

**N U M B E R 5 0**

**S E P T E M B E R 1 9 4 4**

RESTRICTED



**TACTICAL  
AND TECHNICAL  
TRENDS**

MILITARY INTELLIGENCE SERVICE

4000

RESTRICTED

NUMBER 50

SEPTEMBER 1944

---

# TACTICAL AND TECHNICAL TRENDS

MILITARY INTELLIGENCE SERVICE  
WAR DEPARTMENT - - WASHINGTON, D. C.

---



---

United States Government Printing Office

Washington : 1944

## CONTENTS

Number 50, September 1944

	Page
German 170-mm Gun and 210-mm Howitzer on Howitzer Carriage (Mörser-Lafette) 18 .....	1
Amphibious Enemy (Japanese) Tank, Floated by Pontons, Employed in Central Pacific .....	6
Germans Use French-Made Antipersonnel 60-mm "Jumping" Mine .....	8
German Plan for a Completely Organized Battery Position .....	10
German 280-mm Railway Gun Has Possible Range of 31 Miles .....	12
Japanese Air-to-Air Parachute Bomb Hangs from 150-Foot Cable .....	14
Smoke Sprayers on (German) Armored Vehicles .....	16
Improved Japanese 90-mm Mortar 120 Pounds Lighter than Familiar Model 94 .....	20
Thirteen-Ounce "Mustard Pot" Newest German Antipersonnel Mine .....	20
Germans Introduce Light Antitank Mine (T5) Containing 10-lb. Cast TNT Charge .....	21
Familiar Nicknames Given German Radio Equipment; Use Phonetic Alphabet .....	22
Modified Soviet Field Guns, in German Hands, Employed as Antitank Weapons .....	23
New Armor-Piercing H. E. Shell for <i>Flak 40</i> Encountered over European Targets .....	25
Magnetic Hollow Antitank Charges Fitted with Field-Made Spikes .....	25
How Our Positions and Installations Appear on German Maps and Aerial Photos .....	26
Heavy Schneider 47-mm Gun Reported in Use by Germans as Antitank Weapon .....	29
Recent Data on Time and Space Factors of German Armored Units .....	30
Range of German 150-mm Heavy Howitzer Increased by 2,000 Yards .....	31
Germans Abandon Minefield Pattern Planting in Italy, Use More Antipersonnel Mines .....	32
New German Rifle and Pistol Ammunition for Silenced Weapons and Sharpshooters .....	33
German and Japanese Field Wire .....	33
Nomenclature of German Armored Vehicles and Self-Propelled Weapons .....	34
Index (for Numbers 41 through 50) .....	43

## NOTICE

Readers are invited to comment on the use that they are making of this publication and to forward suggestions for future issues. Such correspondence may be addressed directly to the Military Intelligence Service, War Department, Washington 25, D. C.

Reproduction within the military service is encouraged provided (1) the source is stated, (2) the classification is not lowered, and (3) one copy of the publication in which the material is reproduced is furnished the Military Intelligence Service, War Department, Washington 25, D. C.

An index is published for each series of 10 issues of *Tactical and Technical Trends*. Such an index is included in this issue and 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.*

**GERMAN 170-MM GUN K. 18 AND 210-MM HOWITZER  
ON HOWITZER CARRIAGE [MÖRSER-LAFETTE] 18**

Reports from the field continue to mention use by the Germans of the 170-mm gun K. 18 mounted on the howitzer carriage *18 17-cm K Mit Mrs. Laf. 18*. This carriage was originally designed for the 210-mm standard German heavy howitzer. The latter weapon is designated by the Germans as *21-cm Mrs. Laf. 18*. The 170-mm gun is notable for its long range (over 32,000 yards), its mobility, and its unique design features. Although commonly referred to as a 170-mm gun, its actual caliber is 172-mm. A short report on this weapon was published in TACTICAL AND TECHNICAL TRENDS No. 22, p. 35.

**CARRIAGE (MRS. LAF. 18)**

The carriage consists principally of a long, narrow bottom carriage, the rear portion forming a modified box-type trail, and a top carriage of two triangular side members, crossbraced by transoms. The carriage is supported in traveling position on a cranked axle and two steel wheels with solid rubber tires. In firing position the carriage is supported on a firing platform, and the end of the trail rests on a trail platform. This type of firing suspension makes emplacement easy on level ground but is not as adaptable to terrain irregularities as three-point suspension.

The firing platform is a circular steel disk, reinforced by steel webbing and having a circumferential roller track. The carriage is supported by means of a heavy V-shaped carriage support, connected to the platform through a ball-and-socket joint. The supporting arms are locked in sockets in the bottom carriage when in firing position. The weight of the carriage is distributed, and traverse is facilitated, through two retractable rollers on the end of jacks mounted on each side of the bottom carriage. A third retractable roller operates at the rear of the firing platform, and is used only to raise the trail.

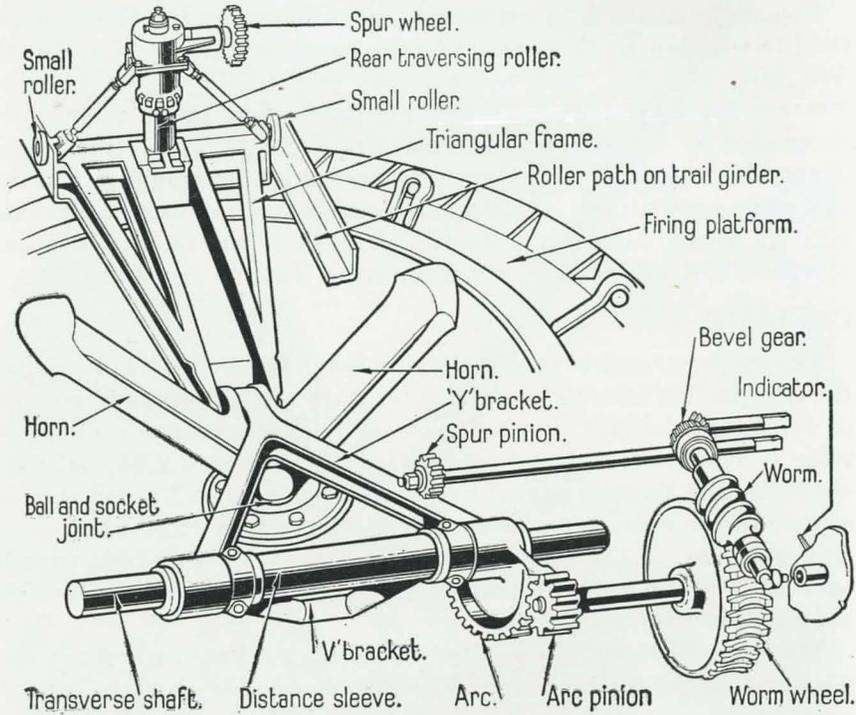
The firing platform lowering and raising mechanism consists of two frames pivoted together at their apexes and connected to the firing platform through two lugs at the rear of the carriage support. The front frame is Y-shaped, with its open ends connected to and pivoting about a transverse shaft in the bottom carriage. The end of the "Y" extends downward between the vertical arms of the carriage support and is inserted between the lugs at its base. The rear frame is tri-



*German 170-mm gun K-18 on howitzer carriage (Mörser-Lafette) 18.*

angular, the apex also being attached to the carriage support, on the outside of the two lugs. A pin through the triangular frame, the carriage support lugs, and the Y-frame connects the three. The rear end of the triangular frame rests on rollers operating on roller paths running longitudinally along the inside of the bottom carriage side members, and the housing for the rear platform roller is mounted on this frame.

The Y-frame rotates along the transverse shaft through the operation of arc-and-pinion gearing. As it starts forward and down it swings



the firing platform forward and down, and the triangular frame is pulled forward on the roller paths through the action of the connecting pin at its apex. This action continues until the Y-frame has rotated under the transverse shaft. Then both the Y-frame and the triangular frame point forward and the vertical carriage support arms engage the sockets in the carriage. A fixed tubular bracket, projecting downward and to the rear from the transverse shaft, hits a stop at the rear of the triangular frame when it has moved fully forward. This prevents the frame from lifting from the roller paths. When the firing platform is raised to its rear (or traveling) position it is held in place by clamps extending down from the bottom carriage.

The trail platform is generally rectangular in shape and, like the firing platform, is steel reinforced with webbing. It supports the

end of the trail and permits traverse of the piece. The trail is connected to it through a pinion gear operating in a traversing rack in the trail platform. Through a handwheel on the side of the carriage and linkage to the pinion a traverse of about 280 mils is possible. For large deflection shifts the rear traversing roller on the firing platform is screwed down until the trail is lifted. With the entire carriage then supported by the carriage support arms and the three rollers, a few men with handspikes can easily rotate the entire piece through 6,400 mils. The trail platform is held to the trail for this operation by pins extending through corresponding lugs on trail and platform.

Elevation is accomplished through conventional arc-and-pinion gearing. Maximum depression for both gun and howitzer is 18 mils, and maximum elevation for the gun is 925 mils. For the howitzer it is reported to be 1,240 mils, but this is doubtful as the cradle for both weapons is the same. The length of the side members of the top carriage prevents the breechblock from opening when the piece is at any but low elevations. An elevation indicator pointer mounted on the right trunnion takes with it a following pointer when the piece is elevated, so that the operator may quickly return the piece to the same elevation again by making the pointers coincide.

Two pneumatic push-type equilibrators support the tube, working against arms mounted on top of the cradle. These are interesting in design, because the air pressure may be regulated through a valve connecting the cylinders to reserve air bottles. A gauge indicates the pressure both in the equilibrators and in the reserve air supply. The carriage has a dual recoil system, one for the tube and one for the top carriage. The top carriage operates on slides on the bottom carriage and recoils in the plane of the bottom carriage. The carriage recoil and recuperator cylinders are mounted side by side in the bottom carriage. The piece recoils on slides in the cradle through two sets of rollers. The recoil cylinder is mounted in the bottom of the cradle and the recuperator cylinder is mounted to a yoke on the top of the cradle above the tube. The recoil and recuperator pistons are attached to the breechring. Both recoil systems are hydropneumatic and the control-rod system is similar to that provided for the 88-mm gun. The dual system, enabling the weight of the top carriage to absorb part of the recoil shock, permits shorter recoil for the piece itself.

The axle is mounted to the front of the bottom carriage, with cranked ends attached to the center of leaf springs. The rear of the springs are fixed to the bottom carriage, but the front ends may be raised through arc-and-pinion gearing, thus rotating the axle, and lifting the cranked ends and the wheels. In traveling position the front ends of the leaf springs are held in position by locking brackets securing a

shaft connected to the front spring shackles. A power braking system is supplied for both the carriage and limber.

The weapon is towed through a U-shaped towing attachment securing the carriage to a two-wheeled limber. The open ends are pivoted to the trail several feet from the end and the closed end carries a bushing for insertion of the limber pintle. Its weight is supported by tension balancing springs on either side of the trail. It may be locked in any of three positions. A chain winch is mounted on the rear portion and connects to the end of the trail. In traveling position the attachment is locked to the trail. For firing, the attachment is unlocked and the winch is used to lower the end of the trail, the attachment pivoting upward. When the trail is lowered the towing attachment may be lifted from the limber pintle by handspikes. It is then lowered against the balancing action of the springs and again locked to the trail.

### THE 170-MM GUN

The 170-mm gun K.18 consists of tube, jacket, breech ring and horizontal, sliding-wedge breechblock. The breechblock operates on five small rollers and is provided with a continuous-pull-type firing mechanism. It has the following safety features:

A safety catch engages the striker and prevents its going forward until the catch is set to the "fire" position.

Lateral movement of the breechblock causes a lug on the firing lever to engage a groove in the breech ring which prevents any movement of the firing lever when the breechblock is open.

Lateral offset of the firing pin and the percussion cap when the breechblock is not fully closed prevents firing.

The general characteristics are as follows:

Length.....	28 ft.
Length of gun and carriage.....	43 ft. 6 in.
Weight in traveling position.....	41,070 lbs.
Weight of gun and carriage.....	Weight in action: 38,400 lbs. Weight of piece (with breechblock): 7.44 tons.
Muzzle velocity (Ch 4), 138-lb. shell.....	3,035 f/s.
Range with 138-lb. shell.....	32,371 yds.
Rifling.....	Uniform 1 in 30 calibers.
Number of grooves.....	48.
Width of land.....	0.1875 in.
Width of groove.....	0.28125 in.
Depth of groove.....	0.0625 in.
Recoil (piece).....	Normal at 50° elevation 33.86 in. Safety limit 36.61 in.
Recoil (upper carriage).....	Normal at 10° elevation 49.21 in. Safety limit 56.30 in.

Ammunition is separate loading and more complicated than similar American ammunition. There are four charges made up from five different sections. Charge 1 consists of a powder bag called *Sonderkartusche 1* (special cartridge), containing approximately 33.7 pounds of tubular propellant called "diglykol", which consists of nitrocellulose and diethylene glycol-dinitrate. Charge 2 is formed by the addition of extra sections of propellant (weighing 10.1 pounds) wrapped around *Sonderkartusche 1*. These increments are called *Sonderkartusche 2*. For charges 3 and 4 there is a base increment, *Hauptkartusche* (principal cartridge) in a brass cartridge container with approximately 35.3 pounds of propellant. For Charge 3 an additional increment, *Vorkartusche 3* (forward cartridge) of 28.7 pounds is added. For Charge 4, *Vorkartusche 4*, a small charge containing about three pounds of propellant is inserted in a longitudinal hole through *Vorkartusche 3*. Each of the sections has a separate igniter except *Vorkartusche 4*. *Hauptkartusche* in the brass case, *Sonderkartusche 1* and *2* (complete), and *Vorkartusche 3* are issued in separate steel containers, and *Vorkartusche 4* are packed 24 to a box. In firing charges other than 3 and 4, the base section is removed from the cartridge case and either Charge 1 or Charge 2 inserted.

The gun fires a 150-pound shell (*17-cm K. Gr. 39*) with TNT filling for charges 1, 2, and 3, and a 140-pound shell (*17-cm K. Gr. 38 [Hb]*) with ballistic cap, for Charge 4 only. The TNT charge for the latter is 15.4 pounds. Both percussion and combination time and percussion fuzes are provided for both shells.

### THE 210-MM HOWITZER

This is similar to the gun in construction. Its characteristics are as follows:

Length.....	21 ft. 4 in.
Length of howitzer and carriage.....	41 ft. 2 in.
Weight of howitzer and carriage.....	Weight in action: 19 tons (approx.). Weight of piece: 6.48 tons.
Muzzle velocity.....	1,854 f/s.
Range.....	18,400 yds.
Rifling.....	Uniform, 1 in 55 calibers.
Number of grooves.....	64.
Width of land.....	0.156 in.
Width of groove.....	0.219 in.
Depth of groove.....	0.094 in.
Recoil.....	Normal at 70° elevation: 33.46 in. Safety limit 37.40 in.
Shell weight.....	247 lbs.
Number of charges.....	6.

This weapon fires both normal high-explosive shells and concrete-piercing shells.

### THE PRIME MOVER

The prime mover for both weapons is the standard 18-ton half-track prime mover *Sd. Kfz. 9*, which has the following characteristics:

Weight, empty.....	15 tons.
Engine.....	230 HP.
Road speed (good roads).....	25 mph.
Fuel capacity.....	64 gals.

The tubes of both weapons are designed to be removed from the cradle and transported separately, but reports indicate that they are frequently transported on carriage in battery at rates up to 25 miles per hour.

### AMPHIBIOUS ENEMY TANK, FLOATED BY PANTONS, EMPLOYED IN CENTRAL PACIFIC

A new type of amphibious tank, used by the Japanese in the Marshall Islands, has an interesting means of flotation provided by the attachment of bow and stern pontoons. The pontoons conform to the shape of the hull and are attached by a series of pincer clamps controlled by a handwheel situated inside the tank, enabling the pontoons' quick release if so desired. The volume of the bow ponton is estimated to be 220 cubic feet and that of the stern ponton at 105 cubic feet. Two rudders are situated in the stern pontoons and are operated from within the hull. Two propellers are fitted to the rear of the tank.



*Japanese amphibious tank with bow ponton attached.*

With the exception of the suspension, this tank is an entirely new Japanese design, the hull simplified, reentrant angles eliminated, and welding used throughout. In addition, the round turret is of a new type, characterized by an unusually large diameter, giving the impression of greatly reduced height.

Rubber seals are fitted around all openings, up to and including the turret ring, to make the tank waterproof. The tank hull is not divided into individual compartments.

There are definite indications that the primary armament represents an improvement over the armament of other Japanese vehicles. The coaxial mounting of the turret machine gun is of particular significance. As no Japanese tank has been encountered in the past with its weapons so mounted, this must be regarded as a radical departure in Japanese tank design.

The general characteristics are as follows:

Crew.....	3 men.
Weight distribution:	
w/pontoons.....	24,915 lbs.
w/o pontoons.....	21,100 lbs.
front pontoons.....	2,300 lbs.
rear pontoons.....	1,515 lbs.
Length over all.....	24 ft. 4 in.
Length w/o pontoons.....	15 ft. 10 in.
Height.....	7 ft. 8 in.
Width.....	9 ft. 2 in.
Ground contact.....	10 ft. 10 in.
Distance between track centers.....	8 ft. ¼ in.
Distance between rear idler and front sprocket.....	12 ft. 8 in.
Diameter of rear idler.....	26 in.
Diameter of bogie wheel.....	22 in.
Diameter of front sprocket.....	19½ in.
Diameter of truck support roller.....	12 in.
Height of sprocket to ground.....	2 ft. 5 in.
Width of track.....	12 in.
Pitch of track.....	3½ in.
Number of track links.....	103.
Suspension.....	2-bogie, 4-wheel with suspension spring inside hull.
Steering:	
on land.....	clutch brake.
in water.....	twin rudders.
Escape doors.....	5—2 in floor, 2 in top of hull, 1 in turret.

### POWER PLANT

Type.....	6-cylinder, air-cooled Diesel.
Hp rating.....	110 @ 1,400 rpm.
Carburation.....	None: Bosch-type injectors.
Ignition.....	None.
Cooling.....	Centrifugal blower.

## POWER PLANT—Continued.

Transmission.....	Conventional sliding gear, 4 speeds forward, one reverse, high and low range.
Power train:	
on land.....	Engine, clutch, propeller shaft, transmission, final drives, sprockets, track.
in water.....	Engine, clutch, transfer case, propeller shaft, propellers.

## ARMAMENT

One 37-mm gun in turret:	
Traverse.....	360°
Elevation.....	5½°
Depression.....	11½°
One M. G. 7.7-mm, coaxially mounted with 37-mm gun.	
One M. G. 7.7-mm, in left front hull, in ball mount.	

## ARMOR

Turret:	
Sides.....	13.2-mm (0.52-in.).
Top.....	6-mm (0.24-in.).
Hull:	
Front.....	12-mm (0.47-in.).
Sides.....	9-mm (0.35 in.).
Rear.....	8-mm (0.32 in.).
Top.....	6-mm (0.24 in.).
Bottom.....	8.5-mm (0.334 in.).

## GERMANS USE FRENCH-MADE ANTIPERSONNEL 60-MM "JUMPING" MINE

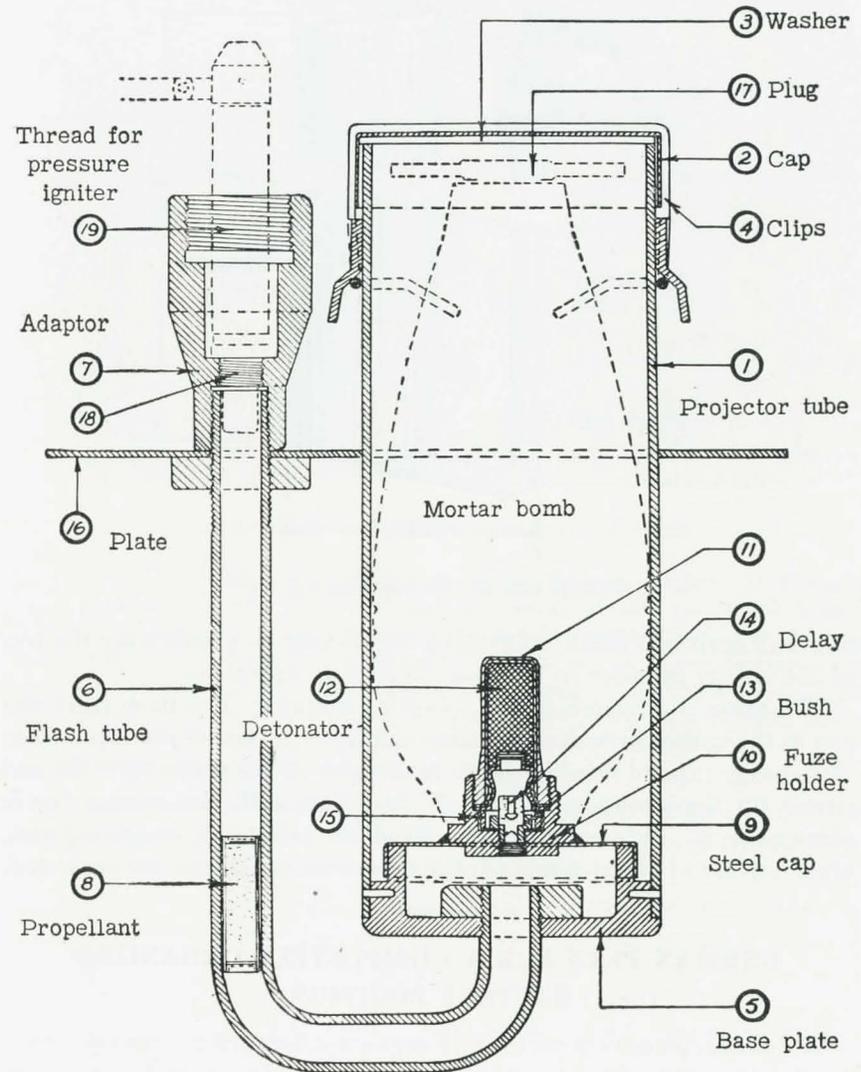
German minefields in France may be expected to contain anti-personnel mines of French origin which are designed to throw into the air bombs that explode at a height of between 1 foot 7 inches and 6 feet 6 inches. The mines have the German designation "*Sprungmine 442 (f)*."

The over-all height of the mine, less igniter, is 8¼ inches; the supporting plate is 6⅞ inches, the weight of the mine is 5½ pounds, and the bomb filling is five ounces of Melinite.

A detailed description of the mine, illustrated in the accompanying sketch, is as follows: the steel projector tube (1), of 60.3-mm bore, is closed at its upper end by a cap (2), with a rubber sealing washer (3), which is held in position by clips (4). At its lower end the tube is closed by a machined base plate (5), driven in position and fixed by dowels, into which is screwed a flash tube (6). An igniter adaptor (7) is screwed on to the open end of the flash tube. In this tube there is a propelling charge (8), consisting of 0.8 gm of black powder. The pressed-steel cap (9), to which is welded the fuze holder (10), is inside the projector tube and is a push-fit over the base plate (5). The fuze

holder (10) is threaded externally to fit into the mortar bomb and internally to take the holder (11) containing a detonator (12). The bush (13) containing a delay pellet (14) is screwed into the fuze holder. There is a small distance piece (15) to prevent the detonator from being screwed down on to the delay pellet.

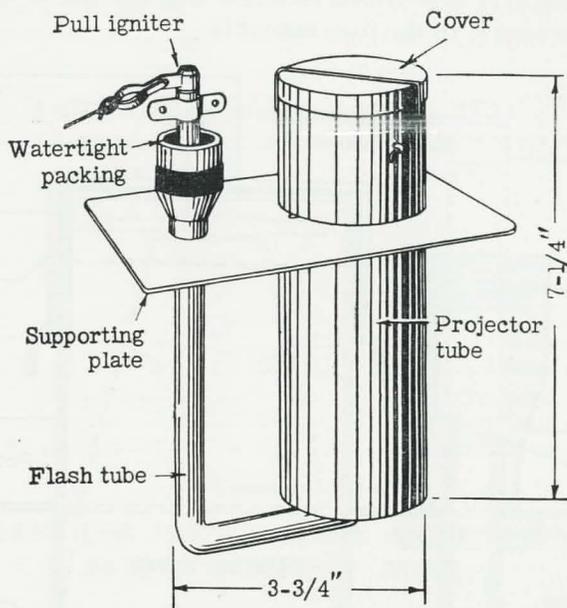
The projector tube and flash tube are fixed to a rectangular plate (16). This plate is designed to fit over the hole in which the lower part of the mine is placed to insure that the mine remains vertical and also to prevent it from sinking if it is used with a pressure igniter. A winged plug (17) is provided to screw into the tail of the bomb to assist in fastening it to the fuze assembly.



Details of "*Sprungmine 442 (f)*."

The mine may be set either with a French pull igniter or a French push-and-pull igniter. The pull igniter screws into the lower internal thread (18) of the adapter (7). To make the joint watertight, the resulting space between the igniter and the inside of the adapter should be plugged with tallow. The push-and-pull igniter screws into the upper internal thread (19) of the adapter (7). With this igniter, the joint should be made watertight with adhesive tape.

The mine is normally laid with the head of the igniter protruding just above the surface of the ground. Alternatively, when the push-



General view of "Sprungmine 442 (f)."

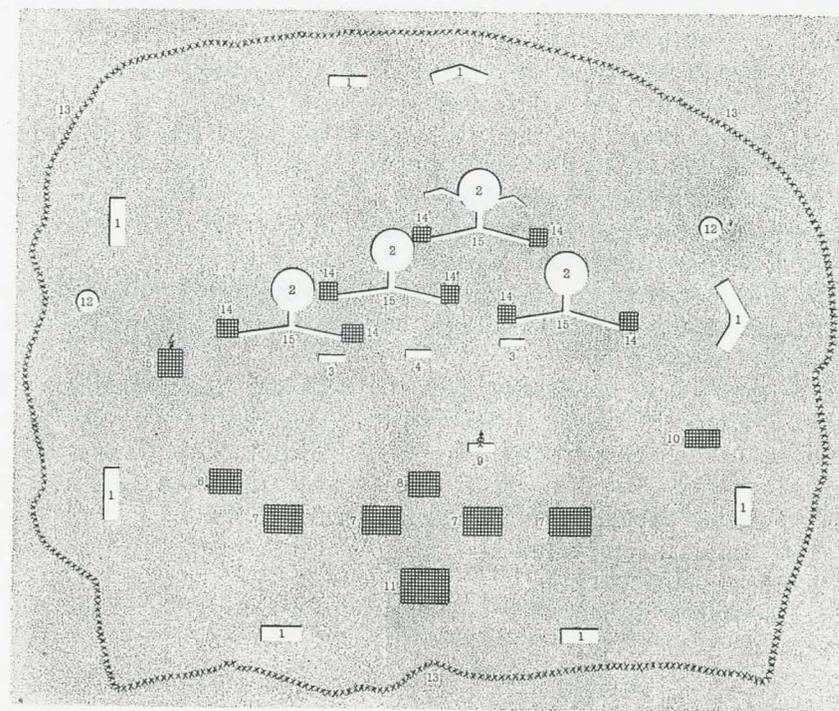
and-pull igniter is fitted, a covering board may be placed over the top of the igniter in order to increase the area of operation.

The mine is actuated in the following manner: The flash from the cap in the igniter fires the propelling charge (8). Gases produced from this charge expand into the space in the base of the projector tube and throw up the pressed-steel cap (9) together with the mortar bomb screwed to it. At the same time the delay pellet (14) is ignited and, after a delay of about  $\frac{1}{8}$  second, the detonator and bomb are exploded.

### GERMAN PLAN FOR A COMPLETELY ORGANIZED BATTERY POSITION

A German plan for a completely organized battery position is shown in the accompanying diagram. The dimensions of such a position

would naturally vary, depending on the terrain, but it appears to require an area of about 75 to 100 yards. Numbered features of the position are as follows:



German plan for a completely organized battery position.

1. Trenches for all-around defense and close antitank combat.
2. Prepared gun positions.
3. Slit trench for platoon leader.
4. Slit trench for battery officer.
5. Dugout for radio operator connected with forward observer.
6. Dugout for *Rechner* (computer).
7. Dugout for gun crew.
8. Communications and telephone dugout.
9. Slit trenches for *Sperrfeuerposten* (antiaircraft [?] machine-gun posts).
10. Supply dugout.
11. Dugout for officer and platoon leader.
12. Prepared machine-gun positions.
13. Barbed-wire obstacle.

Additional dugouts (for munitions) according to needs.

In connection with the above, the following quotation from a German document entitled Notes on Education and Training, Number 15 reveals German experience with revetments:

"In the future old boards and doors will no longer be used to support trenches and ramparts; instead the revetments will be made with sod or well-bound fascines. Walling with boards is no longer considered adequate, based on the combat experience of 1944. Where boards still remain they will be removed and replaced with material as indicated above."

## GERMAN 280-MM RAILWAY GUN HAS POSSIBLE RANGE OF 31 MILES

The German 280-mm Railway Gun, believed to be the *28-cm K5 (E)*, is a very heavy, long-barreled gun, unique in construction and operation. It has the following unorthodox features:

1. Traverse is effected by running the gun carriage onto a portable turntable, which is carried as part of the equipment.
2. The gun fires a pre-rifled H. E. projectile which has longitudinal splines to fit into the grooves of the rifling instead of rotating bands.
3. The 3,425-pound breechblock is of horizontal sliding type, and has a percussion-type firing mechanism.
4. A short cartridge case is used for obturation.
5. The gun carriage has an additional recoil action obtained by having a buffer recuperator between the gun carriage and the portable turntable platform.

The gun is built on massive lines. It is 70 feet 7½ inches long, and has a chamber 10 feet 4¼ inches long by 1 foot 1¼ inches in diameter. Grooves in the rifling are 1¼ inches deep. Complete with its carriage, the gun weighs 231 tons. With an estimated maximum elevation of 50°, it has an unconfirmed maximum range of 31 miles.

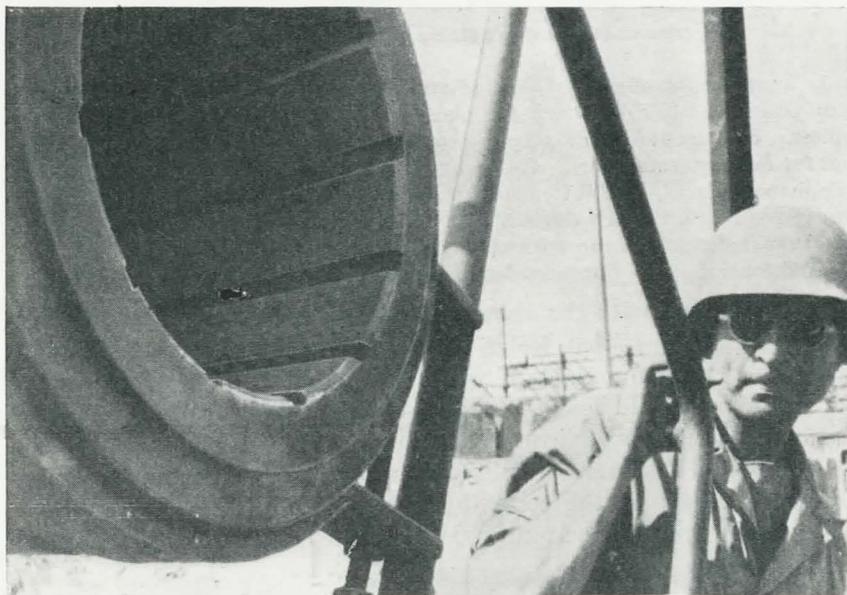
The complete train consists of the following:

Diesel-electric locomotive.

Car for carrying turntable rail segments and inclined rail section, with hand-operated derrick for unloading.

Turntable-platform car.

280-mm gun carriage.



Close-up muzzle view showing the deep grooves into which shell splines fit.

Motivated flat-car having electric power generating unit and an electric-operated derrick for hoisting ammunition.

Air-conditioned car (for powder) carrying a removable auxiliary electric generating unit.

The weight of the complete gun car, 231 tons, would limit the speed of this train to an estimated 5 to 10 miles per hour.

Emplacement of this equipment would take considerable time. The ground must be level and firm before the turntable track, in 18 sections, can be laid.

The turntable-platform car is placed in the center of the turntable track, and, with trucks removed, is lowered by hydraulic jacks until four sets of flanged rollers fitted transversely to the platform at each end rest on the circular rails. Pivoting on a central jack, it is driven around by a gasoline-electric unit. It must be re-leveled after each movement in azimuth.

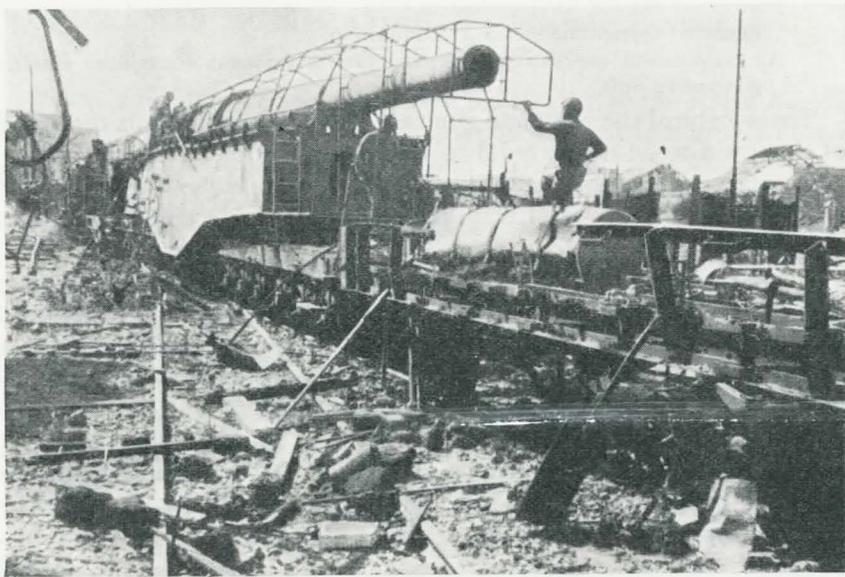
The gun carriage is rolled up onto rails fitted to the bed of the turntable-platform car. Its front end is coupled to a hydraulic buffer and hydropneumatic recuperator which are fitted to the turntable-platform car. This provides carriage recoil in addition to normal barrel recoil incorporated in the gun.

It is believed that under favorable conditions emplacement may be accomplished in 6 to 10 hours by a skilled crew.

Limited speed on railways, and difficult emplacement, would preclude employment of this ponderous equipment in forward areas. As a coast defense weapon, however, it would be a sufficient threat to battleships' heaviest armor to keep major enemy naval units beyond its extreme range.



Car carrying turntable track.



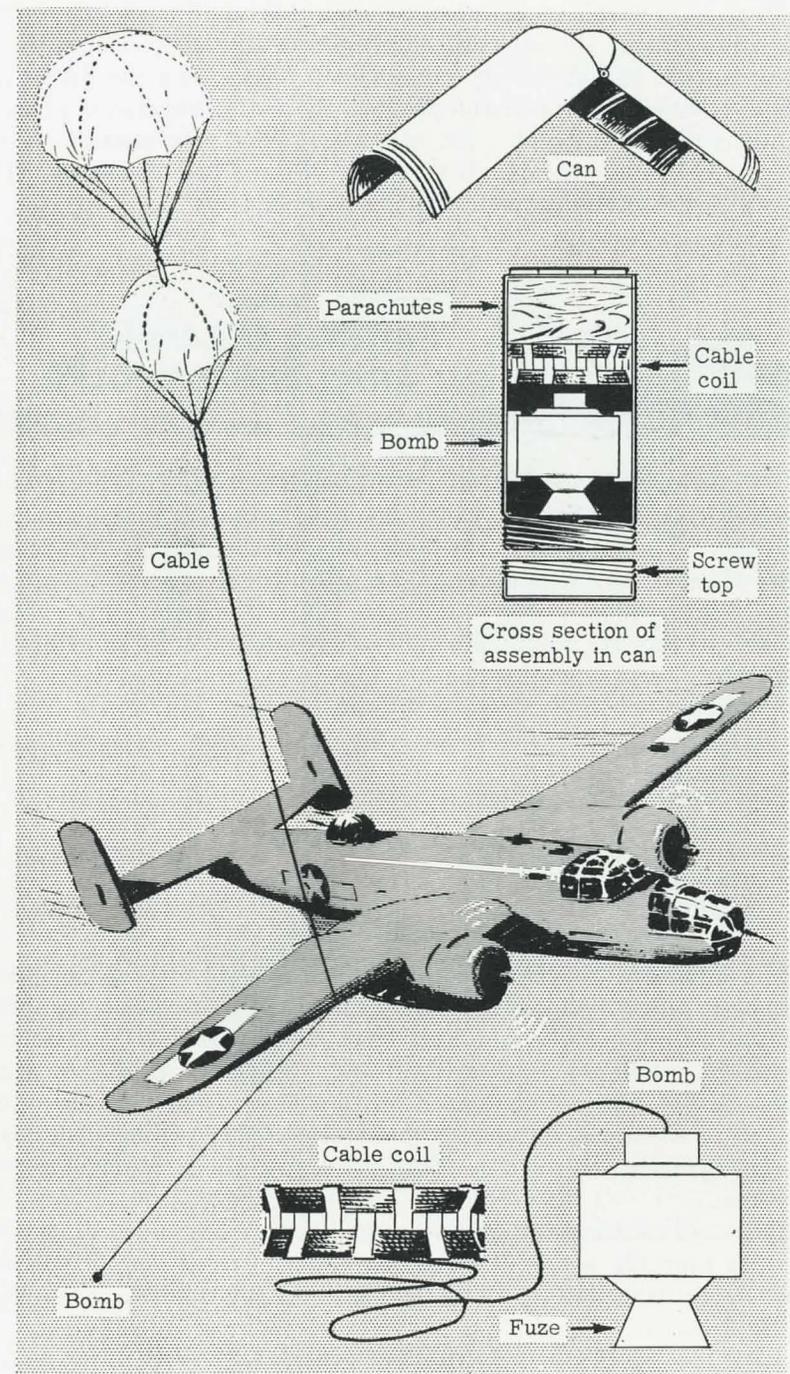
280-mm K5 (E) German railway gun.

### JAPANESE AIR-TO-AIR PARACHUTE BOMB HANGS FROM 150-FOOT CABLE

A device obviously designed to be dropped from intercepting Japanese aircraft upon United Nations bomber formations consists of a small bomb, weighing approximately 1 pound, which is attached to one end of a thin, twisted-steel cable about 150 feet long. Two small parachutes are attached to the other end of the cable to insure that it will hang vertically as it falls.

The entire bomb, complete with parachutes and cable, is packed in a gray can, 7 inches long and 3½ inches in diameter. The can is made in two halves, hinged diametrically across the bottom in such a way as to open along the long axis of the can. The top is threaded and, when screwed on the can, holds the two halves together. The bomb is a cylinder of cast steel, 2½ inches in diameter by 2 inches high, and filled with a cast explosive believed to be TNT. The fuze is at one end of the bomb and the cable is fastened to the other end. The cable, ¼ inch in diameter, is wound in a compact coil until the bomb is dropped.

The fuze functions on impact from any direction. It is activated by a floating firing mechanism which has a safety pin that is withdrawn by an arming vane. This arming vane rotates when the bomb falls, but until then is held in place by another safety pin that locks it to the side of the fuze.



General details of Japanese air-to-air parachute bomb.

There is no visible means of suspending this bomb in the bomb bay. It is possible that the cans are simply placed on a trap door with the tops removed and the safety pins pulled. Then, as a can drops and fills with air, it flies open and releases the entire apparatus of parachutes, cable, and bomb. An aircraft striking any portion of the cable might cause the bomb to swing upward and detonate. The cable also presents a propeller fouling hazard.



German smoke spraying equipment, evidently designed to produce a screen especially for the concealment of armored forces, has been reported. The equipment has been noted on the *Sd. Kfz. 233*, a fast, eight-wheeled, turretless armored car, mounting the short 75-mm tank gun. This vehicle is well adapted to tactical maneuvering. Eight smoke sprayers are mounted on the vehicle, four on the front of each mudguard.

The general characteristics of the sprayer are:

Height, overall.....	12 in.
Diameter of container.....	4 3/8 in.
Thickness of container wall.....	1/16 in.
Capacity.....	0.42 gal.
Volume of smoke charging.....	0.31 gal.
Free space.....	25%.
Weight, empty.....	5 lb. 13 oz.
Weight, charged.....	10 lb. 6 oz.

The apparatus (see Fig. 1) consists of a mild steel container (1) fitted with a dip pipe (2) and jet pipe (3). The pressure necessary for spraying the charging (4) is obtained from a gas cylinder (5), mounted internally. The generator has two cartridges (6), which, on firing, force the gas cylinder downward on to a boss (7) in the base of the generator, when a striker pin (8) punctures copper sealing disk (9) of the gas cylinder and so releases the gas to give the necessary spraying pressure.

The steel container (1) has a screwed neck (10) welded to it, while the dip pipe (2) passes through the top and is welded in position. Four supporting plates (11), at right angles to one another, are welded on the base.

An adapter (12) screws down into the neck (10), on to a lead washer (13), and carries the cartridges (6), in the top, protected by a plastic

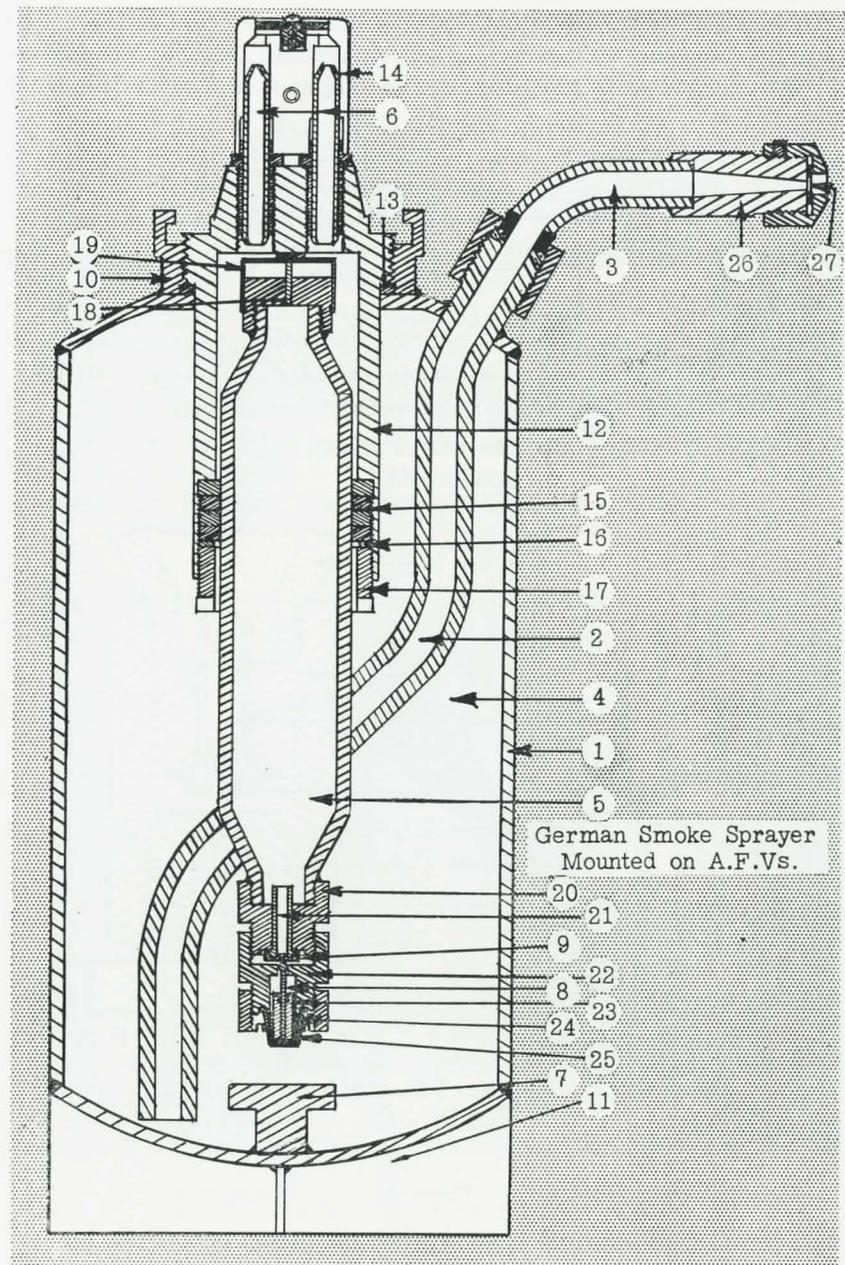


Figure 1.

molded cover (14). The gas cylinder (5) is positioned in the bottom of the adapter by four rubber washers (15) and one brass washer (16), all held by a washer-retaining nut (17). The gas cylinder (5) weighs 14 ounces and has a capacity of 4½ cubic inches. A hole in the top of the cylinder, which is probably used for filling, is plugged with a short

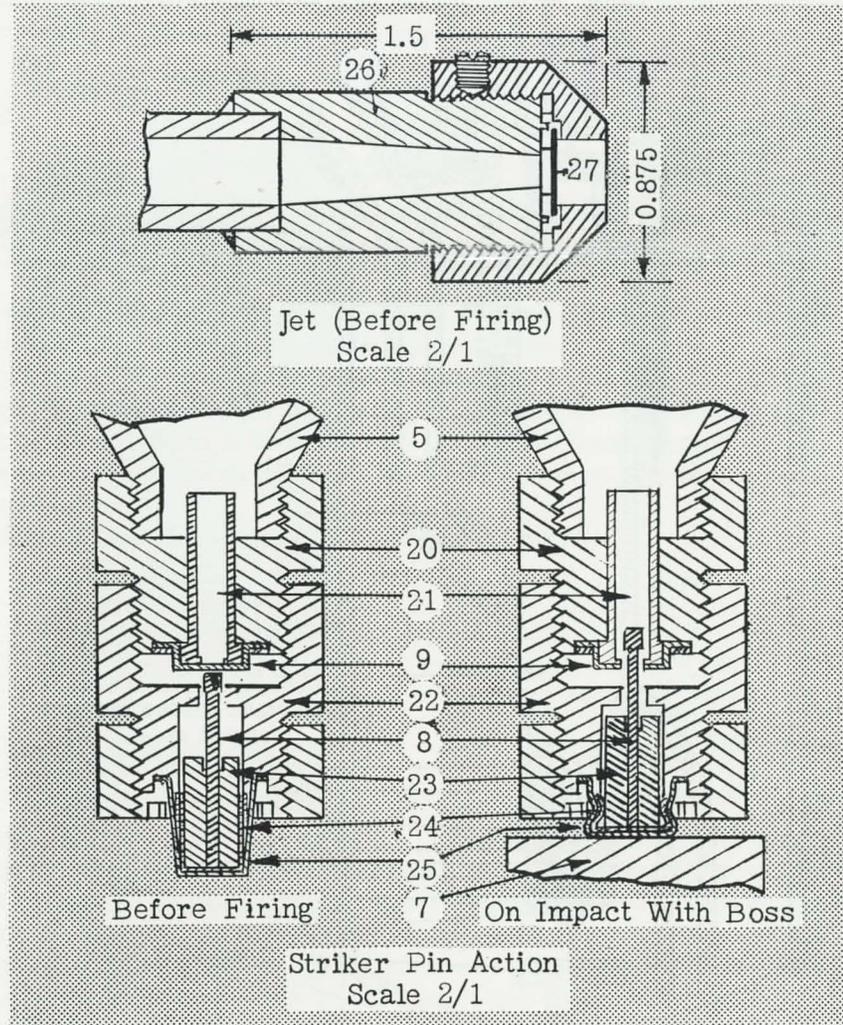


Figure 2.

steel pin (18) of approximately 1/16-inch diameter. Over the pin and head of the cylinder is a lead cap (19) on which are stamped figures, presumably relating to the empty and charged weights of the cylinder.

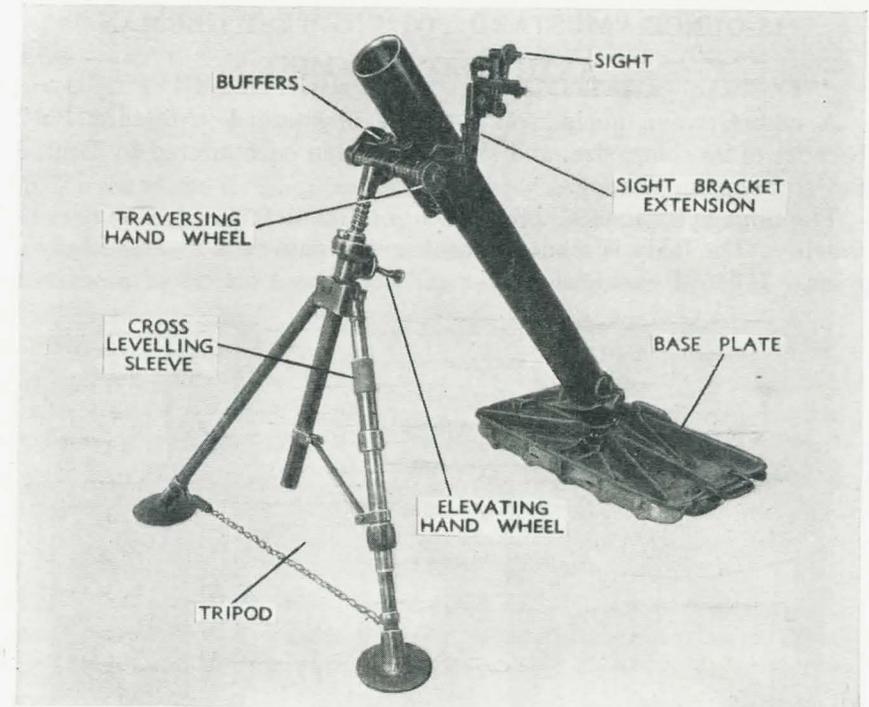
The bottom of the cylinder is externally threaded to receive a screw cap (20) with small central tube (21) sealed by a copper disk (9).

On the cap is screwed the striker pin assembly consisting of the body (22) with striker pin (8) and striker pin block (23) held into the body by a brass cup (24) and lead cap (25).

The jet pipe (3) has the nozzle assembly (26) soldered on to the forward end. The nozzle orifice is closed by a thin lead disk (27) approximately 0.003 inch thick, which prevents escape of the charging before the sprayer is functioned and which is shattered by the pressure set up in the generator on functioning.

The cartridges contain about 0.007 ounce of explosive. The charging is tetanium tetrachloride. The equipment is electrically fired from a control panel within the vehicle.

When (see Fig. 2) the cartridges (6) are fired the gas cylinder (5) is forced down onto the boss (7). The brass cup (24) and lead cap (25) are collapsed and the striker pin (8) is driven forward to puncture the copper disk (9) sealing the lower end of the gas cylinder. The escaping gas forces the gas cylinder up into its original position and builds up pressure within the container until the lead disk (27) in the nozzle orifice is broken and the smoke liquid is emitted.



The 90-mm Model 97 Japanese Mortar (see next page).

## IMPROVED JAPANESE 90-MM MORTAR 120 POUNDS

### LIGHTER THAN FAMILIAR MODEL 94

Mortars used by the Japanese in the Bougainville fighting included the Model 97 (1937), 90-mm mortar, which is a lighter and improved version of the familiar Model 94 (1934) mortar. The 97 model weighs 120 pounds less than the older model. This difference in weight offers a great advantage in difficult jungle terrain where such weapons must be hand-carried.

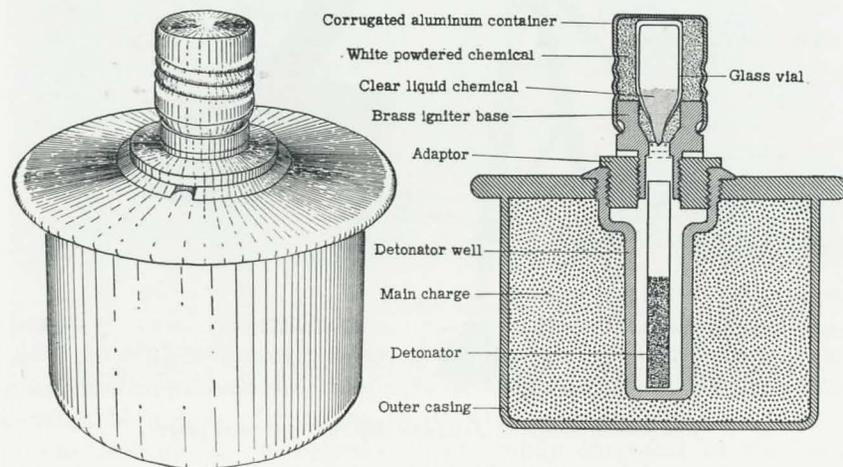
The lighter weight of the newer model is mostly due to the absence of the heavy recoil mechanism found on Model 94. Also the clamping collar and saddle in the new model are lighter than and differ slightly from the clamping collar and saddle in the Model 94.

From a detailed study of the two models it is evident that they both have the same maximum range, 4,150 yards. Both models can provide fire power comparable to light howitzers or field artillery pieces. Moreover, the Model 97 can be used in positions which, because of dense tropical vegetation, are inaccessible to field guns.

## 13-OUNCE "MUSTARD POT" NEWEST GERMAN ANTIPERSONNEL MINE

A new German antipersonnel mine, nicknamed "Mustard Pot" because of its color, size, and shape, has been encountered by United States troops in Europe.

The mine is 3½ inches high, 3 inches in diameter, and 13 ounces in weight. The body is made of sheet metal, painted a mustard brown color. It has a chemical igniter and contains 4 ounces of powdered



"Mustard Pot" Antipersonnel Mine.

picric acid and granular TNT. It is activated by firing pressure of approximately 35 pounds. There is no safety device.

The chemical igniter consists of a corrugated aluminum cylinder which is crimped to a brass igniter case. Inside of this cylinder is a glass vial, partly filled with a clear liquid and a white powdered chemical held in place by a paper disk. The external thread of the igniter base (identical with the standard German igniter thread) screws into an adaptor, which may be either plastic or steel. The adaptor screws into the explosive container.

The mine is exploded by crushing the corrugated aluminum cylinder, thereby breaking the glass vial. This allows the liquid to mix with the powdered chemical, causing a flash, which ignites the detonator.

To neutralize the mine, remove igniter by unscrewing adaptor from explosive container, then remove detonator.

The mine is easily detected by any electric mine detector. If the probing method of mine location is used, great care must be taken to avoid crushing the glass vial inside the aluminum igniter head lest the mine be exploded. Although this method is not recommended because it is not always effective, fields have been cleared of these mines by sprinkling the area with an inflammable fluid and igniting it.

## GERMANS INTRODUCE LIGHT ANTITANK MINE (T5) CONTAINING 10-LB. CAST TNT CHARGE

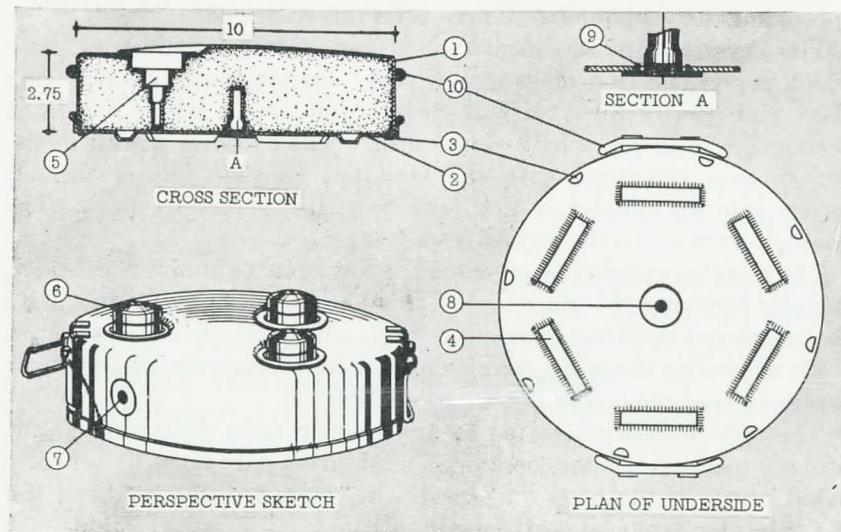
A light mine, weighing only 13¼ pounds and containing a 10-pound charge of cast TNT, is an addition to the German weapons used in defense against tank attack.

The mine is painted olive green; it is 10 inches in diameter, 2¼ inches in depth, and has a two-part zinc casing.

The top of the casing (1) in the accompanying illustration is ¾ inch thick, and the base (2) is ½ inch thick. The top slides into the base and is secured by eight tabs (3) passing through slots in the base, bent over and soft-soldered. The base is dished for strengthening with six rectangular troughs (4). The top is slightly domed and has three adapters (5) sweated into shallow recesses. The adapters have sockets to take *ZdZ 29* igniters (6).

There are three additional sockets for fitting antilifting igniters; two of these (7) are in the side of the casing, diametrically opposite each other and four inches to the right of the center of each handle; the other (8) is in the center of the base. All these igniter sockets are sweated into the casing, and in addition have a locating device in the form of two brass pins (9) which fit into slots on either side of the hole in the mine casing. Two steel carrying handles (10) are held within

## MODIFIED SOVIET FIELD GUNS, IN GERMAN HANDS, EMPLOYED AS ANTITANK WEAPONS



*German Antitank Mine T5.*

loops of brass strip sweated to the casing. The handles are shaped to fit close to the casing when folded.

### FAMILIAR NICKNAMES GIVEN GERMAN RADIO EQUIPMENT; USE PHONETIC ALPHABET

The phonetic alphabet currently used by German signal personnel in voice communications is shown herewith. The alphabet will be especially useful to Allied Forces personnel engaged in intercept work.

It is interesting to note that many items of German radio equipment are given nicknames from this phonetic alphabet; for example, the *Fu D 2* set is referred to as "Dora," and the *Fu B* set is referred to as "Bertha".

<b>A</b> nton	<b>G</b> ustav	<b>O</b> tto	<b>Ü</b> bel
<b>Ä</b> rger	<b>H</b> einrich	<b>Ö</b> dipus	<b>V</b> iktor
<b>B</b> ertha	<b>I</b> da	<b>P</b> aula	<b>W</b> ilhelm
<b>C</b> äsar	<b>J</b> ulius	<b>Q</b> uelle	<b>X</b> anthippe
<b>Ch</b> arlotte	<b>K</b> onrad	<b>R</b> ichard	<b>Y</b> psilon
<b>D</b> ora	<b>L</b> udwig	<b>S</b> iegfried	<b>Z</b> eppelin
<b>E</b> mil	<b>M</b> artha	<b>T</b> heodor	<b>Sch</b> ule
<b>F</b> riedrich	<b>N</b> ordpol	<b>U</b> lrich	

*German Phonetic Alphabet.*

During the period of successful operations against Soviet forces, the Germans captured many standard Soviet field guns of the 76.2-mm caliber, Model 36. Initially these guns were used by the Germans, without modification, and were known by them as *7.62-cm. F. K 36 (r)*. Later, by modifying the chamber and increasing the chamber capacity, adding a double shield and providing German ammunition, they produced a gun that is particularly useful for employment as an antitank weapon.

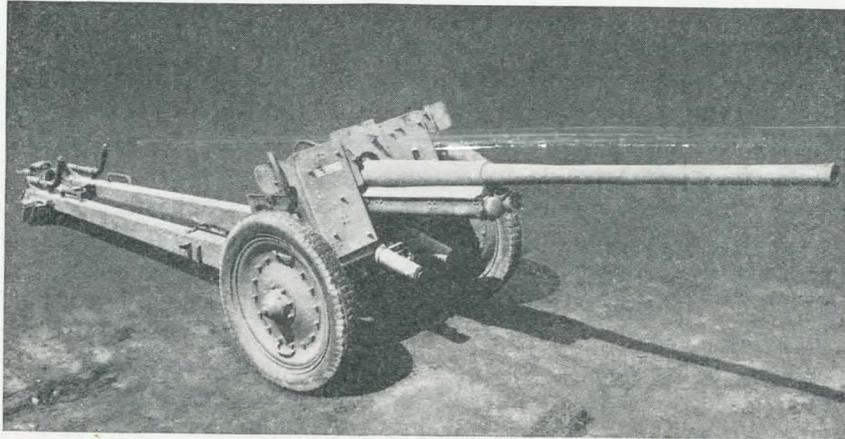
Essential alterations included moving the firing lever and elevating handwheel over the left side, enabling one man to traverse, elevate, and fire the piece. The change in position of the elevating handwheel was made possible by fitting a transverse shaft. On some models, a standard type of double-baffle muzzle brake has been fitted. The gun is designated *7.62-cm Pak 36 (r)*. Though the shield provided by the Germans is lower than the original Russian shield, the Pak 36 nevertheless is primarily a field gun, and as such has a high silhouette as compared with the *7.5-cm Pak 40*. It weighs fully 500 pounds more than the Pak 40 and, due to bad balance caused by very heavy trails, is extremely difficult to manhandle. Soviet forces have replaced it with the handier Model 39 and still lighter Model 42 field guns, both of 76.2-mm caliber.

German units armed with heavy, towed antitank weapons may be armed with either the *7.62-cm Pak 36 (r)*, the *7.5-cm Pak 40*, or the *8.8-cm Pak 43*. A reference to its use as a self-propelled gun was printed in *TACTICAL AND TECHNICAL TRENDS*, No. 21, p. 6. Nomenclature of some of its self-propelled mounts may be found in this issue.

Performance and measurements of the *Pak 36* are:

Muzzle velocity APCBC shell.....	2,427 f/s.
AP40 shot (tungsten core).....	3,248 f/s.
HE.....	1,812 f/s.
Maximum horizontal range HE.....	10,936 yds.
Weight of gun in action.....	3,564 lbs.
Weight of barrel and breech ring.....	882 lbs.
Weight of breech mechanism.....	92 lbs.
Weight of muzzle brake.....	66 lbs.
Over-all length of gun.....	24 ft.
Over-all width of gun (hub-to-hub).....	6 ft. 7 in.
Length of barrel, including breech ring and muzzle brake.....	165.4 in.
Length of jacket.....	49.6 in.
Length of bore, rifled portion.....	115.5 in.
Length of chamber.....	28.25 in.

Rifling; number of grooves.....	32.
Twist, right hand uniform.....	7°9' 45''
Depth of grooves.....	0.03 in.
Width of grooves.....	0.185 in.
Width of lands.....	0.109 in.
Length of recoil, normal.....	21.65 in.
Length of recoil, maximum.....	38.19 in.
Elevation.....	72°
Depression.....	-4°
Traverse.....	27° R 30°L.



The German 76.2-mm antitank gun, Pak 36.

## NEW ARMOR-PIERCING H. E. SHELL FOR *FLAK 40* ENCOUNTERED OVER EUROPEAN TARGETS

A new armor-piercing H. E. shell, it is reported, is being introduced for the German 128-mm *Flak 40* antiaircraft gun. The shell is an improvement on previously used ammunition for this gun, having a better ballistic shape due to the fitting of a ballistic cap.

The new shell consists of a H. E. cavity, a piercing cap, a ballistic cap and base fuze. Two iron driving bands are fitted. The base fuze is the *Bd. Z. 5121*. Tracer No. 106 is fitted. This burns for 6½ seconds, a time of flight approximately equivalent to 4,400 yards. Other data:

Weight of shell.....	62.5 lbs.
Weight of complete round:	
w/brass cartridge case.....	111 lbs.
w/steel cartridge case.....	106 lbs.
Muzzle velocity.....	2,820 f/s.

A description of the 128-mm *Flak 40* antiaircraft gun was published in **TACTICAL AND TECHNICAL TRENDS**, No. 26, p. 4.

## MAGNETIC HOLLOW ANTITANK CHARGES FITTED WITH FIELD-MADE SPIKES

Recent German army instructions concerning the destruction of enemy tanks state that 3-kg (approximately 7 pounds) magnetic hollow charges may be fitted with three spikes for use against tanks having a wooden covering over the armor. These spikes may be made in the field and fixed to stirrups which clip over the magnets.

An alternative method is to fix the spikes to the magnet keeper. The prescribed length for the spikes is 1⅜ inches.

The instructions lament that if thin wood spaced away from the armor is encountered, neither the spikes nor the magnets will hold.

## HOW OUR POSITIONS AND INSTALLATIONS APPEAR ON GERMAN MAPS AND AERIAL PHOTOS

The symbols listed below are employed by the Germans to indicate *enemy* positions, installations, obstacles, etc. on their maps, charts and aerial photograph overlays. In the drawing of the symbols, shading, broken lines and question marks are often used to indicate whether or not an object is identified or merely suspected, and whether or not a position is manned or unmanned. The symbol is placed on the map in such a manner that its center corresponds with the exact location of the installation it represents. In the case of a few symbols, the exact location is indicated by a dot placed within or beside the symbol.

This list supplements the symbols listed in "German Military Symbols," 1 April 1944 (a manual issued under the joint authority of the Assistant Chief of Staff, G-2, War Department General Staff, and the Director of Military Intelligence, War Office, London), which contains only a few of the symbols listed on the next three pages.

<u>Symbols</u>		<u>Meaning</u>
<u>Suspected</u>	<u>Identified</u>	
		Main defensive installation (concrete)
		Defensive installation (concrete or rock)
		Defensive installation (improvised)
		Supporting defensive installation
		Concrete dugout
		Improvised dugout
		Fortified entrance of installation
		Entrance to a tunnel or to an underground installation
		Observation post or command post
		Observation post above ground level (tree, etc)
		Installation of unknown type or construction
		Areas enclosing installation or fortifications of unknown type
		Dummy battery position
		Infantry-gun (howitzer) or antitank-gun position
		MG nest or entrenched riflemen
		Trench for riflemen, communication trench, or anti-splinter trench
		Consolidated field position with advanced combat trenches and heavy infantry weapons
		Multiple wire entanglements
		Antitank obstacles
		Antitank traps
		Street and road block
		Abatis and inflammable barricade
		Flame-thrower
		Prepared for demolition

Suspected	Identified	Meaning
		Demolished
		Minefield
		Cable ditch and shaft
		High tension wire
		Radio station
		Permanent barracks
		Ammunition dump
		Fuel dump
		Camp or tent bivouac
		Dam works or sluice
		Cleared forest
		Airfield
		Searchlight
		Captive balloon
		Sunken or sheltered parking lot for vehicles

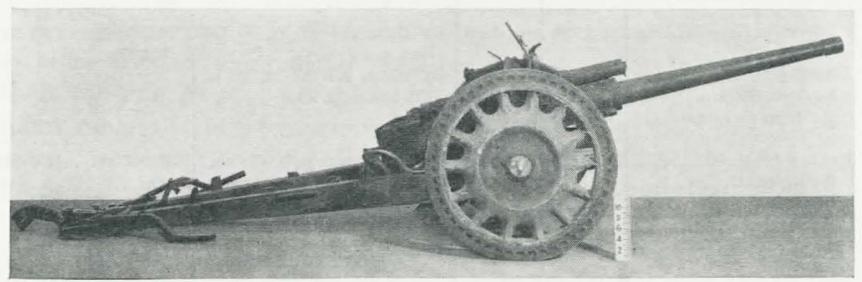
Unmanned (Question mark if suspected)	Manned	Meaning
		Armor-protected battery position
		Battery position
		Heavy battery position
		Battery position located by survey or confirmed by aerial reconnaissance
		Railway battery position
		Antiaircraft machine-gun position
		Light antiaircraft gun position
		Heavy antiaircraft gun position
		Mortar

Unmanned (Question mark if suspected)	Manned	Meaning
		Fixed rocket-projector position
		Assembly position in readiness for multi-barreled guns
		Multi-barreled guns in firing position
		Assembly position in readiness for tanks
		Tanks in firing position

### HEAVY SCHNEIDER 47-MM GUN REPORTED IN USE BY GERMANS AS ANTITANK WEAPON

Antitank weapons used by the Germans include, according to reports, the French-made 47-mm Schneider gun, Model 37. A disadvantageous feature of this gun is its great weight, 2,410 pounds. This is approximately 800 pounds more than the weight of the Japanese 47-mm antitank gun, Model 1.

The over-all length of the Schneider gun is 170¼ inches. Other information concerning the piece is as follows: length of tube, 92¼ inches; length of jacket, 42¾ inches; semiautomatic, vertical sliding breechblock; length of trails, 92 inches; width of weapon (traveling position), 64 inches; thickness of shield, 7 mm; elevation, +18° - 13°; traverse (30° each way), 60°; 36-inch diameter semidisk wheels; hard rubber tires; removable vertical spades; recoil mechanism, probably hydropneumatic constant.



47-mm Schneider Gun, Model 37.

## RECENT DATA ON TIME AND SPACE FACTORS OF GERMAN ARMORED UNITS

Recently obtained data on time and space lengths of various German armored units are given below. The information should be helpful in making estimates of enemy logistic capabilities.

These figures allow a 100-meter (109-yard) interval between battalions, companies, and equivalent units. They include first echelon battle transport (*Gef. Tross I*), supply transport, and repair services, but do not include second echelon battle transport (*Gef. Tross II*) and baggage transport.

Type of Unit	Length of column in yards at 12.4 m. p. h. (20 km. p. h.)	Time length of column in minutes at 12.4 m. p. h. (20 km. p. h.)	Speed on the march in good weather on good roads	Distance covered in 24 hours
Tk Regt.....	25,910	71.2	By day, 12.4 m. p. h. (20 km. p. h.).	93-124 m. (150-200 km.)
Regt Hq.....	910	2.5		
Maint Co.....	2,300	6.3	By night, 7.5 m. p. h. (12 km. p. h.).	
Tk Bn.....	7,200	19.7	As above.....	As above.
Bn Hq.....	190	0.5		
Hq Co with Staff for Admin and Supply.	2,310	6.3		
Tk Co.....	1,040	2.9		
Assault-gun Bn.....	6,780	18.6	As above.....	As above.
Bn Hq.....	770	2.1		
Bn Hq Co.....	1,090	3.0		
Assault-gun Btry.....	1,090	3.0		
Pz Gren Regt.....	14,330	39.3	By day, 15.4 m. p. h. (25 km. p. h.).	124-154 m. (200-200 km.)
Regtl Hq.....	210	0.6		
Regtl Hq Co.....	1,130	3.0	By night, 9.3-12.4 m. p. h. (15-20 km. p. h.).	
Inf How Co.....	1,120	3.0		
AA Co.....	1,070	3.0		
Pz Gren Bn (armd).....	4,660	12.8	By day, 15.4 m. p. h. (25 km. p. h.).	154-186 m. (200-250 km.)
Bn Hq.....	530	1.4	By night, 9.3-12.4 m. p. h. (15-20 km. p. h.).	
Pz Gren Co (armd).....	880	2.4		
Hv Wpn Co (armd).....	1,070	2.9		
Pz Gren Bn (mtz).....	5,660	15.4	By day, 18.6 m. p. h. (30 km. p. h.).	154-186 m. (250-300 km.)
Bn Hq (mtz).....	550	1.5		
Pz Gren Co (mtz).....	1,180	3.2	By night, 12.4-15.4 m. p. h. (20-25 km. p. h.).	
Hv Wpn Co (mtz).....	1,070	2.9		
Pz Ren Bn.....	8,190	22.5	Same as for Pz Gren Bn (mtz). For troops in <i>Volkswagen</i> :	154-186 m. (250-300 km.) Units in <i>Volkswagen</i> up to 217 m. (350 km.).
Ren Bn Hq.....	210	0.6		
Armd Car Co.....	1,310	3.6	By day, 21.7-24.85 m. p. h. (35-40 km. p. h.).	
Ren Co (mtz).....	1,420	3.9		
Hv Wpn Co.....	1,530	4.2	By night, 15.4-18.6 m. p. h. (25-30 km. p. h.).	
Light Ren Clm.....	330	0.9		

Type of Unit	Length of column in yards at 12.4 m. p. h. (20 km. p. h.)	Time length of column in minutes at 12.4 m. p. h. (20 km. p. h.)	Speed on the march in good weather on good roads	Distance covered in 24 hours
AT Bn.....	3,010	8.4	Same as for Tk Bn, Pz Gren Bn (armd), or Pz Gren Bn (mtz) respectively, according to type of equipment used in unit.	
AT Bn Hq.....	600	1.7		
AT Co.....	1,090	3.0		
Armd Arty Regt.....	17,830	48.9	Same as for Tk Bn or Pz Gren Bn (mtz) respectively, according to equipment.	
Arty Bn.....	5,250	14.4		
Arty Bn Hq.....	440	1.2		
Arty Bn Hq Btry.....	1,090	3.0		
Arty Btry.....	1,090	3.0		
AA Bn.....	6,020	16.5	Same as for Pz Gren Bn (armd) or Pz Gren Bn (mtz) respectively, according to equipment.	
AA Bn Hq.....	770	2.1		
Hq Btry.....	1,090	3.0		
AA Btry.....	1,090	3.0		
Light AA Clm.....	330	0.9		
Armd Sig Bn.....	3,720	10.2	Same as for Pz Gren Bn (armd) or Pz Gren Bn (mtz) respectively, according to equipment.	
Bn Hq.....	160	0.5		
Telephone Co.....	1,490	4.0		
Radio Co.....	1,440	4.0		
Light Sig Clm.....	330	0.9		
Armd Eng Bn.....	7,870	21.6	Same as for Pz Gren Bn (armd) or Pz Gren Bn (mtz) respectively, according to equipment.	
Bn Hq (with Ren Sec).....	1,090	3.0		
Armd Eng Co.....	1,310	3.6		
Bridging Clm "K".....	1,310	3.6		
Light Bridging Clm.....	980	2.7		

### RANGE OF GERMAN 150-MM HEAVY HOWITZER INCREASED BY 2,000 YARDS

A range increase of more than 2,000 yards is one of the advantages attained by the Germans in making several important changes in their 150-mm (5.9-in) heavy field howitzer *s. F. H. 18*. The maximum range of that weapon is 14,380 yards. The maximum range of the improved version, designated the *s. F. H. 18/40*, is 16,514 yards.

Both the *s. F. H. 18* and the *s. F. H. 18/40* apparently have the same carriage; however, the latter piece is longer and has a larger chamber, enabling a greater charge to be used. Charges 1 to 8 are

adjusted to give the same muzzle velocity and range as those of the *s. F. H. 18* but Charge 9 gives longer range. Both weapons fire the same projectiles. There is a *15-cm. s. F. H. 42* which may be *15-cm. s. F. H. 18/40* as finally adopted.

Detailed specifications of the *s. F. H. 18* were published in *TACTICAL AND TECHNICAL TRENDS*, No. 42, p. 14.

Data on the *s. F. H. 18/40* are as follows:

Actual caliber.....	149-mm (5.9-in.).
Over-all length of piece (including breech ring and muzzle brake).....	17 ft. 8¼ in.
Length of rifling.....	12 ft. 10½ in.
Direction of rifling.....	RH.
Length of chamber.....	19.92 in.
Capacity.....	601 cu. in.
Normal recoil.....	34.65 in.
Maximum permissible recoil.....	36.22 in.
Elevation.....	0° to 45°.
Traverse.....	50°.
Maximum range (Charge 9).....	16,514 yds.
Muzzle velocity (Charge 9).....	1,952 f/s.
Composition of Charge 9:	
Tubular diglycol base powder (Digl. R. P.— GI—(470 x 4.1/1.8 mm)),	15 lbs.
Igniter powder (Nz. Man. N. P. 1.5 x 1.5 mm).....	1.4 oz.

### GERMANS ABANDON MINEFIELD PATTERN PLANTING IN ITALY, USE MORE ANTIPERSONNEL MINES

German minefield tactics on the present Italian front are markedly different from their methods in the North African campaign. Principal changes have been the abandonment of pattern planting of minefields and the increased use of antipersonnel mines. In addition, belts and patches of antipersonnel mines are used to protect all forward positions.

Minefields in forward areas are invariably covered by fire, both artillery and small arms. It is reported that a recent German order directs that all machine gun emplacements are to be protected with antipersonnel mines.

For articles on the laying of minefields in the North African campaign, see *TACTICAL AND TECHNICAL TRENDS*, No. 1, p. 4; No. 13, p. 8; No. 19, pp. 10-13.

### NEW GERMAN RIFLE AND PISTOL AMMUNITION FOR SILENCED WEAPONS, SHARPSHOOTERS

A 7.92-mm rifle bullet for close-range work, which is almost noiseless when fired from a silencer-equipped weapon, is one of three new types of German small arms ammunition. The German designation of the round is *Gewehr-Nahpatrone*. Its muzzle velocity is reported as 985 f/s, which is less than the velocity of sound.

There is also a corresponding pistol cartridge for close shooting in silenced weapons. This cartridge is of the usual German army pistol caliber, 9-mm, but the bullet is 3-mm longer and slightly heavier than the ordinary pistol bullet.

The third new type of ammunition is a sniper's round, 7.92-mm, made especially to insure accurate shooting. Containers for this ammunition are marked "*fur Scharfschutzen geeignet*".

### CAPTURED ENEMY FIELD WIRE SUITABLE TO SUPPLEMENT U. S. STOCKS

Captured German wire and other signal equipment have often been found suitable for use in the U. S. Army communication systems. Numerous samples of enemy telephone wire, both German and Japanese, have been examined and, in general, it may be stated that both Germans and Japanese are now using field wire which is well made and satisfactory. However, both employ single-conductor assault wire, somewhat similar to Wire W-130-A, which is made without rubber or synthetic resin conductor insulation, and thus has inferior transmission characteristics when wet.

The Germans use single-conductor field wire with ground return, twisted pair field wire, and spiral-four rubber-jacketed cable, depending upon the tactical situation. They use more types of field wire than are standard in the U. S. Signal Corps, but these types are designed for special conditions whereas our wires are suitable for use in any part of the world. Reels of twisted pair, both assault and field type, are useful, but single-conductor type wire (red-insulated)

is of less value because its use involves laying two lines, and it is therefore more difficult to handle.

Sometime ago the Germans were obliged to forego the use of natural rubber insulation, and lately they have substituted aluminum conductors for copper. Like the U. S. Signal Corps, they also use polyvinyl chloride instead of rubber in some instances. Some samples of their PVC-insulated wire show markedly inferior electrical and physical properties when compared with the product of American wire manufacturers.

Experience has shown that, for voice frequencies, appropriate types of enemy wires may be substituted for our own with excellent results. Stocks of captured wire can be salvaged to supplement the supply of wires W-110-B and W-130-A, WC-548, etc.

Other German signal equipment which has been found useful includes German field switchboards, German field telephones and German pack reel units. The latter equipment provides a practical means of laying assault-type wire and also provides a level wind which facilitates recovery.

## NOMENCLATURE OF GERMAN ARMORED VEHICLES AND SELF-PROPELLED WEAPONS

Nomenclature of German armored vehicles and self-propelled guns has undergone a considerable change during the course of the war. Only the basic system of designation has remained constant. In this system, a vehicle is assigned a number (usually three digits) following the abbreviation *Sd. Kfz.* (*Sonderkraftfahrzeuge*, or special motor vehicle). This designation does not indicate the purpose or nature of the vehicle, but merely gives it a convenient reference number in the list of all German special motor vehicles.

Additional designations indicating the type and function of the vehicle itself are employed. The principal additional designations are as follows.

<i>Abbreviation</i>	<i>Meaning</i>
<i>Pz. Kpfw.</i> , followed by a Roman numeral or a name.	<i>Panzerkampfwagen</i> (armored fighting vehicle), a tank. The current abbreviation was adopted to avoid the confusion of the old abbreviation <i>Pz. Kw.</i> with <i>Pkw.</i> ( <i>Personenkraftwagen</i> , personnel carrier.) The numeral or name may be followed by letters to indicate modifications of the original model.

### *Abbreviation*

### *Meaning*

<i>Gw.</i> , followed by a Roman numeral and the designation of the gun carried, the name of the gun being modified by <i>Sf.</i> , which stands for <i>Selbstfahr</i> meaning self-propelled, formerly <i>Selbstfahrlafette</i> , ( <i>Sfl.</i> ), meaning self-propelled carriage.	<i>Geschützwagen</i> (gun carrier), a motor gun carriage for mounting a field piece, a self-propelled artillery carriage. This designation refers to vehicles with a tank chassis converted by moving the engine and accessories forward to provide a fighting compartment in the rear, as contrasted with earlier types in which the weapon was mounted on a cut-down but otherwise unmodified tank chassis.
<i>Pz. Jäg.</i> , followed by Arabic numeral and designation of AT weapon carried.	<i>Panzerjäger</i> (tank hunter), a motor gun carriage armed with an antitank gun, a self-propelled tank destroyer. This designation refers to standard tank carriages on which substantial modifications have been made.
<i>Stu. G.</i> , followed by qualifying designation.	<i>Sturmgeschütz</i> , a motor gun carriage armed with an assault gun. These are turretless tank chassis with a gun mounted in the hull to give a low silhouette and frontal fire with limited traverse. The armament is usually a <i>Sturmkanone</i> ( <i>Stu. K.</i> , assault-gun).
<i>Stu. H.</i> , followed by qualifying designation.	<i>Sturmhaubitze</i> , an assault howitzer; similar to assault-gun; also sometimes referred to as <i>Sturmgeschütz</i> .
<i>Pz. Sp. Wg.</i> , with various suffixes and prefixes.	<i>Panzerspähwagen</i> (armored scout vehicle), armored car or scout car.
<i>Schtz. Pz. Wg.</i> , with qualifying designation.	<i>Schützen Panzer Wagen</i> , a half-tracked armored personnel or weapons carrier.

In the case of tanks, the designation of the complete unit of gun and vehicle is the same as for the vehicle. Weapons mounted on motor gun carriages (except for assault guns) bear the normal weapon designation. Complete units of weapon and carriage are designated in various ways. Usually the weapon designation is given first, followed by *Sf.*, (*Selbstfahr*, or self-propelled), and then followed by the designation of the motor gun carriage. Thus the standard 150-mm field howitzer, self-propelled, is designated *15-cm. s. F. H. 18/1 (Sf.) auf Gw. III/IV* or (shorter form) *s. F. H. 18/1 (Sf.) Gw. III/IV*. The long form for designation of the carriage is *Gw. III/IV für 15-cm. s. F. H. 18/1 (Sf.) (Sd. Kfz. 124)*. The gun itself may be referred to simply as the *s. F. H. 18/1 (Sf.)*, and the carriage as the *Gw. III/IV/s. F. H. 18/1 (Sf.)*.

Tank destroyers follow the same system, but may omit the *Sf.* Names of insects or animals are sometimes applied to complete units. However, the above table by no means covers all terms that may be

applied to motor gun carriages. In view of the lack of consistency, even in official German documents, and because of the constant change which nomenclature of armored and self-propelled vehicles is continually undergoing, the following table is offered as a partial guide to the designations of the complete gun-vehicle units of the more common tanks, armored cars, and self-propelled weapons. The table is arranged by *Sonderkraftfahrzeug* numbers, where they exist and are known.

Sd. Kfz. No.	Designation of Complete Unit	Explanation
6	3.7-cm Flak 18 u. 36 (Sf.)	37-mm antiaircraft on 5-ton half track.
7	2-cm Flakvierling 38 (Sf.)	Quadruple 20-mm antiaircraft on 8-ton half track.
10	2-cm Flak 30 u. 38 (Sf.)	20-mm antiaircraft on one-ton half track.
101	Pz. Kpfw. I	Light tank ("B" is model most used; 5.7 tons, armed with 2 7.92-mm machine guns).
111	gp. Mun. Schlepper	Ammunition tractor on <i>Pz. Kpfw. I</i> A or B chassis.
121	Pz. Kpfw. II	Light tank ("F" is model most used; 10 tons, with 2-cm <i>Kw. K. 30</i> or <i>38</i> and a coaxial 7.92-mm machine gun).
122	Pz. Kpfw. II (Fw)	Believed to be a flame throwing ( <i>Flammenwerfer</i> ) light tank converted from <i>Pz. Kpfw. II</i> models D and E; probably not now in use.
123	Pz. Sp. Wg. II (Luchs)	New reconnaissance vehicle (the Lynx) utilizing a <i>Pz. Kpfw. II</i> chassis, armed with a 2-cm <i>Kw. K. 38</i> .
124	Wespe (le. F. H. 18/2 (Sf.) auf Gw. II).	105-mm self-propelled howitzer ( <i>Pz. Kpfw. II</i> chassis converted to S. P. carriage for the 10.5-cm <i>le. F. H. 18/2</i> and known as the "Wasp").
(?)	Gw. II (Mun)	Ammunition tractor on rebuilt <i>Pz. Kpfw. II</i> chassis.
131	7.5-cm Pak 40 auf Pz. Jäg. II Ausf. A-C u. F.	75-mm self-propelled tank destroyer ( <i>Pz. Kpfw. II</i> chassis models A to C and F with 5 bogies converted to S. P. carriage for the 7.5-cm <i>Pak 40</i> ).
132	7.62-cm Pak 36 (r) auf Pz. Jäg. II Ausf. D u. E.	76.2-mm self-propelled tank destroyer ( <i>Pz. Kpfw. II</i> chassis models D and E with 4 bogies touching top and bottom of track, converted to S. P. carriage for the former Russian 7.62-cm <i>Pak 36 (r)</i> ).
135	7.5-cm Pak 40/1 auf Pz. Jäg. Lr. S.	75-mm self-propelled tank destroyer (French Lorraine tractor chassis converted to S. P. carriage for the 7.5-cm <i>Pak 40</i> ).
135/1	15-cm lg. s. F. H. 13/1 auf Gw. Lr. S.	150-mm self-propelled field howitzer (French Lorraine tractor chassis converted to S. P. carriage for the obsolete 15-cm <i>s. F. H. 13</i> used in World War I).
(?)	Pz. Kpfw. 38 (t)	Light tank of 1938 Czech design with 1 37-mm gun and 2 machine guns; models A-G and S.
138	7.5-cm Pak 40/3 auf Pz. Jäg. 38.	75-mm self-propelled tank destroyer (former Czech light tank chassis <i>Pz. Kpfw. 38 (t)</i> converted to S. P. carriage for the 7.5-cm. <i>Pak 40</i> ).

Sd. Kfz. No.	Designation of Complete Unit	Explanation
138/1	s. I. G. 33/1 (Sf.) auf Gw. 38.	150-mm self-propelled infantry howitzer (former Czech light tank chassis <i>Pz. Kpfw. 38 (t)</i> converted to S. P. carriage for the heavy infantry howitzer, <i>s. I. G. 33</i> ).
139	7.62-cm Pak 36 (r) auf Pz. Jäg. 38.	76.2-mm self propelled tank destroyer (former Czech light tank chassis <i>Pz. Kpfw. 38 (t)</i> converted to S. P. carriage for the former Russian 7.62-cm. <i>Pak 36 (r)</i> ).
140	2-cm Flakpanzer 38	Antiaircraft tank (former Czech light tank chassis <i>Pz. Kpfw. 38 (t)</i> mounting a 2-cm <i>Flak 38</i> ).
140/1	Aufkl. Pz. Wg. 38	Reconnaissance tank ( <i>Aufklärungspanzerwagen 38</i> ) former Czech light tank chassis <i>Pz. Kpfw. 38 (t)</i> armed with a 2-cm <i>Kw. K. 38</i> ).
(?)	Berge Pz. Wg. 38	Armored tank recovery vehicle based on the former Czech tank chassis <i>Pz. Kpfw. 38 (t)</i> .
141	Pz. Kpfw. III Ausf. A-D, u. F-H.	Lighter models of the medium tank (Models A-D being armed with a 3.7-cm gun and 2 machine guns; Models F-H, with a short 5-cm <i>Kw. K. 38</i> , 42 calibers in length, and 2 machine guns).
141/1	Pz. Kpfw. III Ausf. I, J, L, M, N.	Medium tank (Models I, J, L, M, N, are ones now in use; 22 tons, two 7.92-mm machine guns, and 1 long 5-cm <i>Kw. K. 39</i> , 60 calibers in length, or 1 short 7.5-cm <i>Kw. K. 38</i> , 24 calibers in length).
141/2	Pz. Bef. Wg. III	Command tank modified from the <i>Pz. Kpfw. III</i> and fitted with dummy main armament.
141/(?)	Pz. Kpfw. III (Fw.)	Probable designation of flame throwing <i>Pz. Kpfw. III</i> tank.
142	7.5-cm Stu. G. (L/24)	75-mm assault gun ( <i>Pz. Kpfw. III</i> chassis armed with short <i>Kw. K. 38</i> , 24 calibers in length).
142/1	7.5-cm Stu. G. 40 (L/43) oder (L/48).	75-mm assault gun ( <i>Pz. Kpfw. III</i> chassis mounting the 7.5-cm <i>Stu. K. 40</i> of either 43 or 48 calibers in length; the gun is modified from the 7.5-cm <i>Kw. K. 40</i> ).
142/2	10.5-cm Stu. H. 42 (L/28)	105-mm assault howitzer ( <i>Pz. Kpfw. III</i> chassis armed with assault version of its <i>le. F. H. 18</i> known as the 10.5-cm <i>Stu. H. 42</i> of 28 calibers; sometimes called a <i>Sturmgeschütz</i> ).
143	Pz. Beob. Wg. III	Mobile observation post modified from <i>Pz. Kpfw. III</i> and fitted with dummy main armament.
(?)	Pz. Bef. Wg. III	Command tank modified from <i>Pz. Kpfw. III</i> and armed with a 5-cm <i>KwK 38</i> .
(?)	Berge Pz. Wg III	Armored tank recovery vehicle based on <i>Pz. Kpfw. III</i> chassis.
161	Pz. Kpfw. IV A, B, C, D, E.	Medium tank (Models A, B, C, D, E), 22-23 tons, armed, with 2 7.5-cm <i>Kw. K. 38</i> , 24 calibers in length.

Sd. Kfz. No.	Designation of Complete Unit	Explanation
161/1	Pz. Kpfw. IV F and possibly G.	Medium tank (most common models of <i>Pz. Kpfw. IV</i> , with 2 7.92-mm machine guns and a long 7.5-cm <i>Kw. K. 40</i> of 43 calibers in length).
161/2	Pz. Kpfw. IV H	Medium tank (latest version of <i>Pz. Kpfw. IV</i> armed with 2 7.92-mm machine guns and a long 7.5-cm <i>Kw. K. 40</i> , 48 calibers in length).
162	7.5-cm Pak 39 auf Pz. Jäg. IV.	75-mm tank destroyer ( <i>Pz. Kpfw. III</i> chassis combined to form S. P. carriage for the 7.5-cm Pak 39, 48 calibers in length).
(?)	Pz. Kpfw. IV (3.7-cm Flak 37) (possibly 3.7-cm <i>Flak Pz. IV</i> ).	<i>Pz. Kpfw. IV</i> medium tank chassis armed with a 37-mm antiaircraft gun (3.7-cm <i>Flak 37</i> ).
(?)	Designation of complete unit unknown; motor carriage designated <i>Stu. G. IV für 7.5 Stu. K. 40 (L/48)</i> .	75-mm assault gun ( <i>Pz. Kpfw. IV</i> chassis armed with the 7.5-in <i>Stu. K. 40</i> , 48 calibers in length).
(?)	Pz. Beob. Wg. IV	Mobile observation post based on the medium tank <i>Pz. Kpfw. IV</i> .
(?)	Gw. III/IV (Mun.)	Ammunition tractor made from parts of <i>Pz. Kpfw. III</i> and <i>IV</i> chassis.
164	Hornisse (Hornet) (8.8-cm Pak 43/1 auf Pz. Jäg. III/IV (Now known as <i>Nashorn</i> (Rhinceros)).	88-mm self-propelled tank destroyer (Parts of the <i>Pz. Kpfw. III</i> and <i>IV</i> chassis converted to S. P. carriage for the 8.8-cm Pak 43).
165	Hummel (Bumble Bee) (s. F. H. 18/1 (Sf.) auf Gw. III/IV).	150-mm self-propelled field howitzer (Parts of the <i>Pz. Kpfw. III</i> and <i>IV</i> tank chassis converted to form S. P. carriage for the field howitzer 15-cm s. F. H. 18).
166	Brumbär (Grizzly Bear (15-cm Stu. Pz. 43).	150-mm assault howitzer known as the 15-cm <i>Sturmpanzer 43</i> ( <i>Pz. Kpfw. IV</i> chassis converted to form S. P. carriage for the heavy infantry howitzer 15-cm s. I. G. 33 modified and redesignated 15-cm <i>Stu. H. 43</i> ).
171	Pz. Kpfw. Panther	Heavy tank, formerly designated <i>Pz. Kpfw. V</i> . (50 tons, armed with 1 7.92-mm machine gun and a very long 7.5-cm <i>Kw. K. 42</i> , 70 calibers in length). The <i>Sd. Kfz.</i> number when armed with the 7.5-cm <i>Kw. K. 43</i> is not known).
173	8.8-cm Pak 43/3 auf Pz. Jäg. Panther.	88-mm self-propelled tank destroyer ( <i>Panther</i> chassis armed with the 8.8-cm Pak 43/3).
(?)	Pz. Bef. Wg. Panther	Command tank modified from the <i>Panther</i> ; believed to carry the usual main armament.
(?)	Berge Pz. Wg. Panther (Zg. Kw. 35t).	Armored tank recovery vehicle based on the <i>Panther</i> chassis.
181	Pz. Kpfw. Tiger	Heavy tank, formerly designated <i>Pz. Kpfw. VI</i> (weight approximately 60 tons; armed with modified antiaircraft guns 8.8-cm <i>Flak 18</i> and 36 redesignated 8.8-cm <i>Kw. K. 36</i> , with length of 56 calibers; 2 7.92-mm machine guns).
182	Pz. Kpfw. Tiger	Heavy tank. (Believed to be Model H; armed with 8.8-cm <i>Kw. K. 43</i> , 71 calibers in length).

Sd. Kfz. No.	Designation of Complete Unit	Explanation
184	8.8-cm Pak 43/2 auf Ferdinand (Pz. Jäg. Tiger P) (now known as <i>Elefant</i> ).	88-mm self-propelled tank destroyer (unsuccessful <i>Tiger</i> chassis designed by Dr. Ferdinand Porsche, armed with the 8.8-cm Pak 43/2).
(?)	Ferdinand (8.8-cm Stu. K. 43/1).	88-mm assault gun (unsuccessful <i>Tiger</i> chassis designed by Dr. Ferdinand Porsche, armed with a modified 8.8-cm Pak 43/1).
186	12.8-cm Pak 44 auf Pz. Jäg. Tiger.	128-mm self-propelled tank destroyer (modified <i>Tiger</i> chassis mounting the 12.8-cm Pak 44).
(?)	Pz. Bef. Wg. Tiger	Command tank modified from the <i>Pz. Kpfw. Tiger</i> , and armed with a 8.8-cm <i>Kw. K. 43</i> , 71 calibers in length.
221	le. Pz. Sp. Wg. (MG)	Light 4-wheeled armored car (1 7.92-mm MG).
222	le. Pz. Sp. Wg. (2-cm)	Light 4-wheeled armored car (20-mm gun and 7.92-mm MG).
223	le. Pz. Sp. Wg. (Fu)	Light 4-wheeled armored car, radio model (1 7.92-mm MG).
231	s. Pz. Sp. Wg. (6 Rad)	6-wheeled armored car (20-mm gun and MG).
	s. Pz. Sp. Wg. (8 Rad)	8-wheeled armored car (20-mm gun and 7.92-mm MG).
232	s. Pz. Sp. Wg. (Fu) (6 Rad).	6-wheeled armored car (20-mm gun and 7.92-mm MG) with overhead frame aerial.
	s. Pz. Sp. Wg. (Fu) (8 Rad).	8-wheeled armored car (20-mm gun and 7.92-mm MG) with overhead frame aerial.
233	Pz. Sp. Wg. (2-cm) (8 Rad).	
234/1	s. Pz. Sp. Wg. (8 Rad) (7.5-cm).	Turretless 8-wheeled armored car mounting a short tank gun; 7.5-cm <i>Kw. K. 38</i> .
234/2	s. Pz. Sp. Wg. (8 Rad) (5-cm).	Turretless 8-wheeled armored car mounting a long tank gun 5-cm <i>Kw. K. 39</i> .
234/3	s. Pz. Sp. Wg. (8 Rad) (7.5-cm).	Turretless 8-wheeled armored car mounting a 75-mm gun.
247	s. Gp. Pkw	Armored staff car on chassis of 4- or 6-wheeled armored car.
250	le. Schtz. Pz. Wg	Basic designation of 1-ton armored half-track without special fittings.
250/1	le. Schtz. Pz. Wg	1-ton armored half track (infantry personnel carrier) with 5 men and driver, 2 MG 42 (1 mounted), submachine gun, radio.
250/2	le. Fe. Pz. Wg	1-ton armored half-track (signal vehicle for telephone equipment) with 3 men and driver, 1 mounted MG 42, 1 sub-machine gun, radio.
250/3 I	le. Fu. Pz. Wg	1-ton armored half track (signal vehicle for radio equipment) with 3 men and driver, 1 mounted MG 42, 2 sub-machine guns, radio.
250/3 II	le. Fu. Pz. Wg	1-ton armored half track (Signal vehicle for radio equipment) differs from <i>Sd. Kfz. 250/3 I</i> only in radio carried.
250/5	le. Beob. Pz. Wg	1-ton armored half track (mobile OP) with 3 men and driver, 1 mounted MG 42, 2 submachine guns, BC scope and aiming circle, radio.

Sd. Kfz. No.	Designation of Complete Unit	Explanation
250/5	le. Aufkl. Pz. Wg.-----	1-ton armored reconnaissance half-track (differs only from <i>le. Beob. Pz. Wg.</i> in radio carried).
250/6	le. Mun. Pz. Wg.-----	1-ton armored half-track ammunition carrier with 1 man and driver, 1 mounted <i>MG 42</i> , 1 submachine gun, radio.
250/7	le. Schtz. Pz. Wg. (Gr. W.).	1-ton armored half track carrying an 81-mm mortar, with 4 men and driver, 8-cm <i>Gr. W. 34</i> , 1 mounted <i>MG 42</i> , 2 submachine guns, radio.
250/8	le. Schtz. Pz. Wg. (7.5-cm).	1-ton armored half-track mounting a 75-mm gun, with 2 men and driver, 1 mounted <i>MG 42</i> , 2 submachine guns, radio.
250/9	le Schtz. Pz. Wg. (2-cm)---	1-ton armored half-track mounting a 2-cm <i>Kw. K. 38</i> , with 2 men and driver, 1 mounted <i>MG 34</i> or <i>42</i> , 2 submachine guns, radio.
250/10	le. Schtz. Pz. Wg. (3.7 Pak).	1-ton armored half-track mounting a 3.7-cm <i>Pak</i> , with 3 men and driver, 1 mounted <i>MG 34</i> or <i>42</i> , 2 submachine guns, radio.
250/11	le. Schtz. Pz. Wg. (s. Pz. B. 41).	1-ton armored half-track with 1 mounted 2.8-cm <i>s. Pz. B. 41</i> (28/20-mm tapered bore AT gun), 3 men and driver, radio.
250/12	le. Messtrupp-Pz. Wg.-----	1-ton armored half-track for flash- and sound-ranging unit with 2 to 4 men and driver, 1 mounted machine gun, flash and sound ranging equipment, radio.
251	m. Schtz. Pz. Wg.-----	Basic designation of 3-ton medium armored half-track without special fittings.
251/1	m. Schtz. Pz. Wg.-----	3-ton armored half-track (infantry personnel carrier), with 11 men and driver 1 mounted and 2 other <i>MG 42s</i> , 2 submachine guns, radio.
251/2	m. Schtz. Pz. Wg. (Gr. W.).	3-ton armored half-track carrying 7 men and driver, an 81-mm mortar (8-cm <i>Gr. W. 34</i> ), 1 mounted <i>MG</i> , 2 submachine guns, radio.
251/3 I	m. Fu. Pz. Wg.-----	3-ton armored half-track (signal vehicle for radio equipment), with 6 men and driver, 1 mounted <i>MG 42</i> , 2 submachine guns, radio.
251/3 II	m. Fu. Pz. Wg.-----	Differs from <i>Sd. Kfz. 251/3 I</i> only in radios carried.
251/3 III	m. Fu. Pz. Wg.-----	Differs from <i>Sd. Kfz. 251/3 I</i> only in radios carried.
251/3 IV	m. Fu. Pz. Wg. (Kdo. Wg.)-	3-ton armored CP (differs from <i>Sd. Kfz. 251/3 I</i> only in radios carried).
251/3 V	m. Pz. Fu. Wg.-----	Differs from <i>Sd. Kfz. 251/3 I</i> only in radios carried.
251/4	m. Schtz. Pz. Wg. (I. G. Mun.).	3-ton armored half-track ammunition carrier for infantry howitzer ammunition, with 6 men and driver, 1 mounted <i>MG 42</i> , submachine gun, radio.
251/5	m. Schtz. Pz. Wg. (Pi.)----	3-ton armored half-track for engineer equipment, with 8 men and driver, 2 <i>MG 42</i> (1 mounted), 2 submachine guns, engineer equipment, radio.

Sd. Kfz. No.	Designation of Complete Unit	Explanation
251/6	m. Kdo. Pz. Wg.-----	3-ton armored CP.
251/7 I	m. Pi. Pz. Wg.-----	3-ton armored half-track for engineers equipment, with 7 men and driver, 2 <i>MG 42s</i> (1 mounted), 2 submachine guns, engineer equipment, radio.
251/7 II	m. Pi. Pz. Wg.-----	Differs from <i>Sd. Kfz. 251/7 I</i> only in radio carried.
251/8 I	m. Kr. Pz. Wg.-----	3-ton armored half-track ambulance, with 1 man and driver, 1 mounted <i>MG 42</i> , 2 submachine guns, radio.
251/8 II	m. Kr. Pz. Wg.-----	differs from <i>Sd. Kfz. 251/8 I</i> only in radio carried.
251/9	M. Schtz. Pz. Wg. (7.5-cm)	3-ton armored half-track mounting a 75-mm gun (7.5-cm <i>K 37</i> ) ( <i>Sf.</i> ), with 2 men and driver 1 mounted <i>MG 42</i> , 2 submachine guns, radio.
251/10	m. Schtz. Pz. Wg. (3.7 Pak)	3-ton armored half-track mounting a 37-mm AT gun (3.7-cm <i>Pak</i> ), with 5 men and driver 1 mounted <i>MG</i> , 2 submachine guns, radio.
251/11	m. Fe. Pz. Wg.-----	3-ton armored half-track (signal vehicle for telephone equipment), with 4 men and driver, 1 mounted <i>MG 42</i> , 2 submachine guns, telephone equipment, radio.
251/12	m. Messtrupp-u-Ger.-Pz. Wg.	3-ton armored half-track for sound- and flash-ranging unit.
251/13	m. Schallausfn. Pz. Wg.---	3-ton armored half-track with sound measuring equipment.
251/14	m. Schallausw. Pz. Wg.---	3-ton armored half-track with sound calculating equipment.
251/15	m. Lichtausw. Pz. Wg.---	3-ton armored half-track with flash measuring equipment.
251/16	m. Flamm-Pz. Wg.-----	3-ton armored half-track for flame throwers, with 2 men and driver, 2 14-mm mounted flame throwers, 1 7-mm portable flame thrower, 1 mounted <i>MG 42</i> , 2 submachine guns, radio.
251/17	m. Schtz. Pz. Wg. (2-cm)---	3-ton armored half-track mounting a 20-mm gun, with 2 men and driver, 1 2-cm <i>Kw. K. 38</i> , 1 mounted <i>MG 42</i> intercom phones, radio.
251/19	m. Fe. Beob. Pz. Wg.-----	3-ton armored half-track (signal and observation vehicle, believed to be telephone message center).
260	Kl. Pz. Fu. Wg.-----	} Armored radio command cars, probably modified from 4-wheeled armored cars.
261	Kl. Pz. Fu. Wg.-----	
262	Pz. Fu. Wg. (6 Rad)-----	
263	Pz. Fu. Wg. (8 Rad)-----	6-wheeled turretless armored car used as command car, with overhead frame aerial and 1 7.92-mm <i>MG</i> .
265	Kl. Pz. Bef. Wg.-----	8-wheeled turretless armored car used as command car with overhead frame aerial and 1 7.92-mm <i>MG</i> .
266	} Pz. Bef. Wg.-----	Turretless <i>Pz. Kpfw. I</i> commander's tank armed with 1 7.92-mm <i>MG</i> .
267		
268		
311	Sprengstoffträger-----	Command tank modification of the <i>Pz Kpfw III</i> , fitted with dummy main armament and armed with 2 7.92-mm machine guns. Demolition vehicle.

Sd. Kfz. No.	Designation of Complete Unit	Explanation
(1)	7.5-cm Stu. G. 42 (L/71)	75-mm assault gun (carriage probably based on <i>Pz. Kpfw. IV</i> chassis; is armed with the 7.5-cm <i>Stu. G. 42</i> , the assault version of the Panther's 7.5-cm <i>Kw. K. 42</i> ).
(?)	<i>Pz. Kpfw. 39H</i> (f)	French Model 39 Hotchkiss tank.
(?)	7.5-cm Pak 40 auf. <i>Pz. Kpfw. 39 H</i> (f).	75-mm AT gun on French Model 39 Hotchkiss chassis.
(?)	10.5-cm. le. F. H. 18 auf <i>Pz. Kpfw. 39 H</i> (f).	105-mm field howitzer on French Model 39 Hotchkiss chassis.
(?)	Schwerer Wurfrahmen	Six 280/320-mm rocket launcher frames on a half track.
(?)	15-cm. <i>Pz. W. 42</i>	Self-propelled 10-barreled 150-mm rocket projector (armored half-track mounting the 15-cm. <i>Nb. W. 42</i> ( <i>Zehnlg</i> )).

<sup>1</sup> May be in either 14- or 16-series.

## INDEX

### Consolidated Index for Number 41 Through Number 50

Numbers following indexed items indicate first, the issue number; second, the pages

- ABBREVIATIONS, military, Japanese, 47: 46-48
- AERIAL PHOTOGRAPHS used in study of minefields, U. S., 42: 21-22
- AIRBORNE AT GUN, 28/20-mm, German (illus.), 45: 3, 5
- AIRBORNE TROOPS, German defense against, 45: 29
- AIRCRAFT:
- German:
- Heinkel (He) 177* bomber, 41: 1-2
- paratroop transport planes, 49: 23
- Japanese:
- identification, 41: 2-3
- trends in improvement of planes, 49: 42
- Tojo, Type 2 fighter (illus.), 44: 1-2; 46: 1
- Soviet:
- artillery observation and adjustment of fire, 44: 9-11
- grappling iron attached to plane for destroying communication lines (illus.), 42: 1-2
- AIR-GROUND COMMUNICATIONS, Japanese, 41: 2-3; (illus.), 49: 35-37
- AIR SUPPLY to troops in jungle, Japanese, 49: 36-37
- ALARM, trip-wire German (illus.), 45: 25-27
- ALPHABET, phonetic, German (illus.), 50: 22
- AMMUNITION (*see also* Bombs):
- flashless or smokeless powder, 47: 20-22
- German:
- AA gun, 128-mm, 50: 25
- AT, 42/28-mm (illus.), 49: 3, 4
- AT, 75-mm, penetration range, 46: 3
- disintegrating rotating bands for shells (illus.), 42: 30-33
- hollow-charge shells (illus.), 45: 33-35
- 150-mm (illus.), 42: 30-33; 45: 15, 17, 18, 19
- 105-mm (illus.), 42: 30-33; (illus.), 45: 33-35
- parachute flare (illus.), 44: 27-29
- rocket, 43: 16
- small arms, new types, 50: 33
- Italian illuminating projectiles, 46: 29-31
- Japanese:
- delayed-fuze, 20-mm, 43: 18
- inverted ball, 49: 24
- mortar barrage shell, 70-mm (illus.), 44: 3-7
- smokeless powder, 47: 20-22
- white phosphorus shell 75-mm (illus.), 49: 34-35
- wooden bullets, 49: 24-25
- United States cal. .30 M1 AP against Japanese armored shields, 49: 25-26

ANTI-AIRCRAFT MEASURES:

German:

- AA bombs, 42: 2-4
- AA gun ammunition, 128-mm, 50: 25
- armor penetration of AA guns, 41: 46, 47
- circular speed rule, 44: 7-8
- employment of AA by field forces, 41: 41-49
- multipurpose gun, 88-mm, 41: 45-46, 47
- searchlights allotted to AA units, 41: 48-49
- sight, pivoted ring, 41: 46; (illus.) 45: 1-3
- sight, telescopic, 41: 46

Japanese:

- AA batteries of Navy special landing forces, 43: 37
- AA bombs, 41: 32; 50: 14-16
- AA fire, 42: 4-9
- air-to-air parachute cable bomb (illus.), 50: 14-16
- guns:
  - 3-in naval, Model 10 (1921), 49: 1
  - 25-mm Pom Pom, Type 96, Model 2 (1942) (illus.), 48: 1-4
  - mortar shell, 70-mm (illus.), 44: 3-7
  - revetments for guns and searchlights (illus.), 44: 48-49
  - tactics, 42: 4-9

ANTITANK MEASURES:

German:

- AT company of infantry regiment, 42: 42
- grenade, hollow-charge (illus.), 44: 8; 47: 5-7
- guns:
  - 20-mm, 41: 6-8
  - 28/20-mm airborne (illus.) 45: 3, 5
  - 42/28-mm, 41: 25; 49: 3
  - 47-mm, Model 37, *Schneider*, 50: 29
  - 75-mm, ammunition penetration range, 46: 3
  - 76.2-mm, *Pak 36*, 50: 23-25
  - 88-mm, Model 1943, 45: 7
  - 88-mm multipurpose, 41: 45-46, 47
  - parallel bore, 48: 5
  - self-propelled, 48: 4-6
- instructions for firing against the U. S. M-3 tank (illus.), 41: 6-8
- mines, 49: 15; 50: 21-22
- remote controlled demolition vehicles, 49: 7
- spiked hollow charges, 50: 25
- stick bomb fired by 37-mm AT gun, 48: 22-24

Japanese:

- guns (illus.), 43: 1-5; 48: 35, 36-38, 47
- mines, 45: 28 (illus.), 48: 41-44, 45, 49
- obstacles (illus.), 48: 52-54
- organization of AT artillery, 48: 38-41
- tactics (illus.), 48: 35, 47-49
- tank hunting (illus.), 48: 44, 45-46, 48-49
- trends in improvement of weapons, 49: 42

ANTITANK MEASURES—Continued.

Soviet:

- AT guns vs. tanks, 41: 13-15
- AT rifle transported by, and operated from horseback (illus.), 42: 16-21
- instructions for attacking vulnerable parts of German *Pz. Kpfw. (Kw.)* 6, 47: 2-5

ARMORED FORCES (see also Assault guns; Tanks):

German:

- armored train (illus.), 42: 9, 10
- armor skirting on tanks, 42: 9, 11; 48: 12
- AT gun vs. tanks, 41: 13-16
- coating to protect armor against magnetic charges, 48: 12; 49: 9
- cooperation with infantry, 48: 9
- half-tracks, 47: 11
- heavy armored platoon employment, 47: 7-10
- infantry carried on armored vehicles, 46: 3-6
- nomenclature of armored vehicles and self-propelled weapons, 50: 34-42
- salvage of damaged tanks, 47: 10-11
- smoke sprayers on armored vehicles (illus.), 50: 16-19
- tactics, 47: 7-10; 48: 6-11
- tank trends, 41: 13-16; 49: 5-7
- time and space factors of armored units, 50: 30-31
- transport trailer (illus.), 41: 26-29
- wheel-cum-track observation vehicle (illus.), 45: 3, 5-7

ARMORED SHIELDS, Japanese (illus.), 49: 25-26

ARMORED SKIRTING on tanks, German, 42: 9, 11; 48: 12

ARTILLERY. See Antiaircraft measures; Antitank measures; Field artillery;

Howitzers; Mortars; Mountain weapons; Rockets and rocket weapons.

ASSAULT ARTILLERY, German (illus.), 41: 16-17; 48: 4-6, 9-11

BANGALORE TORPEDOES, 45: 28; 46: 12

BARGES, Japanese (illus.), 43: 9-14

"BLACK DRAGON" smoke signal, Japanese (illus.), 49: 39-41

BOMBS:

German:

- antiaircraft, 42: 2-4
- antipersonnel, *SD 10A* (illus.), 49: 27-28
- glider, 42: 2-4
- hollow-charge (illus.), 45: 35-37
- nose-rod for air bombs (illus.), 41: 32
- radio-controlled, 42: 2-3
- rocket projectiles, 42: 3-4
- stick (illus.), 48: 22-26

Japanese:

- AA, used against grounded aircraft, 41: 32
- aerial burst, 47: 1-2
- air-to-air parachute cable bomb (illus.), 50: 14-16
- HE, 50-Kg, Type 97 (illus.), 42: 27-30
- navigation marker bomb (illus.), 49: 33-34

BOOBY TRAPS:

German, 44: 13; 46: 36

Japanese, 45: 28-29

BOX MINES, German, 44: 13; 45: 20 (illus.), 21, 23-25; (illus.) 48: 17-19

BRUMBEAR, 150-mm SP assault howitzer, German (illus.), 41: 16-17; 48: 5

"BUMBLE BEE" (*Hummel*), 150-mm SP field howitzer, German (illus.), 42: 13-16; 48: 5

BUNKERS, stone, German (illus.), 47: 14, 15

BURMA, Japanese defensive tactics in, 47: 16-17

CAMOUFLAGE clothing, German (illus.), 45: 37-38

CANNON, machine, units, Japanese, 48: 38-39

CAVALRY, saddle packing, Soviet (illus.), 42: 16-21

CHEMICAL WARFARE (*see also* Flame throwers; Rockets and rocket weapons; Smoke):

Japanese:

- prussic acid gas grenade (illus.), 48: 44, 45
- white phosphorus shell 75-mm (illus.), 49: 34-35

CIRCULAR SPEED RULE, German, 44: 7-8

COASTAL DEFENSES at Munda, Japanese (illus.), 44: 39-49

COMMUNICATIONS. *See* Signal Corps.

COUNTERATTACK TACTICS:

- German, 46: 34
- Japanese, 44: 21-23

DEFENSIVE POSITIONS:

German:

- on the Voltorno River (map, illus.), 45: 46-52
- symbols (illus.), 50: 26-29

Japanese, on Munda (illus.), 44: 39-49

DELAYED-FUZE ammunition, Japanese, 43: 18

DELAYING ACTION tactics, German, 46: 22-28

DEMOLITIONS, German:

- methods of destroying one's own vehicles, 41: 34-35; 45: 13
- railway track destroyer (illus.), 45: 21, 22
- remote controlled demolition vehicle, Goliath (illus.), 49: 7-9

DEPLOYMENT of German paratroop platoon for an attack (illus.), 42: 24-26

DETECTORS, mine, German (illus.), 41: 22-25; 46: 11-12

DETONATORS:

- German, *J. Feder 504* delay (illus.), 44: 11-13
- Japanese, pressure (illus.), 47: 23-25

DITCHES, AT, Japanese (illus.), 48: 52-54

"DOLLY," 88-mm rocket projector, German (illus.), 49: 28-30

88-mm AT GUN, Model 1943, German, 47: 7

88-mm MULTIPURPOSE GUN, German, 41: 45-46, 47

88-mm ROCKET PROJECTOR, German (illus.), 49: 28-30

81-mm MORTAR, Type 99 (1939), Japanese (illus.), 41: 30-31

ENGINEERS (*see also* Booby traps; Demolitions; Fortifications; Grenades; Minefields; Mines):

German:

- detonator, *J. Feder 504*, delay (illus.), 44: 11-13
- explosive rivet, 41: 25
- pile drivers (illus.), 46: 12-22
- pile driving frame, field (illus.), 46: 12-15
- power saws (illus.), 47: 11-14
- trip-wire alarm (illus.), 45: 25-27

Japanese:

- Bangalore torpedo, 45: 28
- detonator, pressure (illus.), 47: 23-25
- Molotov cocktail, 48: 45-46
- rafts for river crossings, 49: 18

FIELD ARTILLERY (*see also* Antiaircraft measures; Antitank measures; Howitzers, Mortars; Mountain weapons; Rockets and rocket weapons):

German:

- assault weapons (illus.), 41: 16-17; 48: 4-6, 9-11
- field guns, 150-mm, four models (illus.), 45: 14-19
- field guns, 170-mm (illus.), 50: 1-6
- Italy, notes from operations in, 49: 9-11
- light mountain observation battalion, 48: 12-14
- multipurpose gun, 88-mm, 41: 45-46, 47
- railway gun, 280-mm (illus.), 50: 12-14
- roving guns, 46: 6-7
- self-propelled weapons (illus.), 41: 16-17; 42: 13-16; 48: 4-6, 9-11; 50: 34-42
- sound and flash ranging, 48: 13, 14

Japanese, tactics, 42: 12-13

raids on artillery batteries, Japanese, 44: 23-24

Soviet aircraft observation and adjustment of artillery fire, 44: 9-11

FLAME THROWERS on German *Pz. Kpfw. (Kw.) 3* (illus.), 45: 7-14

FLASHLESS POWDER, 47: 20-22

FLASH ranging, German, 48: 13, 14

FORTIFICATIONS, FIELD:

German:

- plan for battery position (illus.), 50: 10-11

- stone bunkers (illus.), 47: 14, 15

- symbols (illus.), 50: 26-29

Japanese defenses on Munda (illus.), 44: 39-49

42/28-mm AT TAPERED-BORE GUN, German, 41: 25; 49: 3-4

47-mm AT GUN, Model 1 (1941), Japanese (illus.), 43: 1-5; 48: 35-37, 47

47-mm AT GUN, Model 37, *Schneider*, German (illus.), 50: 29

GAS GRENADE, Japanese (illus.), 48: 44, 45

GENERAL LEE M-3 TANK U. S. (illus.), 41: 6-8

GLIDER BOMBS, German, 42: 2-3

GLIDERS, German, 49: 23

GOERLICH-principle guns. *See* Tapered-bore guns, German

"GOLIATH," German remote-controlled demolition vehicle (illus.), 49: 7-9

GRAPPLING IRON attached to planes for destroying communication lines,

Soviet (illus.), 42: 1-2

GRENADE LAUNCHER, rifle, Model 100, Japanese (illus.), 47: 22-23

GRENADES:

German:

- AT, hollow-charge (illus.), 44: 8; (illus.) 47: 5-7

- egg grenade used as booby trap, 44: 13

- illuminating rifle grenade (illus.), 49: 26-27

- improvised stick, 45: 27

- rifle propaganda grenade for distributing leaflets (illus.), 43: 14-16

Japanese:

- prussic acid gas (illus.), 48: 44, 45

- smoke signal, fired by grenade discharger (illus.), 49: 39-41

"GRIZZLY BEAR" (*Brumbear*), 150-mm SP assault howitzer, German (illus.),

41: 16-17; 48: 5

HEINKEL (*He*) 177 bomber, German, 41: 1-2

HOLLOW-CHARGE WEAPONS, German:

- bombs (illus.), 45: 35-37; 48: 22-24

- grenade, AT (illus.), 44: 8; (illus.), 47: 5-7

- shells, 105-mm (illus.), 45: 33-35

- spiked hollow charges, 50: 25

HOWITZER COMPANY of German infantry regiment, 42: 40  
HOWITZERS, German:  
75-mm mountain howitzer, Skoda (illus.), 46: 31-33  
100-mm Skoda (illus.), 43: 5-6  
150-mm heavy field howitzer s. *F. H. 18/40*, 50: 31-32  
150-mm SP assault, howitzer, *Brumbear* (illus.), 41: 16-17; 48: 5  
150-mm SP field howitzer, *Hummel* ("bumble bee") (illus.), 42: 13-16; 48: 5  
210-mm on carriage *Mrs. Laf. 18* (illus.), 50: 1-6  
ILLUMINATING SIGNALS:  
German illuminating rifle grenade (illus.), 49: 26-27  
Italian illuminating projectile, 46: 29-31  
INCENDIARY ROCKET, 320-mm, German (illus.), 49: 30-33  
INFANTRY (see also Howitzers; Machine guns; Mortars; Paratroops; Rifles):  
German:  
attack, signs of, 46: 28-29  
battalion, 42: 41, 43-47  
defense against airborne troops, 45: 29  
delay and withdrawal tactics, 46: 22-28  
fortifications for battery positions (illus.), 50: 10-11  
machine-gun company, 42: 43, 46, 47  
motorized, 46: 3-6  
positions, field order for construction of, 42: 26-27  
regiment, organization and armament, 42: 38-47  
rifle company, platoon, and squad, 42: 44-45, 46, 47  
Sicilian Campaign notes, 46: 34-36  
tactics, 45: 29-31  
Japanese:  
Amphibious Brigade, First, 49: 18-21  
countermeasures used against U. S. forces, 44: 21-23  
defensive tactics in Burma, 47: 16-17  
raiding parties for destroying artillery batteries, 44: 23-24  
regimental signal company, 46: 42-44  
Soviet tactics, 44: 24-27  
United States tactics, Japanese estimate, 44: 19-21  
ITALY:  
German defense of Volturno River line (map, illus.), 45: 46-52  
German field artillery tactics used in, 49: 9-11  
JUNGLE WARFARE:  
Japanese:  
air-ground communications (illus.), 49: 35-37  
countermeasures, 44: 21-23  
supply by air, 49: 36-37  
United States tactics as reported by Japanese, 44: 19-21  
LANDING BAGS for rations, Japanese (illus.), 48: 26-27  
LANDING CRAFT, Japanese (illus.), 43: 9-14  
LANDING FORCES, Navy, special, Japanese, 43: 31-38  
MACHINE CANNON UNITS, Japanese, 48: 38-39  
MACHINE GUN COMPANY, German, 42: 43, 46, 47  
MACHINE GUNS:  
German:  
7.92-mm *MG 43*, 47: 23  
7.92-mm *MG 42*, 42: 33-34  
Japanese:  
7.7-mm Model 97 (1937) (illus.), 43: 17-18  
13-mm AA/AT twin-barrel heavy machine gun, Model 92 (1932), 48: 36

MAGNETIC AT MINE, Japanese (illus.), 48: 43, 44  
MAPS, Japanese, how to read (illus.), 47: 29-54  
MEDICINE:  
German medical services, 45: 31-33  
"Scrub typhus," precautions against (illus.), 47: 18-19; 48: 22  
MILITARY SYMBOLS, German (illus.), 50: 26-29  
MINE DETECTORS, German (illus.), 41: 22-25; 46: 11-12  
MINEFIELDS:  
aerial photographs used in locating minefields, U. S. (illus.), 42: 21-22  
clearance, German, 46: 10-12  
German:  
marking, 41: 18; (illus.) 48: 17  
mine-laying methods, 41: 18; (illus.), 20, 21; 42: 22-23  
Sicilian Campaign, 46: 36  
tactics, change in, 50: 32  
Japanese AT mine-laying, 48: 49  
MINES:  
French antipersonnel 60-mm jumping mine used by Germans (illus.), 50: 8-10  
German:  
antitank economical mine, *R. Mi. 43* (illus.), 49: 15-18  
antitank mine T5 (illus.), 50: 21  
box mines, 44: 13; 45: 20 (illus.), 21, 23-25; (illus.), 48: 17-19  
concrete ball mine, 48: 16-17  
"mustard pot" antipersonnel mine (illus.), 50: 20-21  
Norwegian manufactured 42 (N) and AP 43 (N) mines (illus.), 45: 21-25  
ramp mine, improvised (illus.), 43: 7  
shell mines, improvised of French shell (illus.), 43: 7-9; 45: 20  
*Shu-mine 42* (illus.), 48: 17-19  
S-mines (illus.), 42: 23-24; (illus.) 44: 13-19; 46: 36; 47: 14, 16  
stick mine (illus.), 49: 12-13  
*Stockmine* (stake mine) (illus.), 41: 19-22  
*Tellermine* with stick booby trap, 49: 12  
wooden mines (illus.), 45: 21-25; 49: 12-13  
Italian antipersonnel mines used by Germans (illus.), 49: 13-14  
Japanese:  
anti-invasion or anti-boat mines (illus.), 48: 19-22  
antitank Model 93 (1933) land mine, 48: 41-42  
Dutch mushroom-top mine, 45: 28; (illus.) 48: 42-43  
magnetic AT mine (illus.), 48: 43, 44  
MOLOTOV COCKTAIL, Japanese, 48: 46-47  
MORTARS:  
German:  
120-mm, 44: 29  
smoke, or rocket projectors, *Nebelwerfer*, 45: 19-20; 46: 6-7  
Japanese:  
81-mm, Type 99 (1939) (illus.), 41: 30-31  
90-mm, improved (illus.), 50: 20  
90-mm, Type 94 (illus.), 41: 33-34  
shell, 70-mm barrage mortar (illus.), 44: 3-7  
MOTORIZED INFANTRY, German, 46: 3-6  
MOTOR VEHICLES. See Armored forces; Tanks.  
MOUNTAIN WARFARE, German:  
light observation battalion, 48: 12-14  
use of smoke, 48: 15

MOUNTAIN WEAPONS, German:  
gun, 75-mm (illus.), 46: 7-10  
howitzer, 75-mm Skoda (illus.), 46: 31-33  
MULTIPURPOSE GUN, 88-mm, German, 41: 45-46, 47  
MUNDA, New Guinea, Japanese defenses (illus.), 44: 39-49  
"MUSTARD POT" antipersonnel mine, German (illus.), 50: 20-21  
NAVAL 3-in AA GUN, Japanese (illus.), 49: 1-2  
NAVIGATION MARKER BOMB, Japanese (illus.), 49: 33-34  
NAVY SPECIAL LANDING FORCES, Japanese, 43: 31-38  
NEW GUINEA:  
Japanese tactics in, 44: 19-23, (illus.) 39-49  
90-mm MORTARS, Japanese (illus.), 41: 33-34; (illus.), 50: 20  
OBSERVATION BATTALION, mountain, German, 48: 12-14  
OBSERVATION VEHICLE, wheel-cum-track, German (illus.), 45: 3, 5-7  
OBSTACLES, AT, Japanese (illus.), 48: 52-54  
150-mm AMMUNITION, German (illus.), 42: 30-33; 45: 15, 17, 18, 19  
150-mm FIELD GUNS, German (illus.), 45: 14-19  
150-mm HOWITZERS, German (illus.), 41: 16-17; 42: 13-16; 48: 5; 50: 31-32  
150-mm ROCKET PROJECTOR German (illus.), 49: 11  
150-mm STICK BOMB fired by howitzer, German (illus.), 48: 24-26  
105-mm AMMUNITION, German (illus.), 42: 30-33; (illus.), 45: 33-35  
100-mm HOWITZER, Skoda, German (illus.), 43: 5-6  
170-mm FIELD GUN, German (illus.), 50: 1-6  
128-mm AA GUN AMMUNITION, German, 50: 25  
120-mm MORTAR, German, 44: 29  
ORDNANCE (see also Ammunition; Bombs; Grenades; and weapons):  
German:  
heating of vehicle coolant, 43: 16-17  
trailer, heavy transport (illus.), 41: 26-29  
Japanese trends in improvement of planes and guns, 49: 42-43  
PACK SADDLES, Soviet (illus.), 42: 16-21  
"PANTHER" TANK, German *Pz. Kpfw. (Kw.) 5*, 49: 5-7  
PAPER WORK, German officer's comment, 45: 42-43  
PARACHUTE BARRAGE SHELL for 70-mm mortar, Japanese (illus.), 44: 3-7  
PARACHUTE CABLE BOMB, air-to-air, Japanese (illus.), 50: 14-16  
PARACHUTE FLARES, German (illus.), 44: 27-29  
PARATROOPS:  
defense against, German, 45: 29  
German:  
deployment and formations for an attack (illus.), 42: 24-26  
standards, training, and equipment, 49: 22-24  
PHONETIC ALPHABET, German (illus.), 50: 22  
PHOTOGRAPHS, aerial used in study of minefields, U. S. 42: 21-22  
PHOTOPHONE, German (illus.), 48: 27-32  
PILE DRIVERS, German (illus.), 46: 12-22  
PILLBOXES:  
German, 46: 34-35  
Japanese (illus.), 44: 39-42  
POM POM AA GUN, 25-mm, Type 96, Model 2 (1942), Japanese (illus.), 48: 1-3  
POWDER, smokeless or flashless, 47: 20-22  
PROPAGANDA GRENADE, German rifle grenade for distributing leaflets (illus.), 43: 14-16  
QUARTERMASTER (see also Supplies):  
German SS camouflage jumper (illus.), 45: 37-38  
Japanese ration landing bags (illus.), 48: 26-27

RADIO-CONTROLLED BOMBS, German, 42: 2-3  
RADIO-CONTROLLED DEMOLITION VEHICLES, German (illus.) 49, : 7-9  
RADIOS:  
German:  
portable set (illus.), 44: 30-36  
radio-telephone (illus.), 43: 18-26  
transmitter, 5-watt, 45: 39-42  
Japanese, 46: 45-50  
RAFTS for river crossings, Japanese, 49: 18  
RAILWAY GUN, 280-mm German (illus.), 50: 12-14  
RAILWAYS:  
German armored train (illus.), 42: 9, 10  
Soviet restoration, 43: 26-27  
RAILWAY TRACK DESTROYER, German (illus.), 45: 21, 22  
RATION LANDING BAGS, Japanese (illus.), 48: 26-27  
REMOTE CONTROLLED demolition vehicle, German (illus.), 49: 7-9  
REVTMENTS, Japanese (illus.), 44: 48-49  
RIFLE GRENADE LAUNCHER, Model 100, Japanese (illus.), 47: 22-23  
RIFLE GRENADES. See Grenades.  
RIFLE COMPANY of Japanese Navy special landing forces, 43: 32, 34, 35  
RIFLE COMPANY, platoon, and squad, German, 42: 44-45, 46, 47  
RIFLE, German semiautomatic *Gewehr 43*, 47: 23  
RIVER CROSSINGS:  
German defense of Volturno River line (map, illus.), 45: 46-52  
Japanese use of rafts, 49: 18  
RIVETS, explosive, German, 41: 25  
ROCKETS AND ROCKET WEAPONS, German:  
ammunition, 43: 16  
AT rocket launcher, *Ofenrohr* ("stovepipe") (illus.), 46: 1-3  
incendiary rocket, 320-mm (illus.), 49: 30-33  
projectors:  
88-mm (illus.), 49: 28-30  
150-mm armored, *Panzerwerfer*, 49: 11  
smoke mortar or rocket projector, *Nebelwerfer*, 45: 10-20, 46: 6-7  
SADDLE PACKING, Soviet (illus.), 42: 16-21  
SAWS, POWER, German (illus.), 47: 11-14  
"SCRUB TYPHUS," precautions against (illus.), 47: 18-19 48: 22  
SEARCHLIGHTS:  
German allotment to AA units, 41: 48-49  
Japanese, revetments for, 44: 48-49  
SELF-PROPELLED ARTILLERY, German (illus.), 41: 16-17; 42: 13-16;  
48: 4-6; 50: 34  
7.92-mm MACHINE GUNS, German, 42: 33-34; 47: 23  
75-mm AT GUN AMMUNITION penetration range, 46: 3  
75-mm MOUNTAIN GUN, German (illus.), 46: 7-10  
75-mm MOUNTAIN HOWITZER, Skoda, German (illus.), 46: 31-33  
75-mm WP SHELL, Japanese (illus.), 49: 34-35  
70-mm MORTAR SHELL, Japanese (illus.), 44: 3-7  
76.2-mm AT GUN, *Pak 36*, German (illus.), 50: 23-25  
7.7-mm MACHINE GUN, Model 97 (1939), Japanese (illus.), 43: 17-18  
SHIELDS, armored, portable, Japanese (illus.), 49: 25-26  
SICILIAN CAMPAIGN, German methods and tactics, 46: 34-36  
SIGHTS, AA, German, 41: 4-6, 46; (illus.), 45: 1-3

## SIGNAL CORPS:

### German:

field wire, 50: 33-34  
illuminating rifle grenade (illus.), 49: 26-27  
parachute flares (illus.), 44: 27-29  
phonetic alphabet (illus.), 50: 22  
photophone (illus.), 48: 27-32  
radio, portable set (illus.), 44: 30-36  
radio-telephone (illus.), 43: 18-26  
telephone, wall (illus.), 49: 38-39  
transmitter, 5-watt, 45: 39-42  
trends in signal equipment, 46: 33-34  
Very pistol signals used by tank crew, 45: 13

Italian illuminating projectiles, 46: 29-31

### Japanese:

air-ground communications, 41: 2-3; (illus.), 49: 35-37  
"Black Dragon" smoke signal parachute grenade (illus.), 49: 39-41  
field wire, 47: 25-26; 50: 33-34  
methods of communications, 46: 44-51  
organization of signal services, 46: 39-44  
radio, 46: 45-50  
smoke signals, 49: 36, 39-41  
telephone and telegraph services, 46: 39, 40, 42, 45, 50  
telephone, sound-powered (illus.), 42: 35-36  
visual, 46: 50

SKODA WEAPONS, German (illus.), 43: 5-6; (illus.), 46: 31-33

SHÜ-MINE 42, German (illus.), 48: 17-19

S-MINES. *See* Mines, German.

SMALL ARMS ammunition, German: 50: 33

## SMOKE:

### German:

mortars, or rocket projectors, *Nebelwerfer*, 45: 19-20; 46: 6-7  
71 Smoke Regiment, organization and employment 45: 19-20  
sprayers on armored vehicles 45: 12; (illus.), 50: 16-19

### Japanese:

employment, 48: 14-16  
generator, Model 94 (1934) (illus.), 48: 45  
signals (illus.), 49: 36, 39-41  
white phosphorus shell, 75-mm (illus.), 49: 34-35

SMOKELESS POWDER, 47: 20-22

SOUND RANGING, German, 48: 13, 14

SS, Nazi Elite Guard, 41: 35-37; (illus.), 45: 37-38

STICK BOMBS, German (illus.), 48: 22-26

STICK MINES, German (illus.), 49: 12-13

"STOVEPIPE" (*Ofenrohr*), German AT rocket launcher (illus.), 46: 1-3

STOCKMINE (stake mine), German (illus.), 41: 19-22

## SUPPLIES, Japanese:

dropped by air, in jungle areas, 49: 35-37  
transported by barges, 43: 9-10, 13-14

## SYMBOLS, military:

German (illus.), 50: 26-29

Japanese, 47: 29-54

## TACTICS:

### German:

antiaircraft, 41: 41-49  
armored, 47: 7-10; 48: 6-11  
counterattack, 46: 34  
defense against airborne troops, 45: 29  
defense of Volturno River line (map, illus.), 45: 46-52  
delay and withdrawal, 46: 22-28  
field artillery, 46: 6-7; 49: 9-11  
infantry minor tactics, 45: 29-31  
motorized infantry, 46: 3-6  
Sicilian Campaign, 46: 34-36

### Japanese:

antiaircraft, 42: 4-9  
antitank, 48: 35, 47-52  
counterattack tactics used against U. S. forces, 44: 21-23  
defensive, in Burma, 47: 16-17  
field artillery, 42: 12-13  
raids on artillery batteries, 44: 23-24  
smoke, 48: 14-16

### Soviet:

aircraft adjustment of artillery fire, 44: 9-11  
tactics used against Germans, 44: 24-27  
tank, 41: 9-13; 45: 13-14

TANK-HUNTING (*see also* Antitank measures):

Japanese (illus.), 48: 44, 45-46, 48-49

TANKS (*see also* Armored forces):

### German:

armor skirting, 42: 9, 11; 48: 12  
coating to protect armor against magnetic charges, 48: 12; 49: 9  
flame-throwing (illus.), 45: 7-14  
nomenclature, 50: 34-42  
*Pz. Kpfw. (Kw.) 5*, "Panther," 49: 5-7  
*Pz. Kpfw. (Kw.) 4*, 42: 11; 45: 13-14; 48: 5; 49: 5-7  
*Pz. Kpfw. (Kw.) 6*, "Tiger," 41: 15; 47: 2-5; 49: 5-6  
*Pz. Kpfw. (Kw.) 3*, 42: 11; (illus.), 45: 7-14  
salvage of damaged tanks, 47: 10-11  
trends in developments, 41: 13-16; 49: 5-7

Japanese amphibious (new type) (illus.), 50: 6-8

United States General Lee M-3 (illus.), 41: 6-8

TAPERED-BORE GUNS, German, 41: 25; (illus.), 45: 3, 5; 46: 3; 49: 3-4

TELEPHONE AND TELEGRAPH communications:

### German:

field wire, 50  
radio-telephone (illus.), 43: 18-26  
transmitter, 45: 39-42  
wall telephone (illus.), 49: 38-39

### Japanese:

field wire, 47: 25-26; 50: 33-34  
signal services, 46: 39, 40, 42, 44, 45, 50  
sound-powered telephones (illus.), 42: 45-46

TELLERMINE with stick booby trap, German (illus.), 49: 12-13

320-mm INCENDIARY ROCKET, German (illus.), 49: 30-33  
 3-in NAVAL AA GUN, Japanese (illus.), 49: 1-2  
 13-mm AA/AT MACHINE GUN, heavy twin-barrel, Model 92 (1932), Japanese, 48: 36  
 37-mm AT GUN, Japanese, 48: 35, 36, 37, 47  
 37-mm STICK BOMB fired by 37-mm AT gun, German, 48: 22-24  
 "TIGER" TANK, German *Pz. Kpfw. (Kw) 6*, 41: 15; 47: 2-5; 49: 5-6  
 TIME AND SPACE factors of German armored units, 50: 30-31  
 TOJO, TYPE 2 FIGHTER plane, Japanese (illus.), 44: 1-2; 46: 1  
 TORPEDOES, Bangalore, 45: 28; 46: 12  
 TRACK-WHEEL OBSERVATION VEHICLE, German (illus.), 45: 3, 5-7  
 TRAILER, heavy transport, German (illus.), 41: 26-29  
 TRAIN, ARMORED, German (illus.), 42: 9, 10  
 TRANSMITTER, 5-watt, German, 45: 39-42  
 TRANSPORTATION:  
     German heavy transport trailer (illus.), 41: 26-29  
     Japanese, by barges (illus.), 43: 9-14  
     Soviet railroad restoration, 43: 26-27  
 TRIP-WIRE ALARM, German (illus.), 45: 25-27  
 28/20-mm AIRBORNE AT GUN, German (illus.), 45: 3, 5  
 25-mm "POM POM" AA GUN, Type 96, Model 2 (1942), Japanese (illus.), 48: 1-3  
 20-mm AT GUN, German, instructions for firing against U. S. M-3 tank, 41: 6-8  
 20-mm AT GUNS, Japanese, 48: 36, 38, 39, 47  
 280-mm RAILWAY GUN, German (illus.), 50: 12-14  
 210-mm HOWITZER, German (illus.), 50: 1-6  
 "TYPHUS, SCRUB," precautions against (illus.), 47: 18-19; 48: 22  
 UMPIRES, infantry, German, 45: 29-31  
 UNIFORMS, German camouflage jumper for SS troops (illus.), 45: 37-38  
 VEHICLES. *See* Armored forces; Tanks  
 VERY PISTOL SIGNALS used by tank crew, German, 45: 13  
 VOLTURNO RIVER, Italy, German defenses along (map, illus.), 45: 46-52  
 WAFFEN SS, Nazi Elite Guard, 41: 35-37; (illus.) 45: 37-38  
 WHEEL-CUM-TRACK OBSERVATION VEHICLE, German (illus.), 45: 3, 5-7  
 WIRE COMMUNICATIONS. *See* Signal Corps.  
 WITHDRAWAL tactics, German, 46: 22-28  
 WOODEN BULLETS, Japanese, 49: 24-25

*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).

