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RESTRICTED

TACTICAL AND TECHNICAL TRENDS

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MILITARY INTELLIGENCE SERVICE

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MILITARY INTELLIGENCE SERVICE
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An index is published for each series of 10 issues of Tactical and Technical Trends. Such an index has already appeared in Nos. 10, 20, 30 and 40 of this publication.

By arrangement with The Adjutant General the following three publications of the Military Intelligence Service are distributed in the same manner as is prescribed for field manuals (See pars. 6–9, 23a, FM 21–6, "List of Publications for Training."):

Intelligence Bulletin; Special Series; Tactical and Technical Trends.

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Number 49

ANTIAIRCRAFT

JAPANESE 3-INCH ANTIAIRCRAFT GUN, MODEL 10

The Japanese 3-inch antiaircraft gun, Model 10 (1921), is a naval-type weapon. Because it is a habit of the Japanese to classify their guns on the nearest whole centimeter size of the bore, they list this piece as an 8-cm 40-caliber high angle gun. However, the exact diameter of the bore is 3 inches (76.2 mm).

a. Description

The gun is mounted on a conical steel base which permits 360° traverse. The traversing gear, located on the right side of the carriage, operates on the worm and wormwheel principle. Two platforms, one on either side of and attached to the mount, allow the operators to move with the gun as it is traversed.

The gun is of built-up construction and is fitted with a hand-operated, vertical, sliding breech block. The recoil is within a cylindrical tube, in a manner similar to the recoil of the U. S. 75-mm tank gun. A guide on the bottom of the tube rides in a groove, preventing rotation of the barrel. The trunnions are to the rear of the barrel, and muzzle preponderance is compensated for by an equilibrator which is located inside the pedestal.

The buffer and recuperator are situated on top of the barrel. They appear to operate on the oil and spring system, having what seems to be a small oil reservoir on top of the buffer.

The elevating gear operates on the pinion and arc system and provides for approximately −5° to +75° elevation. The gun is laid in elevation from the left side.

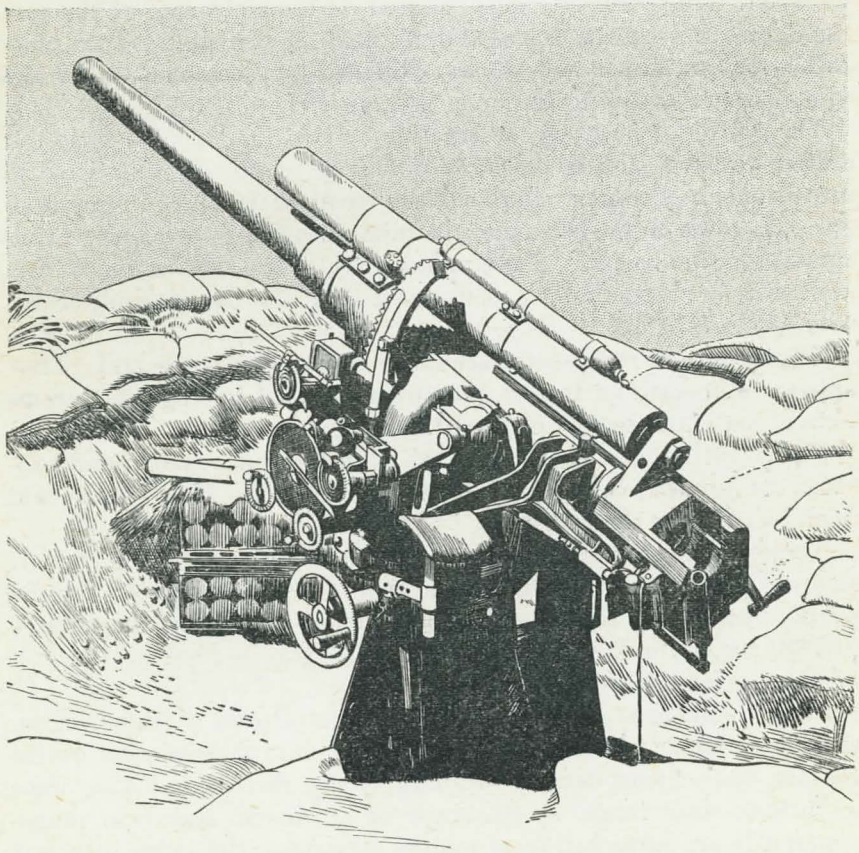
A telescopic sight is mounted on each side of the gun. On the left side is a series of drums and disks, believed to be employed for the purpose of setting lateral deflection, vertical deflection, slant range to 7800 meters, and super elevation. The gun is fired by the gun pointer on the left side of the piece.

On the right side of the piece there appears to be a frame for an electrical system. This is believed to be a data transmission device for use when firing data is supplied by the director. Firing data to include slant range, speed, angle of approach, and fuze range, apparently are furnished from sources other than the sights attached to the piece.

Markings on the fire control disk on the left side of the gun indicate that the muzzle velocity is approximately 2,200 f/s.

b. Characteristics

Caliber	3.00 in.
Diameter bore between grooves	3.075 in.
Over-all length of barrel and breech ring	10 ft 8½ in.
Length of barrel	9 ft 6 in.
Traverse	360°.
Elevation	−5° to +75°.
Length of chamber	1 ft 8 in.
Muzzle velocity	2200 f/s.
Maximum vertical range	25,000 ft (estimated).
Maximum effective vertical range	12,000 ft (estimated).
Rate of fire	20 rpm (estimated).
Length of cartridge case	16.1 in.
Length of complete round	2 ft 4 in.
Weight of projectile and fuze	12 lbs 11 ozs.
Length of projectile (less fuze)	9.3 in.
Length of projectile (with fuze)	12¾ in.



JAPANESE 3-INCH ANTIAIRCRAFT GUN, MODEL 10.

ANTITANK

GERMAN 42/28-MM TAPER BORE ANTITANK GUN

Additional information is now available concerning the 42-mm *le Pak 41* German antitank gun which was described briefly in *Tactical and Technical Trends*, No. 37, p. 4.

The weapon is a tapered bore, 42-mm to 28-mm emergent caliber gun, mounted on a modified 37-mm Pak carriage. This carriage is designed for one-man control of aiming, elevating, traversing and firing. It is of the split trail type but unlike the 37-mm Pak it has a spaced armor shield and is provided with torsion bar type springing. No muzzle brake is used.

Data:

Estimated muzzle velocity (AP)	4100 f/s.
Rate of fire	10 to 12 rounds per minute.
Over-all length of barrel, including breech ring.	7 ft 4½ in.
Length of rifling	5 ft 7 in.
Height of bore from ground	2 ft. 2½ in.
Elevation, maximum	+19°45′.
Depression, maximum	−8°
Traverse	60°.
Diameter of wheels with tires	2 ft 8½ in.
Tires, combat	6.00 x 20.
Length of trails	7 ft 3 in.
Over-all length, travelling position	13 ft.
Over-all width, over hubs	5 ft 5½ in.
Over-all height, top of shield	3 ft 11½ in.
Breech block	Horizontal sliding.
Recoil mechanism	Constant, hydro-spring tube.
Weight in action	990 lbs.

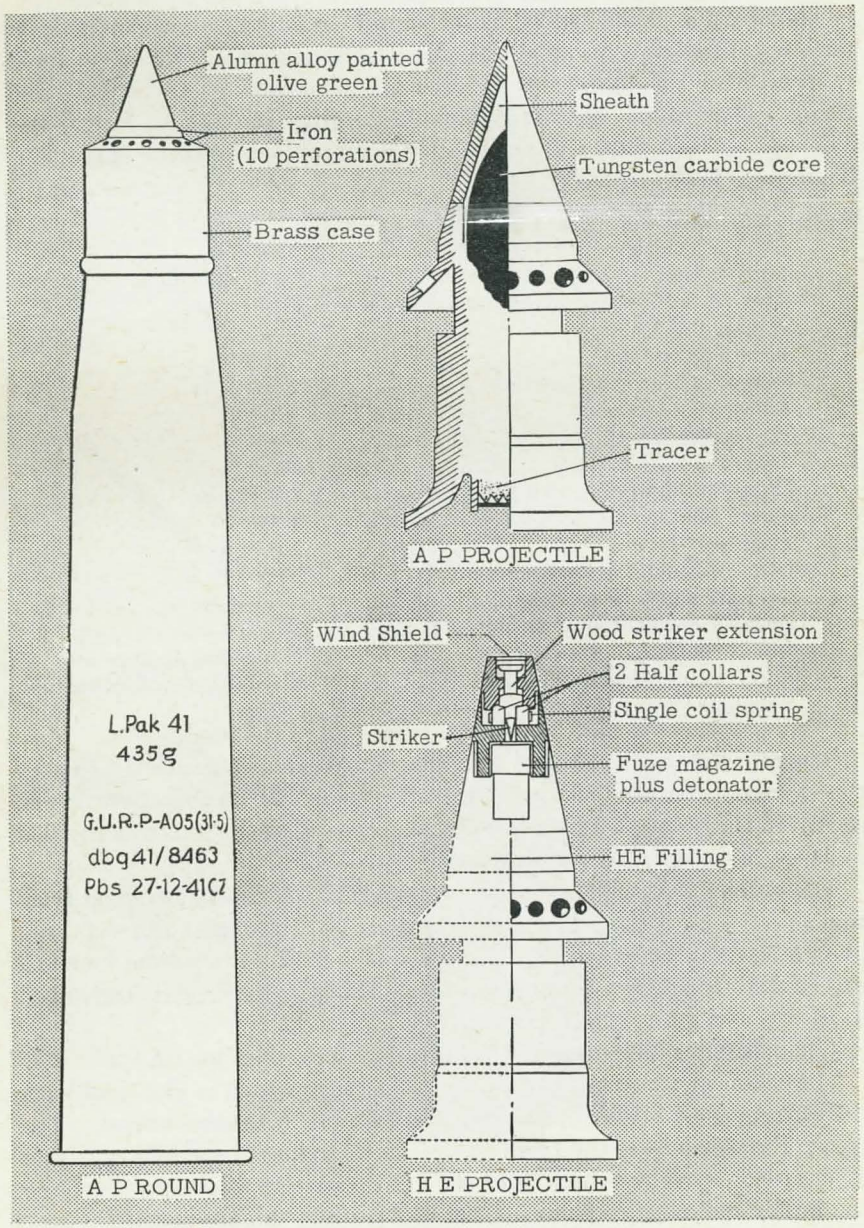
The gun fires both AP and HE ammunition. The projectiles are of the skirted type used in the other taper-bore AT guns. Details are shown in the accompanying sketch. A drawing of the gun was printed in Issue No. 37 of this publication.

The gun barrel is of monobloc construction. It can be removed from the carriage quickly and easily. The barrel is held in the breech ring by two rows of interrupted threads and it is held down at the forward end of the slipper by a light, spring-steel strap. The strap is tightened by means of a quick action lever on the right side.

The firing mechanism is a combination percussion inertia type.

The recoil mechanism is housed in the cradle which is identical with the 37-mm Pak. The buffer cylinder recoils with the barrel. The piston rod, secured to the front of the cradle, remains stationary. Two recuperator springs, which hold the gun in battery position, surround the buffer cylinder and are further compressed during recoil between

the retaining ring at the front end of the buffer cylinder and the retaining collar fixed at the rear of the cradle. The buffer rod is centrally fixed to the rear of the buffer cylinder and slides in the hollow piston rod. The piston rod slides through a stuffing box which is fitted at the forward end of the buffer cylinder.



GERMAN PARALLEL BORE ANTITANK GUNS

Recent reports make available comparative data concerning the muzzle velocity, projectile weight and equipment weight of the parallel bore antitank guns used by the German army. Of the weapons listed in the following table, three are of non-German origin. They are the 47-mm Pak (t) (Czech), the 75-mm Pak 97/38 (French), and the 7.62-cm Pak 36 (Soviet). The comparative data is as follows:

Weapon	MV (AP)	Weight of AP projectile	Weight of equipment
		Pounds	*Pounds*
37-mm Pak	2,690 f/s	1. 50	896
50-mm Pak 38	2,700 f/s	4. 58	2, 016
75-mm Pak 40	2,520 f/s	15. 00	3, 350
88-mm Pak 43	3,400 f/s (estimated)	21 to 22	9, 856
47-mm Pak (t)	2,540 f/s	3. 64	1, 288
75-mm Pak 97/38	1,870 f/s	14. 00	2, 688
7.62-cm Pak 36 (r)	2,430 f/s	16. 72	3, 808

ARMORED

GERMAN TANK TRENDS

Although unconfirmed reports of new German heavy tanks continue to be received, it is indicated that the principal German tanks likely to be met in the near future are still Panther, Tiger, and Pz. Kpfw. 4. There is, however, a new 88-mm (3.46-in) tank gun, Kw. K. 43, with an A. P. performance greatly superior to the 88-mm Kw. K. 36 which, according to reliable information, it will supersede as the main armament of the Tiger tank. It is believed that the Tiger turret will have to be redesigned to some extent before this can take place, and no doubt other improvements and modifications will be made at the same time. No other major development in Panther or Tiger has come to light during the last six months, apart from the fitting of a slightly more powerful engine in both of them (690 H. P. instead of 642 H. P.). The main benefit from this slight increase will be a better margin of power and improved engine life. Maximum speed will only go up about 2–3 m. p. h.

Face-hardened armor, which was not used on early Tiger tanks, has reappeared on certain plates of at least one Panther. On other Panthers only machineable quality armor is used. There is no reason to believe that face-hardening would substantially improve the resistance of the armor to penetration by British capped shot, but it is possible that it may be more effective against Soviet projectiles.

Whereas the Pz. Kpfw. 4 might have been expected to have gradually dropped out as the necessary quantity of Panther tanks became available, there actually was a sharp rise in the rate of its production during 1943.

At the same time, the front armor of Pz. Kpfw. 4 has been reinforced from 50-mm (1.97-in) to 80-mm (3.15-in) by bolting additional armor to the nose and front vertical plates, and the 75-mm (2.95-in) gun Kw. K. 40 has been lengthened by about 14¾ inches. These developments seem to indicate that Pz. Kpfw. 4 is likely to remain in service for many months.

All this is reflected in recent organization evidence. Last autumn the evidence on provisional organization for the German tank regiment in the armored division indicated that the aim was a ratio of approximately four Panther tanks for each Pz.Kpfw. 4: now, however, the standard tank regiment consists of approximately equal numbers of these two types.

The possibility of Tiger production having been discontinued has been considered, but although this would relieve the pressure on existing capacity, it is thought that sufficient tanks of this type to fill the needs of units equipped with them are still being produced.

Pz.Kpfw. Tigers form an integral part of divisional tank regiments only in S. S. armored divisions; armored divisions of the Army may however, receive an allotment of Tigers for special operations.

A number of Pz.Kpfw. 3's converted to flamethrower tanks appeared early this year in Italy, but it is believed that production of this tank ceased some time ago. Some of the assembly firms which produced Pz.Kpfw. 3's in the past are now making assault guns and others are probably producing Panthers. It is in every way unlikely that production of Pz.Kpfw. 3 as a fighting tank will be resumed, however serious the German tank situation may become in the future.

During the last two years the Germans have progressively reduced the number of vision openings and ports in the hulls and turrets of their tanks, thus eliminating weaknesses in their armor at the cost of all round vision. The consequent increase in the blind area surrounding each tank must have contributed towards the success of Soviet guerillas and partisans armed with grenades, oil bombs, demolition charges and the like. In any event, the Germans have recently gone to considerable lengths to provide an effective answer to this form of attack. For example, they have fitted the Tiger with S-mine dischargers which are electrically fired from inside the tank. They are mounted on the superstructure roof and are designed to project a shrapnel anti-personnel mine which bursts in the air a few yards away from the tank. They have so far only been seen on Tiger, but there is no reason why their use should not be extended to other German tanks.

Another measure, apparently intended for protection against hollow charge projectiles and the tungsten carbide cored A. P. bullet of the

Soviet antitank rifle, is the fitting of mild steel skirting plates about ¼ inch thick on the sides of the hull and, in the case of Pz.Kpfw. 4, suitably spaced from the sides and rear of the turret also.

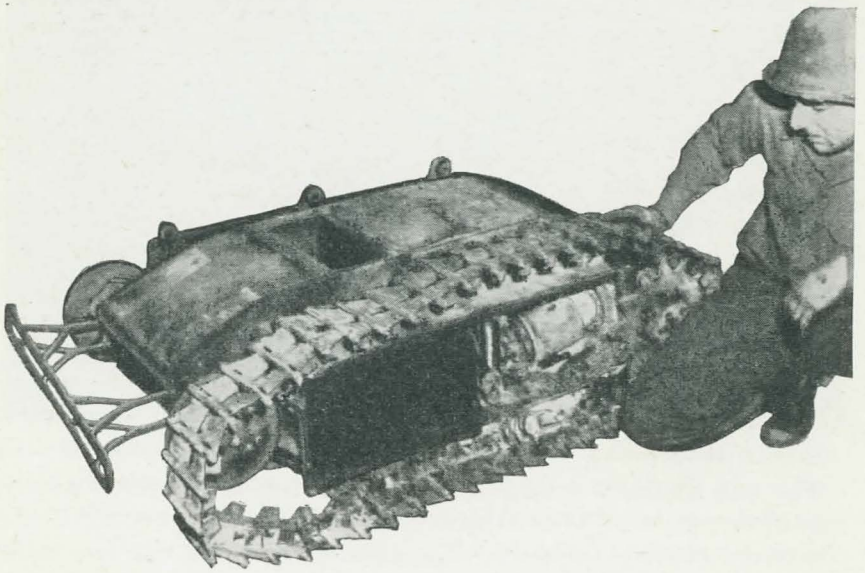
Finally these skirting plates as well as the hulls and turrets of the tanks themselves, are being coated with a sufficient thickness of non-magnetic plaster to prevent magnetic demolition charges from adhering to the metal beneath.

There is no reliable evidence of any basic new types of medium or heavy tank likely to come into service during 1944 and, while a new tank is not quite impossible, it is probable that circumstances will force the Germans to concentrate mainly on production and improvement of current types, particularly Pz.Kpfw. Panther and 4.

There is some evidence that a new development of Pz.Kpfw. 2 will shortly appear as a reconnaissance vehicle. It is sometimes referred to in official documents as though it were an armored car and sometimes as though it were a tank.

GERMAN REMOTE CONTROLLED DEMOLITION VEHICLES

Combat experience has demonstrated that the Germans' vaunted remote controlled demolition vehicle, Goliath, has not been the effective weapon which its users claimed it to be. Not only is it very vulnerable, but also it is easily stopped or even overturned by small obstacles in the terrain. And it is usable only once, as its explosive charge blows it up.



A DAMAGED GOLIATH, LINE-CONTROLLED DEMOLITION VEHICLE.

The Goliath is line controlled and in general appearance resembles a miniature version of the type of tank used by the Allies in World War I. The interior is divided into three compartments. In the rear is a cable and drum, in the center the control mechanism, in the forward compartment an explosive charge estimated to weigh slightly less than 90 pounds.

The hull is $\frac{3}{16}$-inch sheet steel, and is vulnerable to small arms fire. The track is conventional. Surrounded by the track, on each side of the hull, are two compartments for an electric motor and a battery. A second version, however, has been reported as driven by a gasoline engine.

The vehicle is brought up from the rear by truck, and unloaded into a two-wheeled cart for transport to the front line. It is normally directed from there toward an enemy tank or pill box from any sort of cover. On reaching the target, it is detonated by closing a second circuit in the control cable.

Another type of remote controlled demolition vehicle, the B–4, is not expendable. Radio controlled, it is directed toward its target, drops the time-fuzed explosive charge, and returns. The charge is fuzed to explode immediately the B–4 is out of range.

THE B–4 RADIO-CONTROLLED DEMOLITION VEHICLE.

The hull of the B–4 vehicle, which is 12 feet in length, is poorly welded 8-mm plate. The vehicle has a sloping front on which the charge rests before dropping. The interior is divided into two main sections: driver's and radio compartment in front, and engine compartment in the rear. It is gasoline engine driven.

The suspension consists of two full tracks, each having front sprockets, five bogies, and rear idler. There are no return rollers, the track apparently returning along the top of the bogies.

The explosive charge is carried on the sloping front plate of the vehicle, and is reported to consist of 800 pounds of TNT. It is lowered either by radio control, or by a trip mechanism which operates when the B–4 is reversed.

The operator normally drives the vehicle, manually, to the nearest possible point to the target. Here he dismounts, carrying with him the transmitter portion of the radio control. Thence, from suitable cover, he directs the further progress of the vehicle toward the target, which is normally an emplacement or pillbox. When the B–4 has reached the target, he operates the controls which cause the vehicle to drop its load of explosive, and to reverse.

An optional self-destructive device is incorporated to prevent capture.

PROTECTIVE COATING FOR ARMOR

The latest information concerning the protective coating against magnetic charges which the Germans apply to the armor of their tanks and assault guns states that the substance is called "Zimmerit." A previous reference to the use of this material was published in *Tactical and Technical Trends*, No. 48, p. 12.

"Zimmerit" is applied in a thickness of about 4 mm and is hardened by means of a blow torch after it has become dry. The following quantities are required for various equipment:

Assault guns	Approximately 154 lbs.
Pz. Kpfw. 4	Approximately 220 lbs.
Pz. Kpfw. 5 (Panther)	Approximately 350 lbs.
Pz. Kpfw. 6 (Tiger)	Approximately 440 lbs.

ARTILLERY

NOTES ON GERMAN ARTILLERY IN ITALY

A large percentage of enemy fire is adjusted after careful evaluation of targets from observation posts. Also the enemy frequently establishes areas of defensive fires in front of his own lines, covering likely routes of attack by our troops. When conditions warrant, the accuracy of these defensive fires is established by a minimum of registering rounds. These tactics are similar to the procedure of our divisional artillery.

On the lower Garigliano front the enemy's choice and manner of engaging targets indicated no general change from what was experienced on the Rapido river front. However, the effectiveness of adjustments was lessened by the comparative lack of flank OPs and by a smaller number of medium weapons within range for counterbattery fire.

a. Discussion of Particular Types of Targets

(1) The enemy engaged targets principally in the afternoon when the sun favored his observation and handicapped our ground and air OPs which were primarily interested in identifying enemy guns.

(2) In the morning, when sunlight was favorable for friendly observation, several of our OPs generally received some variety of neutralizing fire, usually from 105-mm or lighter calibers. Smoke was employed occasionally.

(3) The infantry in defiladed areas received harassing fire principally from small numbers of shells. Heavier concentrations of 20 to 60 rounds were received in areas where the enemy may have seen considerable movement of troops. These concentrations, while not numerous, were delivered generally at night. The calibers indicated mixed light with some medium. For some time, high velocity weapons sporadically shelled personnel movement in pre-sighted areas in the Minturno environs. This shelling caused little damage.

(4) The enemy is sensitive and quick to bring interdiction fire on excess vehicular movement. Restrictions on traffic have extensively reduced this type of shelling. Interdiction indicating a pre-determined schedule was fired for several days on roads west of the Garigliano River.

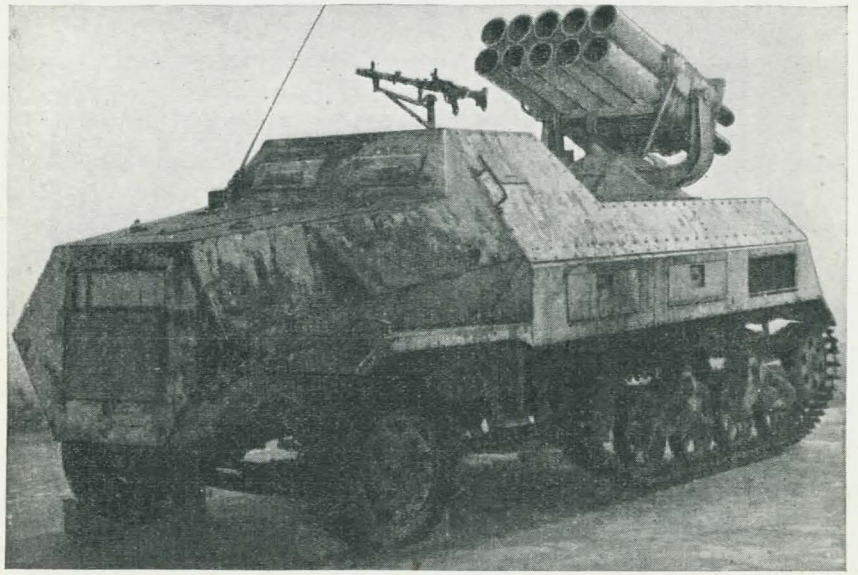
b. Conclusions

(1) General deductions which have been drawn from several hundred shelling reports lead to conclusions that the enemy will not attack a target in a given manner each time it is presented. German OPs maintain a constant and close surveillance of our territory and are quick to react to movement which is judged to be a remunerative target. However the enemy has not shown consistency in appraising the value of targets. This has been demonstrated by enemy reaction to our traffic and personnel movement, and the activity of individual batteries of our artillery. These targets are attacked with determination on one occasion, but at another time, although it is apparent that the same conditions exist, only light harassing fire is used.

(2) It is reasonably indicated that the enemy places more counter-battery fire on our medium and heavy artillery than is directed on the light divisional weapons.

(3) Since enemy employment of photographic intelligence was limited on the Garigliano front, and since there was no good indication that sound ranging was being employed, counter-battery of our artillery was based principally on information from observed adjustment. Camouflage and flash defilade repeatedly concealed our artillery, even when well forward. Interdiction of important road junctions and bridges was considerably lessened when smoke pots were employed. However this screening many times interfered with our own visibility.

(4) The identification of our tanks or SP artillery will draw fire immediately, and will receive constant harassing attention which has amounted to comparatively heavy concentrations of massed fire.

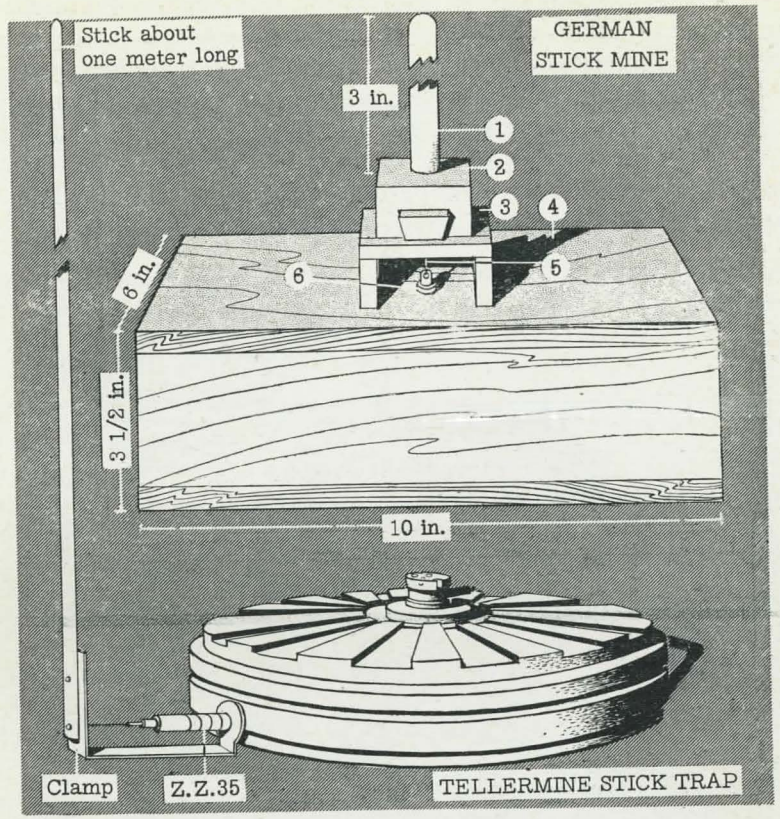


GERMAN 150-MM ROCKET PROJECTOR

The 150-mm *Panzerwerfer* (armored projector) 42 consists of two horizontal rows of five tubes each, mounted at the rear of a lightly armored semi-tracked vehicle on a turntable. The gunner sits inside the body of the vehicle, immediately below the turntable, with his head in a shallow cupola. The rocket projectiles are the same as those used in the 150-mm *Nebelwerfer* 41 (see *Tactical and Techical Trends*, No. 10, p. 23) and are fired electrically. A radio mast is usually carried on the mount, near the driver's cab, and there is a light machine gun on the roof of the cab.

General characteristics of the weapon are:

Length (approx)	26 ft.
Weight	7 tons, 1680 pounds.
Engine	68 hp Opel.
Speed	24 mph.
Armor	6–8 mm.
Crew	3.



ENGINEERS

GERMAN STICK MINES

Information has been received that the Germans are attaching stick booby traps to steel Tellermines and to a new type of wooden mine.

In one instance the Tellermine had a pull-igniter, Z.Z.35, screwed into the side socket through a hole in a metal clamp. A three-foot stick was attached to the clamp as shown in the accompanying sketch. A piece of wire was fastened to the bottom of the stick and to the eye of the pull-igniter so that any movement of the stick tightened the wire and fired the igniter and mine.

The German designation for the wooden mine with stick attachment is *B-Stabmine*. The body of the mine consists of a wooden box 10 x 6 x 3½ inches. The initiating stick (1) (see accompanying sketch) is fixed in the wooden block (2). The wooden block is wedged into a base (3) which is raised on supports above the cover

of the box (4). A wire (5) is attached to a hook in the base of the wooden block and to the eye of a pull-igniter Z.Z.35 (6). The pull-igniter is held in a metal clamp in the cover of the box. Any movement of the stick pulls the wire (5) and fires the igniter and charge.

ITALIAN ANTIPERSONNEL MINES

A recent report supplies information regarding German Schü-Mines and Italian 1–pound antipersonnel mines which are being encountered in Italy. They are laid just below ground level, concealed by earth sprinkled over the top, or sometimes the mines are laid on the surface in rocky ground. There has been some confusion as to the correct nomenclature of these mines. The designations "Italian A. Per. Mine 1 lb", "Italian Antipersonnel Bakelite Mine", and "Italian A Per. Mine 1 lb. (Wooden)" all refer to the same basic type of mine. The type most recently encountered is made of wood, but available reports indicate very little difference between it and the bakelite type that is described here.

* * * * * * *

The mine consists of a rectangular bakelite box (1) (see accompanying sketch) containing a high explosive charge of 5⅓ ounces of TNT. The box has a hinged lid (2). The charge (3) partly fills the box and is held in position by the projection (4). Around three sides of the charge are deeply grooved fragmentation plates (5).

The striker mechanism consists of the metal tube (6) which contains the striker (7) and the striker spring (8). The detonator (9) has a flange at its open end which holds it in position in the striker tube, the flange being secured between the perforated plug (10) and the screwed locking ring (11).

The mine is armed by first cocking the spring (8). This is done by pulling out the ring (12) and inserting the actuating pin (13). The detonator is next inserted in the striker tube and secured by the locking ring (11).

The whole assembly is now inserted in the box, with the detonator fitted into a recess in the explosive charge. The flange (14) on the striker tube is located inside the box while the actuating pin (13) is outside and inserted upwards as indicated. Finally the lid is gently closed until the edge opposite the hinge rests on the actuating pin. The mine is thus armed and sensitive to a small pressure on the lid which causes the latter to push out the pin (13) and release the striker.

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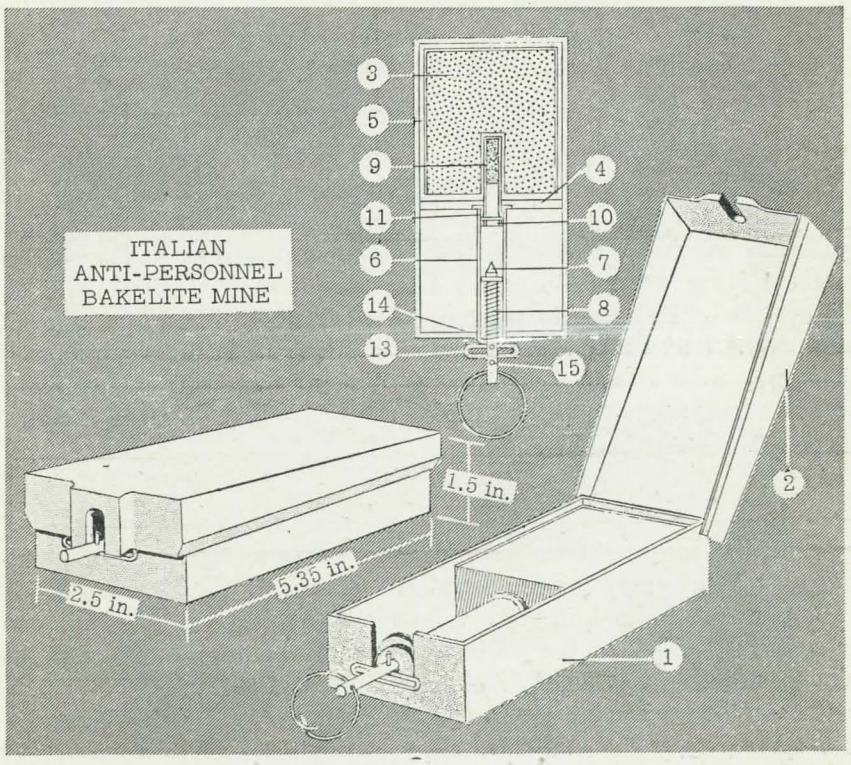


To neutralize the mine, carefully lift the lid clear of the actuating pin (13). Place a wire in inner hole (15) and lift out the whole striker assembly. Unscrew the locking ring (11) and take out the detonator.

NOTE: The striker assembly slips easily into the side of the mine in a recess cut out to receive it. A corresponding slot in the lid enables the mine to be completely closed when the striker is not cocked.

GERMANS BUILD ECONOMICAL AT MINE

It is reported that the Germans have effected substantial economies in defense against tank attack by producing a mine that requires less explosive for a given area than any other type of antitank mine. As an illustration of the extensive coverage made possible by the new mine, it is said that a double row 100 yards wide, comprising 66 of these mines, gives the same coverage as a row of similar width comprising 300 Tellermines of the T. Mi 42 or T. Mi 43 type. Use of the smaller number of mines not only reduces the amount of matériel but it also simplifies the task of mine laying.

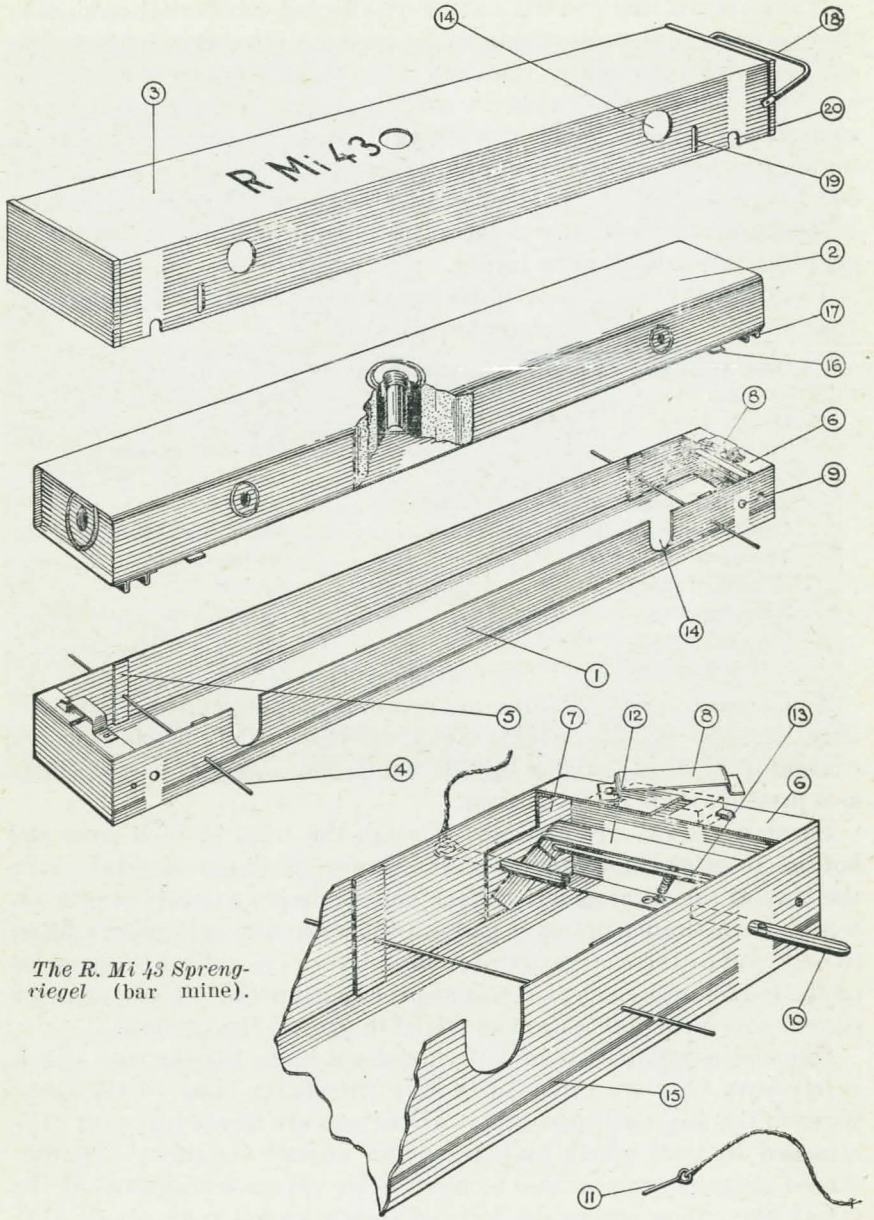
The German designation of the new mine is *R. Mi 43 Sprengriegel* (bar mine). Its general characteristics are:

Over-all length	31½ in.
Over-all width	3¾ in.
Height (laid)	3½ in.
Total weight	20.5 lbs. (approx.).
Color	Light khaki.
Markings (stencilled in black on lid)	R. Mi 43.
Construction	Sheet steel (spot welded).
Thickness of casing	.04 in. (approx.).
Weight of charge	8.8 lbs.
Main igniters	Type ZZ.42.
Firing pressure (ends)	440 lbs.
Firing pressure (center)	880 lbs.

The mine consists of three main parts: a spot-welded sheet steel tray (1)—see accompanying sketches—which contains an encased charge of TNT (2), and a lid (3) which fits over the tray and acts as a pressure plate on the charge.

Shear wires (4) are threaded through the tray, ⅞ inch from the bottom, to support the charge; reinforcing strips (5) are welded inside the tray at the shear points. Each end of the tray is folded over on top to form slotted pressure plates (6) to actuate the igniters fitted to each end of the charge; reinforcing plates (7), welded to the sides of the tray, in the corners, are bent over as supports to these pressure plates. Swivel clips (8) are provided to protect the igniters.

One and a half inches from each end are holes (9) through which safety bars (10) are threaded to keep the charge clear of the shear wires in the unarmed condition. These bars are secured by pins (11) attached by cord which may be wound around the mine. Spring-loaded shutters are provided to block holes (9) on withdrawal of the safety bars; these are in the form of spring-loaded angle strips (12) which swing on pivot pins (13). These shutters can be manipulated from the bottom of the tray through holes ⅜ inch from the end by means of a bar or a large nail.



The R. Mi 43 Sprengriegel (bar mine).

One side of the tray is slotted in two places (14) to accommodate anti-lifting igniters which may be fitted to sockets provided in the one side of the charge.

There is a thin red band (15) painted along the sides of the tray one-half inch from the bottom to indicate the correct position of the lid when the mine is armed.

Two white paint marks are found over the holes for the safety bars on the side of the mine from which the anti-lifting igniters may protrude.

The charge, which has a metallic casing, is provided with five igniter sockets. Two are for the main igniters at each end; these are recessed so that only the ends of the igniters show when they are fitted and they are not visible from the outside when the mine is laid. The other three are for anti-lifting igniters; one is in the center of the top of the charge and the other two in one side, five inches from the ends.

Two shear battens (16) fixed to the bottom of the charge ensure double shear action. Two channels (17) are also fixed to the bottom of the charge; these fit over the safety bars.

The lid is of spot-welded sheet steel construction. It is fitted with a handle (18) at one end. Holes are positioned to correspond with the sockets provided for anti-lifting igniters in the charge. Two slots (19) are provided for the shear wires; these may be bent over after the lid is fitted. There are also two slots (20) into which the safety bars slide. White paint marks are found above these slots to correspond with similar marks on the tray.

Mines are transported singly in wooden packing cases with main igniters and safety bars in position.

Protecting paper strips cover the igniter holes in the lid. The cords attached to the safety bars are wound around the mine.

Instructions for arming the mine are as follows: after it is laid and anti-lifting or trip-wire igniters are fitted, the two safety bars are withdrawn.

The mine is fired either:

(1) By pressure on the lid, sufficient to shear one or both of the shear wires:

(2) By the functioning of anti-lifting or trip-wire igniters fitted in the sockets:

(3) By the reversal of one main igniter, type ZZ.42, with its wings below the end pressure plate so that it will function if an attempt is made to lift the charge from the tray:

(4) Electrically, by remote control.

The mine also lends itself to the usual booby trap devices such as a trip-wire attached to the handle of the lid.

Instructions for lifting the mine are as follows:

Take usual precautions to neutralize any possible anti-lifting igniters. Carefully turn the mine on to the side free from igniter sockets. Carefully insert a toggle bar, in the form of a large nail or similar object, through the holes in the bottom, 3/8 inch from either end, and press on the pivoted shutters to enable large nails or stout wire to be inserted through the holes as safety bars to support the charge. These safety bars must be inserted without the use of any force.

After securing the safety bars, the mine is safe to lift complete and remove to a disposal site.

If any difficulty is experienced in inserting the safety bars, the mine should be destroyed where it lies, or pulled from a safe distance by a length of cable.

JAPANESE RAFTS FOR RIVER CROSSINGS

How the Japanese secretly move large troop units across rivers by means of rafts is revealed in a report from reliable sources.

Prior to a planned river crossing, log rafts are built and scattered along the river bank, overhanging trees and camouflage being used to furnish concealment from reconnaissance planes.

When it is time for the crossing to be made the rafts are assembled under cover of darkness. The rafts are then lashed together and the downstream end is secured to the shore held by the Japanese forces. The upstream end of the line of rafts is then released with the result that it is swung by the stream current out and over to the opposite shore. After troops and transport have crossed on the improvised bridge during the night, the rafts are pulled upstream to their original positions and concealed.

INFANTRY

THE FIRST AMPHIBIOUS BRIGADE, JAPANESE ARMY

The extent of operations by United Nations forces in the Pacific area apparently convinced the Japanese High Command, nearly a year ago, of the need for specially organized and equipped amphibious forces, and efforts have been made by the Japanese to convert army units into organizations of this type. The 1st Amphibious Brigade, for example, was developed from an independent garrison unit stationed in Manchuria. After reorganization it was sent to Truk in conformity with a strategic plan to create mobile forces that could be used to bolster the defenses of the far-flung Japanese Empire at threatened points.

The original plan envisaged concentration of the entire Brigade on Kwajalein, but the inexorable pressure of United States offensive

strategy in the Central Pacific induced the Japanese to disperse the Brigade more widely. Most of the unit was annihilated by American attacks on Kwajalein and Eniwetok, and the dispersion of forces which the American strategy had compelled was responsible in considerable measure for this disastrous defeat.

Details of the conversion of the garrison unit into an amphibious brigade afford interesting information as to the changes in personnel and equipment the Japanese consider necessary to adapt existent forces to the exigencies of amphibious warfare. The fact that troops were shifted from Manchuria to the Marshalls furnishes a revealing commentary on the stresses which have been imposed on Japanese military resources by the mounting tide of American offensive power in the Pacific.

The nucleus of the 1st Amphibious Brigade was the 3d Independent Garrison Unit which was organized 10 years ago for service in Manchuria to guard railroads. T garrison unit consisted of a headquarters and three infantry battalions—the 11th, 15th, and 16th.

It is known that the 16th Battalion had a total strength of 912 in August, 1941; there were 31 officers and 80 warrant and non-commissioned officers. The battalion, in addition to four rifle companies, had a gun platoon and a mountain gun platoon.

The other battalions were organized in a similar fashion and had approximately the same strength; communications were handled by signal sections attached to each battalion.

When, in the fall of 1943, it was decided to reorganize the Independent Unit as an amphibious brigade, extensive personnel shifts were required to implement the plans for the reorganization. Certain personnel, such as limited service men, officer training school candidates, aviation cadet candidates, etc., were transferred from the unit during the conversion process, and replacements, drawn for the most part from the 1st, 14th, and 28th divisions, were assigned to bring the brigade up to its authorized strength.

Significant alterations were made in the structure of the battalions of the old garrison unit to adapt them for amphibious warfare. One of the four rifle companies was eliminated from each battalion, but a mortar company, artillery company, and engineer platoons were added to each battalion. The engineer platoons were filled largely from personnel of the eliminated riflle companies, but the artillery and mortar companies were made up primarily of qualified replacements from divisions in the vicinity.

On 30 November 1943, the 1st Amphibious Brigade officially was activated under the command of Major General Yoshimi Nishida, former commander of the Independent Garrison Unit. The newly-formed brigade was placed under the command of the Commander-

in-Chief, Eastern District Army, until embarkation for the Marshalls, after which it passed to the control of the Commander-in-Chief of the Fourth Fleet.

Fusan was chosen as the point of embarkation, and the constituent battalions reached this port during early December, 1943. On 14 December the brigade embarked for Truk on the *Tajima Maru* and the *Hibi Maru*. During the first night at sea the transports and their escorts were threatened by a submarine which, however, was driven off before it could attack. After anchoring in Saeki Bay during the night of 15 December, the ships proceeded without further incident to Truk, where they dropped anchor on the 27th.

There is conclusive evidence that the original intention of the Japanese was to build up a mobile force based on Kwajalein, whence it could be rushed to any threatened point in the Marshalls to serve as such a force, but the unremitting pressure of American attacks and threats of attack necessitated alterations in the disposition and employment of the brigade when it passed under control of the Inner South Seas Force at Truk.

The new defense plan assigned the 2d Battalion (less the 3d Company), a platoon of engineers, and three signal squads to Wotje island, while the 3d Company and a medical detachment were allocated to Maloelap. The 1st Company of the 3d Battalion and a mortar platoon were designated for service on Kwajalein, and the balance of the brigade was to be garrisoned on Eniwetok.

On 30 December the brigade sailed from Truk in the same transports that had brought it to this base. The ships arrived at Eniwetok five days later, and the troops assigned to the defense of this atoll were disembarked. On 8 January the remainder of the brigade left for Kwajalein, where anchor was dropped by the two transports on the 10th and 11th, respectively. The Kwajalein forces took up their garrison duties, while the personnel assigned to Maloelap boarded a destroyer and sailed for that destination.

Units destined for Wotje, with the exception of the 1st Company of the 2d Battalion that went there on a destroyer from Engebi, bivouacked on Kwajalein, awaiting transport. Before they moved, however, the American attack exterminated them, together with the garrison actually assigned to Kwajalein. The same fate befell the defenders of Eniwetok, and it is believed that the only survivors of the brigade were the 1st and 3d Companies of the 2d Battalion which went to Wotje and Maloelap.

The brigade, which remained under the command of General Yoshimi until its virtual annihilation, had a total authorized strength of 3,940 officers and enlisted men. Brigade headquarters personnel totalled 118, of which 14 were officers and 2 warrant officers. Each of the three battalions had a strength of 1,036, with 103 in the 1st Company and 197 in each of the other two. The mortar company had a complement of 155, while the artillery company had 121, and the infantry engineers platoon 66. Each of the three battalions had exactly the same table of organization.

Besides the battalions, the brigade had a machine cannon unit with a strength of 76, a tank unit with 66, an engineers unit with 243, and signal and medical units with 139 and 190 respectively.

It is interesting to note that the brigade was assigned a complement of 120 Japanese civilians (*Gunzoku*) who accompanied it into the field. Of these 10 were construction specialists, draftsmen, and clerks; the remainder were laborers. One of the civilians who had been a fisherman in Japan was assigned to the same work to augment the food supply.

Each rifle company of the battalions was equipped with 12 heavy grenade dischargers, 12 light machine guns, two heavy machine guns, two 81-mm mortars, and a 20-mm automatic gun in addition to its small arms.

The mortar company was armed with twelve 81-mm mortars in addition to small arms. Three 75-mm mountain guns and two 37-mm rapid fire antiaircraft guns were allocated to the artillery company. The infantry engineers platoon had one (possibly four) 50-mm mortars, one M97 81-mm mortar, two M99 81-mm mortars, two flame throwers, and a set of demolition equipment.

Nine light tanks, each armed with a 37-mm tank gun and two heavy machine guns, made up the armored equipment of the tank unit. The machine cannon unit was provided with six 20-mm machine cannons.

The total armament of the brigade was as follows:

M100 Rifle Grenade Attachment	200
M95 Sword	79
Bayonet	3679
M99 Rifle	2049
M14 Pistol	225
M89 Heavy Grenade Discharger	112
M99 LMG	108
M92 HMG	18
M97 81-mm Mortar	57
M99 81-mm Mortar	6
M98 50-mm Mortar	3 (possibly 12)
M100 Flame Thrower	6 (possibly more)
Demolition Equipment Set	3 (possibly more)
M97 20-mm Automatic Gun	9
M94 37-mm Rapid Fire Gun	6
M41 75-mm Mountain Gun	9
M98 20-mm AA Machine Cannon	6
M95 Light Tank	9
M98 37-mm Tank Gun (in tanks)	9
M97 HMG (in tanks)	18

GERMAN PARATROOP STANDARDS LOWERED

The physical, mental, and training requirements for German paratroopers have been lowered, according to recent reports on their training and equipment. Formerly paratrooper personnel were required to meet high physical and mental standards. Now, however, only good average mental and physical qualities, and "the proper spirit"—belief in final victory—are required. For non-jumping personnel (drivers, guards, etc.) the standards are even less rigid.

The proportion of "enthusiastic" volunteers has diminished, jumping personnel being all volunteers. In some cases, pressure to "volunteer" is exercised, starting with 17-year-old boys in the compulsory labor service. The age limit is 33, but, in rare cases, older men are accepted. The glamor of the paratroop service suffices to bring in many of the volunteers, but more effective inducements include rations of a better quality than is usually issued, generous leave, and extra pay.

A man can always obtain a transfer from any other unit to a paratroop unit if he has the necessary qualifications. Married men are eligible, and men are permitted to marry after joining. The only personnel refused permission to transfer to the paratroopers are German Air Force pilots.

The initial training period of three months has been reduced to a period of from six to eight weeks. The new trainee goes either to the depot at Stendal or to any G. A. F. training unit. To qualify as a paratrooper each trainee must make six jumps, the first from an altitude of 600 to 700 feet, and the next five jumps from decreasing heights down to 250 to 300 feet. The first three jumps are made without arms, the fourth and fifth with a machine pistol, and the last with a rifle or light machine gun.

It is standard practice for paratroopers to carry with them all normal infantry equipment including light machine guns and 81-mm mortars. When a paratrooper jumps with a rifle, he holds the barrel tightly between his legs with the rifle sling wound around his right arm. Machine pistols are similarly carried. Mortars and light machine guns are hooked on to the men. Each weapon has a length of rope tied to it so that it can be let down to the ground before the man lands and thus avoid injuring him. Ammunition (two boxes, each of 300 rounds of small-arms ammunition) and spare barrels are also carried in the descent. Heavy machine-gun tripods are dropped separately.

Airborne guns and antitank guns may be dismantled and dropped in two or more parts, each part in a metal container dropped by one double parachute. Frames may be used, in which case the gun will be dropped in one piece, using a quintuple parachute. To drop motorcycles, frames are used with four double parachutes attached. This is the only type of transport to be dropped so far. Flame-thrower

sections in which the flame-thrower would be dismantled and the parts carried by the crew in the descent, have been considered.

It is reported that a new type of parachute, fitted with one buckle to release all straps simultaneously, has been tested but so far has not been used operationally. In addition, a triangular parachute, smaller than the one in general use, has been reported. It is non-oscillating and makes possible jumps from 180 to 200 feet.

The DO–23, JU–52, and HE–111 are among the planes used by paratroopers. The DO–23, which has a capacity of six to eight men, is used only for training and non-operational jumps. The JU–52, the standard paratroop transport aircraft, carrying 12 paratroopers, is now being superseded by the HE–111, which appears to be more popular with paratroopers. The HE–111 has a hatch in the floor and holds eight men.

Gliders used by paratroopers are the DFS 230, the Gotha 242, and the Me Gigant. The DFS 230 or LS (*Lastensegler*—freight carrier), towed by DO–17, DO–217, HS 126 or HS 129, is used almost exclusively as a personnel or freight carrier, and very seldom for jumping. It has a capacity of 10 to 11 men, including one or two pilots. The Gotha 242, towed by He 111, may be used as a transport glider for heavy weapons, motorcycles, light cars, etc., or as a jumping plane or landing plane for 20 men. It is normally used only as a jumping plane at training schools and as a landing plane in areas clear of the enemy. Eight men can jump simultaneously, going out through doors in the sides of the body. The Me Gigant, if employed as a glider requires two He 111s, or one JU 90. It has a capacity of 80 men, or 60 men with full equipment. Jumps can be made from four exits. Casualties in jumping have been numerous and jumping appears to have been discontinued.

The field ration of the paratrooper is intended to last for three days. It consists of two tins of sausage (approx. 4¼ oz.), two tins of cheese (approx. 4¼ oz.), a package of biscuits, a bar of chocolate substances, six pieces of chewing gum, a tin of lemonade powder, and a package of solid fuel for heating.

Recent reports on the paratroopers contained the following miscellaneous information:

Staff officers in paratroop units are chiefly trained paratroopers but include infantrymen who have done some jumping.

No units appear to have been organized so as to combine glider troops and paratroopers.

First aid training is given, and in one unit 100 men were selected from each company for basic first aid instruction, concentrating on aid for broken bones and wounds. These men were to be used under the orders of the battalion medical officer.

Little mention is made of jumping at night or under cover of smoke. The condensed courses given at present do not, it is believed, include such training. It is presumably given in a special course.

It is reported that sometimes groups of men have been trained to act as tank-hunting teams as well as to perform the usual paratroop duties.

There is no arbitrary rule for order of jumping, however the second in command usually jumps first and the section leader jumps last.

For other articles about German paratroopers, see the following issues of *Tactical and Technical Trends:* "German Paratroop Attack", No. 42; "Notes on German Paratroops", No. 24; "Organization, Training, and Employment of German Parachutists", No. 11; "German Parachutes", No. 5.

ORDNANCE

JAPANESE WOODEN BULLETS AND INVERTED BALL AMMUNITION

A few rounds of standard Japanese Model 38 (1905) 6.5-mm rifle ammunition, in which the metal balls had been replaced by crudely whittled softwood bullets were found by U. S. forces on Bougainville. Ammunition with regular turned wood bullets was also found. In addition, the noses of a small quantity of 6.5-mm rifle ammunition had been reversed so that the flat base was exposed instead of the point; perhaps this was a local attempt to improvise dumdum bullets.

Tests were conducted to determine the effectiveness of the wooden bullet and the inverted ball ammunition. Before testing the ammunition under review, the rifle was first "zeroed" with standard Japanese ball ammunition, so that a close pattern was obtained in the center of the bulls-eye.

The tests demonstrated that the use of wood bullets as antipersonnel ammunition, even at very short ranges, would be highly ineffective because of erratic ballistic qualities and the nature of the material.

Because of the corkscrewing action and the soft lead center of the inverted ball ammunition (for the 6.5-mm rifle), it was estimated by the reporting unit that this ammunition would have a greater destructive effect than that of the conventional ball. The inverted ball ammunition could be used with some degree of accuracy at comparatively short ranges.

A medical ballistics investigating team made a thorough study of causes of wounds, and the effects of various types of Japanese ammunition, on Bougainville. The team reported that none of the wounds examined was caused by either wood, dumdum, or inverted ball ammunition.

In connection with the subject of Japanese wooden bullet ammunition, it is known that special cartridges with wooden projectiles are used with both the cup-type and the spigot-type rifle-grenade launchers. Wooden bullets used in firing tests with the cup-type rifle-grenade launcher for the armor-piercing hollow-charge grenade have given satisfactory results. Therefore it is apparent that the Japanese use of wooden bullets is as a propelling charge for their rifle grenades rather than for close range antipersonnel use as has been reported several times from the Pacific area.

PHOTO SHOWS 4 PENETRATIONS OF ARMORED SHIELD BY ARMOR PIERCING AMMUNITION FIRED FROM RIFLE AT 200 YARDS RANGE.

CAL. .30 M1 AP AMM WILL PENETRATE JAPANESE PORTABLE ARMORED SHIELDS

A number of Japanese portable armored shields were found on Kolombangara Island and New Georgia. It was first thought that these shields were carried by machine gunners for use as portable defensive armor, but a recent discovery of a number of these shields fitted in gun ports of pillboxes may indicate that this is the primary use for them. These shields are of two sizes but of the same thick-

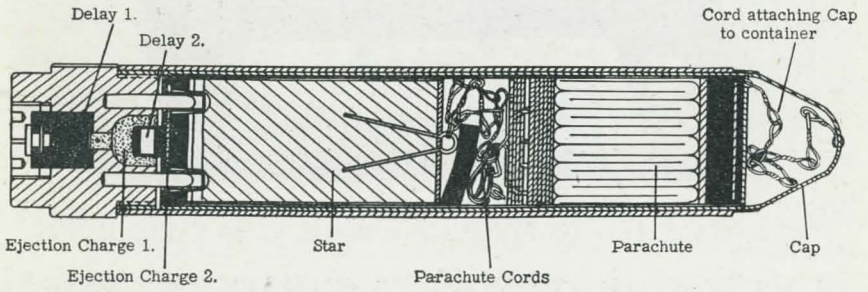
ness—¼ inch. The size of the largest shields is 14 inches by 20 inches. The smallest shield found is 12 inches by 16 inches. The armor appears to be face hardened, since armor-piercing ammunition penetrations caused small fragments to break off instead of making the rose-petal type of hole that usually occurs in homogeneous armor plate.

Firing tests against one of the large shields were conducted on New Georgia. In the first test, the weapon used was the U. S. caliber .30 M1 rifle, and the ammunition used was caliber .30, M2, ball. *At a range of 100 feet*, with the shield slanted at 10 to 15 degrees from normal, six rounds of the ball ammunition were fired at the shield. Each round caused a slight dent in the shield but did not penetrate. The surface was not even slightly cracked. In the second test, eight rounds of caliber .30 AP ammunition were fired into the plate under the same conditions, with 100 percent clean penetrations.

A subsequent test against both the large and small shields resulted in the following conclusions: (a) U. S. caliber .30, M2, ball ammunition will not penetrate these shields; (b) at ranges up to 200 yards, U. S. caliber .30, M1, armor-piercing ammunition will pentrate these shields, and produce an added hazard in the flying fragments from the steel plates.

GERMAN ILLUMINATING RIFLE GRENADE

The following information on the German illuminating rifle grenade (*Gewehrfallschirmleuchtgranate—Gw. F. S. Lt. Gr.*) is taken from a German source.



GERMAN ILLUMINATING RIFLE GRENADE.

a. Details

The grenade may be identified by the white cap and the inscription "Gewehr Fallschirmleucht granate" stencilled on the body. A 1.5-gm propellant charge is enclosed in a cartridge case which is closed with a wooden bullet. Each grenade is packed, together with a propellant charge, in a cardboard container. Forty-eight containers are packed

in a wooden box—weight 39.6 pounds. The grenade has a diameter of 1.18 inches, is 6.88 inches long, and weighs approximately 10 ounces.

b. Action

On firing, delay 1 is ignited by the flash from the propellant gases. After 6.5 seconds of flight, ejection charge 1 is initiated. This ejects the container holding the star and parachute. At the same time, delay 2 is initiated. During this part of the flight, the cap hangs from the container by means of a cord. After delay 2 has burned through (2 seconds), ejection charge 2 is initiated and the parachute and star ejected. It is stated that distances up to 650 meters may be illuminated.

GERMAN ANTIPERSONNEL BOMB SD 10A

Examination of the SD *10A* antipersonnel bombs, which has been used by the Germans in Italy, reveals the following facts:

The body is made from a seamless steel tube, the tail fins being made of thin sheet metal. The tail cone is secured to the body by four rivets. The Z(66) nose impact fuse is used in the bomb.

a. Dimensions

Over-all length	20.5 in approx.
Length of body	12.7 in approx.
Diameter of body	3.4 in approx.
Length of tail	8.5 in approx.
Width across tail	4.7 in approx.
Average wall thickness	0.62 in approx.
Total weight	22 lbs.
Weight of filling, including booster pellets	1.75 lbs.

b. Markings

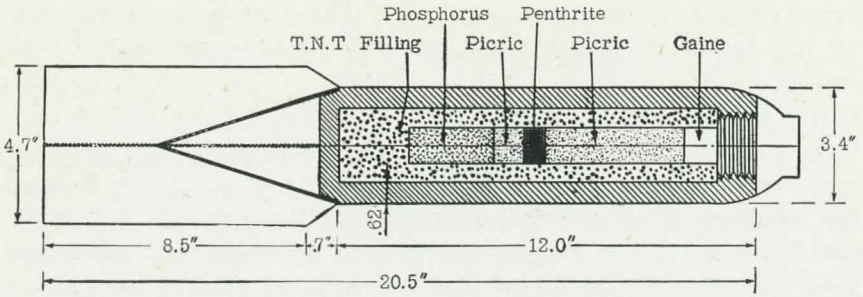
The body is painted field grey. The tail unit is red, or grey with red stripes on the cone.

c. Initiating system

This consists of:

Standard Rheinmetall fuze.

1 picric pellet, 1 in diameter, 4.3 in long.
1 picric pellet, 1 in diameter, 0.6 in long.
1 picric pellet, 1 in diameter, 0.75 in long.
1 phosphorus pellet 0.87 in diameter, 2.4 in long.

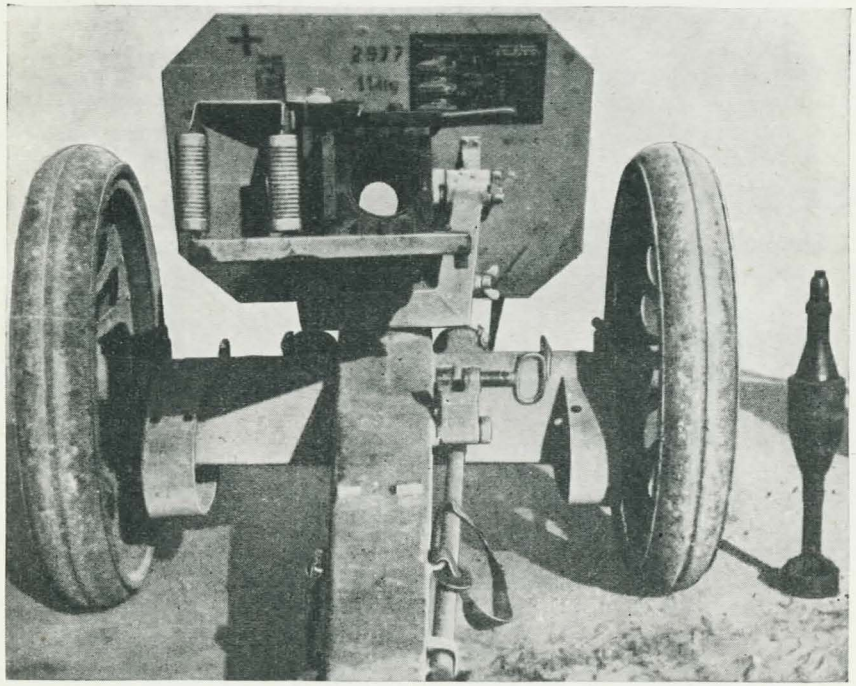


GERMAN ANTIPERSONNEL BOMB SD 10A.

The main filling consists of cast TNT with a central bore to accommodate the booster pellets.

GERMAN 88-MM ROCKET PROJECTOR

The German 88-mm *Rocketenwerfer 43*, nicknamed "*Puppchen*" or "*Dolly*" is a closed-breech rocket launcher. This weapon, which is transported on a two-wheeled carriage, is nine feet two-and-one-half inches in over-all length. Total weight of the equipment is 334.4 pounds but it can be dismantled into seven loads, the heaviest of which weighs 94.6 pounds. A gas deflector in the shape of a truncated cone is fitted over, but does not protrude beyond, the muzzle.



BREECH OF GERMAN 88-MM ROCKET PROJECTOR.

To fire the weapon, open the breech by a rearward pull on the operating handle, which is situated on the top of the breech ring. This action cocks the hammer, which is held in firing position by a sear. After a round has been loaded, push the operating handle forward, thus closing the breech. The rocket can then be fired provided that the safety, fitted to the left of the firing pin in the center of the breechblock, is turned to "F" position. An additional safety feature prevents the hammer from striking the firing pin unless the breech is completely closed.

The piece is aimed by grasping the two handles at the left rear of the cradle and aligning the open sights on the target. Elevation is steadied by a hydropneumatic link fitted between the upper carriage and the breech ring on the left side of the tube. The rear sight is adjustable from 180 to 300 to 700 meters in steps of 100 meters. A squeeze of the right handle depresses the sear, releasing the hammer. The small shock of recoil developed by the rocket gases against the closed breech is transmitted directly to the spade.

The weapon fires the 88-mm German "Bazooka" projectile, modified, and has a percussion primer replacing the electric primer. The rocket is fitted with a base plate having a protruding rim to seat the round in the tube. The base plate and primer are the only parts of the round which are extracted after firing.

The German abbreviation for the ammunition is: "*8.8 cm. R. Pz. B. Gr. 4312.*" It is packed three rounds to a box with a white label printed in black.

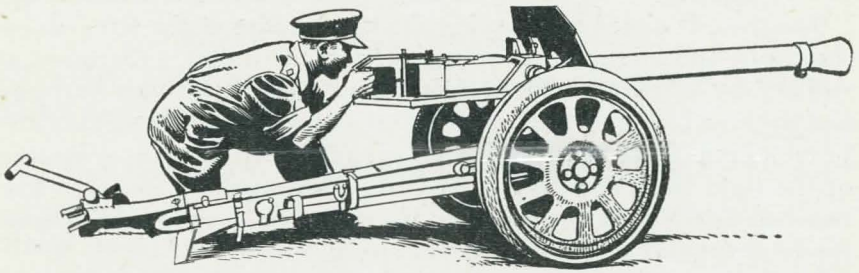
The general characteristics of the weapon are:

Caliber	88-mm.
Maximum range, limited by sight	750 yds (approx.).
Traverse, on wheels	R, 500; L, 500 mils.
Over-all length of weapon	9 ft 2½ in.
Over-all length of barrel with breech mechanism	5 ft 5 in.
Over-all height to top of shield, on wheels	2 ft 11 in.
Over-all height to top of shield, on firing segments	1 ft 7⅛ in.
Over-all width	3 ft 4 in.
Diameter of wheels	2 ft 3 in.
Length of trail	4 ft 7 in.
Axis of bore, above ground on wheels	2 ft ¼ in.
Axis of bore, above ground on firing segments	1 ft 7⅛ in.
Thickness of tube wall	$\frac{3}{32}$ in.
Thickness of breechblock	⅝ in.
Length of gas deflector	8 in.
Diameter of gas deflector at muzzle end	6 in.

601363°—44——3

Weight of pack loads:

Shield	24.2 lbs.
Tube	41.8 lbs.
Cradle, breech ring and breech mechanism	50.6 lbs.
Upper carriage	26.4 lbs.
Axle and trail	94.6 lbs.
Right wheel	48.4 lbs.
Left wheel	48.4 lbs.
Total weight in firing position	334. 4 lbs.



GERMAN 88-MM ROCKET PROJECTOR IN FIRING POSITION.

GERMAN 320-MM INCENDIARY ROCKET

Although the 320-mm rocket has so far been found only with an incendiary filling, it would also be suitable for gas dissemination. If it is encountered it will probably have been fired by the heavy smoke regiment of German GHQ troops or by the machine gun platoon of the armored Panzergrenadier company of the Panzer Division, as these units may fire this or other types of rocket. If used by the armored Panzergrenadier company the rocket will be launched from the *Schwerer Wurfrahmen*, which consists of six launchers on a half-track.

This rocket weighs 176 pounds filled and 88 pounds empty. The dimensions are given in figure 1. It has been made in both European and tropical versions, the latter being a slight modification of the rocket as made for a temperate climate, and has a maximum range of about 2,400 yards.

The metal crate shown in figure 1 serves three purposes. With the handles folded it is a shipping container, with the handles extended as in the figure it is a carrying case, and when the hinged, curved crossbar at the nose end is opened the crate serves as a launcher. the crate weighs 46 pounds. It bears the marking *32-cm. Wurfkorper M. Fl. 50.*

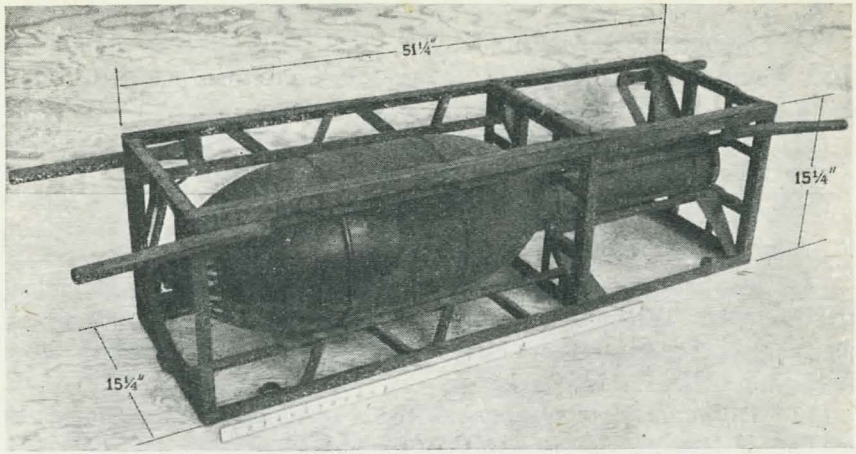


FIGURE 1. GERMAN 320-MM INCENDIARY ROCKET AND CRATE.

The component parts of the projectile, minus the fuze and ignition grid, are shown and numbered in figure 2.

The following paragraphs describing the parts are numbered the same as the corresponding part in figure 2, and are under two sections, A., *Component Parts of the Incendiary Portion*, and B., *Component Parts of the Rocket Motor.*

A. Component Parts of the Incendiary Portion

(1) The *incendiary container* is hollow and egg-shaped, weighing 35 pounds empty and is of 12-gallon capacity. At the nose end is the burster well opening, and near the nose the filling plug for the incendiary mixture. The tail end is sealed internally and is also threaded to receive the motor assembly. The incendiary mixture is a reddish-brown liquid found on analysis to be principally kerosene (B. P. 150–300° C.). The container is marked as follows:

On nose below fuze adapter	32-cm. WK Fl.
On container body	Nn 144. 43 P IG Nn 144. 43 L
On container tail adapter	aks 41.

(2) The *fuze plug* (nose fuze not shown) is made of a molded plastic. The nose fuze is of the impact type and is marked "Wgr. Z 50".

(3) The *fuze adapter* is made of a molded plastic. It fits into the burster, and the narrow portion contains the booster (not shown in figure 2), while the larger portion receives the fuze.

(4) The *cardboard spacers* fit on the fuze adapter.

(5) The *solid burster charge* is PETN (Pentaerythrite Tetranitrate) and is light pink in color.

(6) The *hollow burster charge* is also PETN and pink in color.

(7) The *igniter charge container* is a sealed, thin-walled aluminum tube containing a pyrophoric magnesium mixture which ignites spontaneously on exposure to air.

(8) The *burster stick*, which is pink in color, is wrapped in paper.

(9) This is a *hollow burster charge*, the same as No. 6.

(10) This is a *solid burster charge*, the same as No. 5.

B. Component Parts of the Rocket Motor

(11) The *motor tube* is closed at one end and externally threaded at both ends. The closed end fits into the incendiary container while the open end receives the venturi block. The tube is marked "dbg 42/69," and "Nn 114 43."

(12) The *maintainer assembly* is made of aluminum and fits with the flat side against the closed end of the motor tube.

(13) The *maintainer assembly spacer* consists of a split ring which fits against the maintainer assembly.

(14) The *propellent charge* is a nitrocellulose composition weighing 14.5 pounds. It has eight longitudinal corrugations on the periphery and 9 holes through the length of the powder block.

(15) The *quickmatch tube* is a celluloid tube closed at both ends by a pellet of black powder and containing a length of quickmatch. It fits into the central hole of the propellent charge.

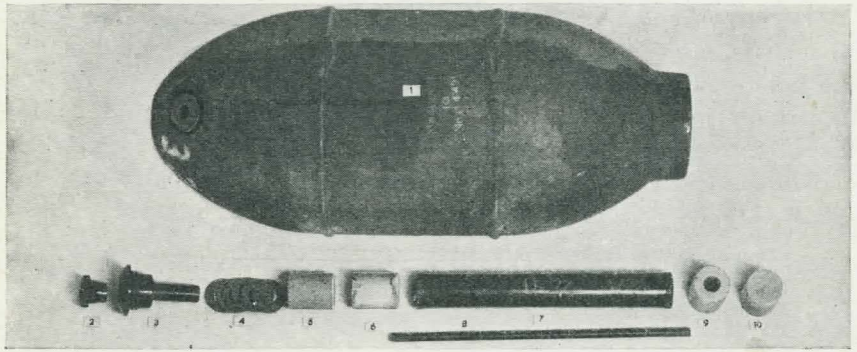


FIGURE 2. a. COMPONENTS OF INCENDIARY PORTION.

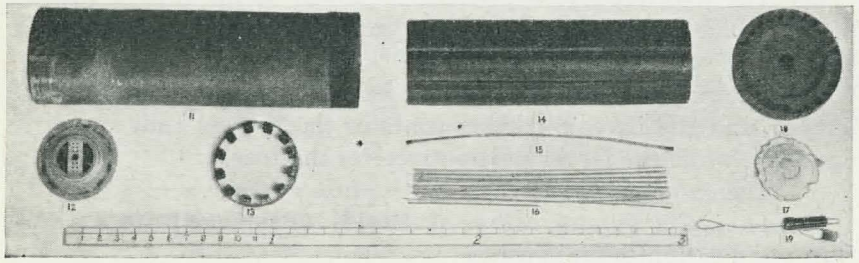


FIGURE 2. b. COMPONENTS OF ROCKET MOTOR.

(16) The *ballistite tubes*, of which there are eight, are placed in the corrugations on the periphery of the propellent charge. They probably promote a uniform ignition of the propellent.

(17) The *primary ignition charge* is a bag of porous, rough cloth, containing six flakes of double-base powder (nitroglycerine and cellulose nitrate). The bag is inserted next to the propellent block and in contact with the quickmatch tube. The primary ignition charge is supported by the ignition grid (not shown in figure 2).

(18) The *venturi nozzle assembly* has 26 jets set at an angle to rotate the projectile. In the base of the assembly is a hole in which an electric squib may be inserted for firing.

(19) The *electric firing squib* is placed in the central hole of the *venturi nozzle assembly*.

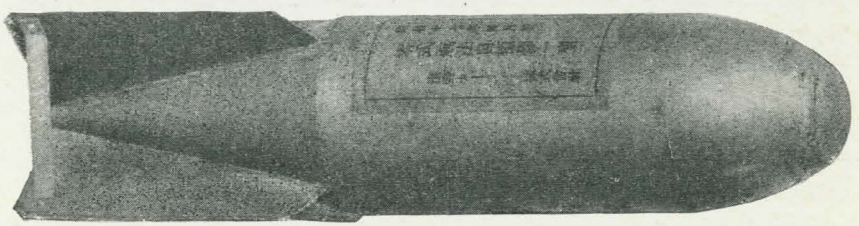
JAPANESE NAVIGATION MARKER BOMB

Forming a bright white spot on the sea surface, the Japanese Navigation Marker Bomb can be very useful in daylight to determine tides, drift, and currents. It can also be used as a "fix in shooting the sun", to mark adjacent locations of submarines, and to indicate hidden reefs which are observable from the air.

The white spot formed on the surface of the water by dropping the bomb is about 25 feet in diameter. While it is not believed that the spot would be visible from a distance of more than 2 miles at an altitude of 600 feet, it probably could be seen from points as far as 5 miles distant if the observer were flying at a height of 1,000 feet. At altitudes higher than 1,000 feet, the spot probably would be visible over distances up to 10 miles.

The bomb is painted aluminum color and has a streamlined body with tail cone and four sheet metal fins. It is 12½ inches long, the body is 3 inches in diameter, and the tail fins measure $4\frac{3}{16}$ inches across opposite fins. The bomb is filled with powdered aluminum.

The bomb, weighing 3.7 pounds, is made of a solid cast iron nose, a sheet metal body and tail. Within the body of the bomb is a wood plunger which, on impact with the water, pushes off a wood disk which is attached to the tail of the bomb. It is in this manner that



JAPANESE NAVIGATION MARKER BOMB.

the powdered aluminum is released to float on the water. The bomb can be dropped from a plane flying at heights ranging between 600 and 6,000 feet.

JAPANESE 75-MM WP SHELL

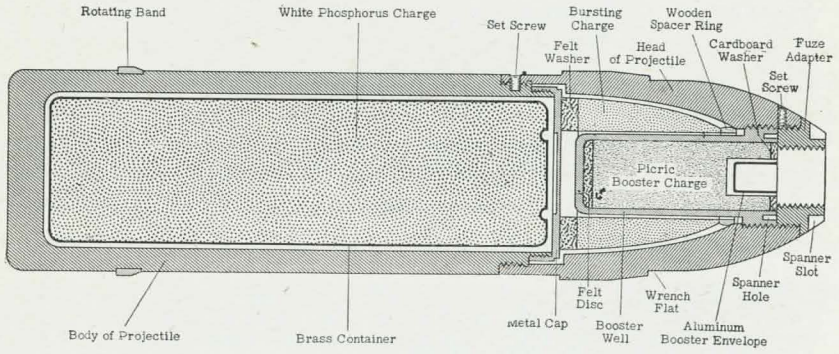
While smoke screening seems to be the principal use for which the Japanese 75-mm WP shell was designed, it is believed that the projectile might be of some use also as a ranging shell.

The shells are fired by the Model 94, Japanese 75-mm mountain gun. The length and weight of the complete round, less fuze, are 21½ inches and 15 pounds 10 ounces respectively.

The projectile is painted white with a red band, approximately ⅜ inch wide, painted around the fuze adapter. The casing is of forged steel. The ogival head, fitted with a left hand threaded fuze adapter, is screwed into the body of the projectile at a point about ⅞ of an inch below the bourrelet. The adapter is provided with spanner slots and the ogival head with wrench flats, and both are locked in place with set screws. The booster tube, provided with two spanner holes, is screwed into the same threads as the adapter. The body of the projectile, where the ogival head is screwed on, is closed with a metal cap which is provided with wrench flats.

The metal cap, booster well, and the inside surfaces of the head and body of the projectile are coated with a hard, dull black, baked-on lacquer, apparently consisting of shellac and lamp black.

The booster charge consists of high grade picric acid pressed in a thin waxed, cylindrical, cardboard container, 61 mm long and 25 mm



in diameter, and containing a well for the aluminum booster envelope. A felt disk is glued to the bottom of the cylinder.

The bursting charge consists of a 50–50 mixture of picric acid and dinitronaphthalene in a thin yellow cardboard container, designed to fit in the annular space between the ogival head and the booster well. The charge is 51 mm in length, 38 mm in diameter at the top, and 56 mm in diameter at the base, with a hole 32 mm in diameter through the entire length.

The 709-gram filling of white phosphorus is packed in a brass container almost cylindrical in shape but tapering slightly toward the base. The top and the bottom of the container are soldered in, and the seam down the side is brazed.

The brass cartridge case is of the type commonly used with the Model 94 mountain gun. It has no extractor groove and is centrally tapped to take a short primer with a base diameter of 16 mm.

The propelling charge consists of 320 grams of graphite coated nitrocellulose powder, contained in a silk bag.

The various projectiles for the Model 94 mountain gun are also known to be used in other Japanese 75-mm field guns, and it can be assumed that this WP projectile may be used with those guns.

SIGNAL CORPS

JAPANESE AIR-GROUND COMMUNICATION

Use of tree-top signals in the jungle is stressed in a recently obtained Japanese document which outlines methods of air-ground communication. The document points out that while ground signals are easily visible in open country, if panels are placed on the ground in jungle terrain, even though they are displayed in clearings, it is difficult to see them from an airplane because:

(a) small open spots in the jungle are low relative to the height of the treetops;

(b) the light below the trees is not bright;

(c) shadows are numerous in such clearings;

(d) terrain is often uneven;

(e) the multiplicity of detail (such as outstandingly tall trees, bright flowering trees, and multi-colored foliage) seen in the jungle by the air observer, make it very difficult to locate any small ground signal.

To overcome these difficulties, the Japanese have prescribed the following procedure:

Panels should be displayed in treetops for the purpose of attracting attention or establishing identity. The ground troops should cut the small limbs off the prominent treetops to such an extent that a panel

or ground marker can be easily seen from the air. Panels are most easily seen if placed on trees at prominent topographical features such as river junctures or hilltops.

Small open spots in the jungle, such as those caused by treefalls, are not satisfactory as display points for panels, for an aerial observer gets only a glimpse into a small opening as he passes swiftly over.

A smoke grenade set off in a treetop is the best means of establishing initial air-ground contact. A puff of white smoke suddenly appearing from a treetop is visible for miles, and enables a plane to locate ground troops quickly. The importance of setting off the smoke grenade high up in the tree must be emphasized, because smoke generated near the ground will certainly become diffused before reaching the treetop level. Smoke generated on the ground often fails to rise as high as the treetops.

For final, positive identification in connection with any smoke signal, some conspicuous signal arranged in advance should be displayed in a nearby tree. Thus the danger of accidentally supplying the enemy can be eliminated.

If the ground troops do not have smoke grenades, they can light a smoky wood fire shortly before a previously agreed hour. However, the smoke from a wood fire is not nearly as conspicuous or as unmistakable as the white smoke of a chemical grenade.

The special jungle conditions that make use of air-ground signals more difficult also govern the dropping of supplies from the air. The special procedure prescribed for dropping supplies is as follows:

Supplies should be dropped upon the source of the smoke. The plane flies either upwind or downwind. Off to the side of the line of flight a soldier is posted as a treetop lookout; he calls to a smoke grenade operator to set off a treetop grenade when the plane is coming toward the troops expecting supplies. A treetop observer is important, for otherwise the smoke grenade may be set off and wasted when the plane is circling in another area.

Ground troops in the jungle, when expecting supplies dropped by plane, should be dispersed singly so that the area is well covered, and the packages are sure to be spotted as they drop. Each soldier should stand behind a tree trunk, and, for safety, away from the direction of the approaching plane. Inexperienced men should be impressed with the fact that a number of packages pushed out of the door of a plane together is a real danger to men in a tangle of vegetation below unless they are sheltered by tree trunks. If a smoke signal is being used, men should be distributed in a line upwind and downwind, and the plane should drop supplies along this line.

If supplies are being dropped upon a steep hillside, they should be dropped in a line approximately following the contour of the

ground at the signal point, and the receiving ground troops should place themselves accordingly.

The difficulty of locating supplies on the ground in really dense jungle is serious. Very important packages should be dropped with a long white streamer attached and wound loosely so that it will trail behind as the bundle falls. This "tail" will remain above the foliage of the undergrowth and makes it much easier to find the package.

Whatever the method of air-ground contact, it is very important that jungle troops know when to expect airborne supplies, otherwise they will have only a very poor chance of making the necessary preparations for establishing contact and preparing for the arrival of the plane.

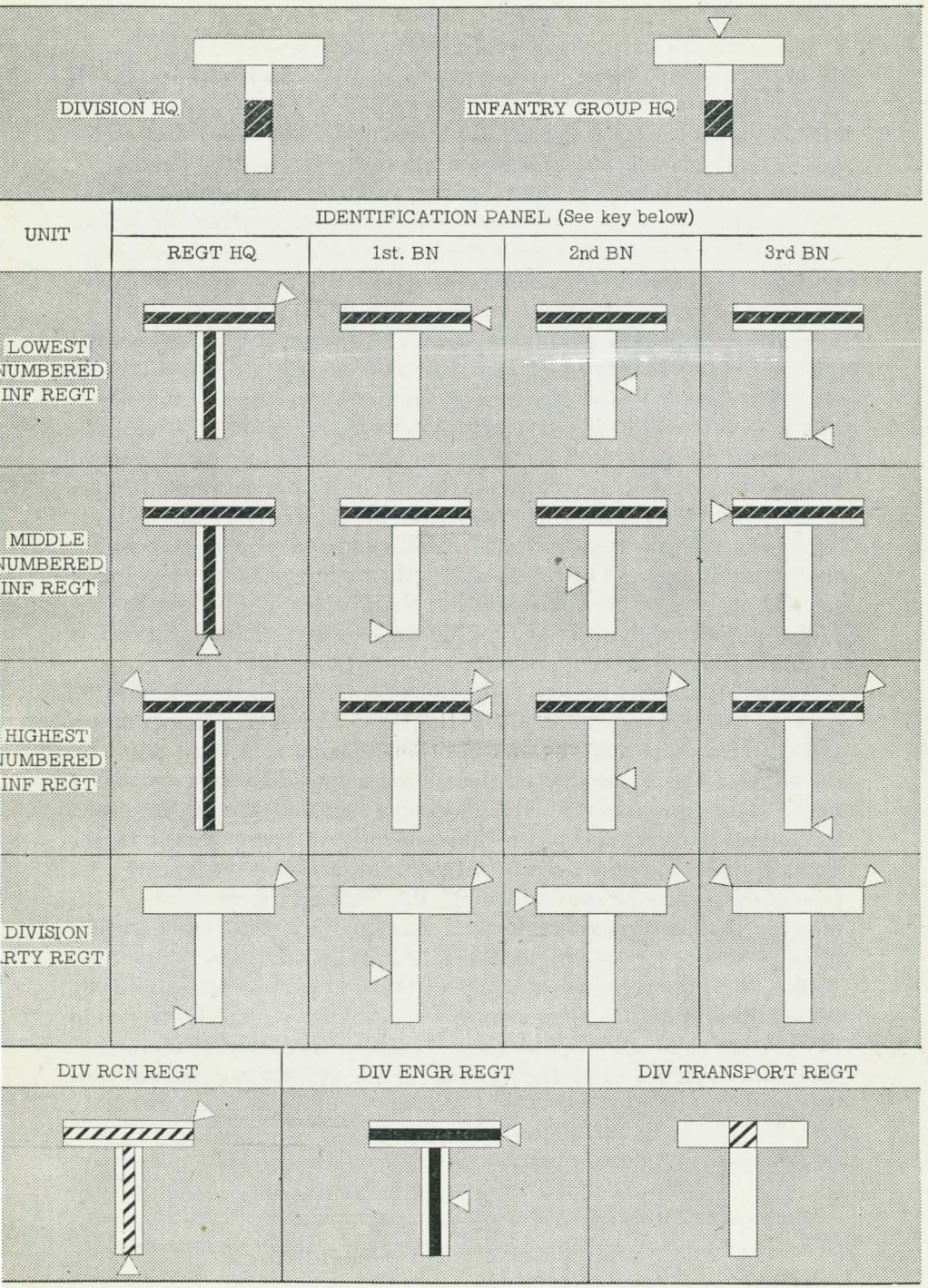
Some panels used by a Japanese infantry division in the South Pacific for identification of ground troops from the air are shown in the illustration. The arrangement falls into a definite pattern, analysis of which may aid in identifying unknown panel systems.

Both the division and infantry group headquarters are distinguished by one identical red bar across the tail of the T, and the headquarters of the infantry regiments by a red stripe the length of the tail of the T. All of the infantry regiments and battalions have red stripes running the length of the head of the T, while other colors or no color are used for components of the division other than infantry. Within the infantry regiments a red stripe running the length of the tail of the T is bound in the case of the regimental headquarters only.

A further differentiation is the use of a triangular panel, with its apex in varying positions along the edge of the T. Sometimes a second triangle is used, but its position remains at a fixed point on the edge of the T for any particular regiment. The first (or only) triangle is invariably moved clockwise around the T for each successive infantry regimental headquarters from the lowest to the highest number. Within the infantry or artillery regiments, the triangle is similarly moved around the T from the position of the triangle that designates regimental headquarters, to other positions in clockwise order to designate the 1st, 2d, and 3d battalions.

One division required that identification panels be carried by battalions and higher units in the case of infantry and artillery, and by each regiment in the case of the engineer and transport regiments. The panels were laid in the vicinity of the respective headquarters.

Figure 1 IDENTIFICATION PANELS USED BY A JAPANESE INFANTRY DIVISION



Key to symbols used by the editor to represent colors

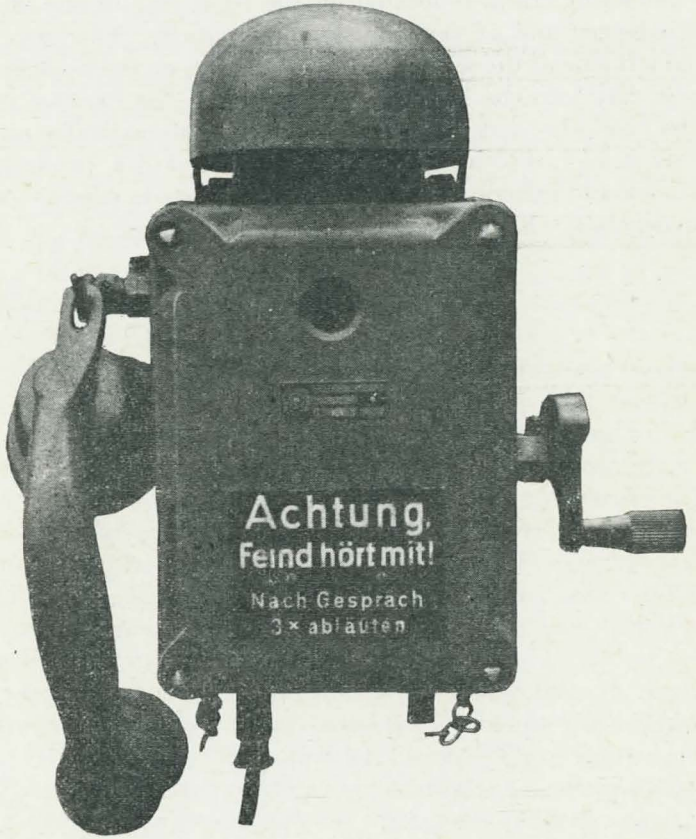
Indicates red Indicates black Indicates blue

GERMAN WALL TELEPHONE

A type of German wall telephone which is simple in construction and operation, and which, when captured, may be useful to Allied forces, is described below.

The instrument is a local battery telephone, waterproofed and ruggedly built, evidently designed for use where dampness and vibration are prevalent. It has been found in artillery and gun emplacements, underground searchlight stations, and in underground living quarters.

The handset is connected to the main assembly by a heavy, rubber-covered cord. The receiver is covered with a rubber ear cushion.



GERMAN WALL TELEPHONE FOR FIXED EMPLACEMENT.

Both the main assembly case and the handset frame are of cast metal. The ringer assembly is mounted on the top of the set. A circular glass visual indicator window, about one inch in diameter, is located about 1¼ inches down from the top center of the front

cover plate. This plate is fastened by means of four bolts, with triangular-shaped heads, recessed in each corner of the face. These bolts require a special set wrench for loosening.

Directly below the circular glass window is the manufacturer's name plate, and below that a plate bearing an inscription, a translation of which is "Attention, the enemy listens with you. Ring three times after speaking."

On each of the four rear corners of the set are bolt brackets for mounting the set to the wall. At the bottom of the set are four outlets, one for the handset cord, one for the battery supply, one for the line wire, and one for an additional cable for another receiver and transmitter when used.

The generator crank is located on the right side of the set. It is counterbalanced and of very sturdy construction. The switch hook is on the left side of the set. The handset hangs on the hook by means of a hole cast into the handset frame. When the handset is lifted from the hook, the visual indicator shutter is automatically retracted.

The set is 15 inches in height, 7¼ inches in width (excluding the switch hook and generator crank) and 5½ inches in depth. No German nomenclature has been found for this apparatus.

JAPANESE "BLACK DRAGON" SMOKE SIGNAL

The black-banded Japanese projectile designated "The Black Dragon," is a daylight parachute smoke signal which is fired from the Japanese Model 89 grenade discharger. The claim is made by its users that the signal is visible over a distance of approximately 8,000 yards.

The projectile is 7¼ inches long, 2 inches in over-all diameter, and weighs approximately 10 ounces. It consists of a cardboard-cased cylindrical main body and a brass base attachment for the propelling charge. The main body, containing the parachute smoke unit and ejection charge, is a cardboard cylinder 5⅞ inches long, $1\frac{5}{16}$ inches in diameter, with recessed black cardboard top. This cylinder is marked with a $\frac{5}{16}$-inch black band around the upper part and Japanese characters printed in black.

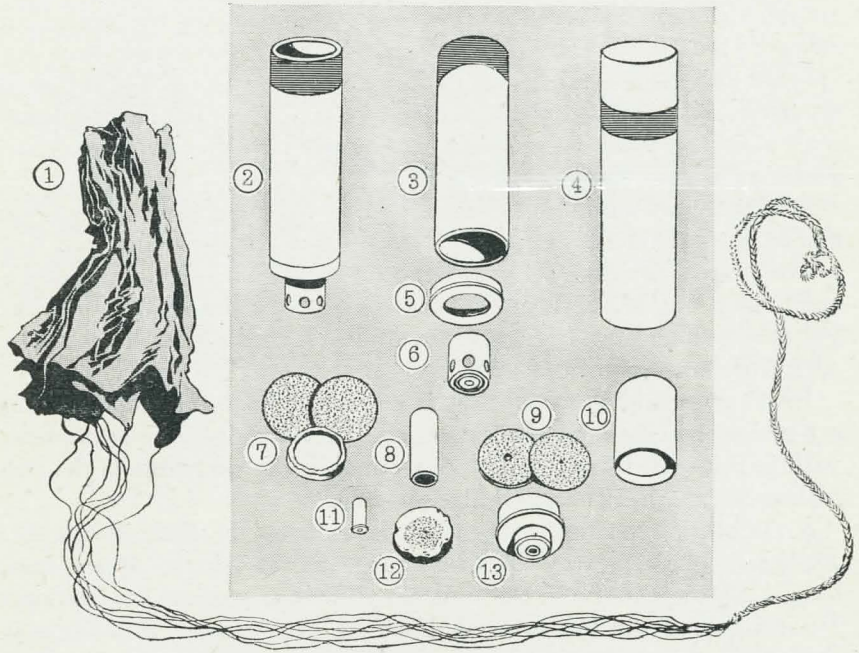
A ring-shaped brass plate with a ⅜-inch lip fitted around the lower rim of the cardboard cylinder forms the base of the main body and serves as an expanding, rotating band for the signal. The base attachment extending below the main body consists of a brass propellant cup 1¼ inches long and $1\frac{3}{32}$ inches in diameter, with vent holes sealed with tinfoil around its periphery.

Inside the propellant cup is a 0.38-caliber brass cartridge holding a 3-grain black powder flash charge. The cartridge case is provided with paper-sealed flash vents. Surrounding the cartridge is the propelling charge of 0.2 ounce of black powder.

A Bickford type fuze delay train leads from the flash charge to a 10.8-grain black powder ejection charge in the bottom of the main body. Above it is the smoke unit, a cylindrical iron smoke container 2⅝ inches long and 1⅝ inches in diameter. The smoke container is attached to a black crepe paper parachute which is 30 inches in diameter. Strands of quickmatch are provided to permit ignition of the smoke mix from the flash of the ejection charge. The smoke container holds 2.8 ounces of a smoke mix containing 35 per cent napthalene, 56 per cent potassium chlorate, 7.5 per cent antimony sulfide and a priming layer of black powder.

In the launching of the smoke signal, percussion from the firing pin of the grenade discharger initiates the primer of the 0.38-caliber cartridge, igniting the flash charge and delay train. The propelling charge is set off through the flash vents in the cartridge case. Propelling gases escaping through the propellant cup vent holes drive the signal from the weapon and at the same time expand the brass expansion ring, causing it to engage the rifling. The delay train ignites the ejection charge, which expels the smoke unit and fires the quickmatch leading to the smoke mix.

1. Parachute (paper), 30 inches diameter.
2. Assembled round.
3. Shell body (cardboard).
4. Packing tin.
5. Expansion ring (sheet brass). Fits over closure block (13), and base of shell body (3).
6. Propellant cup (sheet brass), housing propellant charge and cartridge (11). Fits over end of closure block (13).



7. Closure discs (cardboard).
8. Tube (cardboard). Parachute (1) is folded around tube.
9. Discs (cardboard) located between closure block (13) and smoke container (10).
10. Smoke container (sheet iron).
11. .38 caliber cartridge (brass).
12. Smoke container closure disc (wood).
13. Base closure block (wood) containing delay and ejection charges.

When the signal is fired from the Japanese Model 89 grenade discharger set at maximum range, the smoke unit is ejected at an estimated height of 400 feet, 4.4 seconds after firing. The parachute opens immediately and the smoke unit produces a thin, black smoke and white flame which burns erratically for 9.2 seconds. The smoke unit then detonates.

GENERAL

TREND TOWARD BETTER JAPANESE PLANES AND GUNS

While the small arms and artillery of the Japanese army have been and probably will continue to be inferior to the weapons used by the armies of the United Nations, there has been a perceptible improvement in the power, speed and ruggedness of Japanese aircraft.

Together with the effort of the Japanese to develop better planes, there has been an attempt to increase aircraft fire power. At the beginning of the war, the primary Japanese aircraft weapons were the 7.7-mm, the low-velocity 20-mm and the 12.7-mm guns. However, the trend as the war developed has been to arm Japanese planes with more guns, to replace 7.7-mm guns with 12.7-mm, and 20-mm guns, and to develop more powerful guns of the latter caliber.

Higher velocity 20-mm Oerlikon and German guns have appeared in aircraft. A modification of the high velocity Model 97, 20-mm antitank gun has appeared as a free mount gun in bombers; it is being used even though it has a comparatively slow rate of fire. In order to meet the demand for guns of larger caliber, single-shot 37-mm tank guns have even been mounted in fighter planes, and it has been reported that 13-mm and 25-mm guns have been mounted in a few aircraft.

Ground weapons have also shown some improvement. Model 1 (1941) 47-mm antitank gun is a thoroughly modern high-velocity weapon, with individually sprung wheels which permit rapid towing. The new tank 37-mm gun, designed in the same year, also shows modern thought. Hollow charge ammunition has appeared in 75-mm calibers and in rifle grenades, and may be expected in other sizes. Effective armor-piercing high explosive ammunition for 75-mm artillery has also been recovered.

As tanks and antitank weapons have been the subject of much development activity by all belligerents, further Japanese changes in such weapons may be anticipated. It is considered probable that the Japanese will endeavor to furnish their army with more effective antitank guns and ammunition, but meager production facilities may closely limit this activity. However, antitank stick grenades for the 37-mm gun—grenades similar to those used by the Germans—may appear.

Japanese development of a weapon comparable to the German bazooka or *faustpatrone* is believed to be a definite possibility. Such an antitank weapon might be used effectively by the Japanese, whose traditions call for close combat. Production of such a simple weapon would put little strain on manufacturing facilities and the weapons

could be readily transported to the battle fronts. Technical information for such a development is available from the Germans.

If production facilities are available, major changes should be expected in Japanese antiaircraft weapons. With the Japanese loss of air superiority this is, no doubt, their most serious weapon problem next to aircraft.

It seems unlikely that any major changes will be made in the production of unarmored vehicles, due to the impossibility of creating an automotive industry capable of building enough vehicles or power driven equipment to affect the outcome of the war.

As the industrial and research capacity of Japan is small in comparison with that of the United Nations, it can be anticipated that the present superiority of United Nations weapons will continue to increase despite all Japanese attempts to improve their weapons.

Distribution Symbols:

Armies (20); Depts (10); Def Comds (10); Base Comds (10); Island Comds (10); Sectors (10); HD (10); Maj Bases (Overseas) (10); T of Opn (10); Sv C (10); R & H (excluding Sep Bn) (5); Arm & Sv Boards (2); RTC (150); Unit Trg Center (30); Posts, Camps & Sta (1); Replacement Dep (65); Sv Sch (100); ROTC Unit (3); Ord Dist (10); Tech Sv (10).

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WAR OFFICE