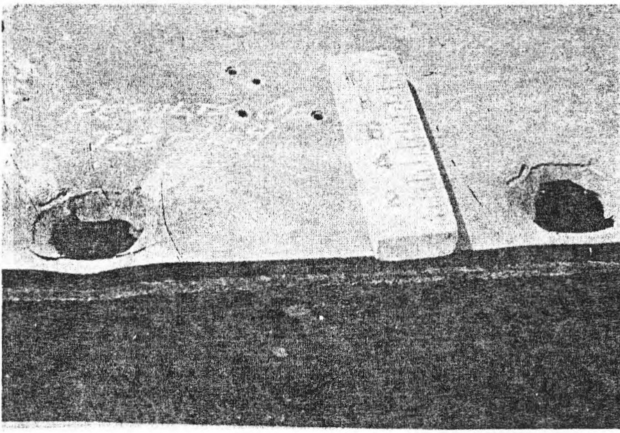


FIG 5 Tests 3 & 4. 1 in. Homogoneous Armour.

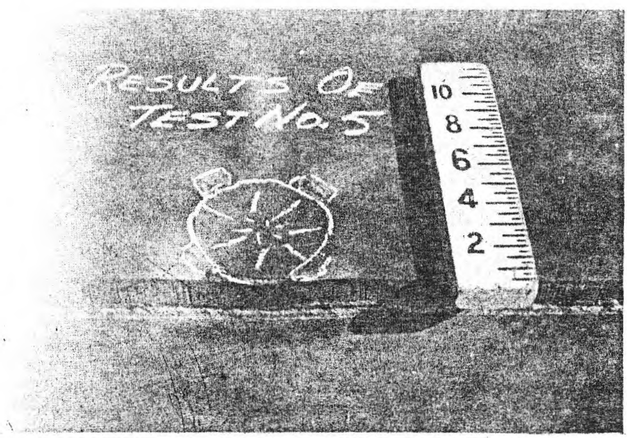


FIG 6 Test 5. 1½ in. Homogeneous Armour.

MAGNETIC AP MINE TESTS

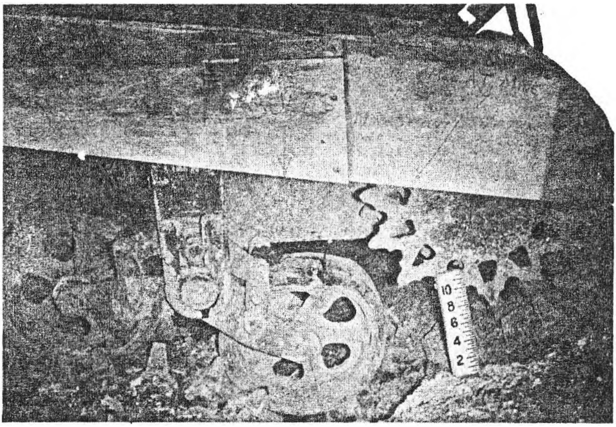


FIG 9 Test 7. Light Tank, Rubber Track.

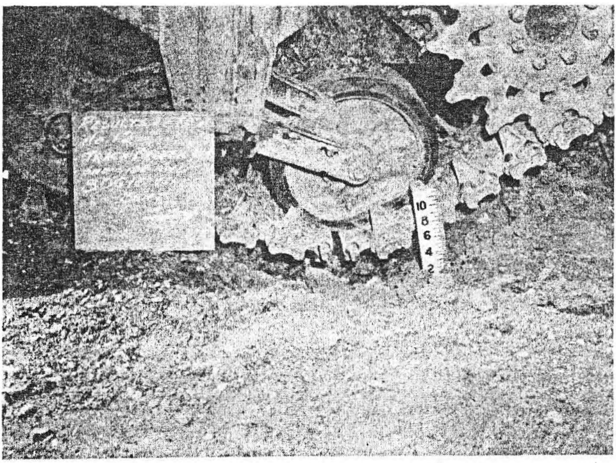


FIG 10 Test 12. Medium Tank, Steel Track.

MAGNETIC AP MINE TESTS

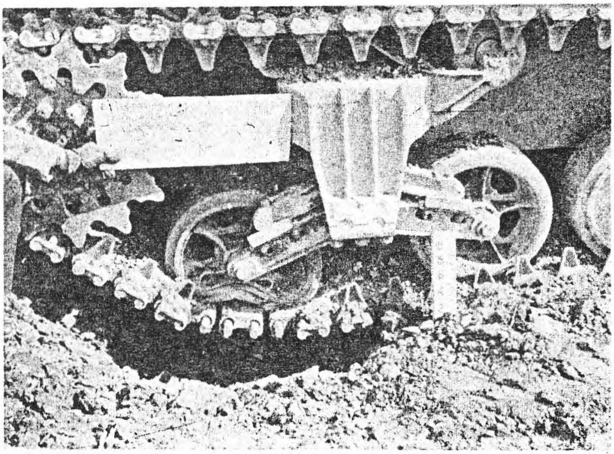


FIG 11 Test 13. Medium Tank, Steel Track.

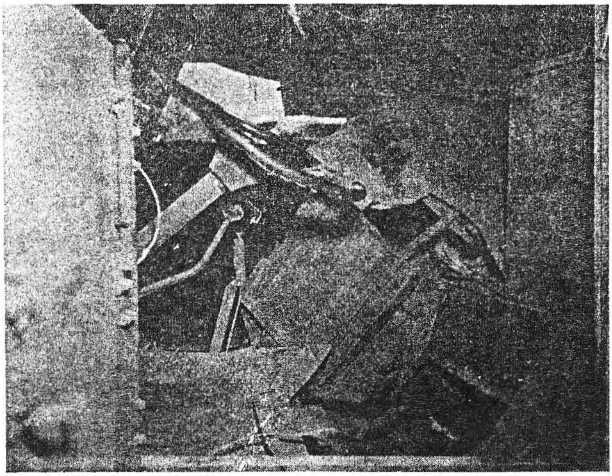


FIG 12 Test 10. Half Track Vehicle.

MAGNETIC AP MINE TESTS

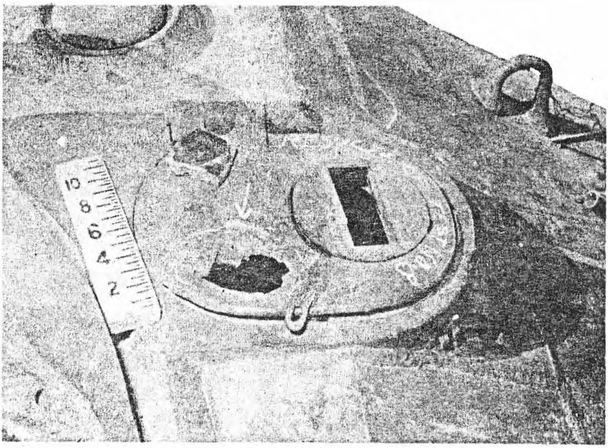


FIG 13 Test 8. Med. Tank, Driver's Hatch.

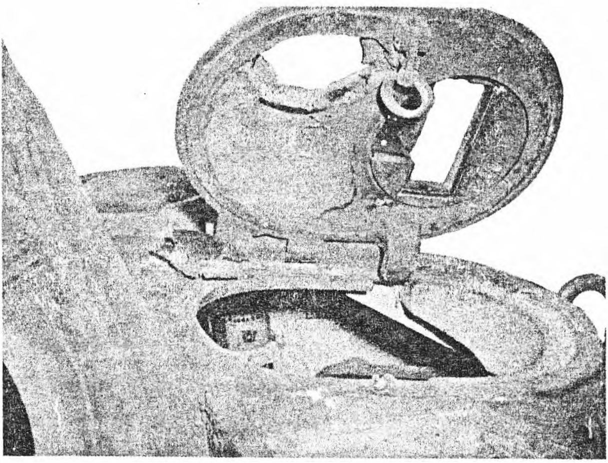


FIG 14 Driver's Hatch. Bottom View.

MAGNETIC AP MINE TESTS

FIG 15 Test 9. Medium Tank. Top Door of Engine Compartment.

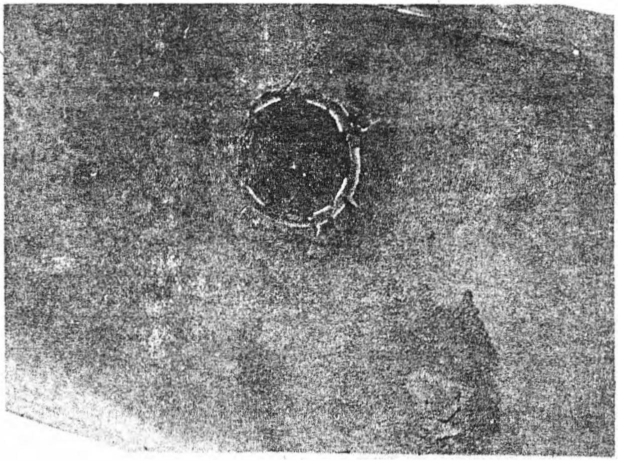


FIG 16 Test 9. Underside view of Fig. 15.

MAGNETIC AP MINE TESTS

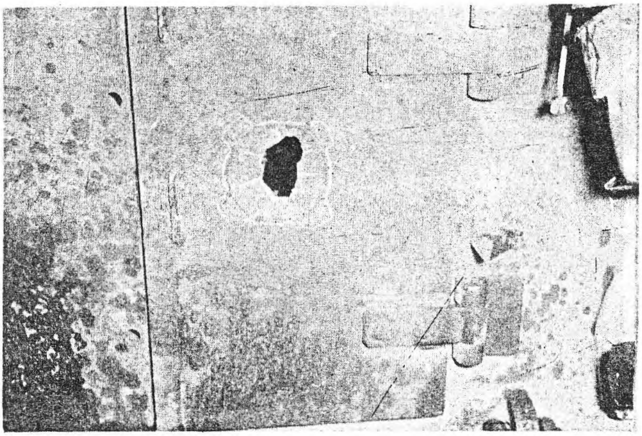


FIG 17 Test 14. Rear Door of Engine Compartment.

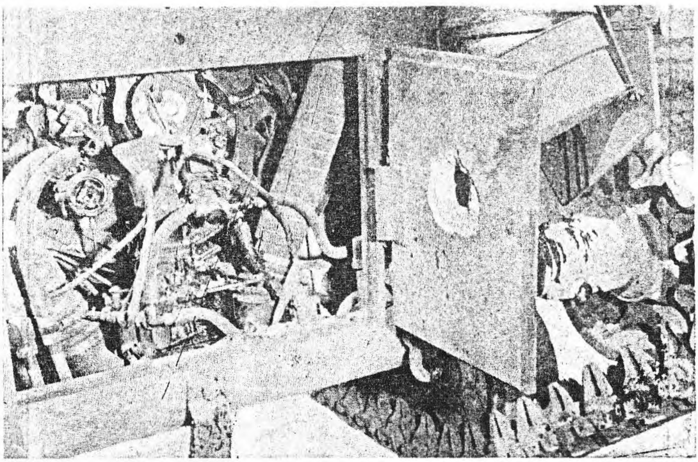


FIG 18 Test 14. Inside view of Fig. 17

CHEMICAL AGENT DETECTOR KIT

1. GENERAL

Consists of four sets of detector tubes, a cylinder for holding the tubes, rubber aspirator bulb, rubber connecting tube, extra rubber stoppers, a file and wooden carrying case. The kit is used for field detection and identification of chemical warfare agents.

2. DESCRIPTION (Figs 1 - 4)

(a) Aspirator Bulb: The red rubber bulb has a metal valve on one end and a metal connector for rubber tubing on the other end. The bulb is 145 mm long, 50 mm in diameter (maximum) and weighs 93 gms. Fastened to one end was 10 mm rubber tubing 22 cm in length.

(b) Tube Cylinder: This part is made of light rust-proof alloy, and weighs 474 gms without the charcoal filling. The cylinder is 62 mm in diameter and 200 mm long. With extensions 1 cm in diameter for connecting rubber tubing the total length is 262 mm. The cylinder assembly consists of a removable tube housing and a charcoal container. A 60 mesh brass screen is soldered into the bottom of the charcoal container. The charcoal is enclosed on top by a removable rustproof 60 mesh screen, which in turn is held in place by a rubber washer and a 2 cm long retaining ring, which screws into place. The free end of the retaining ring holds a red rubber stopper which has five holes to hold the set of five detector tubes. This stopper is the size of a standard No. 10 rubber stopper and weighs 55 gm. Three of these stoppers were received with the kit. The holes in the stopper are numbered from 1 to 5 with Arabic numerals. Around the top outside of the charcoal container is printed a series of number combinations. A rotating sleeve below this series has a window through which may be read the interpretation of the results obtained after exposing the tubes, when the window is brought into position under the proper combination of numbers. A translation of these interpretations is as follows:

Number on Chamber	Translation of Characters in Window
13	N Chemical
14	S Chemical
23	S Chemical
34	N Chemical
123	Mustard
1 (青) 23	Adamsite
125	Prussic Acid
234	Phosgene
235	Prussic Acid
1234	Mustard Gas
1245	Phosgene
1 (茶) 2345	Adamsite
12345	Lewisite

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