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WEAPONS FOR JUNGLE WARFARE

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WAR DEPARTMENT
WAR DEPARTMENT GENERAL STAFF
ORGANIZATION AND TRAINING DIVISION G-3
WASHINGTON

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WALNO 653.

21 June 1944.

MEMORANDUM FOR COLONEL SCHMAHL:

Subject: Manual on Weapons for Jungle Warfare.

1. Inclosed manual which was prepared as a result of a special mission by General W. A. Borden should be of general interest.
2. This should be called especially to Major Link's attention as it contains information which he requested me to get for him.
3. Attention is called to a recent change on page 86. The mount referred to is no longer of the same general type as the mount T9, as test has shown that the 81mm base plate is not heavy enough for the job.

W. H. VAN DINE
Lt Col, QMC

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Foreword

1 November 1943

Operations against the Japanese in the Pacific Theaters have demonstrated the urgent need for methods of destroying or dispersing their infantry employed in the jungle without the delays and difficulties now encountered.

On August 30, 1943, Col. W. A. Borden was detailed on a special mission by the Chief of Staff relative to the development of weapons for jungle warfare. After establishing procedures to be followed and directing development and procurement of certain equipment, he, with a group of five other officers, proceeded by air to SWPA and SPA to demonstrate the new items being proposed and to ascertain the views and requirements of the combat organizations. Col. S. B. Ritchie was designated to act for Col. Borden in his absence.

A study was made promptly of the types of bunkers used by the Japanese. Replicas were constructed at Aberdeen Proving Ground, Edgewood Arsenal, Fort Belvoir, Fort Pierce, Fort Bragg, Fort Benning, and near Ocala, Florida. For the latter, the Army Air Forces have selected a terrain which is as near duplicate of jungle terrain as could be found in this country. It is expected that, in addition to tests by the Air Forces, combined tests may be conducted in this area later. One of the difficult problems in jungle warfare is to locate bunkers and other enemy positions without suffering undue casualties. The development of instrumental and other means to facilitate location of the enemy in the jungle is being pursued vigorously.

Testing of standard equipment to determine its effectiveness against personnel in fox holes and in destroying bunkers, and to establish

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desirable modifications in this equipment, has gone forward as rapidly as possible along with the development and test of new items. This development work is still in progress and should terminate in the standardization through established military procedure of equipment found suitable and desirable, and manufacture and issue of the items with appropriate technical and tactical doctrines.

The use of standard weapons with increased firepower is stressed. Where improvements are made in existing equipment or where new items are introduced, maximum utilization is made of standard components readily available to simplify procurement and save time.

To withstand the peculiar weather conditions, more effective packaging and crating is being developed. Aerial delivery containers for safe and effective transport and delivery of jungle warfare items by air within the theaters are included in the program. The imperative need to keep weights to an absolute minimum for man packing is emphasized.

Reports from Col. Borden's mission indicate that many of the items which have been proposed are desired, and requisitions have already been received for most items submitted for test. Initial shipments to the Pacific Theaters have started. It is expected that a number of the items found suitable for jungle warfare will also have useful application in other theaters.

There follows a brief description of the items under consideration and the development projects under way. All agencies concerned have cooperated fully in making this undertaking a success.

S. B. Ritchie

S. B. RITCHIE
Colonel, Ordnance Department

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NOTE

In this book are listed only a few of the many standard items of equipment now being used or considered suitable for jungle warfare. It is assumed that such items as standard artillery and small arms, rifle and chemical grenades, standard smoke signals, demolition kits, bombs and communications equipment are known to the theaters.

It is realized that there is no substitute for artillery in providing fire power and considerable effort is being devoted to the development of satisfactory track laying prime movers to tow these pieces through the jungle. Basically, the commercial type slow speed tractor has been utilized, and is being provided with wider tracks, special grousers, pintles and lunettes, front mounted winches and special stowage arrangements to convert them into a military prime mover.

Extensive development has been undertaken to provide mortars with increased fire power. These mortars should provide necessary fire power during initial landings when conventional artillery is not available, and should offer considerably more effectiveness in overcoming prepared Japanese positions than the existing mortars of smaller calibers.

The illustrations reproduced in this volume are the latest available at the time of going to press. In most instances they are photographs of items under development which may differ considerably from the models finally accepted for production.

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CHEMICAL WARFARE SERVICE ITEMS

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GRENADE, HAND, SMOKE (WP), M15

This grenade is designed for laying smoke screens, and for incapacitating enemy personnel by means of severe and slow-healing burns caused by the white phosphorous filler of the grenade.

The M15 grenade is cylindrical in shape. It is $4\frac{1}{2}$ inches high, with a diameter of $2\frac{3}{8}$ inches. It consists essentially of a grenade body, a burster well, and a Fuze, Detonating, Hand Grenade, M6A3.

PRINCIPAL CHARACTERISTICS

| | |
|---------------------|---------------------|
| Height | $4\frac{1}{2}$ ins. |
| Diameter | $2\frac{3}{8}$ ins. |
| Weight, empty | 9 ozs. |
| Weight, loaded | 24 ozs. |
| Weight of WP filler | 15 ozs. |
| Range | 30 to 40 yds. |
| Duration of screen | 25 sec. |
| Radius of burst | 20 ft. |



GRENADE, HAND, SMOKE (WP) M15

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MORTAR, CHEMICAL, 4.2 INCH, M2A2

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The 4.2 Inch Chemical Mortar is a rifled, muzzle loading weapon. It can deliver high explosive shell by plunging fire with a demolition effect that is destructive to bunkers and field fortifications. It also utilizes chemical shell to lay smoke screens, and H.E. Shell with time fuze against personnel. Firing may be conducted at elevations of between 800 mils and 1,080 mils, with a right and left traverse of 150 mils each.

The Mortar, M2A2, consists of a barrel with a firing mechanism and shock absorbing mechanism; a base, plate equipped with collapsible (sliding) carrying handles on two sides, and a standard which supports the



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CHEMICAL MORTAR, 4.2", M2A2

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barrel when the weapon is in firing position. The standard is composed of a traversing mechanism, elevating screw, elevating wheel, shock absorber, spades, and connecting rods which fasten the standard spade parts to the base plate.

The mortar may be broken down and transported on a two-wheeled hand cart drawn by either two or four men, depending on the terrain; carried manually by its crew, or packed on mules. The weapon disassembles into three loads, consisting of the barrel, the base plate, and the standard.

PRINCIPAL CHARACTERISTICS

| | |
|-----------------------------|-------------------------|
| Weight of barrel..... | 100 lbs. |
| Weight of base plate..... | 150 lbs. |
| Weight of standard..... | 53 lbs. |
| Total weight..... | 305 lbs. |
| Elevation..... | 800 mils to 1,080 mils |
| Traverse (total)..... | 300 mils |
| Maximum range..... | 3,200 yds. - 4,400 yds. |
| Minimum range..... | 600 yards |
| Rate of fire-rapid..... | 20 rds. per minute |
| Rate of fire-sustained..... | 5 rounds per minute |

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SHELL, H.E., 4.2" CHEMICAL MORTAR, E53

This shell is for use in the 4.2" Chemical Mortar, M2A2. It is a streamlined projectile of the semi-fixed type. It is extremely effective against bunkers, pill boxes and other defense structures utilized in jungle warfare.

The E53 shell consists essentially of a shell body, a fuze, a TNT bursting charge, and a propelling charge composed of an ignition cartridge and a number of bundles of powder serving as the propellant. A point detonating instantaneous fuze, a time fuze, or a delay fuze can be employed with this shell.

The external dimensions of the E53 shell are the same as those of the standard 4.2" Shell, M3. The wall thickness of the E53 Shell is, however, .43" as compared to .225" for the M3.

The weight of the Shell, E53, empty, is 25.7 pounds. When loaded with its charge of 6.3 pounds of TNT filler, it weighs 32 pounds.



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SHELL, H.E. 4.2", E53, WITH FUZE, PROPELLANT AND IGNITER CARTRIDGE

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CHARGE, PROPELLING, 4.2" CHEMICAL MORTAR, E5

This charge consists of $20\frac{1}{2}$ bundles or increments. Each bundle is composed of two 60-grain, $2\frac{3}{4}$ " square sheets of .025 inch Ballistite. The $20\frac{1}{2}$ separate bundles are assembled as follows: five 1-bundle packets, three 5-bundle packets, and one $\frac{1}{2}$ -bundle sheet. The charge therefore actually comprises but three kinds of packets and nine pieces. The kinds may be clearly identified by their thickness and stitching. Using the subject charge, it is possible to fire the E53 shell to a maximum range of approximately 3,500 yards.

FUZE, T AND S.Q., E39 FOR SHELL, H. E., 4.2", M3

The E39 Fuze is a combination super-quick and 25 second-powder-train time fuze normally used with the 75 mm gun and howitzer and the 105 mm howitzer. The employment of a special adapter-booster with this fuze makes it function efficiently with the Shell, H.E., 4.2", M3, for time action or for super-quick detonation on impact.

The fuze consists of a closing-cap assembly, which carries the super-quick element; a concussion plunger for initiating the burning of the time train; a body which carries two brass time-train rings; an interrupter, and a black powder magazine charge. The rear portion of the body is threaded for assembly to the mating threads of the booster.

The time-train ring is graduated from 0 to 25 seconds, the graduations from 1 to 25 being in division of 0.2 second.

Safety features of the fuze include a firing pin support that will collapse only under the force of impact, and supports the firing pin at a safe distance from the detonator assembly; an interrupter which prevents super-quick action in the event that the super-quick detonator functions pre-

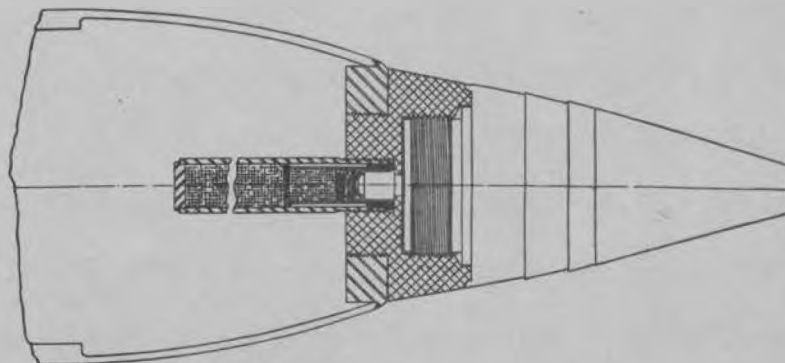
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maturely; a removable cotter pin which supports the plunger during transportation, thereby preventing firing of the concussion primer through accidental shearing of the shear pins; plunger shear-pins which restrain movement of the plunger after removal of the cotter pin until the shear pins are sewed as a result of set-back which enables both time rings to burn completely without igniting the base charge of the fuze; vent closing disks which prevent premature ignition of powder trains by chamber gases and seal them against moisture and a safety disk at the ignition end of the graduated-ring time train which, when the fuze is set at less than 0.4 second covers the body pellet and prevents its ignition by the graduated ring.

There is no selective setting provided for super-quick action, but, when desired, it is obtained by firing with the time train set at safe or with a time of burning which is surely in excess of time of flight. When fired for super-quick action, the nose of the fuze must impact on hard ground to insure functioning in the first and second zones. In the outer zone the fuze will function dependably on all types of ground or water impact.

The Adapter-booster is an assembly of a special aluminum adapter, lower detonator assembly of the Fuze, P.D., M46 or M47, and the booster from the C.W.S. 4.2" C. M. Fuze, M3. By means of this adapter - booster the E39 T and S.Q. Fuze can be assembled to the M3, H. E., 4.2". C.M. Shell without modification of fuze, shell or loading. These items are separate items of issue and are not issued as components of a complete round.



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FUZE, TIME AND SUPERQUICK, E39

~~CONFIDENTIAL~~ FUZE, P. D., DELAY, T89. ~~UNCLASSIFIED~~

This fuze is an impact type, single purpose, delayed action point detonating fuze similar in function to the M53 fuze used in the 81MM Mortar. It is intended for use with the M3 H.E., 4.2" Chemical Mortar Shell for producing a demolition effect by detonation of the H.E. charge after the projectile has penetrated the target. The delay interval between impact and detonation is .10 seconds. It is designed to be bore safe and to function on impact with the ground or water when fired in any zone of the 4.2" Chemical Mortar. The fuze is a component of the complete round and not a separate item of issue.

The fuze consists of the body, containing the booster, the slide assembly and detonator, and the slider locking device; the head, which contains the firing pin and the delay element; and the delay element with a primer, delay charge, and a "spitter" charge for firing the detonator in the slider.

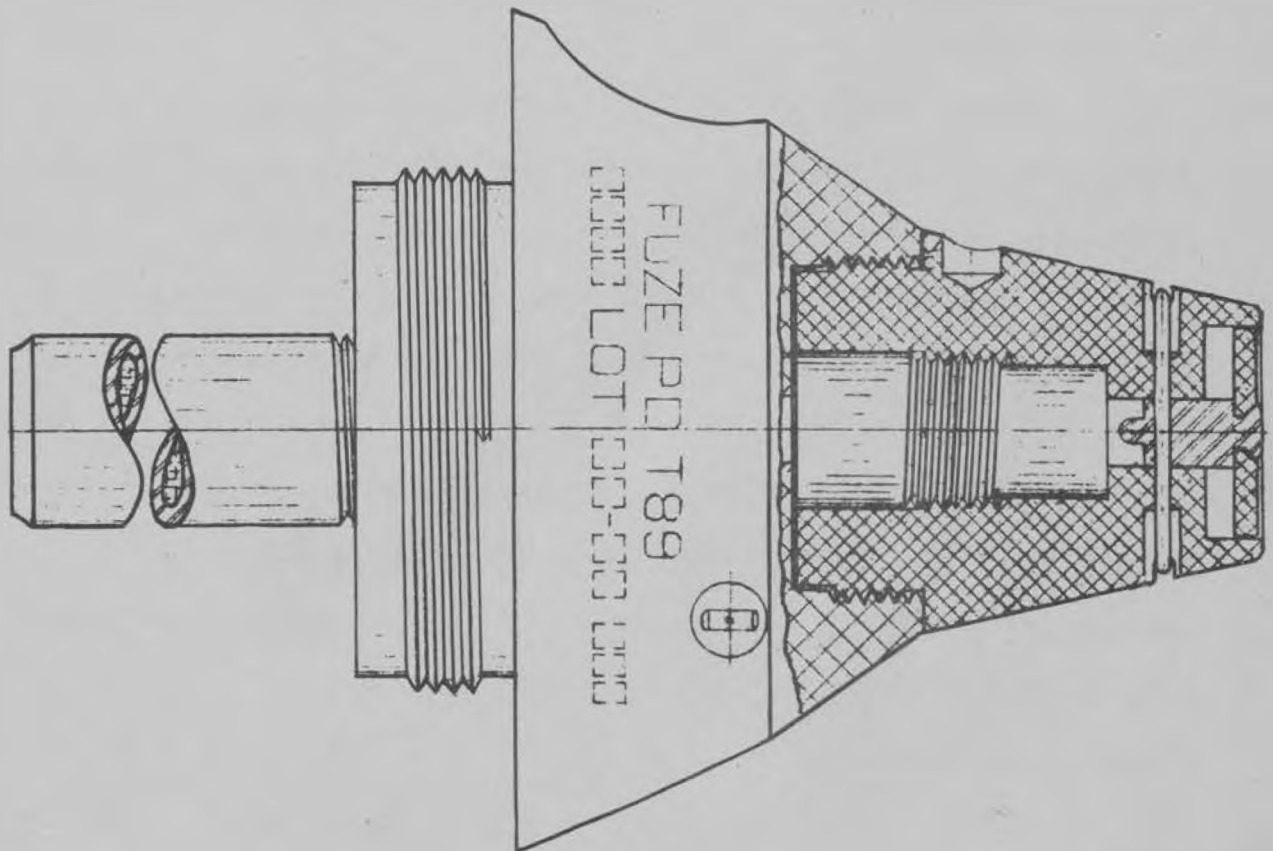
The firing pin is normally held rigidly in place by a shear wire in the nose of the fuze with the front of the pin a short distance above the primer in the delay element. The delay element is screwed into the fuze head so that the "spitter" charge lies directly above the position occupied by the detonator when the slider is in the armed position. The detonator is out of line with the delay element in the unarmed position, but, when the fuze is armed it occupies a position in line with the delay element and the booster.

Safety devices comprise the shear wire, which prevents motion of the firing pin towards the primer until a force equivalent to impact with a firing target has been applied to the nose of the fuze, and the positioning of the detonator out-of-line with the booster charge until the fuze has been armed, thus preventing functioning of the booster by chance action

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of the detonator. As further precautions, the slider is locked in place by a cotter pin and a set-back pin, and centrifugal force is required to arm the slider.

Upon impact, the nose of the fuze is crushed and the firing pin is forced down, severing the shear wire and finally contacting the primer in the delay element. The primer ignites the delay charge which, after burning for 0.10 seconds, ignites the "spitter" charge. A flame from the "spitter" charge is directed downward onto the detonator. The detonator then explodes and detonates the booster charge which, in turn, detonates the high explosive filling in the shell.



FUZE, P.D., DELAY, T89

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PACK, MULE, E7, FOR 4.2 INCH CHEMICAL MORTAR

Animal transport of the 4.2" Chemical Mortar is practicable by means of mules equipped with packs. The pack consists of the Saddle, Phillips, Pack, Cargo, to which have been welded strap metal adapters and hangers to accommodate the disassembled mortar with its ammunition, tools, and accessories.

The mortar is divided into two loads for transport, each load to contain the following items:

| Load No. 1 | Load No. 2 |
|---|---|
| Baseplate 159 lbs. | Barrel 101 lbs. |
| Shell, H.E., 4.2" (2 rds) ... 49 lbs. | Standard 52 lbs. |
| Adapters and Hangers <u>15 lbs.</u> | Tools and Accessories <u>75.5 lbs.</u> |
| 223 lbs. | 228.5 lbs. |

Ammunition for the mortar is carried in loads of either six or eight rounds per mule. For a six round load the shells in their original containers, three boxes, are slung as a 3-time load and lashed with a double diamond hitch. The weight is $188\frac{1}{2}$ pounds. Eight rounds per mule may be carried, using the original containers, four boxes slung as a 2-time load weighing 253 pounds, lashed with a double diamond hitch. Or the rounds may be removed from their containers, 8 rounds "MANTAED," and slung as a 2-time load, lashed with a single diamond hitch, and weighing 211 pounds.

Six mules to a platoon, two for the mortar and four for ammunition, permits a platoon going into action to carry 34 rounds.

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MULE PACK, E7, FOR 4.2" CHEMICAL MORTAR, LOAD NO. 1



MULE PACK, E7, FOR 4.2" CHEMICAL MORTAR, LOAD NO. 2

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PACK, MAN, E6, FOR 4.2 INCH CHEMICAL MORTAR, M2A2

When prepared for manual transport the 4.2" Chemical Mortar M2A2 is broken down into three loads consisting of the barrel, base plate, and the standard with spade and stakes. Tools and accessories, and ammunition, comprise two additional loads.

The barrel is carried by two men, each equipped with a single loop, cotton web, cross body shoulder strap. The barrel is suspended at the side of the men slightly below the waist level. It is supported by the shoulder straps, one strap being attached to each end of the barrel.

Two men carry the base plate in the manner of a litter by means of the extended metal carrying handles. Each pair of handles is supported by a cotton web strap which passes from one of them up in front of the carrier's shoulder, across the back of his neck, thence in front of his other shoulder and down to the other handle.

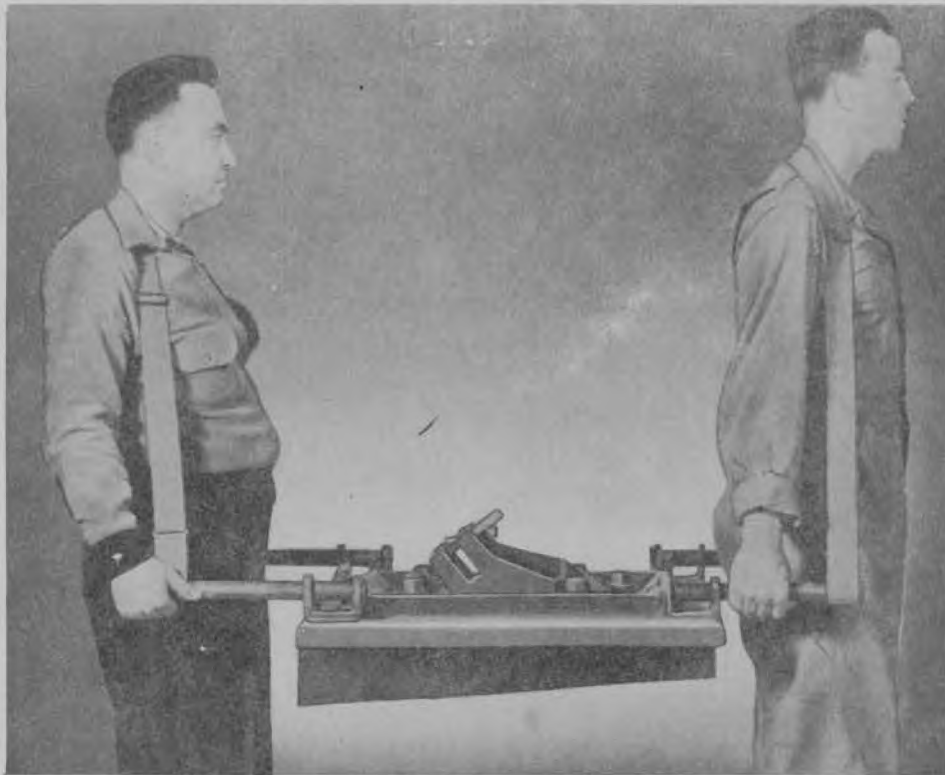
The standard, stakes and spade are carried by two men employing a plywood litter. The standard and spade are fitted into wooden slots on the top surface of the litter, where they are bolted into place with wing nuts. The three aiming stakes are suspended from the under side of the litter, held in a diagonal position by a single wooden slot furnished with wing nuts.

The tools, sand bags and other accessories, are carried by one man using a standard plywood pack board to which there is fitted a shallow plywood box with a hinged cover. The handle of the pick mattock is carried in wooden slots fastened to one side of the box.

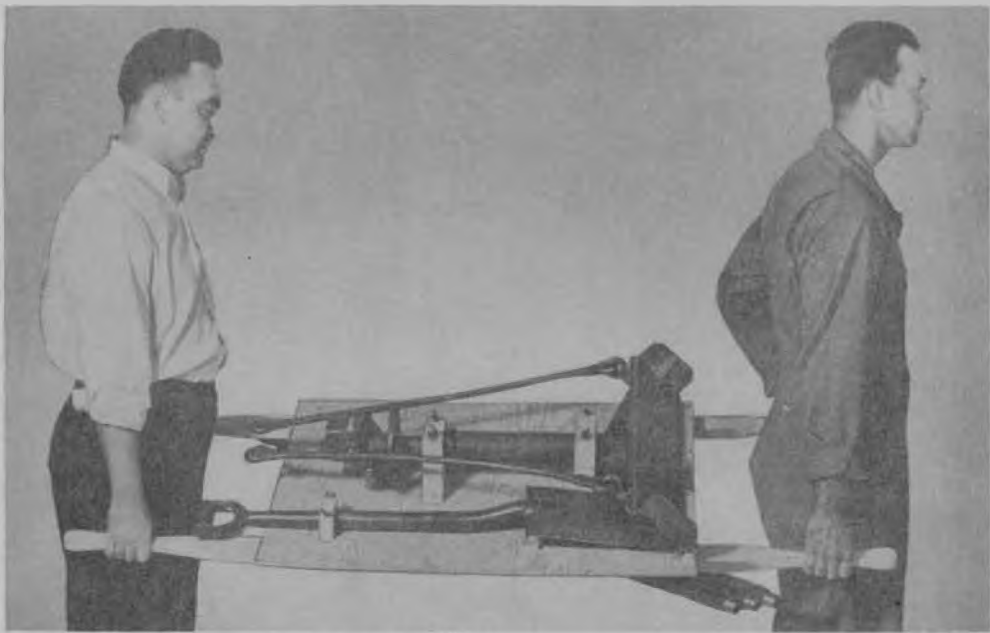
Two 4.2 inch Chemical Mortar Shells are carried by using the standard plywood pack board which is fitted with a plywood support and two cotton web straps. The frame and straps hold the shells in position while they are transported. The shells are packed in waterproof fibre containers.

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MAN PACK, E6, FOR 4.2" CHEMICAL MORTAR BASE PLATE

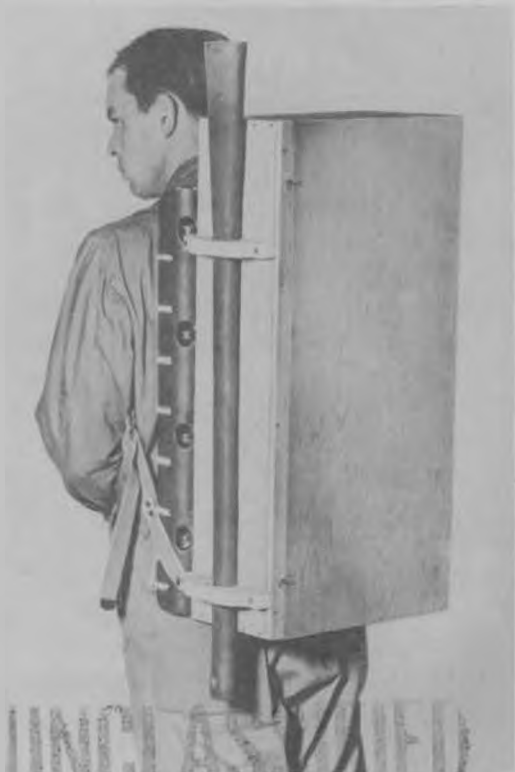


MAN PACK E6, FOR 4.2" CHEMICAL MORTAR STANDARD, STAKES AND SPADE

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MAN, PACK, E6, FOR 4.2" CHEMICAL MORTAR BARREL



PACK, MAN, E6, FOR 4.2" CHEMICAL MORTAR TOOLS AND ACCESSORIES



PACK, MAN, E6, FOR 4.2" CHEMICAL MORTAR AMMUNITION

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FLAME THROWER, PORTABLE, E3

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The Portable Flame Thrower, E3, can be employed to project a flame to a maximum range of 80 yards. It may be used against personnel in the open or in bunkers and other field fortifications. It consists of two fuel tanks of four gallons capacity and a 205 cubic inch pressure tank combined in a portable unit; a dual connecting hose, and a gun assembly for projecting the flame. A remote control cut off valve in the nozzle of the gun effects a quick fuel cut off which eliminates drip.

The fuel is propelled by compressed air supplied by a gasoline engine driven air compressor of the air cooled, 4 cylinder, 3-Stage, V type. The minimum air pressure is 2,300 pounds per square foot. Power consumption is approximately 5.5 Brake Horse Power, and the rate of delivery is 7 cubic feet per minute at 2,000 pounds per square inch. The compressor is designed for continuous operation.

Ignition is by means of five slow burning incendiary charges loaded into a moulded plastic cylinder. These charges are ignited by the forward movement of a match head coated push pin. Duration of burning for each charge is approximately ten seconds.

For distance and long burning, a thickened fuel (Napalm) is utilized. Unthickened fuel consisting of crank case drainings plus 10% gasoline is used for short range where high temperature and smoke are required. The fuel discharge is a continuous flow of approximately 8 to 10 seconds duration. Pressures in the fuel tanks are 350 pounds per square inch for thickened fuel and 250 pounds per square inch for unthickened fuel. Air pressure in the pressure tank is 1,800 pounds per square foot.

The effective range of the Flame Thrower E3 with 4% Napalm is 50-60 yards, although a maximum range of 70-80 yards is obtainable. Using unthickened fuel, the effective range is 25-30 yards and the maximum range is 35 yards.

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When full, the Flame Thrower E3 weighs 61 pounds. The weight of the filled tanks is 52.5 pounds, the gun weighs 6.75 pounds, and the base with its couplings weighs 1.75 pounds.

This flame thrower is mounted on a metal frame, canvas-backed, packboard with shoulder straps to permit it to be carried on the back of the operator.



FLAME THROWER, PORTABLE, E3

CANISTER AMMUNITION, 4.2"

The development of a canister for the 4.2" Chemical Mortar, M2A2, is being investigated. Studies have not yet reached the point where characteristics can be determined.

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SHELL, INCENDIARY, 4.2" - PYROTECHNIC MIX

Development of an incendiary shell with Pyrotechnic Mix for use in the 4.2" chemical mortar is now under way.

PYROTECHNIC MIXTURE

The filling for incendiary projectiles developed by the Chemical Warfare Service and designated Pyrotechnic Mixture burns intensely for a period ranging from three to fifteen minutes. The mixture is in the form of a thick jell which has a high burning temperature due to its magnesium content.

The composition of the Pyrotechnic Mixture consists of a magnesium compound known as Perminetty Goop, isobutyl-methylaculate, coarse magnesium, barium nitrate, ammonia perchlorate, gasoline and oil.

When assembled in a projectile the Pyrotechnic Mixture surrounds a burster tube contained in an igniter tube of white phosphorous. Ignition of the Pyrotechnic mix is accomplished by the white phosphorous, which is blown into the mixture upon detonation of the burster charge. Destruction of the projectile allows the ignited mixture in gobs ranging in size from a walnut to a football to be distributed over an area where it burns fiercely. The time of burning is dependent on the size of the Pyrotechnic Mixture gobs.

The concensus of opinion held by CWS is that white phosphorous for incendiary purposes should preferably be replaced by Pyrotechnic Mixture in projectiles of greater weight than 100 pounds.

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Q FLAME THROWER AS TANK KIT

Burning fuel introduced into bunkers in quantity by means of flame throwers is effective in the elimination of enemy troops occupying the bunkers, and will result in damaging or destroying the bunkers. Protection for flame thrower operators and the ability to bring the flame thrower within range of its objective are enhanced by mounting a "Q" flame thrower on an M3 or an M5 light tank. In addition to its use against fortified positions it can also be employed as an antipersonnel or antitank weapon.

The "Q" Flame Thrower, as now designed for use in a light tank, is mounted in a cylindrical basket which replaces the conical basket containing the 37mm gun. It consists essentially of a gun assembly with electric ignition system and air operated fuel valve, six cylindrical fuel tanks, twenty-one compressed air drums, and a secondary fuel system. Elevation and depression are provided for by means of a support in the gun base, while traverse is by rotation of the turret. The flame thrower and basket are assembled as a unit, which permits Service Forces in the field to convert a tank to flame thrower use by lifting out the 37mm gun turret basket and inserting the flame thrower basket in its place.

Accessories and service kits for maintaining and filling flame throwers in the field accompany each flame thrower unit.

PRINCIPAL CHARACTERISTICS (PRELIMINARY INFORMATION)

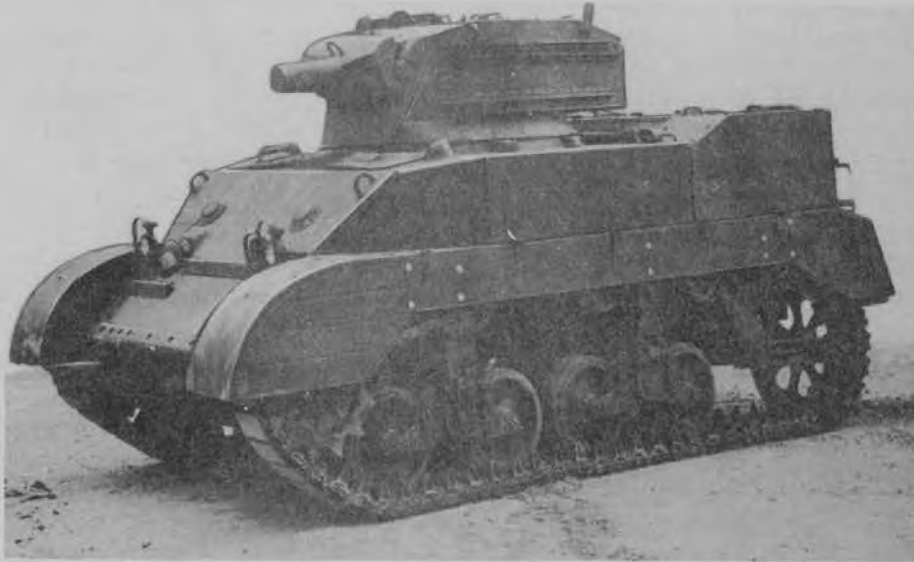
| | |
|------------------------------|---|
| Fuel capacity | 125 gals. |
| Maximum Range | 135 yds. |
| Effective Range | 75 - 100 yds. |
| Total time of fuel discharge | 50 seconds. |
| Traverse | 360° |
| Depression | -10° |
| Elevation | +30° |
| Ignition System | Air atomized gasoline and electric spark |
| Propellant | Compressed air or Nitrogen |
| Fuel | 8% Napalm |

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Indications are that the "Q" Flame Thrower will not be accepted in its present form, inasmuch as removal of the 37mm gun leaves the tank without adequate armament for protection. The theaters of operations insist that the Flame Thrower must be accompanied by the weapons installed as standard armament for the tank.



M5A1 LIGHT TANK EQUIPPED WITH MODEL Q FLAME THROWER



TURRET BASKET ASSEMBLY FOR MODEL Q FLAME THROWER

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COLORED SMOKE AND/OR FLAME FOR FLAME THROWERS

Due to the dense vegetation in the jungle it is often impossible to detect the emissions of ordinary signal projectiles. Branches, thick foliage and lianas interfere with passage of signal devices and conceal them when they function. It was, therefore, considered that the use of colored smoke or flame in flame throwers would have a greater chance of being visible, inasmuch as the flame could be projected at a high angle and burn its way through intervening obstructions.

The smoke incidental to the use of a flame thrower is black, and so far efforts to color it have not been successful. Investigation has, therefore, been instituted in an attempt to color the flame. So far this attempt has been without success.

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CORPS OF ENGINEERS ITEMS

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DEMOLITION SET NO. 5, INDIVIDUAL

This demolition set is to be used as a hand-placed charge in the assault of a fortified position by parachutists or jungle troops. The set may be attached to a parachute harness or slung over the shoulders. It has been standardized for Infantry, Engineers and Cavalry.

The set consists of two bags, each 12 inches high, 9 inches wide, and 5 inches deep. The weights of each bag when loaded as indicated are given herewith:

| Load | No. of Blocks | Weight of Bag and Load |
|----------------------------|---------------|------------------------|
| Tetrytol..... | 4..... | 10.5 lbs. |
| Tetrytol..... | 8..... | 21 lbs. |
| TNT..... | 24..... | 12 lbs. |
| Plastic Explosive, M3..... | 4..... | 9 lbs. |
| Plastic Explosive, M3..... | 8..... | 18 lbs. |

The cloth material of the bags is rot proof, moisture proof and fire proof. Each bag contains sufficient demolition material to provide for the necessary priming, fuzing and lighting of the charges. The fuze lighters are packed five to a waterproof paper envelope. The tetrytol and plastic explosives are more powerful than TNT and should be preferred for use.

CONTENTS OF DEMOLITION EQUIPMENT SET NO. 5, INDIVIDUAL

| ITEM | NUMBER | WEIGHT - each unit | |
|---|----------|--------------------|------|
| | | Lbs. | Ozs. |
| Bag, Canvas, Water repellent and fire-proof, carrying, demolition equipment | 2 | 2 | 12 |
| Box, cap, 6-cap. capacity | 2 | | 3 |
| Blocks, demolition, M3 (composition C2) | 8 blocks | 18 | 0 |
| Cap, blasting, special, non-electric | 12 | | 1 |
| Cord, detonating, primer-cord, 50' spool | 2 spools | | 10 |
| Crimper, Cap, with fuze cutter | 2 | | 11 |
| Envelope, fuze lighter, waterproof | 2 | | 1 |
| Firing Device, M1A1. Pressure type | 2 | | 11 |
| Firing Device, M1, pull type | 2 | | 6 |
| Fuse, blasting time | 30 feet | | 7 |
| Lighter, fuze | 10 | | 2 |
| Tape, friction, general use, grade A, 3/4" wide, 1/2 lb. roll | 2 rolls | 1 | |

Total weight 25 0

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DEMOLITION SET NO. 5, INDIVIDUAL

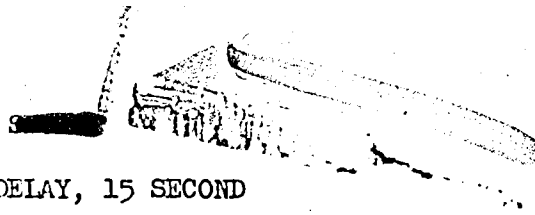


PARATROOPER WITH DEMOLITION EQUIPMENT

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DETONATOR, DELAY, 15 SECOND

When assault demolition charges are fired by means of a piece fuse, a fuse lighter and a non-electric cap, the charge may fail to detonate due to the fuse lighter being pulled away or becoming wet. The interval of delay between the lighting of the fuse and the demolition cap is determined by the length to which the fuse is cut. Correction of these deficiencies is accomplished by means of a Delay Detonator which is water resistant and will fire successfully when submerged to a depth of several feet.

The Delay Detonator consists of an assembly of a pull type fuse lighter, a short fuse delay and a blasting cap. The 15 second Delay Detonator is 11/16" in diameter and 6 3/8" long including the cap detector. It weighs two ounces.

On the fuse lighter end of the Detonator is a 3/4 inch diameter ring passing through the loop in the fuse lighter pull wire. Also passing through this loop is a cotton pin which acts as a safety. The fuse lighter functions when a wire coated with sticker compound passes through a capsule filled with flash compound. The fuse lighter ignites a short fuse train which in turn fires a blasting cap protruding from the case.

To protect the device in transit a "cap Protector" or guard 2 7/16" long fits over the blasting cap.

The end of the Delay Detonator will screw into the threaded cap walls on the bangalore torpedo, the shaped charge M2A1 and T3, the Demolition Block M2, and the one pound TNT block. It can be attached to explosives not fitted with a threaded detonator hole by using friction tape

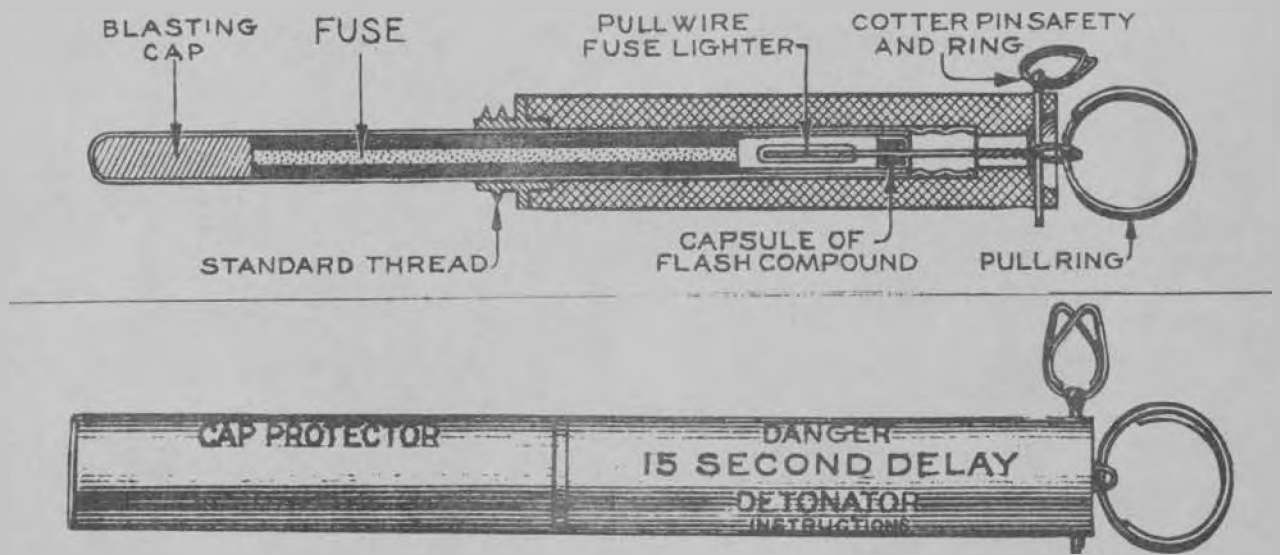
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or twine. The detonator hole in the M3 antipersonnel mine is too small in diameter to permit inserting the Delay Detonator.

The following table indicates the approximate delay time which can be anticipated with the Delay Detonator, 15 Second, at the temperatures given.

| Temperature in Degrees Fab. | Delayed time (seconds) |
|-----------------------------|------------------------|
| 120 | 14-16 |
| 70 | 15-17 |
| 0 | 16.5-18.5 |
| -40 | 17.5-19.5 |

15 Second DELAY DETONATOR M 1



DETONATOR, DELAY, 15-SECOND

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DEMOLITION EQUIPMENT, SET NO. 7, ELECTRICAL

Demolition Equipment Set No. 7 is designed to provide demolition accessories for electrical firing of explosives provided in Demolition Equipment Set No. 5, Individual.

The same carrying bag used for Demolition Set No. 5 is used for Set No. 7. Although the electrical set is issued without explosives as a supplement to the Demolition Equipment Set No. 5, Individual, there is sufficient extra space in the bag to pack twelve one-half pound blocks, Demolition M2 or M3 (Composition C2), with the electrical equipment. The electrical equipment fits snugly into the chipboard box provided to prevent the articles from moving about in shipment.

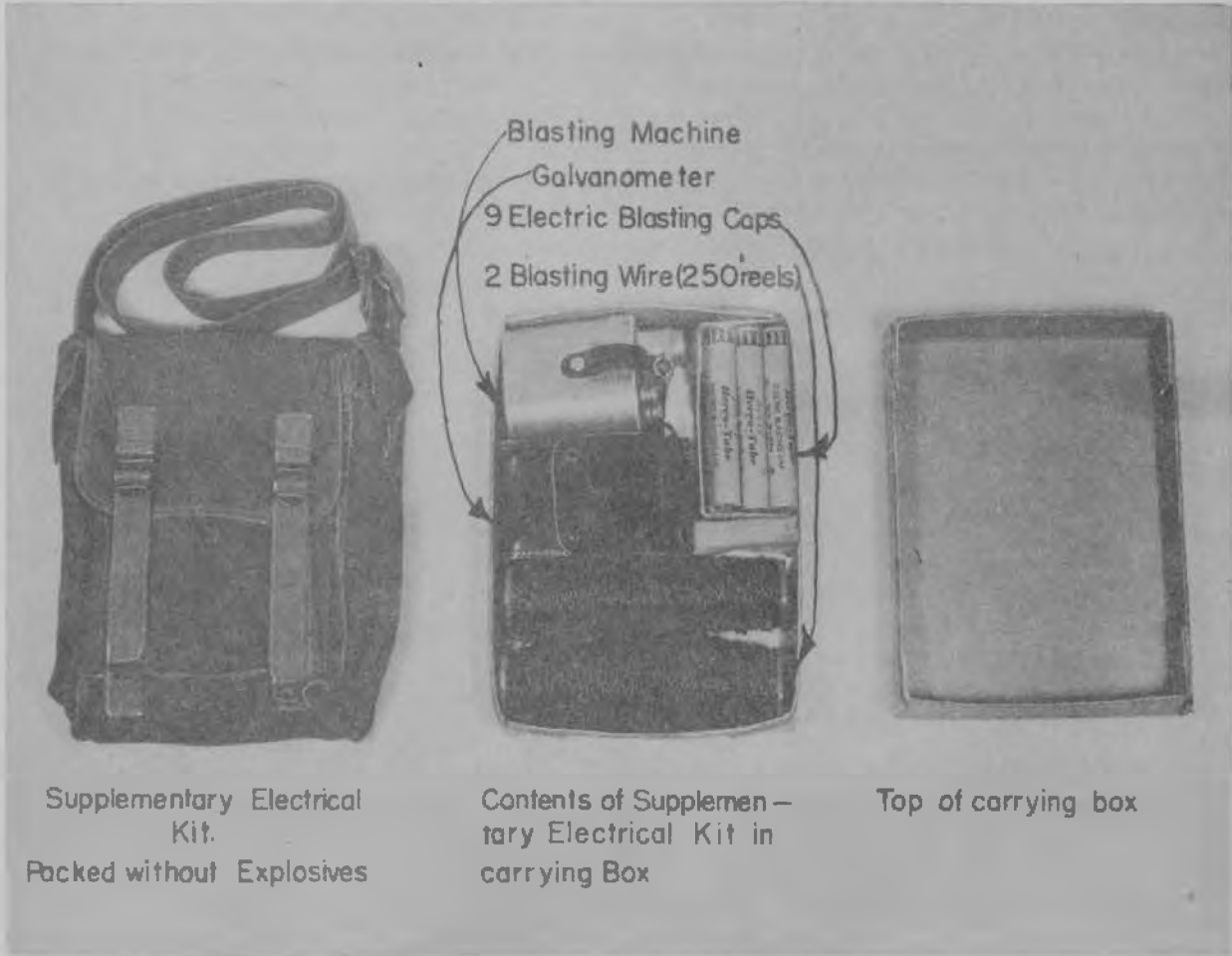
CONTENTS OF DEMOLITION EQUIPMENT SET NO. 7, ELECTRICAL

| ITEM | NUMBER | WEIGHT | |
|--|------------------|----------|----------|
| | | Lbs. | ozs. |
| Bag, canvas, water repellant and fireproof, carrying, demolition equipment | 1 | 1 | 6 |
| Box, fiber, solid, telescopic design, 12" x 8" x 3" | 1 | 1 | 0 |
| Cap, blasting, special, electric | 9 | | 13 |
| Galvanometer, blasting, with leather case and carrying case | 1 | 1 | 10 |
| Machine, blasting, 10-cap capacity, with extra handle | 1 | 5 | 0 |
| Wire, firing, copper, 2-conductor, polyvinol chloride covered No. 20. AWG, 250' spools | 2 spools | <u>4</u> | <u>3</u> |
| | Total weight. | 14 | 0 |

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- Blasting Machine
- Galvanometer
- 9 Electric Blasting Caps
- 2 Blasting Wire (250 reels)

Supplementary Electrical Kit.
Packed without Explosives

Contents of Supplemen-
tary Electrical Kit in
carrying Box

Top of carrying box

DEMOLITION SET NO. 7, ELECTRICAL

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EXPLOSIVE, SHAPED CHARGE, T3

The Explosive, Shaped Charge, T3 consists of a moulded fiber or metal container, 9.5 inches in diameter and 12.5 inches in height, having a conical void in the base and a cone shaped top. The standoff support consists of steel legs, 15 inches long, welded to a metal band which is fastened to the base of the charge by means of a wing nut. The shaped charge contains 26 pounds of cast 50-50 pentolite explosive and the entire assembly weighs 35 pounds. A threaded firing device receptacle with cap well is located in the top of the charge and covered with a strip of removable tape.

The charge is normally insensitive to detonation by small arms fire but may be occasionally set afire by .30 caliber ball or tracer ammunition.

1. The charge can be detonated with a 15-second delay detonator, a U. S. Engineer Special Non-electric Blasting Cap or a U. S. Engineer Special Electric Blasting Cap. The tape is removed from the top of the charge and the detonating agent is inserted in the cap well.



EXPLOSIVE, SHAPED CHARGE, T3

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2. The 15-second delay detonators and the standard type firing devices are held firmly in place by means of the threaded female bushing at the top of the cap well.

3. The U. S. Engineer Special Non-electric and Electric Blasting Caps may be held firmly in place by means of the Priming Adaptor, M1 or by inserting a wooden wedge.

The charge is most effective in penetrating structures when the base of the charge is placed 15 inches from the surface to be attacked. This proper standoff is established by the metal legs attached to the base of the charge.

The charge was designed to drill holes in reinforced concrete in the attack of fortifications. It may also be used, however, to penetrate armor plate or log constructed bunkers, and to fulfill any requirements for a powerful directional explosive effect.

Bunkers made of logs or earth-filled drums may be attacked by firing the charge on the top or against the sides and front. The charge will completely penetrate 4 feet of earth and 4 layers of 12 inch diameter logs. Hot metal fragments will be projected into the closed emplacement and the emplacement will be filled with smoke and dust for approximately five minutes.

1. When the charge is fired, fragments from the target and container of the charge may fly in all directions. Therefore, the user should take adequate cover and allow a distance of 500 feet for training purposes. Under combat conditions, a distance of 100 feet should be adequate for men lying down and out of the direct line of blast, or closer if under cover.

2. The charge contains a cast explosive that will be damaged by rough handling. It should not be dropped on a hard surface as the efficiency will be decreased if the explosive is cracked.

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3. Any obstructions placed in the cavity will have a detrimental effect on the results obtained and should, therefore, be avoided.

4. A high temperature is obtained in boreholes drilled by shaped charges, and these must be allowed to cool for at least twenty minutes, or be cooled with water if they are to be filled with explosives.

5. The usual care that is accorded any blasting cap should be exercised in priming the charge.

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PRIMING ADAPTOR M1

The Priming Adaptor M1 consists of a plastic fitting with a 9/16 inch NC thread on one end, a slot to take electric lead wires and a shoulder so designed that fuze or primacord passes through it but it holds a cap. It is used in conjunction with all explosives containing a threaded detonator well. The priming adaptor is made of a suitable plastic, olive drab in color.

The Priming Adaptor M1 is used to hold detonators in place in explosive blocks or any explosive fitted with threaded detonator wells.

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PIPING OF GASOLINE TO BUNKERS

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Destruction of bunkers and their occupants may be effected by piping gasoline into the bunkers and igniting the fuel by a burst from a flame thrower. The gasoline is allowed to discharge into the embrasure of the bunker for approximately 15 seconds before it is ignited. Ignition of the gasoline results in a definite explosion and in flames which fill the interior of the bunker.

The gasoline is introduced into the bunker through the medium of standard 4 inch light weight pipe line equipment. The pipe is brought as far to the front as possible and is then coupled to a flexible synthetic rubber hose. The hose, in turn, is connected to a 1-inch pipe, approximately 100 feet long, to which is attached a $\frac{1}{2}$ -inch nozzle. The 1-inch pipe is pushed into position until the nozzle is approximately 25 feet from the objective, at which point a valve provided at the connection of the hose to the 4-inch pipe is opened to allow the fuel to be ejected.

Pumping equipment forces the fuel through the pipe line, creating an emergent pressure of 300 pounds per square inch at the nozzle. This equipment is the standard PPU(Petrol Pumping Unit) now used for pipe line service. It is composed of a GMC-270 engine used in the standard 6 x 6, 2 $\frac{1}{2}$ -ton cargo truck, and a two-stage Byron-Jackson Centrifugal pump.

Further development of piping equipment is under way which may result in considerable modifications of the system described above.

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SNAKE, DEMOLITION, M2

The Snake, Demolition, M2 consists of explosive cartridges 3-3/4 inches in diameter and 4 feet long clamped between 12 gauge corrugated metal plates 9 feet long, 14 inches wide, the latter assembled in shingle fashion and bolted together. The forward end is equipped with a nose and its associated adaptor to guide the snake over or around obstacles. Hooks for towing and pushing by either the medium or light tank are provided at the front and rear ends.

The snake may be assembled in any convenient length up to 400 feet. 20 feet of the forward end and 60 feet of the rear end are assembled without explosives to provide a safety section that may be straddled by the tank during pushing and to provide room for insertion of tamping bags to control the explosion. The distance of 60 feet on the rear end has been determined by test to be the minimum distance at which the snake can be detonated without jeopardizing the safety of the pushing tank and crew.

Several different explosive charges may be used in the snake. The charge specially designed for the purpose is a 3-3/4 inch by 4 ft. cartridge in a metal container consisting of an 80/20 mixture of Amatol (80% Ammonium Nitrate and 20% TNT) except for 6 inches of each end which is crystalline TNT. The loaded cartridge weighs from 22 to 24 pounds. 160 are required for a 400' snake. An alternate recommended loading utilized the M1 Bangalor Torpedo in which 8 torpedoes are accommodated within the two corrugations of the plates. This loading gives an explosive weight of 14.4 lbs. per ft. as compared to 10 pounds for the special cartridge.

After being pushed into position on the target being attacked, the snake is detonated by directing the tank's machine gun fire on the impact plate of the firing device which is located at slightly over 60 feet from the rear of the snake.

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The snake was designed for creating a path through antitank mine fields but is very effective against other targets such as concrete tank obstacles and in clearing a path through thick natural growth. A 400 ft. snake loaded with 3-3/4" cartridges will blast a crater approximately 100 yards in length, from 9 to 12 feet in width, and from 2 to 3 feet deep, depending on the type of soil and its moisture content. For shipment, the snake is packed in 85 packages occupying a total volume of 188.6 cubic feet. The gross weight when packed is 13,741 pounds, while the net weight, assembled, is 12,491 pounds. It is transported in two 2½-ton trucks, and can be assembled in two hours by a squad of twelve men.



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SNAKE, DEMOLITION, M2



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BLOCK, DEMOLITION, CHAIN

The Block, Demolition, Chain, M1 assembly consists of eight 2" x 2" x 10" blocks of tetrytol strung on primacord and packed in a haversack for ease in use and handling. The entire chain or any part of it may be used laid out in a line, wrapped about an object, or detonated as packed in the haversack.

Each block is rectangular in shape and is inclosed in a white cotton bag. One block is equivalent to six 1/2-pound TNT blocks. The blocks are cast in place with 8 inches of primacord between blocks and two feet of free primacord at each end of the assembly. The eight blocks and primacord as assembled weigh 21 pounds; the entire assembly 22 pounds. Two complete units are packed in a wooden box.

The tetrytol is a more powerful explosive than TNT. It is also more brisant and therefore more effective where a cutting charge is needed. The primacord is detonated by means of a blasting cap in order to fire the chain. The blocks and the cord are quite insensitive to shock but the assembled units are slightly more sensitive than TNT. Sympathetic detonation between unconnected blocks can be obtained when they are separated by as much as 10" in air. The blocks are not affected by moisture and can stand submergence in water for 24 hours without appreciable effect upon their characteristics.

The care, handling, and storage of material is the same as for TNT blocks.

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TANKDOZER

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The Tankdozer is a combination of a bulldozer and a medium tank. It can be used to knock over block houses and bury their occupants, or to help clear away material and artificial obstacles. In any operation involving the landing on a beach, they would be very useful in preparing exits from the beach by removing obstructions, including underbrush on the edge of the jungle.

The Tankdozer consists of a moldboard approximately 11 feet wide and 42 inches high mounted on a standard M4 Medium Tank by means of side arms attached to trunnions connected to the two front bogies. Power for controlling the dozer, originally furnished by a "Jeep" motor, will be supplied by a hydraulic unit. The performance of this unit is comparable to that of the Caterpillar D-8 tractor in straight dozing. However, the tank is not as maneuverable as the tractor.

The total weight of the Tankdozer is 68,630 pounds, of which 61,000 pounds is the weight of the M4 Medium Tank, and 7,630 lbs. is the weight of the Bulldozer. Mounting the dozer on a light tank is in progress.



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TANKDOZER

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TRACTOR, CLETRAC, MODEL AGH (TRACK MODIFIED)

This tractor was proposed for use in towing the 105 mm Howitzers, M2A1 and M3A1, airborne, and other towed loads such as cargo trailers or sleighs of similar weight. It is a modification of the commercial Crawler tractor.

The modifications to be made to the tractor consist of a front mounted power winch, water proofing for a depth of five feet, the installation of a muffler and an electric starting motor, and replacement of the track shoes on the 24" - wide track by 5" X 5" X $\frac{1}{2}$ " angle irons.

Indications from the SWPA are that this tractor should be equipped with a Diesel engine.

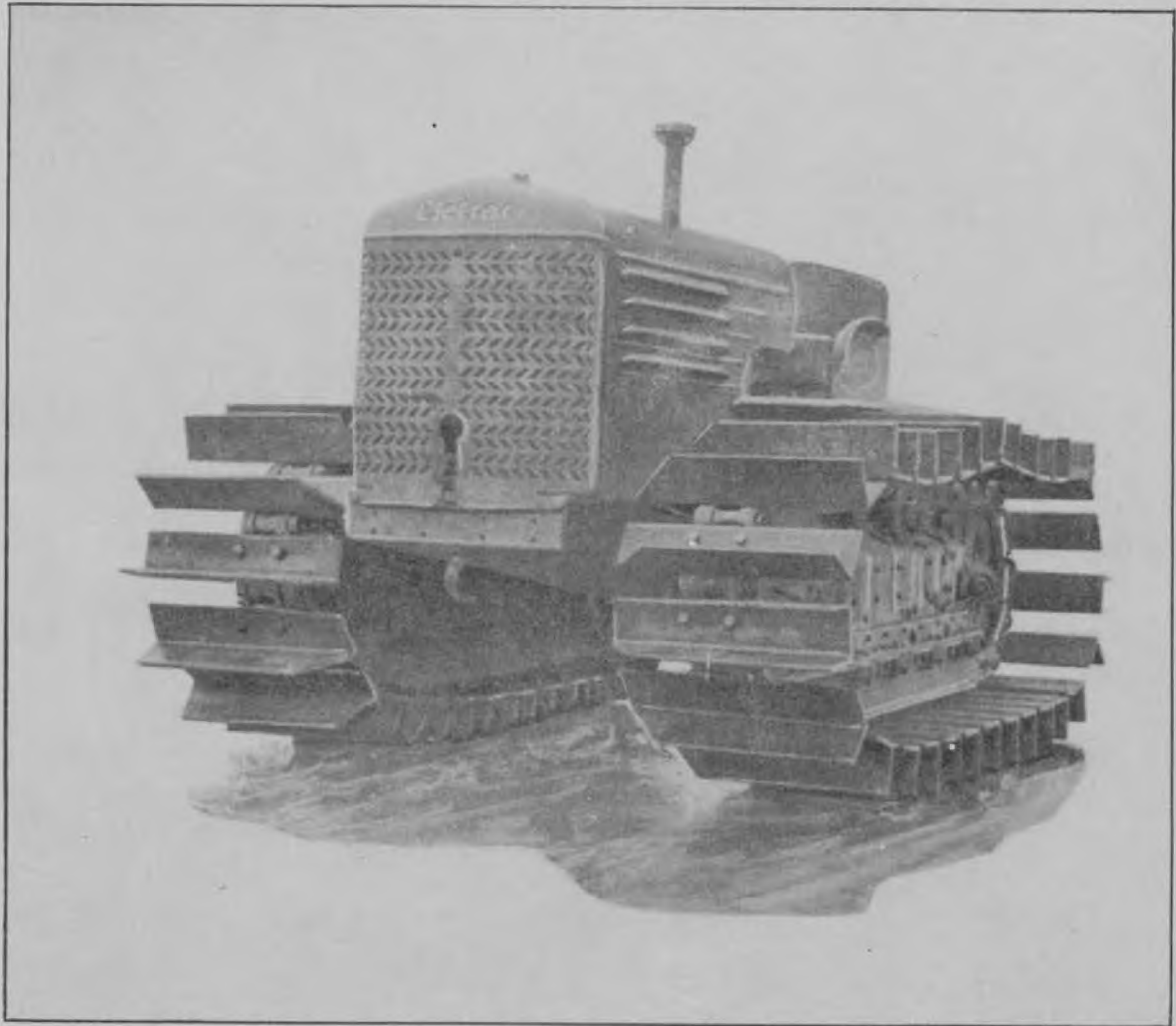
Procurement of the Cletrac Tractor AGH has been temporarily suspended pending further tests of the D4 and TD-9 tractors as prime movers.

PRINCIPAL CHARACTERISTICS

| | |
|--|------------------------------------|
| Net Weight - 8000 lbs. | Overall length 190 $\frac{1}{2}$ " |
| Payload 150 lbs. | Overall width 70" |
| Gross wt. 8150 lbs. | Overall height 55 $\frac{1}{2}$ " |
| Track width 24" | |
| Track contact area 2640 sq. in. | Ground clearance at low point 16" |
| Unit Ground Pressure 3.1 lbs. | Angle approach 30° |
| | Angle Departure 60° |
| Suspension type-Coil Spring Front, Rear Solid to Drive Sprocket | |
| Track Type - 5" x 5" x $\frac{1}{2}$ " stock angle iron | |
| Track material - steel | Engine |
| Grousers - 5" integral with plate | Make - Hercules 00C |
| Drawbar maximum - 5700 lbs. | Bore - 4" |
| Winch - Front Mounted, Power | Stroke - 4 $\frac{1}{2}$ " |
| Steering - controlled differential | Displacement - 226 cu. in. |
| Transmission - Speeds forward, 3 | Rated Power - 44 HP at 1530 RPM |
| Speeds reverse, 1 | Rated Torque - 170 h.p. |
| Turning radius $\bar{7}$ 9 ft. | HP/TON - 10.8 |
| Maximum Speed 4 $\frac{1}{2}$ MPH at 1530 RPM | Cooling differential - 95°F |
| | Cooling type - Force pump |

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TRACTOR, OLETRAC, MODEL AGH (TRACK MODIFIED)

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ORDNANCE DEPARTMENT ITEMS

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LAUNCHER, GRENADE, M7

The Grenade Launcher M7 is used to fire rifle grenades from the Rifle, Caliber .30, M1, using the Cartridge, Rifle Grenade, Caliber .30, M3, as the means of propulsion. The rifle with launcher attached will fire A.T. Grenades M9 and M9A1; A.T. Practice Grenades M11 and M11A1; Rifle Practice Grenade M11A2; Rifle Impact Fragmentation Grenade M17 (formerly the T2), and, when used with the Adapter M1, the Mk. II Fragmentation Grenade. The launcher also can be used for firing ground signals modified for projection from grenade launchers.

A valve screw on the launcher must be inserted in the gas cylinder of the rifle in place of the regular gas cylinder lock screw. The valve screw contains a valve which opens to permit the escape of excessive pressures caused in the gas cylinder of the rifle by the grenade cartridge. The launcher is secured to the rifle by a latch which clamps behind the bayonet lug. A stud on the launcher protrudes into the valve screw when the launcher is assembled. The launcher body has six graduations for different ranges. A grenade retainer spring slightly larger in diameter than the launcher body, serves to hold the grenade in its proper position on the launcher.

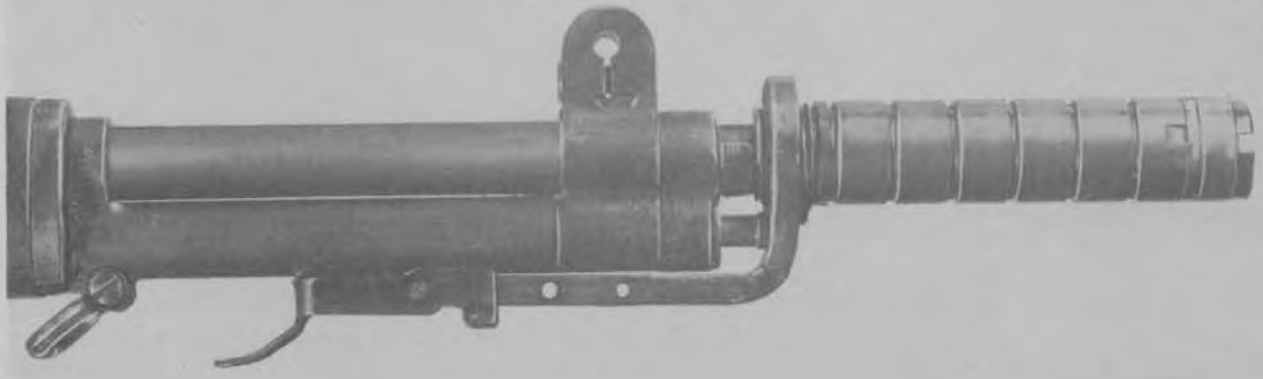
Service ammunition may be fired from the cartridge clip when the grenade launcher is in place. Since the valve is then open, full recoil is impossible and the rifle can only be operated as a single shot weapon.

The launcher weighs 12 ounces, is $7\frac{1}{2}$ inches long, and has a bore of $\frac{1}{2}$ -inch.

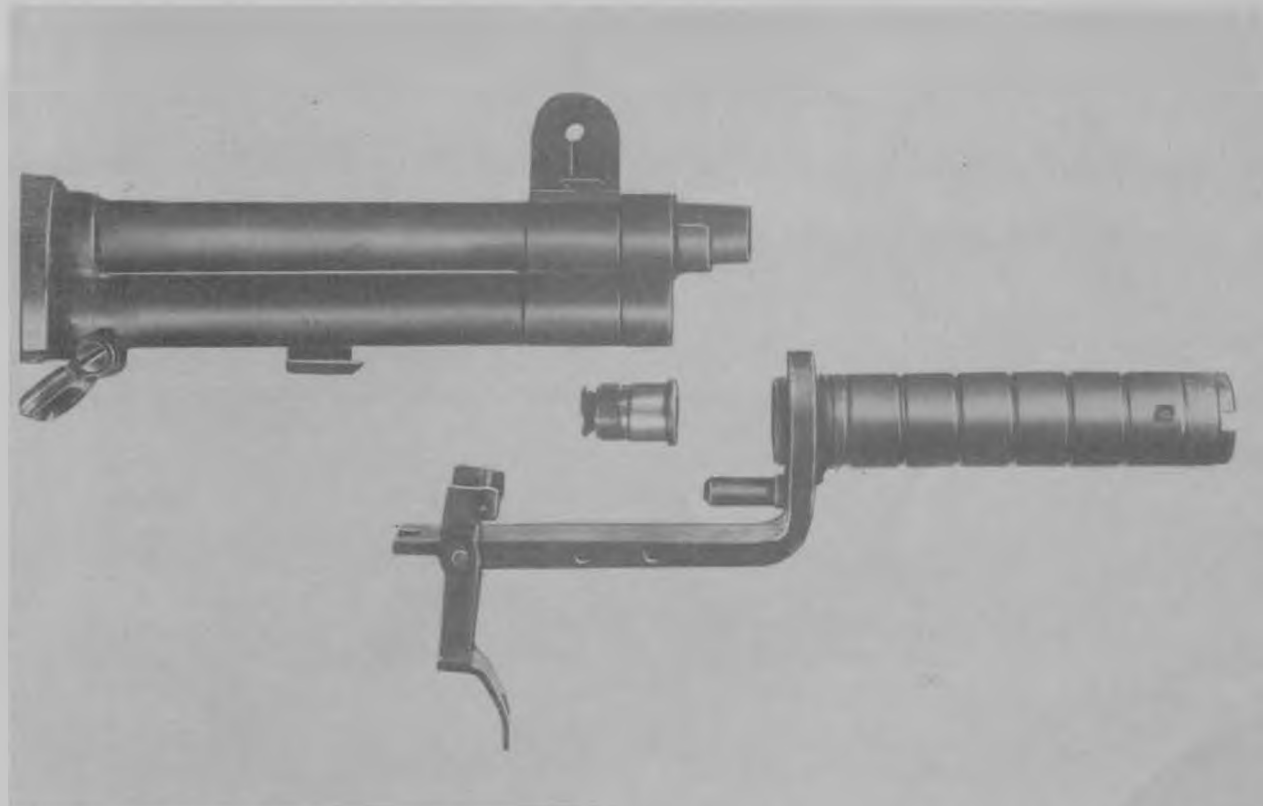
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LAUNCHER, GRENADE, M7, SHOWING LAUNCHER STUD RETRACTING THE VALVE SCREW



LAUNCHER, GRENADE, M7, DETACHED FROM RIFLE, SHOWING VALVE SCREW SUBSTITUTED FOR STANDARD GAS CYLINDER LOCK SCREW

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SIGHT, RIFLE, GRENADE LAUNCHER, T59

The Rifle Grenade Launcher Sight T59 can be installed on the stock of caliber .30 rifles M1903, M1903A1, M1903A3, Rifle M1, and caliber .30 Carbine M1. This sight is also being adapted for mounting on the 60mm mortar for use in low angle fire. The unit will consist of the sight mounted on a circular ring which clamps to the mortar tube.

The complete sight consists of a mounting plate fastened to the left side of the stock by two special wood screws, and a sight bar assembly which snaps on the mounting plate. It is approximately five inches long.

Two identical sets of calibrations are located on the lip of the mounting plate to allow for assembly to the stock with the plate in either direction. Each set of calibrations is marked in five degree intervals from 0 degrees to 45 degrees, each ten degrees being numbered. A 60 degree calibration is also marked.

The sight bar assembly is composed of a five inch sight bar having an open sight and a spirit level. Located on the upper center portion of the sight bar assembly are the click spring and its retainer which hold the assembly on the mounting plate. The click spring retainer has a small vertical index line which is used to indicate elevation settings against the



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scale on the mounting plate. Adjustment by clicks, for use at night, is in five degree increments from 0 degrees to 45 degrees and one 60° click.

Means are provided for correction of elevation and deflection. To adjust for vertical "zero" the cap screws on the click spring retainer are loosened and the sight bar is rotated in the proper direction to bring the point of aim and point of impact on the same horizontal line of the target. In order to obtain horizontal "zero" the rear sight screw is loosened and the rear sight is moved in the direction desired.



SIGHT, GRENADE LAUNCHER, T59, SIGHT REMOVED FROM RIFLE, MOUNTING PLATE REMAINS ATTACHED TO STOCK

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CARTRIDGE, GRENADE, AUXILIARY, CALIBER .30, T18 (20 GRAIN CHARGE)

The Auxiliary Grenade Cartridge M7 is designed to give additional range to grenades fired from rifles when using standard grenade launchers and cartridges. The auxiliary cartridge M7 fits the M1, M2, M7 and M8 launchers for all models of the Caliber .30, M1903 rifle, the M1917 and M1 rifles, and the M1 carbine. Where used to supplement the standard grenade cartridge, it gives 100 to 150 yards greater range.

The auxiliary cartridge M7 (20 grain charge) is a caliber .45 case draw piece loaded with 20 grains of powder. The case is sealed with a paper wad. The cartridge M7 is placed in the end of the launcher, a rim on the base of the case holding it in place. It functions only with the standard M3 or M6 grenade cartridges. The flame from the M3 or M6 cartridge penetrates the paper wad and ignites the powder in the auxiliary cartridge. The auxiliary cartridge is ejected from the launcher simultaneously with the grenade.

Since the auxiliary cartridge is used to obtain greater range, the grenade is set as far back on the launcher as possible. However, it can be used for firing at other positions and at shorter ranges in order to reduce the time of flight.

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Elevations and Corresponding Ranges
for Grenades Fired From M1903 and M1
Rifles, with Launcher M1, Grenade
Rifle Cartridge M3, and Auxiliary
Cartridge M7 (20 grain charge)

| <u>Grenade M9A1</u> | | <u>Grenade M17</u> | | <u>Grenade Mk.II</u> | |
|---------------------|-----------------------------|--------------------|-------------------|----------------------|-------------------|
| <u>Elevation</u> | <u>Range</u> <u>yds.</u> | <u>Elevation</u> | <u>Range(yds)</u> | <u>Elevation</u> | <u>Range(yds)</u> |
| 5° | 91 | 30° | 262 | 30° | 226 |
| 10° | 175 | 45° | 291 | 45° | 235 |
| 15° | 226 | 60° | 245 | 60° | 189 |
| 20° | 278 | | | | |
| 25° | 315 | | | | |
| 30° | 344 | | | | |
| 35° | 379 | | | | |
| 40° | 401 | | | | |
| 45° | 364 | | | | |



CARTRIDGE, GRENADE, AUXILIARY, CAL. .30, T18

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GRENADE, RIFLE, FRAGMENTATION, M17

The Fragmentation Rifle Grenade M17 is an antipersonnel grenade for use with standard grenade launchers, grenade cartridges and caliber .30 rifles. It was designed to give greater fragmentation than the M9A1 Grenade, and to avoid air bursts which occurred with use of the MKII Hand Grenade. It is fired in a manner similar to that of the antitank grenade M9A1, except for range determination. The grenade is detonated by a fuze which functions upon impact. The maximum range when fired from a grenade launcher on the M1917 or M1903 rifles is about 220 yards.

The grenade consists of a serrated cast iron body to which is fitted a tail assembly composed of a stabilizer tube and a fin assembly. The impact fuze is located in the forward end of the stabilizer tube. The fuze is held in the unarmed position by a safety pin which fits in a hole through the fuze body and clamps about the stabilizer tube. The stabilizer tube and fuze are identical with those of the antitank grenade M9A1. The grenade body used is the Mk. II hand grenade type.

The grenade is fired from a grenade launcher fitted to a Caliber .30 rifle by using a standard grenade cartridge. The rifle may be fired from the shoulder when firing the M17 grenade, but best results are obtained by placing the rifle butt on the ground.

The range of the grenade will depend upon the distance to which the stabilizer tube of the grenade is placed on the launcher. To facilitate finding the same positions repeatedly, a launcher positioning clip is provided to be placed between the rings on the launcher. By counting the rings exposed, the firer can adjust for range even when he can not see the launcher. With five rings showing, the range is 55 yards; with four rings, 80 yards; with three rings, 105 yards; with two rings, 130 yards; with one ring, 165 yards.

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With no rings showing the range will be either 195 yards or 220 yards, depending on whether the rifle is held at an angle of 45 degrees or at an angle of 40 degrees.

PRINCIPAL CHARACTERISTICS

| | |
|-----------------------|--------------------------------------|
| Weight | 1.68 lbs. |
| Bursting Charge | .74 oz. |
| Length | 9.75 ins. |
| Body | Cast iron |
| Fuze | Part of stabilizer tube assembly. |
| Range, Maximum | |
| Rifle..... | 220 yds. |
| Carbine | 136 yds. |



GRENADA, RIFLE, FRAGMENTATION, M17

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GRENADE, RIFLE, W.P., T5

This projectile embodies a majority of metal parts of the standard Grenade, Rifle, A.T., M9A1, designed for laying down smoke and for spraying personnel with phosphorous to inflict severe burns. It consists of a head containing white phosphorous, together with a bursting charge; an inertia fuze, and a tail assembly.

Principal Characteristics

| | | |
|--|-------|----------|
| Weight loaded (complete)..... | 1.5 | lbs. |
| Length, overall | 10 | ins. |
| Weight of white phosphorous charge ... | 8.5 | oz. |
| Burster | PETN, | 13.5 gr. |
| Muzzle velocity | 160 | f/s |
| Range | 250 | yds. |
| Radius of burst | 15 | ft. |



GRENADE, RIFLE, W.P., T5

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ADAPTER, GRENADE PROJECTION, M1

The Grenade Projection Adapter M1 enables the Mk. II fragmentation grenades to be fired from the M1917, M1903A1, or M1 caliber .30 rifles, and the M1 carbine, through the medium of a Grenade Launcher. Rifle Grenade Cartridges, Caliber .30, M3 or M6, are used to propel the grenade and adapter. For projecting the grenade, the rifle may be fired from the shoulder, although best results are obtained by placing the rifle butt on the ground. The maximum range of the grenade is about 190 yards, limited by the time of burning of the fuze.

The Adapter, M1, consists of a stabilizer tube and fin assembly, similar to that of the M9A1, A.T. Grenades, to which are attached claws to engage the serrations of the Mk. II Fragmentation Grenade. The long claw is fitted with an arming clip retainer and an arming clip into which the grenade fuze lever is inserted when the grenade is placed in the adapter. The arming clip is held in position by friction and retained on the long claw by the bent-over position of the arming clip retainer, permitting the fuze pin to be removed without danger of arming.

Upon firing, the arming clip remains stationary while the grenade and adapter are propelled forward. The arming clip straightens the bent-over portion of the arming clip retainer and slips from the claw and grenade fuze lever, permitting the fuze to become armed. The adapter remains attached to the grenade throughout its flight.



ADAPTER, GRENADE PROJECTION, M1, WITH MK. II GRENADE

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BAG, AMMUNITION, MACHINE GUN, CALIBER .30, T22, AND SLING

It was considered that an important function of machine guns would be to blind bunkers while they are attacked by other means. It appeared desirable for this and other purposes to have a Caliber .30 Machine Gun which can be carried and fired by one man. A method has consequently been provided for so using the M1919A4 or M1917A1 guns removed from their mounts. Either gun can be fired from the hip in the same manner as a submachine gun.

In order to adapt the guns to transport and hip firing by an individual soldier, a Sling and



Ammunition Bag T22 can be attached to the weapon, which is then carried and fired while suspended from the left shoulder by the sling.

The ammunition bag is of canvas, with a metal plate on the back. It is 8½ inches deep, and can be carried on the pistol or cartridge belt when not attached to the gun. Its capacity is 50 rounds in a web belt. The bag fastens to the gun by two projections which hook on the belt holding pawl pin, and by a hook on the bottom of the metal plate

AMMUNITION BAG, T22, AND SLING, ATTACHED TO FLEXIBLE M. G., CAL. .30, FOR FIRING FROM HIP which snaps into the left side

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of the machine gun. Snaps are provided on the bag to keep it closed when not on the gun to prevent foreign material from entering the bag and fouling the ammunition.

The sling consists of a fabric strap with adjusting buckle and a clamp sewed to one end for attaching to the buffer of the machine gun, and two front bands, one a barrel jacket sling band for the M1919A4 and the other a water jacket sling band for the M1917A1 gun.



AMMUNITION BAG, T22, FOR FLEXIBLE MACHINE GUN, CAL. .30

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SIGHT, OPTICAL RING, T29E2

The Optical Ring Sight, T29E2, is used on the 2.36" Rocket Launchers M1 and M1A1. It provides a simple means for determining elevation settings and for estimating leads in tracking moving targets. The sight is novel in that only one point is required for alignment on the target. Settings for elevation are made on the range scale, while leads are set by tracking the target at different points on the sight rings.

The sight assembly consists of a lens, lens cover, sight bracket, pintle and range indicator. When not in use, the sight may be folded flat against the barrel, with the cover snapped over the front of the lens for protection. For firing, the sight is placed in the extended position, where it is maintained by detents. Elevation is provided by rotation of the sight on its pivot. An elevation arm, which clicks into detents on the range scale, holds the sight in place.

The range scale, graduated for ranges from 0 to 700 yards in 50 yard intervals, has each 100 yards numbered.

The lens gives the impression of having concentric rings with dark transparent lines at right angles near the center of the field. The horizontal line is used to maintain elevation when aiming at a moving vehicle. The concentric rings are used in estimating the lead. The center ring subtends an angle of 60 mils. The nature of the lens provides an almost infinite sight radius.

The sight mount comprises a metal bracket on which the range scale and the sight assembly are fixed. Two ring clamps which fit around the barrel of the launcher hold the assembly in position.

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SIGHT, OPTICAL RING, T29E2, WITH SIGHT EXTENDED

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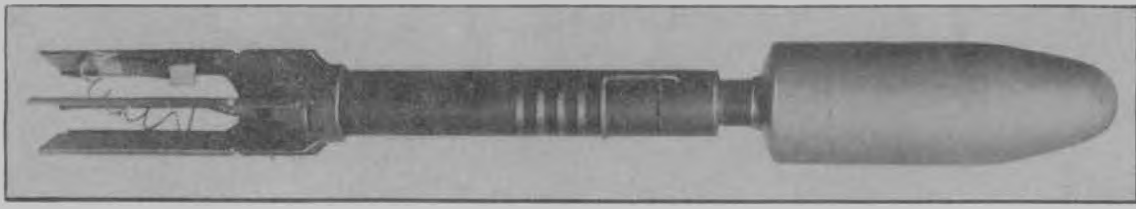
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ROCKET, SMOKE, W.P., 2.36", T26

The Smoke Rocket, W.P., 2.36", T26, is a complete round of ammunition employed for the production of smoke upon contact with the target. While its principal use in jungle warfare will be for smoke laying and as an anti-personnel projectile, it may be used against tanks, pill boxes and machine gun nests. It is to be fired from the Rocket Launcher, A.T., 2.36", M1A1. The stabilizer tube and finned tail of the T26 are the same as those on the 2.36" rockets M6A1 and M7A1, and its ballistics are identical to those of the H.E.A.T. rocket. The head of the T26 rocket is rounded, while the heads of the M6A1 and M7A1 rockets are pointed.

Principal Characteristics

- Length..... 19.5 ins.
- Weight..... 3.5 lbs.
- Muzzle Velocity..... 260 f/s
- Maximum Range..... 600- 700 yds.
- Effective Range..... 150- 600 yds.
depending on type of target
- Fuze..... Base detonating,
integral with rocket
- Filler..... White Phosphorous
- Weight of filler..... 405 grams
- Burster charge..... EC Powder
- Weight of Burster charge.. 3.5 grams



ROCKET, SMOKE, W.P., 2.36", T26

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ROCKET, H.E., 2.36", T30

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The Rocket, H.E., 2.36", T30, was designed to obtain improved fragmentation effect against personnel. It may be fired from any standard model of the 2.36" Rocket Launcher (Bazooka). The rocket is fabricated by combining the standard 2.36" rocket motor and fin assembly with the 60mm mortar H.E. Shell M49A2. Fuze, Mortar, 60mm, M52 modified to operate at the lower set back encountered in firing the rocket, maybe used to detonate the projectile. The M49A2 head contains a charge of flake TNT which weighs 0.34 pound.

The weight of the complete T30 round is approximately 4.1 pounds. The estimated muzzle velocity is 225 feet per second, and the maximum range is 500 yards.

At the present time it is questionable whether or not this rocket will be used, inasmuch as the fuze now employed is unsatisfactory when the 60mm H.E. Shell M49A2 is assembled with the rocket motor. A new fuze, under development, may eliminate this difficulty. It is also possible that the 2.36" fragmentation rocket may have greater fragmentation effect than the T30, in which case the latter projectile may be preferred.



ROCKET, H.E. 2.36", T30

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GUN, A.T., 37mm, T32 and MOUNT, TRIPOD, T9

The need for a weapon capable of hand transport which would have greater fire power than that possessed by small arms, resulted in the development of the Gun, A.T., 37mm, T32, on Mount, Tripod, T9.

The gun and mount can be broken down into five separate loads for manual transport. These loads consist of the gun tube, the breech ring with breech mechanism, the recoil mechanism and cradle, the sleigh, and the tripod mount. No load weighs more than $67\frac{1}{2}$ pounds.

The breech mechanism and gun tube are the same as for the 37mm antitank gun, M3, except that the tube is shortened and has interrupted threads for quick assembly and disassembly in the field. A locking device is located on the upper surface of the breech ring.

The recoil mechanism is the same as that of the 37mm Gun Carriage, A.T., M4, except that it has been shortened, and consequently, lightened, for ease in transportation. The cradle is fixed to the tripod mount by a small top carriage.

The sleigh fits on the cradle in the same manner as the 37mm Gun Carriage M4. The tube is secured to the sleigh by a key which fits in a keyway in the gun tube. When the key is in position in the keyway, snap locks on the sleigh secure the tube in place.

The Mount, Tripod, T9, is the same as the Caliber .50 Machine Gun Tripod, M3, with a modified traversing and elevating mechanism between the legs of the mount.

The sight to be used with this gun is the M6 Telescope, normally used with the 37mm Gun Carriage, M4. A telescope mount secured to the cradle has a horizontal adjustment similar to the M19 mount on the 37mm A.T. Gun Carriage M4. The vertical adjustment has been modified to consist of a worm gear which is clamped by a locking nut.

Ammunition consists of Shell, H.E., M63, with Fuze, B.D., M58, fixed to Case, Cartridge, 37mm, MK.IIIA2, and Shell, Canister, M2, with propellant charges modified to suit the ballistic characteristics of the T32 Gun. The velocity, 1500 foot-seconds for the H.E. M63, round was selected as the maximum allowable to suit the gun mount. The canister velocity will be less, as the same propelling charge will be used.

Principal Characteristics

| | |
|--|---------------------|
| Length of tube..... | 50 ins. |
| Weight of tube..... | 58 lbs. |
| Weight of breech ring and breech mechanism..... | 52 lbs. |
| Weight of recoil mechanism and cradle..... | 67.5 lbs. |
| Weight of sleigh..... | 28 lbs. |
| Weight of tripod..... | 51 lbs. |
| Total weight of gun and mount..... | 256.5 lbs. |
| Recoil mechanism..... | Hydro-spring |
| Breech mechanism..... | Vertical Drop Block |
| Elevation..... | -5° to +12° |
| Traverse..... | |
| With traversing bar..... | 800 mils |
| Without traversing bar..... | 6400 mils |
| Muzzle velocity (Shell, H.E., M63)..... | 1500 f/s |
| Range, 90.9 mils elevation (Shell, H.E., M63)..... | 2,500 yds. |
| Computed Maximum range (Shell, H.E., M63)..... | 7,750 yds. |



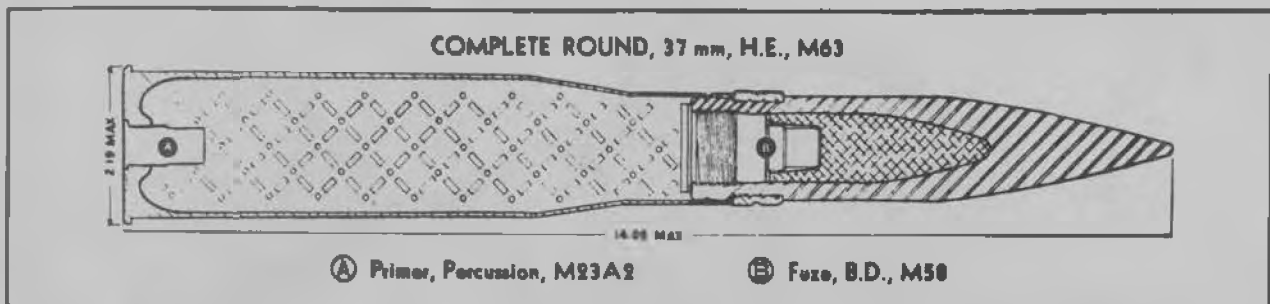
SHELL, H.E., 37mm, M63

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The H.E. round for the light weight 37mm. Gun T32 utilizes standard metal components for the standard 37mm. tank and antitank guns, but employs a different propelling charge. The Shell, H.E., 37mm, M63, with Base Detonating Fuze M58, and Percussion Primer M23A2, is assembled with the 37mm Cartridge Case M11A2. The bursting charge is TNT. The propellant for the round is M2 composition FNH powder, the grains of which have a single perforation and a web of 0.029 inch.

CHARACTERISTICS

| Projec- tile Weight | Projec- tile Charge and Weight | Fuze | Primer | Propel- ling Charge and Weight | Com- plete Round Weight | Muzzle Veloc- ity f/s | Maxi- mum Range (approx) | Rated Pres- sure p.s.i. |
|---------------------------|--|-------------|--------|--|----------------------------------|--------------------------------|-----------------------------------|----------------------------------|
| 1.61 lbs. | TNT, 0.085 lb. | B.D. M58 | M23A2 | M2 Com- posi- tion FNH powder 835 grains | 2.30 lbs. | 1500 | 7,750 yds | 20,000 |



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CANISTER, 37mm, M2

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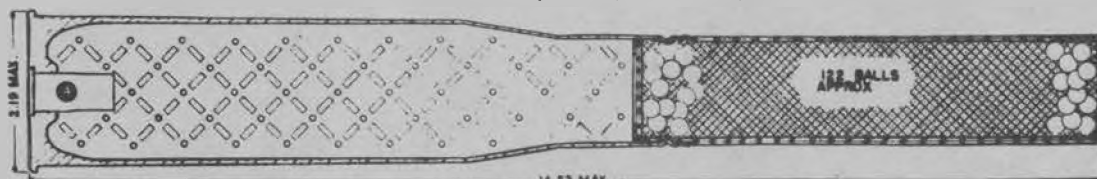
Canister, 37mm, M2, is a can-like container filled with approximately 122 balls embedded in a resinous matrix. The shock of discharge ruptures the case, which bursts within 100 feet of the muzzle. The balls are then sprayed in a cone of dispersion which makes them particularly effective against personnel in the open. The propelling charge for the round is M2 composition Powder, having a single perforation per grain with a web of 0.029 inch.

CHARACTERISTICS

| <u>Projectile Weight</u> | <u>Projectile Charge</u> | <u>Primer</u> | <u>Propelling Charge and Weight</u> | <u>Complete Round Weight</u> | <u>Muzzle Velocity</u> | <u>Rated Pressure p.s.i.</u> |
|--------------------------|--------------------------|---------------|---|------------------------------|------------------------|------------------------------|
| 1.94 | 122 | M23A2 | M2 Composition FNH powder 835 grains | 2.50 lbs. | --- | 20,000 |

The Canister, 37mm, M2, is a standard item in all respects except for a reduction in the propelling charge to enable it to be used in the Gun, 37mm, T32.

COMPLETE ROUND, 37 mm, CANISTER, M2



Ⓐ Primer, Percussion, M23A2

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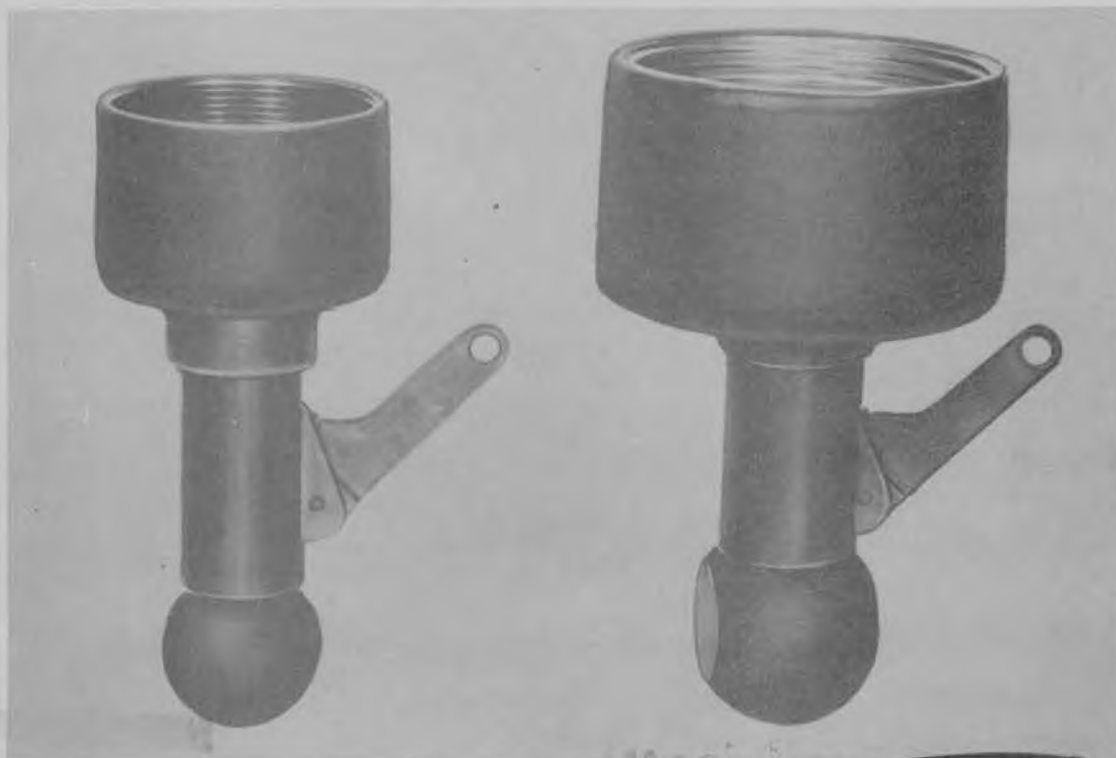
MORTAR, 60mm., T18

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The Mechanical base cap makes it possible to equip a standard mortar with a mechanical firing mechanism which will enable the weapon to be used for direct fire, and allow the firing pin to hit the primer a second time in case of misfire. Direct fire may be employed by removing the mortar from its base plate and bipod, after which the weapon can be fired at low angles of elevation by resting the base cap against a tree, rock, log, or other firm foundation.

A mechanical base cap for the 81mm. Mortar T19 differs from that for the 60mm. only in size.

The Mortar, 60mm., T18 is composed of a standard mortar tube to which is assembled a gase cap with mechanical firing mechanisms, a small gas plate, a ring type sight mount with a grenade type sight T59, and a carrying strap.



60MM. AND 81MM. MORTAR MECHANICAL BASE CAPS

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CANISTER, 75MM, T30

The 75mm Canister, T30, under development as antipersonnel ammunition for use in the 75mm howitzer, has been tested in a limited quantity. It is used in conjunction with the standard 75mm cartridge case loaded with a reduced propelling charge. The canister weighs approximately 14.7 pounds and contains 390 steel balls, each .5 inch in diameter, imbedded in a resinous matrix. This canister has also been successfully fired from the 75mm gun in limited quantity.

CANISTER, 105MM, T18

This canister, which is under development, is used for firing from 105mm howitzer M2, M2A1 and M3. The weight is approximately 33 pounds. Each of the 390 balls with which it is loaded is .7 inch in diameter.

Both the 75mm and 105mm canisters have the same pattern, with a dispersion 40 feet in diameter at 150 yards range. The penetration at 150 yards is one inch of pine boards. It has possible application against personnel and for clearing jungle undergrowth.



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105MM. CANISTER, T18

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In order to secure from a new and heavier projectile a range equal to that of standard ammunition for the 81mm Mortar M1, and to improve the range and accuracy of standard rounds, an extension has been proposed for addition to the mortar barrel. This extension increases the fire power of the weapon.

The extension is essentially an additional length of tube with a clamp at one end which fits over the muzzle of the 81mm Mortar, M1. A longitudinal split in the clamp is placed over the quadrant seat of the mortar tube, and the clamp is then tightened by means of a bar handle. The extension weighs approximately 30 pounds, and adds 23 inches to the length of the M1 Mortar. When not desired, the extension may be easily removed, thus permitting the mortar to be used in the normal manner.

While all standard 81mm mortar ammunition may be fired with the Mortar Extension, T1, the special rounds, Shell, H.E., 81mm, T19, with Fuze, M53E1, or Fuze T & SQ, T88, developed for use with the extension, should not be fired from an M1 mortar unless the extension is employed.

When fired with the extension T1 the standard Shell, H.E., M43A1 with Fuze, P.D., M52, is furnished with six propellant increments. Shell, H.E., M56 with Fuze, P.D., M53, is supplied with four increments. Muzzle velocities and maximum ranges for both shells, when used with the Extension T1, are given below:



81 MM. MORTAR EXTENSION, T1, SHOWING BOLT FOR CLAMPING TO MORTAR

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| | <u>Charge</u> | <u>Muzzle Velocity</u> (foot-secnds) | <u>Maximum Range</u> (yards) |
|--------------------|---------------|---|---------------------------------|
| Shell, H.E., M43A1 | (0 | 240 | 568 |
| | (1 | 344 | 1078 |
| | (2 | 439 | 1629 |
| | (3 | 526 | 2226 |
| | (4 | 604 | 2747 |
| | (5 | 676 | 3165 |
| Shell, H.E., M56 | (6 | 744 | 3491 |
| | (1 | 322 | 965 |
| | (2 | 436 | 1627 |
| | (3 | 532 | 2239 |
| | (4 | 617 | 2775 |



81 MM. MORTAR AND EXTENSION TUBE, T1, WITH AMMUNITION

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FUZE, TIME AND SUPERQUICK, T88

The Time and Superquick Fuze, T88, under development is a combination fuze designed to effect functioning of 81MM Trench Mortar projectiles after a predetermined lapse of time in flight, or upon impact. The fuze has a 25-second time ring and the time setting arrangement of this fuze is such that it may be reset. The fuze will arm satisfactorily with all propelling charges standard for the 81MM Mortar.

The T88 Fuze is "detonator safe" because the slider in the unarmed position holds the detonator out of alignment with the booster charge. Arming of the slider within the bore of the mortar is prevented by the safety pin, the head of which "rides" the bore of the mortar, thereby retaining the slider in the unarmed position while the round is in the bore.

The lower cotter pin prevents the arming of the setback pin during transportation, thereby insuring against arming the slider.

The upper cotter pin supports the plunger during transportation, thereby preventing accidental shearing of the shear pins and firing the primer. The upper cotter pin also supports the firing pin.

When the graduated time train ring is set safe the metal between the ends of the powder time train in the graduated ring covers the body pellet. At this setting it is possible for both time trains to burn completely without igniting the body pellets.

The vents in both time train rings are sealed by vent closing discs which serve to seal the rings and prevent premature ignition of the powder trains by propellant gases in the mortar. The pressure generated by the gases upon ignition of the powder train ruptures these discs, thereby providing vents for the gases generated as the burning of the time train progresses.

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The safety disc located at the ignition end of the graduated time train ring prevents functioning of the fuze where set at less than 0.4 second. At this setting the safety disc covers the body pellet and prevents functioning on time action. A fuze so set, however, will function on impact.

When fired from the mortar, the setback force causes the plunger to shear the shear pins and force the primer striker against the primer. The primer, upon firing, ignites the upper ring pellet, which in turn ignites the black powder in the upper time train ring. Setback also causes the setback pin to be withdrawn from engagement in the safety pin, in which position it has been held by pressure from the setback pin spring. Upon withdrawal of the setback pin, the safety pin is partially ejected outward by the safety pin spring, until the head comes in contact with the bore of the mortar, where it remains to constrain the slider from movement until the round emerges from the bore. As soon as contact with the bore is lost at the muzzle, the safety pin spring completes ejection of the safety pin, throwing it clear of the fuze. The slider is then forced to the armed position by the slider spring. The detonator in this position is also exposed to the relay. The guide pin restrains the slider from rotational movement during the arming stroke.

If the graduated time train ring is set safe, or if the time setting is greater than the time of flight, then, upon impact, the striker is depressed against the pressure of the firing spring which serves to support the striker against air pressure while in flight. Depression of the striker effects penetration and functioning of the detonator in the slider which, in turn, functions the booster charge. This charge effects functioning of the projectile to which the fuze is assembled.

The weight of the Fuze, T. & S.Q. is approximately 1.48 pounds.

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SHELL, H.E., 81MM, T19

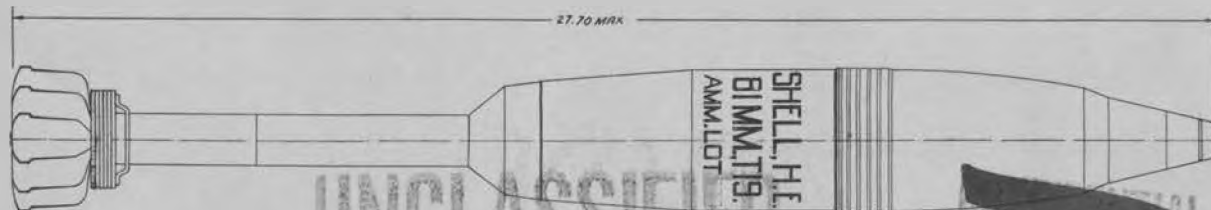
The Shell, H.E., 81mm, T19, under development, was designed for use in the 81mm Mortar M1 with the 81mm mortar extension T1. Since the purpose of the shell is the partial or total penetration of log type bunkers and similar fortifications the shell walls are thickened sufficiently to withstand impact with such materials. A .15 second delay in functioning enables the large TNT charge of the projectile to do great damage to the structure attacked. The high angle of fire combines with the weight of the shell to create a high terminal velocity necessary for penetration of field fortification roofs.

The Shell, T19, is planned for four propellant increments which will give a muzzle velocity varying from 368 foot seconds (Charge 3) to 563 foot seconds (charge 6), with ranges of from 1267 yards to 2613 yards.

The shell was formed by changing the outside contour of Shell, H.E., 90mm, M71, to allow it to be used in the 81mm Mortar M1. The modified projectile was then combined with the standard 81mm Mortar Shell fin assembly, with a boom 5 3/4 inches long.

PRINCIPAL CHARACTERISTICS

| | |
|-----------------------------------|-------------------|
| Length..... | 27.7 ins. |
| Weight, Complete (with fuze)..... | 20.74 lbs. |
| Primer..... | M34 |
| Ignition Cartridge..... | M6 |
| Fuze..... | P.D., M53E1 |
| Projectile charge and weight..... | TNT, 2.35 lbs. |



81MM. MORTAR AND EXTENSION, T1, WITH AMMUNITION SHELL, H.E., 81MM., T19

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SHELL, H.E., 105MM, T17

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This shell which is under development, is for fragmentation use against personnel sheltered in fox holes, and for the destruction of bunkers and other field fortifications. It is fired from the mortar, 105mm, T13. While the range for which the present projectile is designed is established at 2000 yards, it is expected that this will be extended to longer range when a base plate and bipod capable of taking the greater pressure have been developed.

The T17 shell weighs 28.5 pounds, with a charge of approximately 4.9 pounds of TNT. Final details of the propellant have not been determined, although about 1,800 grains of 81mm powder is the probable amount to be employed. This will give a muzzle velocity of 480 foot-seconds and a range of approximately 2000 yards.

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 MORTAR, 105MM, T13

The Mortar, 105mm., T13, was designed to provide a mortar of medium weight with greater firepower than that of the 81mm. mortar. It may be used against personnel, foxholes and bunkers, and as an infantry weapon to accompany initial landing forces to provide artillery fire until conventional pieces are landed.

The tube of the T13 mortar is in two sections which may be disassembled for carrying. The bipod and base plate, comprising Mount T12, are identical with those of the 81mm. mortar except for the tube clamp. The 81mm. sight, M4, is used with this weapon. Shell H.E., 105mm., T15, is fired from the 105mm. mortar, T13.

The T13 mortar and mount may be broken down into individual loads for manual transport on Quartermaster Corps Packboards. The mortar comprises two loads, with two additional loads for the mount and accessories, and ten loads for ammunition. The weights of the weapon loads are as follows:

| | |
|------------------------|----------------|
| Mortar, Base Section | 54 lbs. |
| Mortar, Muzzle Section | 42½ lbs. |
| Mount, Bipod | 40 lbs. |
| Mount, Base Plate | <u>42</u> lbs. |
| Total | 178½ lbs. |

While the mortar T13 is at present limited to firing a 28-pound shell with a maximum range of 2,000 yards, due to the inability of the 81mm. mortar base plate and bipod to withstand heavier firing reactions, a special 105mm. base plate and bipod under development will eventually permit a 33-pound shell with a range of 6,000 yards to be used with this weapon.

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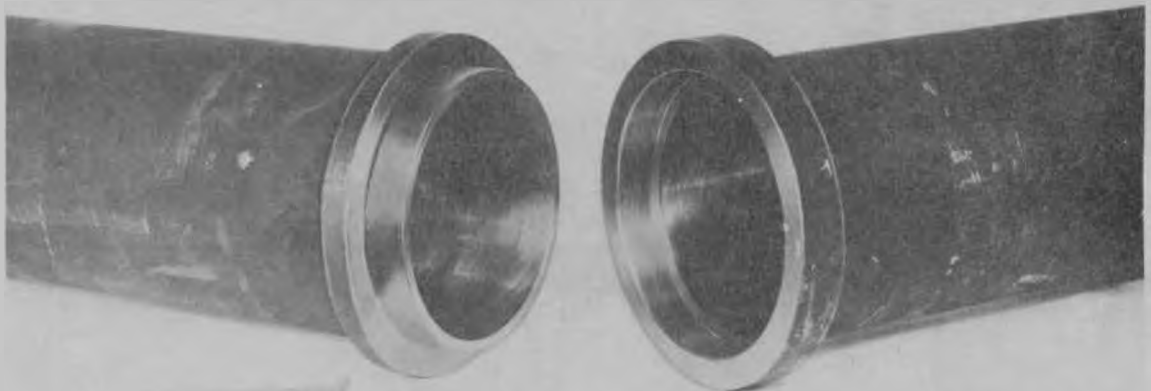
71



105MM. MORTAR, T13E6, AND MOUNT, T12, IN FIRING POSITION



CLAMP FOR 105MM. MORTAR T13E6



BOTTOM SECTION JOINT (LEFT) AND MUZZLE SECTION JOINT (RIGHT) OF 105 MM MORTAR T13E6

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LAUNCHER, ROCKET, ARTILLERY, 4.5 INCH, T35

The Launcher T35 is a ground-to-ground weapon that is essentially an artillery piece consisting of a launcher tube complete with a 4.5" rocket. It may be used by landing parties in establishing beach-heads, or against bunkers and other field fortifications. The weight of the launcher, approximately 52 pounds, permits it to be carried to the firing position on the shoulder of one man. The T35 launcher is expendable, designed for firing only one round.

The launcher consists of a plastic tube 4 feet long with waterproof covers at each end. The rocket used for firing is contained in the tube as an integral part of the weapon. Four folding legs, two in front and two in back, are attached to the tube and can be pushed into the ground to form a base, elevation being controlled by the depth to which the rear legs are inserted.

In the rear of the launcher tube are located two spools, each of which holds 100 feet of wire. One end of the wire is soldered to the contact ring on the rocket igniter cup.

Firing is accomplished electrically by means of a remote blasting machine magneto exploder with a ten cap capacity. Rockets may be fired singly, or in salvos in which case the rockets, wired together in series, are set up not more than 150 feet apart. The free wires of the first and last launchers are then brought together and attached to the terminals of the exploder. A small battery is included in the front cover of the launcher, and this may be used to ignite the rocket when fired singly.

The rocket M8 (more fully described hereinafter) is of the unrotated type with folding fins which open when it leaves the tube. For use in Launcher T35 the rocket is equipped with Fuze P.D., M4 (.10 second delay).

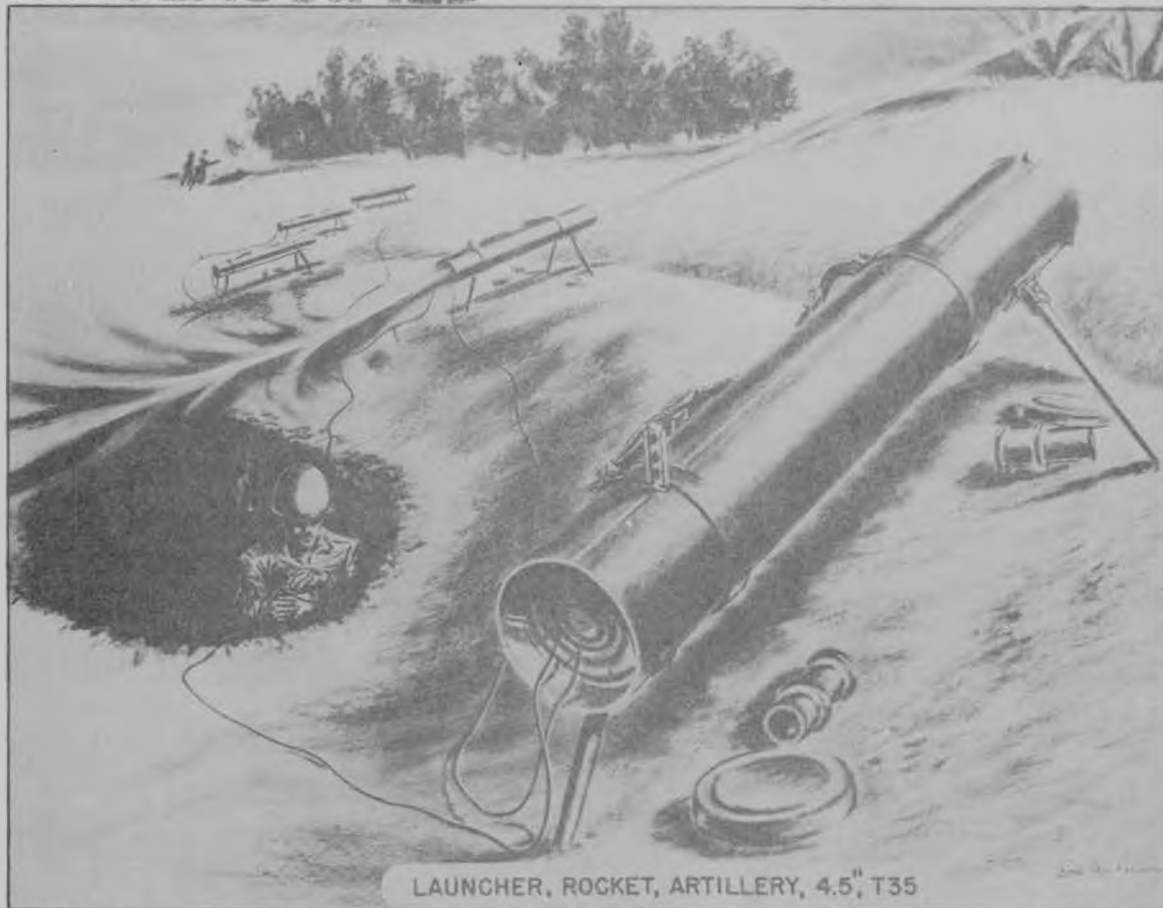
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LAUNCHER, ROCKET, ARTILLERY, 4.5", T35

LAUNCHER, ROCKET, ARTILLERY, 4.5", T35, ARTIST'S VISUALIZATION OF LAUNCHERS IN ACTION



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LAUNCHER, ROCKET, ARTILLERY, 4.5", T35, DISASSEMBLED

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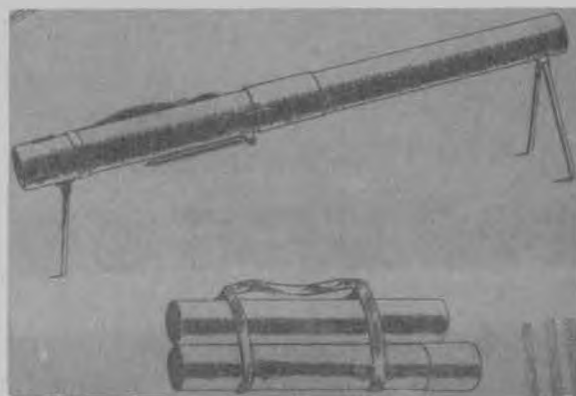
LAUNCHER, ROCKET, ARTILLERY, 4.5", T38

Because the 4.5" Rocket Launcher T35 was designed primarily for short range fire, with accuracy a secondary consideration, a launcher of the same general type but with greater accuracy than the T35 was proposed. The light weight of the expendable plastic launcher with its projectile makes it particularly desirable for use under jungle conditions. By increasing the length of the tube it was felt that sufficient accuracy could be obtained to make such a weapon satisfy the requirements of jungle warfare.

The T38 launcher consists of a modified Rocket Launcher T35 and an additional tube four feet long bearing a sleeve at one end which fits over the muzzle end of the T35. When the two tubes are assembled it results in a single tube eight feet in length. The extension tube has two folding legs in front, which, with the two legs at the rear end of the T35, form a base for emplacing the launcher. To obtain elevation the front legs may be extended to the proper length and locked in position.

In order to give proper elevation to the launcher a T59 sight will be mounted on the side of the T35 tube.

For transport the unit is disassembled and the two tubes are strapped together. A carrying strap enables the T38 to be carried by an individual soldier. The weight of the assembly is approximately 75 pounds.



LAUNCHER, ROCKET, ARTILLERY, 4.5", T38

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ROCKET, FRAGMENTATION, 4.5", T29

The Rocket, Fragmentation, 4.5", T29, may be used for ground-to-ground fire in all existing 4.5" ground launchers, and in 4.5" aircraft rocket launchers for plane-to-ground fire. Its primary function is as an anti-personnel projectile.

The T29 weighs approximately 44 pounds. It is composed of a 4.5" rocket motor to which is assembled a standard 20 pound fragmentation bomb head modified to fit the motor. The head contains a charge of TNT weighing 2.7 pounds which is detonated by the fuze M127 modified to arm only after acceleration has taken place. The fuze which is a mechanical type, will allow for setting either air burst or instantaneous burst upon impact.

This rocket will have a range of approximately 3,600 yards at 42° elevation.

The temperature limits for safe firing of the rocket propellant powder is from 20° F. to 120° F.



ROCKET, FRAGMENTATION, 4.5", T29

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TRACTOR-DRAWN ARTILLERY

Reports from SWPA and SPA indicate that standard artillery is a suitable means for destroying bunkers and dispersing Japanese infantry in the jungle when the artillery can be brought to bear on the target. It is believed that this can be most effectively accomplished by the use of suitable tractors. These must have adequate traction and flotation for the type of terrain to be encountered. Col. Borden's mission has indicated that tractor-drawn field artillery is the most important requirement in equipment for jungle warfare.

Three tractors — D4, D6, and D7 — are being requisitioned by the theaters for use as prime movers. Pilots are being tested at APG to determine the modifications required.

About five-sixths of the tractors are to be equipped with front winches and the remainder with blades.

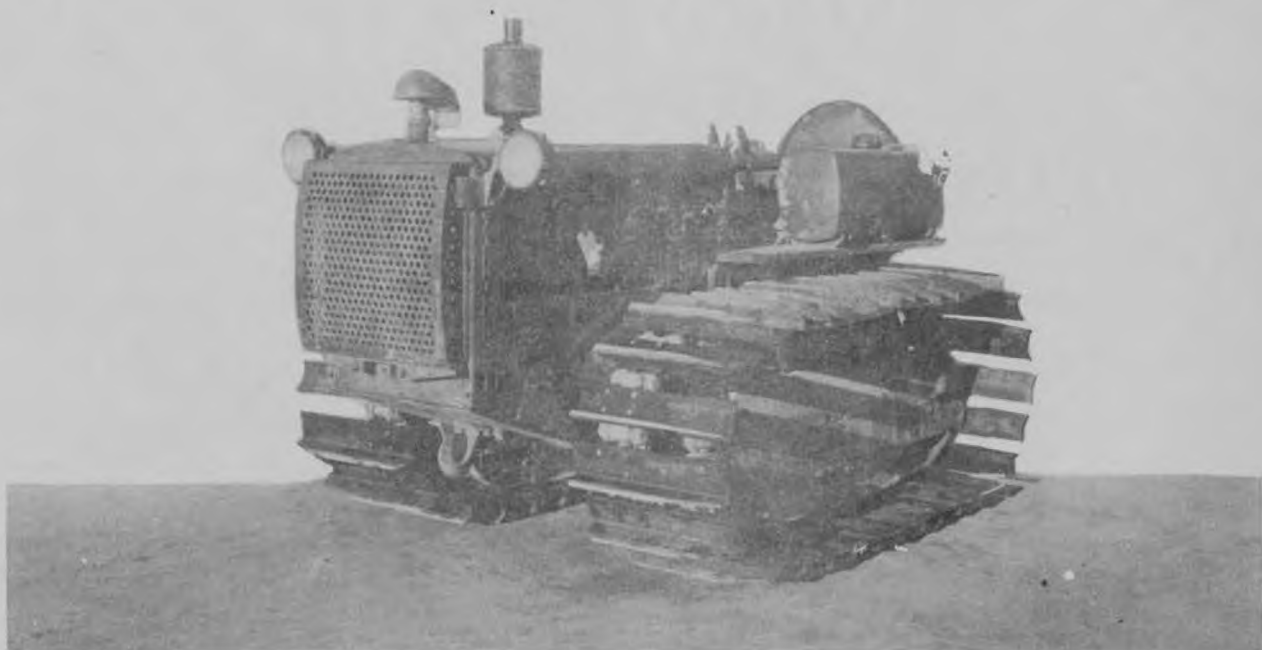
Tests (such as three in tandem hitch) are also being made on the 1-ton modified trailer and the six ton track laying Athey trailer with these tractors as prime movers. The use of skid paws (in addition to those mentioned hereinafter) is being investigated. The tractors are Dieselized and to be waterproofed for five feet of water.

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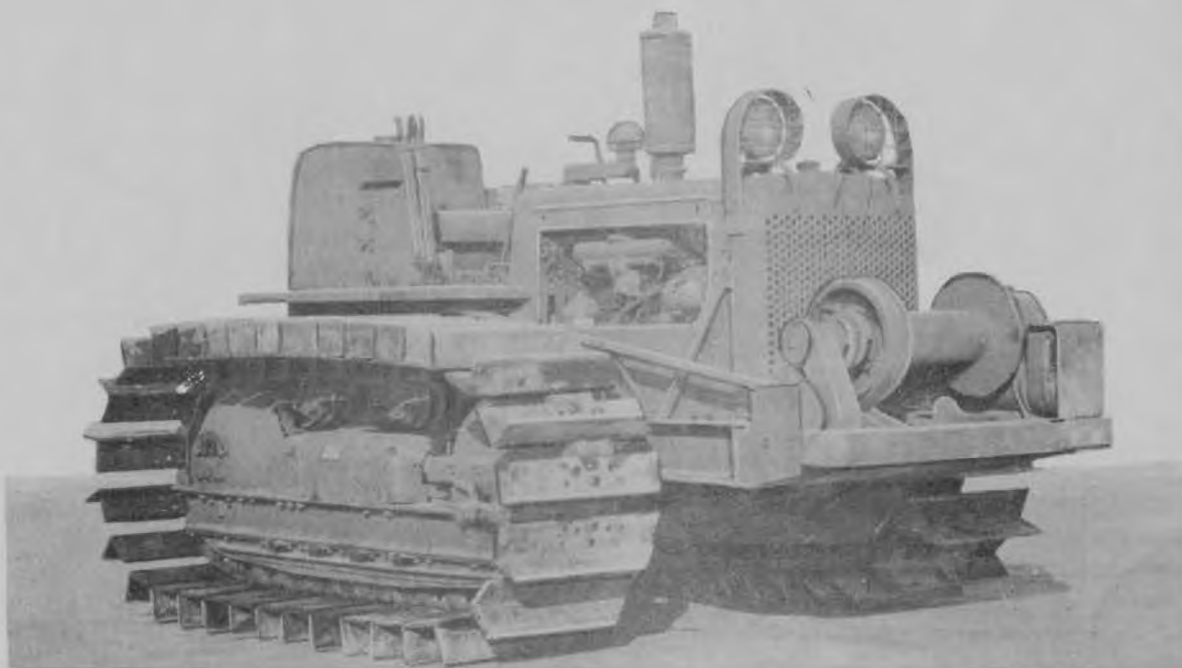
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TRACTOR, D-4, WITH 24" ANGLE IRON TRACK AND 3 1/2" TAPERED GROUSER



TRACTOR, TD-9, WITH FRONT MOUNTED WINCH AND 5"x5" ANGLE IRON TRACK

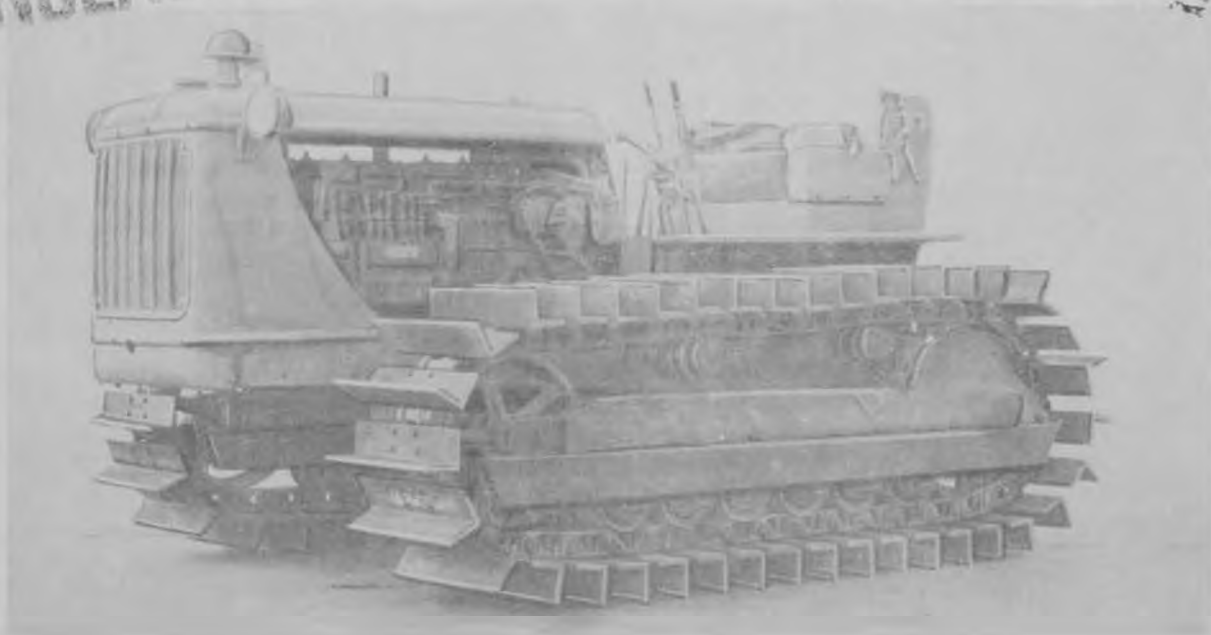
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TRACTOR, D-6, WITH STANDARD 20" PLATES REPLACED BY 24" OPEN PLATES
MANUFACTURED FROM 5"x5" ANGLE IRONS



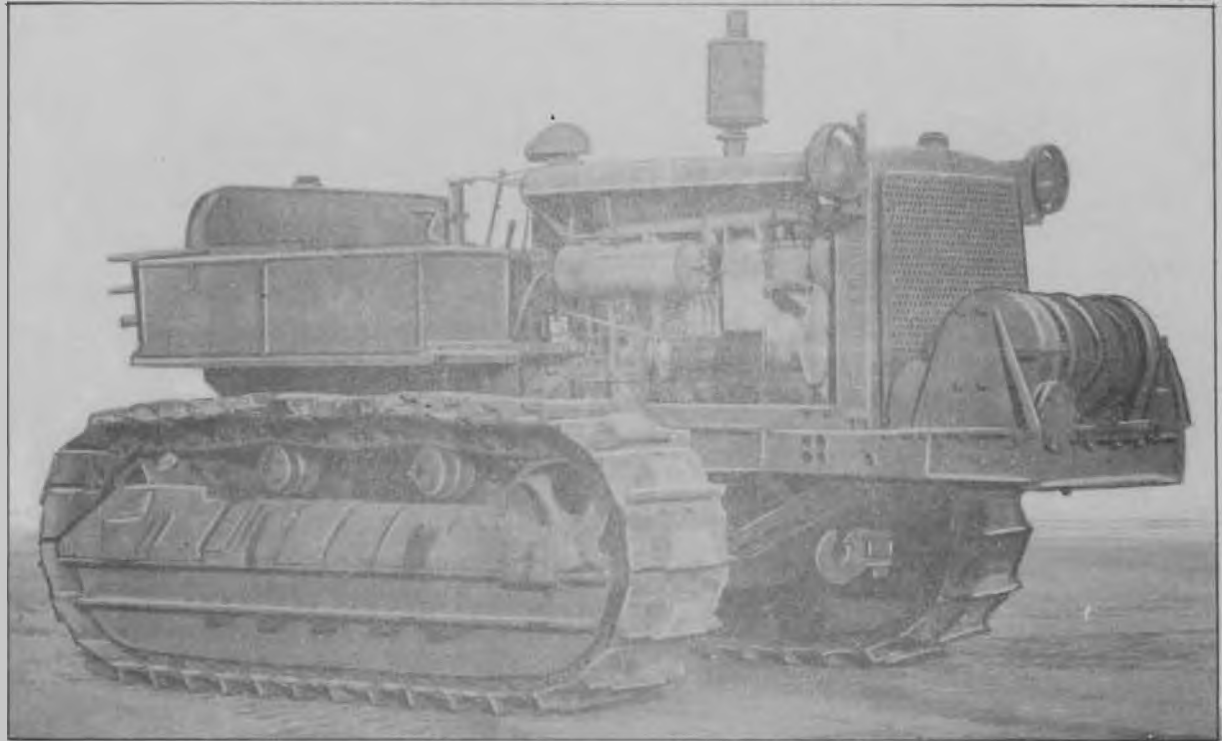
TRACTOR, TD-14, WITH FRONT MOUNTED WINCH

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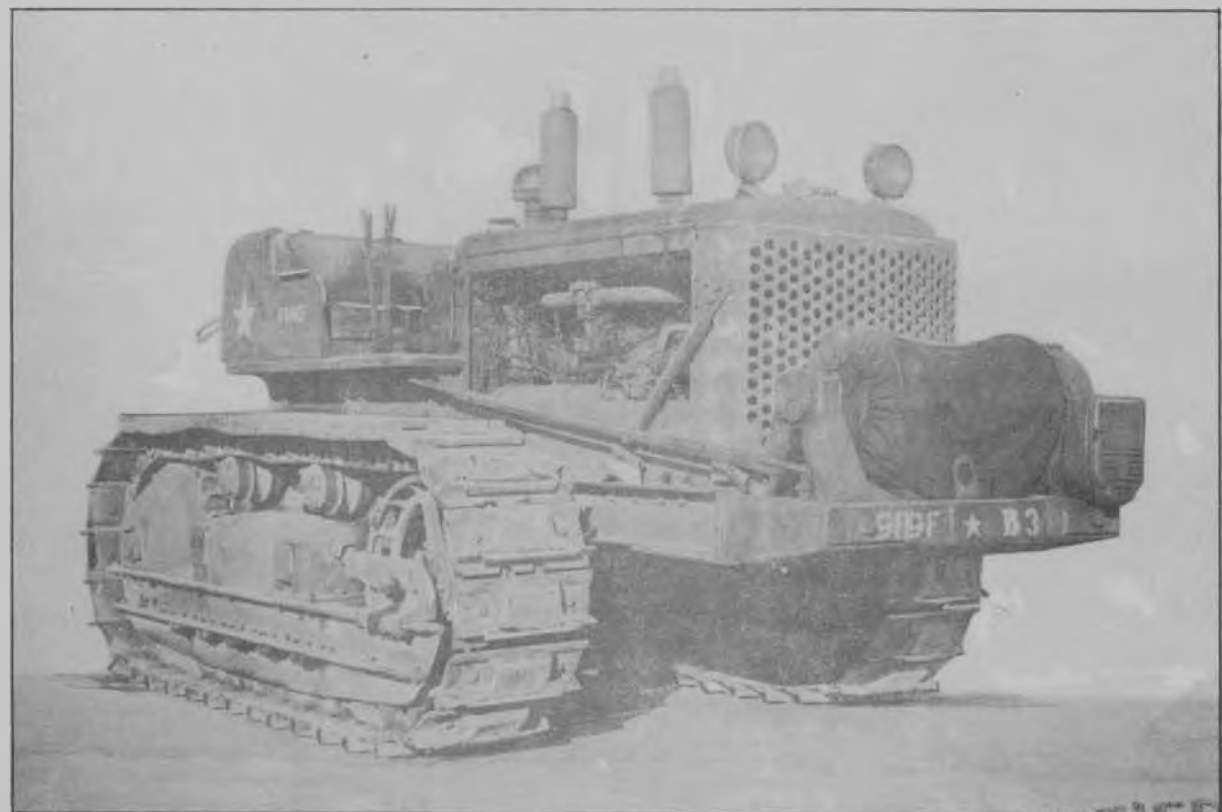
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TRACTOR, D-7 WITH STANDARD 20" PLATES, STREET PLATES AND FRONT WINCH



TRACTOR, TD-18, WITH FRONT MOUNTED WINCH

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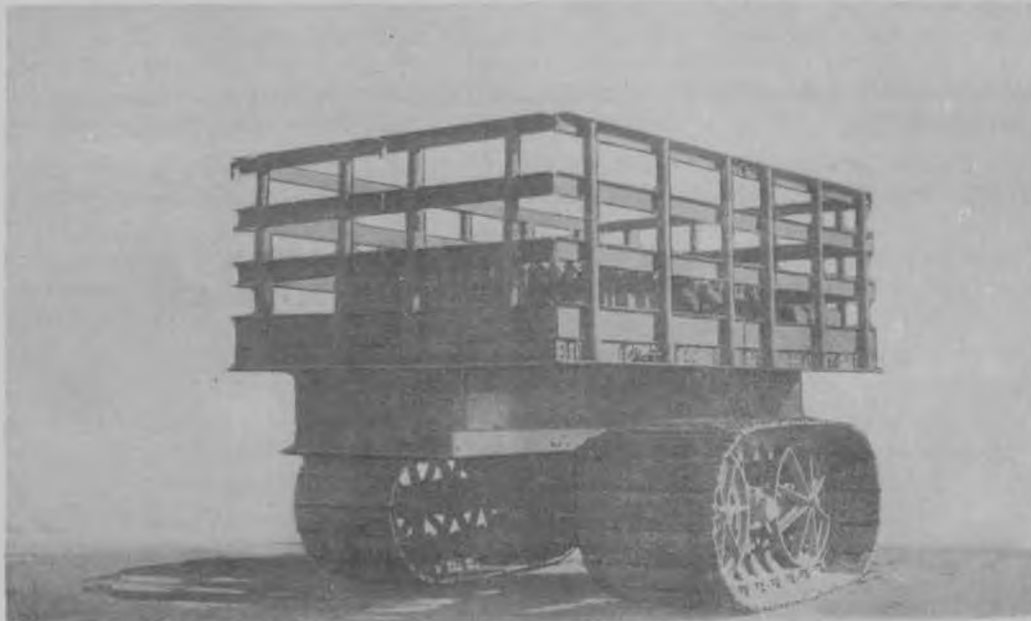
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TRAILER, ATHEY, TRACK LAYING, 6 TON, ES451

The 6-ton Athey Track Laying Trailer, ES451, was recommended because of its close similarity to the Model BT-898-4 trailer purchased by the Ordnance Department. In order to reduce the ground pressure from 13.8 to 9.2 pounds per square inch, tracks of 30" width are proposed in place of the 20" tracks originally supplied.

APPROXIMATE CHARACTERISTICS

| | |
|-------------------------------|------------------------------|
| Net weight | 9,000 lbs. |
| Gross weight | 21,000 lbs. |
| Overall length | 199 ins. |
| Overall width | 106.5 ins. |
| Overall height | 92 ins. to top of stakes |
| Cargo space | 11 ft. 6 ins. x 7 ft. 2 ins. |
| Ground clearance | 14.5 ins. |
| Track contact and (30" track) | 2,280 sq. ins. |
| Turning radius | 12 ft. |



ATHEY TRAILER, 6-TON, WITH 30" TRACK

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KITS, CAPSTAN, FOR $\frac{1}{4}$ -TON 4 x 4 TRUCK

In view of the desirability of a front mounted winch on the $\frac{1}{4}$ -ton 4 x 4 truck (Jeep), and request from the field for such modification, a capstan from a $\frac{1}{4}$ -ton 4 x 4 Amphibian has been adapted for this purpose. The capstan is mounted on the frame channels in front of the Jeep radiator on a plane with the bumper. Drive for the capstan is furnished from the front end of the engine crankshaft.



FRONT MOUNTED CAPSTAN ON $\frac{1}{4}$ -TON 4x4 TRUCK. RIGHT FRONT VIEW



FRONT MOUNTED CAPSTAN ON $\frac{1}{4}$ -TON 4x4 TRUCK. LEFT SIDE VIEW

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TREE MOUNT, T71 - FOR FLEXIBLE CAL. .30 MACHINE GUN

For the purpose of firing a remotely controlled machine gun at enemy troops or positions without a tripod or from stations well above ground a mount was proposed which would permit a Flexible Cal. .30 Browning Machine Gun M1919A4 to be fastened to a tree.

The Tree Mount, T71, consists of a jointed arm with a vertical base plate at one end and an ammunition box and a mount for the gun at the other end. The gun may be traversed on the mount and clamped in the position desired. The gun and mount can be raised or lowered by loosening the nut securing the hinged arm joint. Elevation of the weapon is accomplished in the usual manner by means of the regular elevating mechanism.

The mount and gun are fastened to a tree by a chain attached to the base plate and passed around the trunk until it is engaged in a notch on the opposite side of the base plate. Provision is made for taking up the slack of the chain and securing it firmly.

This mount is now undergoing modifications. The Tree Mount, T71 is only one of several tree mounts under investigation.



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TREE MOUNT, T71 -- FOR FLEXIBLE MACHINE GUN, CAL. .30

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MORTAR, 60MM, SHOULDER FIRED

The shoulder fired 60mm Mortar is a development proposed by a member of the Marine Corps. It is of the recoil type, consisting of a 60mm mortar tube partly enveloped by a sleeve containing a spring recoil mechanism which absorbs the recoil and returns the tube to firing position. A trigger activated firing mechanism fires the standard H. E., M49A2 shell with cartridge only, used in this weapon. Recoil of the mortar tube cocks the firing mechanism. The mortar is supported by a bipod with folding legs and has a rectangular shoulder rest attached to the rear end of the sleeve. A bar sight adjustable for elevation by means of a knurled knob is fastened to the left side of the sleeve.

With this mortar it is possible to obtain hits on a 6' x 6' target at ranges up to 600 yards. It is recognized that the heavy recoil of this weapon places a severe strain on the operator.



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60 MM. SHOULDER FIRED MORTAR, WITH SIGHT

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CANISTER AMMUNITION 75 MM, 76 MM, 90 MM

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Canister rounds for the 75 mm gun, the 76 mm gun, and the 90 mm gun are under investigation.

SHELL, WP FOR 105 MM HOWITZER, T13

Design studies are now being made for a white phosphorus shell for the 105 MM Howitzer, T13. Upon completion of the drawings, test lots of the shell will be manufactured.

155 MM MORTAR

The development of a 155mm mortar, smooth bore and rifled, is being vigorously pursued. This weapon should be a companion piece to the 105mm mortar, T13, for use with the infantry in beach landings until conventional artillery arrives, and for attack of heavier installations.

The mortars under development include a breech-loading rifled type, and muzzle-loading smooth bore and rifled types. It is expected that ranges of approximately 6,000 yards may be obtained with projectiles weighing from 60 to 90 pounds. Preliminary firings indicate great promise for this weapon.

Carts and wheeled mounts are under investigation for transporting this mortar.



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EXPERIMENTAL PROJECTILE NO. 2 FOR 155 MM. MORTAR, T15

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155 MM MORTAR, T16, ON 155MM MORTAR MOUNT, T9

This mortar is a muzzle loading, rifled bore, gas ignition, separate primer weapon using the bipod type mount, T9, with baseplates designed for log support. Where no logs are available, a separate tripod base has been provided, together with three plate footings in order to absorb the recoil on soft ground. The barrel is 10 calibers long, and fires a projectile weighing 63 pounds.

| | |
|--------------------------------------|--------------|
| Elevation | 35° to 80° |
| Total traverse | 30° |
| Muzzle velocity (65° elevation) | 500 f/s |
| Max. range (approx. 65° elevation) | 2,000 yards |
| Powder pressure | 2,600 p.s.i. |
| Weight (gross) with log support base | 1,167 lbs. |
| Weight (gross) with ground base | 1,164 lbs. |
| Heaviest single portage load | 285 lbs. |

155 MM MORTAR, T17, ON 155 MM MORTAR MOUNT, T10

The 155mm mortar, T17, is similar to the mortar, T16, except that the T17 tube has a smooth bore. The mount, T10, is of the same general type as the mount, T9. It has bases for log support and for firing when emplaced on soft ground. The mortar and mount disassemble into the smallest practical unit loads for transport, the heaviest single load having a gross weight of 440 pounds.

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155 MM MORTAR, T24

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There is under development at the present time, a 155mm mortar, T24, which is being designed to more nearly incorporate the ideal requirements of a jungle warfare mortar than do the mortars T16 and T17. The estimated range of the mortar, T24, is 2,500 yards. In order to more closely approximate the portage weights desired for jungle transport, an attempt will be made to keep the heaviest unit load within 150 pounds.



155MM. MORTAR, T16 (RIFLED BORE),
AND MOUNT, T9, WITH LONG BASE PLATE,
IN FIRING POSITION



155MM. MORTAR, T17 (SMOOTH BORE),
AND MOUNT, T10 ON BASE PLATE FOR
SOFT GROUND, IN FIRING POSITION

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LAUNCHERS, ROCKET, MULTIPLE, ARTILLERY, 4.5 INCH, T27, T27E1

This launcher, designed to provide a light and highly mobile weapon of great fire power for ground-to-ground use, is similar to the 3.25 inch Launcher, T25 except for caliber and method of transport. It is an 8 tube launcher which may be mounted on a $1\frac{1}{2}$ ton truck, or assembled for ground fire at a selected position. This weapon is in the development stage. One pilot is now at Aberdeen Proving Ground for test. The second pilot, which will be designated T27E1, is being designed for break-down into two man loads not exceeding 120 pounds each.

PRINCIPAL CHARACTERISTICS

| | |
|--------------------|--|
| Launcher | 8 tube |
| Weight | Minimum consistent with stability during firing. |
| Elevation | -5° to plus 45°. |
| Traverse | Provided by turning truck, or by shifting trail for ground fire. |
| Firing mechanism | Electric, permitting single round or ripple fire. |
| Blast protection | None for crew. |
| Sighting equipment | For indirect fire only. |

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LAUNCHER, ROCKET, MULTIPLE, ARTILLERY, 4.5", T27. RIGHT REAR VIEW,
SHOWING CABLE AND FIRING BOX

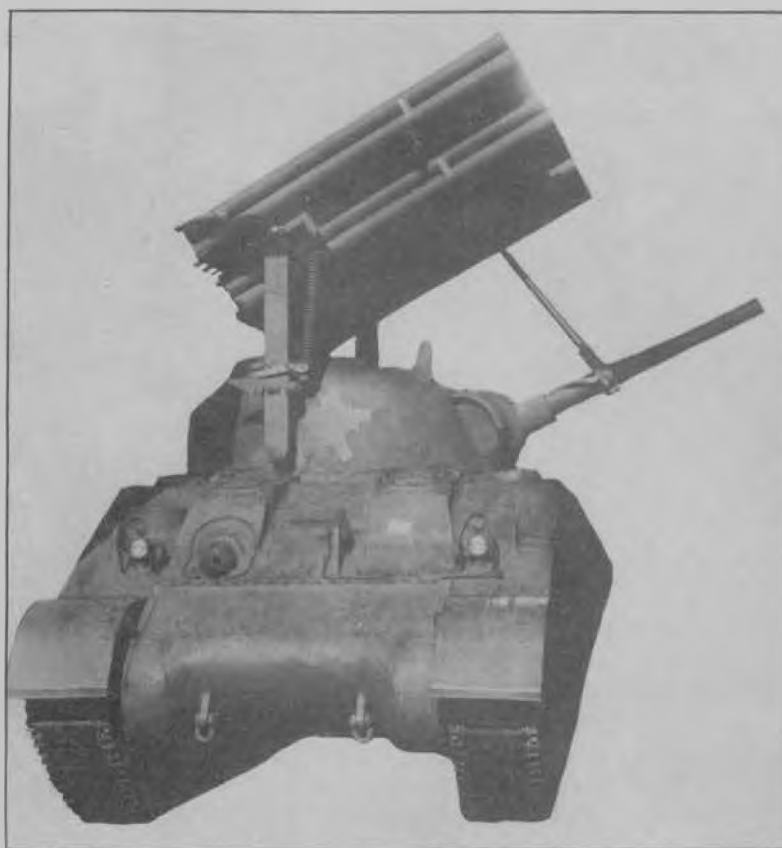
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LAUNCHER, ROCKET, MULTIPLE, ARTILLERY, 4.5 INCH, T34

This ground-to-ground launcher, now under development, will be mounted on the turret of a Medium Tank, M4, for use in the initial stage of beach landings. It is of the expendable type, composed of 60 plastic tubes which may be jettisoned after firing or when desired. The rockets are fired electrically, either singly or in ripple fire. Elevation is from -5° to plus 30° , through the gun sighting and elevating mechanism. Traverse is accomplished by movement of the turret. All 4.5" ground-to-ground rockets may be used in this launcher.



LAUNCHER, ROCKET, MULTIPLE, ARTILLERY, 4.5", T34

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ROCKET, PYROTECHNIC MIX, 4.5"

A rocket filled with the new Pyrotechnic Mix, to be fired from any of the 4.5" artillery rocket launchers, is under investigation.

ROCKET, WP, 4.5"

A smoke and antipersonnel rocket with a WP charge is also being developed for 4.5" artillery rocket launchers.

ROCKET, H.E., 7.2 INCH, T14

This rocket was designed as a powerful demolition projectile. It is propelled by a fast burning double base powder in extruded stick form. The muzzle velocity is approximately 920 feet per second, and the maximum range is approximately 6,000 yds. Fuze T1 and Navy Fuze MK. I 37 are used with this rocket. Work was suspended on this T14 rocket while it was in the design stage, due to the large number of projects in progress, but development was resumed in September, 1943.

ROCKET, CHEMICAL, 7.2 INCH, T15

Rocket T15 is similar to the T14 H.E., except for substitution of a chemically loaded head in place of the H.E. head used on the T14. The weight is approximately 70 pounds. The minimum range for this projectile is 500 yards. Fuzes are the T1 and Navy Mk. I 37. Development status is identical with that for the T14.

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 ROCKET, H.E., A.T., 7.2 INCH, T16

This is the T14 rocket with an H.E., A.T. head for anti-tank use. Development of this rocket was suspended until September 1943, when it was resumed.

ROCKET, PRACTICE, 7.2 INCH, T17

This practice rocket is the Rocket, H.E., 7.2 Inch, T14, on which an inert head has been substituted for the original H.E. head. Development of the project was suspended for a period, but was resumed in September, 1943.

ROCKET, CHEMICAL, 7.2 INCH, T21

This is a fin-type rocket with a head containing a chemical load. Four longitudinal fins are now welded over the ring fins of the original design to give additional stability and improve the dispersion.

The motor is 3.25 inches in diameter, 29 inches long, and contains a propellant consisting of four sticks of powder. Each stick of powder has an outside diameter of 2.4 inches, an inside diameter of 1.00 inch, and a length of 24 inches.

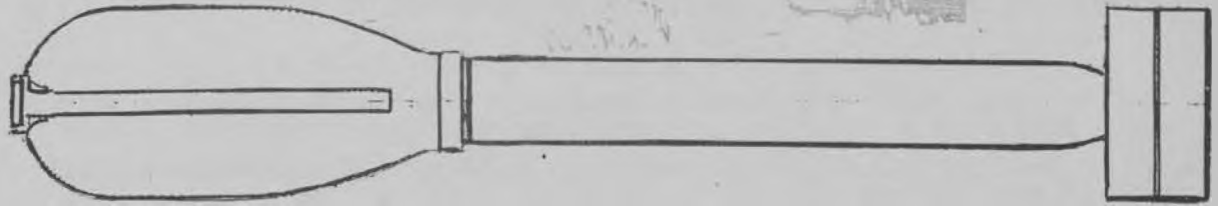
PRINCIPAL CHARACTERISTICS

OF

ROCKET, CHEMICAL, 7.2 INCH, T21

| | |
|------------------------------|-----------------------------|
| Length (w/o fuze) | 45.4 ins. |
| Weight | 50 lbs. |
| Weight of head (with filler) | 28.21 lbs. |
| Type of filler | Chemical |
| Weight of filler | 20 lbs. |
| Fuze | T1 or Navy Mk. 137 modified |
| Muzzle velocity | 600 f/s |
| Maximum range | 3,500 yds. (approx.) |

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ROCKET, H.E., 7.2 INCH, T24

This rocket is identical with the Rocket Chemical, T21, except that it employs an H.E. head in place of the chemical head used in the T21.

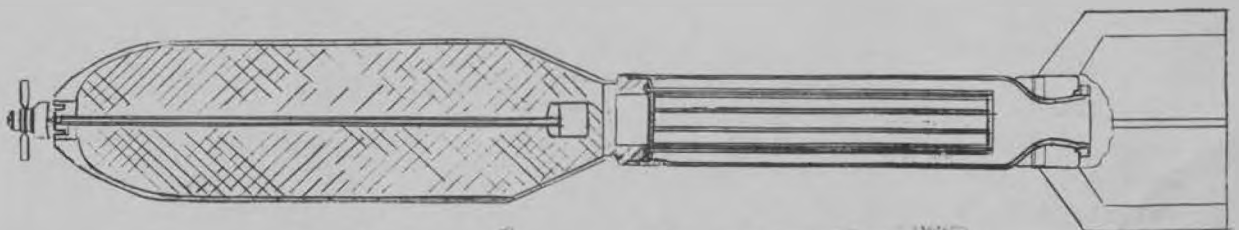
ROCKET, CHEMICAL, 7.2", T21

ROCKET, H.E., 8", T25

The 8" Rocket T25 is composed of the standard 100-lb. M30 Demolition Bomb with Fuzes M103, mounted on a 4.5" Rocket Motor. It has been successfully fired in tests at Aberdeen Proving Ground.

PRINCIPAL CHARACTERISTICS

| | |
|------------------------|----------|
| Weight | 120 lbs. |
| Explosive charge (TNT) | 50 lbs. |
| Overall length | 58 ins. |
| Muzzle velocity | 275 f/s |
| Range (approximate) | 500 yds. |



ROCKET, H.E., 8", T25

CHEMICAL BOMB, 100-POUND, M47A2 - PYROTECHNIC MIX OR WP CHARGE

Experiments are being undertaken by the Chemical Warfare Service and California Institute of Technology to determine if pyrotechnic mix and white phosphorous can be used successfully in this projectile. If the tests are satisfactory the bomb may then be assembled to a rocket body for use with launchers. Three 100-pound bombs will carry as much payload as one 500-pound bomb and have greater dispersion. This bomb may be loaded with WP for antipersonnel use.

ROCKET, H.E., 10 INCH, T10

The Rocket, H.E., 10 Inch, T10, is a ground-to-ground projectile which can be used for demolition, or as a chemical shell. When used for demolition purposes, the head is filled with T.N.T., for which chemicals are substituted when desired. The rocket has fixed fins and is fired electrically.

PRINCIPAL CHARACTERISTICS

OF

ROCKET, H.E., 10 INCH, T10

| | |
|---------------------------------|-------------------------|
| Weight, total | 210 lbs. |
| Length, overall | 53 ins. |
| Muzzle velocity | 550 f/s |
| Range (45° elevation) | 2,200 yds. |
| Weight of head (w/o filler) | 40 lbs. |
| Weight of filler (T.N.T.) | 77 lbs. |
| Fuze | Fuze, Bomb, Nose, M110 |
| Motor | |
| Length | 23½ ins. |
| Diameter | 10 ins. |
| Propellant (Double Base Powder) | 108 sticks |
| Length, each stick | 5 ins. |
| Outside diameter, each stick | 7/8 ins. |
| Inside diameter, each stick | ¼ ins. |
| Burning time | 0.2 sec. |
| Internal pressure | 2,800 lbs. per. sq. in. |

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ROCKET, H.E. 10", T10

ROCKET, H.E., 10 INCH, T10E1 (HIGH VELOCITY)

This rocket differs from the T10 in the following specifications:

| | |
|---------------------------------|------------|
| Total weight | 190 lbs. |
| Muzzle velocity | 1,050 f/s |
| Maximum Range | 5,000 yds. |
| Weight of head (w/o filler) | 28 lbs. |
| Weight of filler (T.N.T.) | 40 lbs. |
| Fuze | M4 |
| Propellant (Double Base Powder) | 162 sticks |

ROCKET, H.E., A.T., T10E2

Rocket T10E2 differs from the T10 only in its weight (180 pounds) and the use of an H.E., A.T. head employing the hollow charge principle. The head without filler, weighs 40 pounds. The weight of the T.N.T. filler is 35 pounds.

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PARACRATES

In order to provide for the safe dropping of a weapon, its related equipment, and a supply of ammunition by parachute, paracrates are under development. A paracrate consists of a suitable protective container or support and cover especially designed for the material which it is to contain. It is provided with parachute harness and with quick release fastenings. If it is to be dropped from a bomb rack, a paracrate also has rings for attachment to a bomb shackle.

At present, complete paracrate equipment has been standardized for the 75MM pack Howitzer, M1A1 on the 75MM Howitzer Carriage, M8. The howitzer, mount, sighting equipment, spare parts, and tool box are divided into seven loads which are contained in Paracrates, M1 to M7 inclusive. Ten rounds of ammunition, each in a fiber container, are packed in Paracrates M8. The ninth load, designated Paracaisson M9, consists of eight rounds of ammunition, in their containers, with the wheels, axle, drawbar, and other components of a cart. The cart may later be used with the caisson or for other purposes. The weights of the respective loads range from 202 lbs. to 331 lbs. Each load is attached to a standard 24 foot cargo parachute. Usually each parachute is of a different color, so that the various loads may be quickly identified.

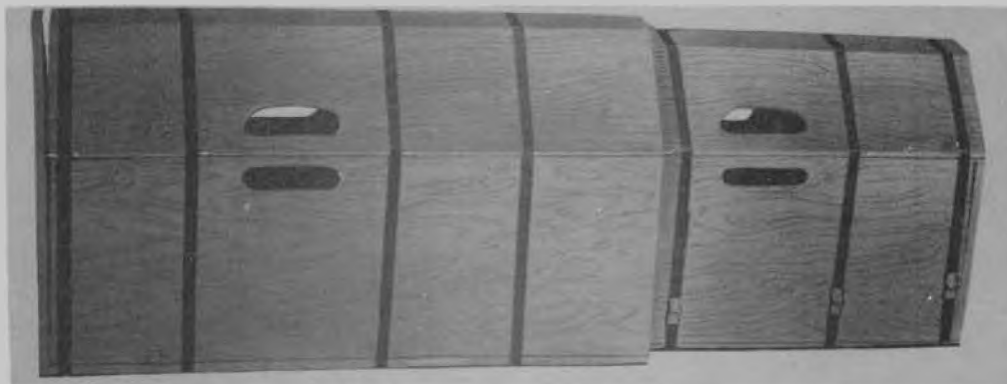
Paracrates M1 to M5 and the paracart are dropped from the parachute pack racks beneath the airplane. The remaining three loads are pushed out the open door of the airplane in a daisy chain arrangement.

Another group of paracrates are now under development for use with the 75MM pack Howitzer. These include Paracrates T12 and T13 and Paracaisson T14, made of corrugated steel; as well as paracrates T15 and T16 and Paracaisson, T17, all made of corrugated steel. These items are to be given comparative tests with the standard plywood paracrates.

Designs for packing and crating to provide for delivery within the theaters by air of special jungle warfare items are being expedited.



PARACRATE, T1, WITH CHUTE SUSPENSION



PARACREST



PARACRATE, T8 (CLOSED TYPE), ASSEMBLED

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105MM HOWITZER INSTALLATION ON LIGHT TANK, M5

The installation of the airborne 105mm Howitzer, M3A1 in Light Tank, M5, provides a weapon for use in jungle warfare. The howitzer is mounted on a box structure on the stripped chassis of the tank. It is positioned about 2" to the right of the center of the vehicle so as to allow sufficient space for the driver. Portions of the regular howitzer trails are used in the mounting. Thin plate sides are raised approximately 18" above the sponsons, thus providing an inclosed space for cargo and personnel with some protection against small arms fire. Later designs are providing additional protection by the use of armor shields, against grenades and small arms fire. The howitzer can be elevated and depressed between the limits of -5° and plus 30° . Limits of traverse are 22° to the right and approximately 18° to the left. This installation is now under test.

For the use in jungle warfare, it will be necessary to install wider tracks. It is expected that ground pressures of around 5 pounds per square inch can be obtained. The weight of the pilot illustrated herein, with 4-man crew, ammunition, and stowage, is estimated to be about 26,000 pounds.

Two pilots, completely engineered and stowed, are under manufacture for service test.

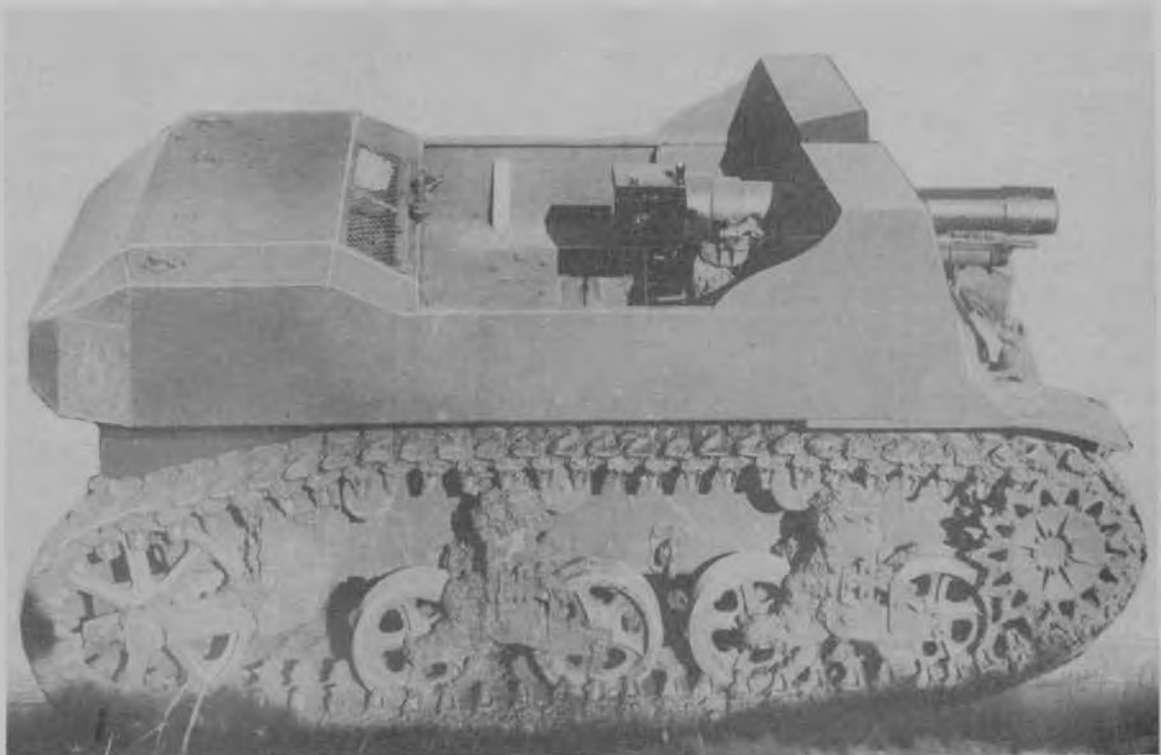
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105MM. HOWITZER, M3A1, ON LIGHT TANK CHASSIS, M5. GUN AT MAXIMUM DEPRESSION



105MM. HOWITZER, M3A1, ON LIGHT TANK CHASSIS, M5

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CROSLLEY MULE LIGHT RECONNAISSANCE VEHICLE, T30 (CROSLLEY TUG)

The Crosley Mule Light Reconnaissance Vehicle T30 was designed for operation on narrow mountain and jungle trails. It has the advantage of very narrow width and low ground pressure, while its light weight permits it to be manhandled when necessary. It has extremely good low speed maneuverability and will haul a full track trailer with a payload of 800 pounds. In average soft mud operation it will stay on top, but it is limited where there are deep ruts or holes made by other vehicles.

The T30 employs a six wheel suspension in combination with a Bombardier type track composed of rubber bands and equal spaced steel grousers. A differential braking system is employed. The engine is the Crosley 2-cylinder, air-cooled, CE-1 of 50 cubic inch displacement and a rated power of 19.5 HP at 3800 RPM.

PRINCIPAL CHARACTERISTICS

| | |
|-------------------------------|------------------------------|
| Net Weight | 950 lbs. |
| Payload | 200 lbs. |
| Gross weight | 1150 lbs. |
| Track Width | 10 ins. |
| Track Contact area | 960 sq. ins. |
| Unit Ground pressure | 1.2 lbs. per sq. in. |
| Suspension type | Wheel (6 wheel) |
| Track type | Bombardier |
| Track material | Rubber bands, steel Grousers |
| Grousers | Equal spaced steel |
| Drawbar maximum | approx. 950 lbs. |
| Steering | Controlled differential |
| Transmission | 3 |
| Speeds forward | 1 |
| Speeds reverse | 8 ft. |
| Turning Radius | 76 ins. |
| Overall length | 44 ins. |
| Overall width | 33½ ins. |
| Overall height | 9 ins. |
| Ground clearance at low point | 20 m.p.h. |
| Maximum speed | |

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Engine

Make
Bore
Stroke
Displacement
Rated power
Rated torque
HP/Ton

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Crosley 2 cyl. aircooled, CE-1
3 1/8"
3 1/4"
50 cu. ins.
19.5 HP at 3800 RPM
33 HP at 2800 RPM
33.9



CROSLEY MULE LIGHT RECONNAISSANCE VEHICLE, T30

TRACTOR, LIGHT, (HI-SPEED), T39

The Hi-Speed Light Tractor T39 is designed as a prime mover for the 105MM Airborne Howitzer M3A1 where swampy ground must be traversed. It is also being considered as a gun motor carriage for this howitzer and as a cargo carrier. It is an eight-wheeled vehicle incorporating a Bombardier type track 35 inches wide upon which the 7.5 x 16 tires ride. The low ground pressure of 1.5 lbs. per sq. in. enables the tractor to negotiate terrain in which most vehicles would become bogged.

The tractor T39 is powered by a Cadillac 42 V-8 engine of 320 cubic inches displacement which develops 110 H.P. at 3,200 R.P.M. The maximum speed is 45 miles per hour.

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LIGHT CARGO CARRIER, T16 (MODIFIED)

The Light Cargo Carrier T16 is a modification of the British Bren Gun Carrier. The principal changes in design provided for a use of the controlled differential steering system; a Ford V-8, Mercury engine; two wheeled bogies on each side; a redesigned and welded hull structure, and refinement of the track and suspension.

This carrier has now been further modified to permit its use in jungle country where it must at times operate under amphibious conditions.

The modifications include the addition to the vehicle of a 10,000 pound capacity front winch; movement of the engine as far forward as possible to provide better balance; a reduction in width to $61\frac{1}{2}$ inches, and a shell at the rear to facilitate backing out of swamps. Improvements were made in the cooling system and vapor lock, and track throwing was cured by placing drums on each side of the sprockets.

Removal of the upper armor and changes in the front plates, with the addition of sheet metal skirts, enables the carrier to float with a payload of 1500 pounds and be propelled by its tracks at a speed of four to five miles an hour.

The various changes in the structure of the Carrier have lightened it to the extent where it now weighs but 6600 pounds unloaded.

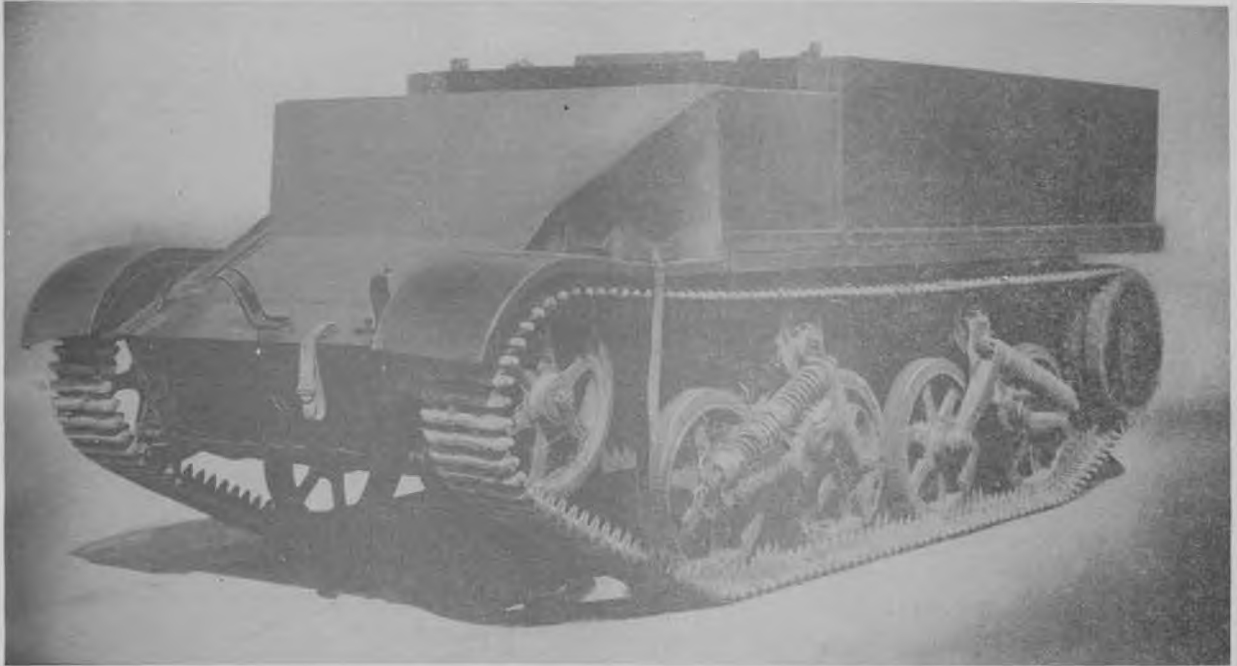
Reports from Colonel Borden's mission indicated that the tendency is towards a tractor and cargo cart rather than the subject vehicle, and the procurement of this vehicle has been suspended for jungle warfare use.

Tests at Aberdeen Proving Ground indicate that the vehicle, with its rated payload, gives excellent performance in swampy terrain.

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UNIVERSAL CARRIER, T16 (MODIFIED)

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CARRIER, 1/4-TON (TRACK LAYING JEEP), T26

The track Laying Jeep is being designed as a prime mover for the 105MM Airborne Howitzer M3A1. It is a high speed tractor with eight wheels, 4.00 x 8 tires, and a 12 inch Bombardier track. The unit ground pressure is 2.5 lbs. per. sq. in. When carrying maximum payload of 800 pounds, the gross weight of the vehicle is estimated at 3,300 pounds.

The standard engine of the 1/4-ton 4 x 4 truck is used in the Track Laying Jeep, enabling it to attain an estimated maximum speed of 50 miles per hour.

TRUCK, PICKUP, 1/4 - TON, 4 X 4

The 1/4-ton 4 x 4 Pickup Truck is now under design for use as a cargo carrier rather than for the transportation of personnel. It utilizes the 1/4 ton cargo body, and is assembled from parts of the standard 1/4 ton 4 x 4 truck. Aside from the body, it differs from the Jeep only in having a greater overall length, height, wheelbase, and clearance. A front mounted capstan is an additional feature of the Pickup Truck. The tires for the Pickup Truck are 7.50 x 20 instead of the 6.00 x 16 tires used on the Jeep. These larger tires materially improved the performance of the vehicle in jungle terrain.

Comparative characteristics of the Jeep and Pickup Truck are given below.

| | Jeep | Pickup Truck |
|-----------------------------------|------------|--------------|
| Curb weight | 2,240 lbs. | 2,240 lbs. |
| Payload | 800 lbs. | 1,000 lbs. |
| Gross Weight | 3,040 lbs. | 3,440 lbs. |
| Length overall | 132 ins. | 142 ins. |
| Width overall (including handles) | 62 ins. | 62 ins. |
| Height overall | 80 ins. | 92 ins. |
| Wheelbase | 80 ins. | 92 ins. |
| Tread F & R | 49 ins. | 54 ins. |
| Axle Clearance | 8 3/4 ins. | 11 3/4 ins. |
| Tires | 6:00 x 16 | 7:50 x 20 |
| Maximum Speed | 50 m.p.h. | 50 m.p.h. |

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The impossibility of transporting a standard 2 1/2-ton, 6 x 6, short wheelbase cargo truck as a single load in airplanes now in use has resulted in an expedient which will permit such a vehicle to be broken down into two loads, each of which can be transported in a C-47 Airplane.

In order to prepare the truck for aerial transport, a production fix is being worked out wherein the body is removed and the truck stripped of its accessories. The truck is then cut in half just back of the cab, and reinforcing channel irons are bolted to the frame. Each of the two truck sections is loaded in a separate airplane for flight to its destination. Upon delivery, the two sections are bolted together by means of the channel irons, the accessories and body are replaced on the chassis, and the truck is ready for service.

WATER PROOFING 1-TON TRAILER

Use of the 1-ton trailer in jungle areas, where it must pass through swamps, suggest waterproofing of the vehicle to protect its cargo and permit flotation. It has been demonstrated that this process enables the trailer to be floated in calm water with a 1,000 pound load (one-half the rated payload), with a freeboard of six inches in calm water.

This waterproofing is accomplished by applying two or three layers of electrician's rubber tape around the tailgate opening to form a watertight gasket between the tailgate and the body, and by application of two-inch-wide strips of Utilitape around the inside corners of the body. Strips of four-inch Utilitape are applied over the two-inch strips, allowing the four-inch strips to extend one inch on either side. The purpose of this is to seal any leaks due to imperfections in welding. Patches of Utilitape are also applied to all bolts inside the body. One 1-pound roll of electrician's rubber tape and 45 feet of four-inch

Utilitape are required

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SLEDS

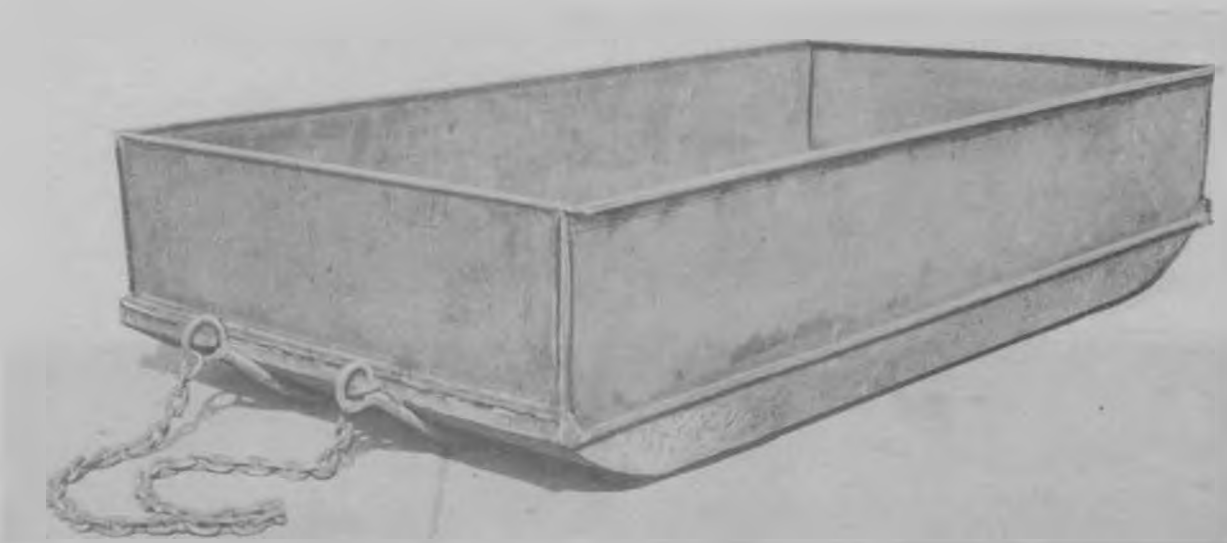
The difficulties experienced in transporting cargo over the quagmires encountered in jungle country has led to the development of cargo carrying sleds which will slide over soft mud and float in water. The vehicle consists of a barge-shaped body of No. 11 gage sheet metal, with 1 1/4 inch x 8 inch planks across both ends and the bottom, mounted on wooden runners 6 feet 6 inches long, 4 3/4 inches wide and 3 1/2 inches thick. Steel tow hooks 3/4 inches in diameter are bolted to both ends of each runner. The overall length of the sled is 8 feet 2 1/2 inches. The width is 4 feet, and the overall height is 24 3/4 inches. The empty sled weights approximately 400 pounds and will float a 2000 pound payload with approximately 6 inch freeboard in calm water.

A similar design but constructed of wood has been made. Its characteristics are equivalent to those of the steel sled. Descriptions of these sleds have been sent to SWPA, SPA, and CPA for their use in constructing the sleds locally if desired.

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SLED, WOOD, FOR MUD AND WATER OPERATION



SLED, METAL, FOR MUD OPERATION

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SKID PANS

The great difficulty of moving the 105MM Howitzer M3A1 and the 1/4 ton 2-wheel cargo trailer over swampy ground without their getting mired may be prevented by the use of skid pans. These skid pans are steel plates formed to fit under the axle of the cargo trailer, with the ends secured to the opposite ends of the vehicle, or under the axle and trails of the Howitzer. If the weapon or trailer equipped with skid pans sinks into the mud, the skid pans will support the load and allow it to slide over the surface when hauled by the prime mover.

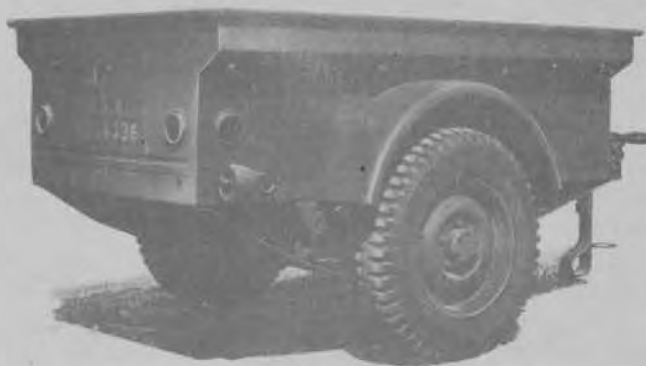
It is to be noted that these are only transportation expedients which are also under investigation for application to other artillery weapons and towed loads.

Descriptions of skid pans have been sent to SWPA, SPA and CPA for use in local manufacture if desired.



105MM. HOWITZER CARRIAGE, M3A1 (AIRBORNE), MODIFIED BY USE OF SKID PANS

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TRAILER, $\frac{1}{4}$ -TON, EQUIPPED WITH SKID PANS
TIRES FOR JEEPS

The desirability of obtaining better traction when using the Jeep resulted in a suggestion that the vehicle be equipped with 7.50 x 16 tires inflated at pressures lower than those used with the standard 6.00 x 16 tires. These larger tires will give greater mobility to the truck without necessitating any change in the vehicle or the wheels, as demonstrated at Aberdeen Proving Ground. This information has been transmitted to the Pacific Theaters.

ROCKET, COLORED SMOKE, 2.36 INCH

This is a signal rocket, to be fired from the 2.36" Rocket Launcher, M1A1. Several types of signal rockets using colored smoke have been considered. These include: 1) air burst; 2) ground burst; 3) base ignition, candle type; 4) base ignition, candle type, ground impact; 5) air burst utilizing a time fuze; and 6) trailer base ignition type.

The last two types have been selected for actual development. At present, it is planned to provide five colors of smoke for the rocket, but if the rocket proves satisfactory, additional colors may be developed.

This rocket is to incorporate the standard rocket motor and standard components of other ammunition items modified to make a suitable projectile for this purpose.

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GRENADA, RIFLE, COLORED SMOKE, T8

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This grenade is similar to the T6 Rifle Grenade except for modification of the body to provide additional smoke emission holes. The project is in the early stages of development, and only a few test rounds have been manufactured. Requisitions have been received for this grenade in colors of red, yellow and violet, which are prepared for jungle use.

Shell, Colored Smoke, 60MM

At present there are under consideration two 60MM Shells for colored smoke filling. The T6 has been loaded with explosive type colored smoke filler. Early tests have indicated that favorable results may be obtained. However, in order to use existing range tables, the standard 60MM M49 H.E. Shell with the same type of filling is under consideration. Test lots will be fired at Aberdeen in the near future.

Shell, smoke, 60MM, WP, T6

Shell, smoke, 60MM, HC, T8

These shells have given satisfactory results in firing tests and limited procurement for extensive service tests has been initiated.

Requisitions have been received from the theaters for the 60MM Shell, T6.

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37MM "SPICOT" GUN

In an attempt to launch a large spigot shell from a 37mm gun, a gun was made by mounting a shortened 37mm gun on the base plate of the 81mm mortar and using the bipod of the 60mm mortar for rigidity. Although the combination was fairly successful, the project for the gun was dropped because of the fact that it carried a low priority and the 81mm base plate was not considered strong enough for the load and reaction that would be imposed upon it. The spigot shell is, however, still under consideration, and smaller models for firing from the 37mm Antitank Gun, M3 are still under investigation (These are of two types: one is a 20 lb. fragmentation bomb with modified M111 bomb fuze, and the other is a 6" diameter, 10 lb. Hollow Charge Shell.)

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SPIGOT BOMB FOR 37MM ANTITANK GUN

In the attempt to develop or adapt weapons and ammunition which will be particularly effective against Japanese personnel and jungle fortifications, the German Spigot or Stick Bomb has been tested at Aberdeen Proving Ground. These tests demonstrated that this projectile possesses great armor piercing properties and should be capable of adaptation for use with the American 37mm Antitank Gun.

The Spigot Bomb is a hollow charge finned grenade designed for the German 37mm Pak Gun to make it more destructive when employed as an antitank weapon. The bomb, which is made of pressed steel, has attached to it a steel rod which fits into the bore, and a perforated sleeve which fits around the barrel of the gun. The hollow charge, in the rear of the steel cup (or cone), consists of two blocks of dinitro anoline with TNT. Two detonators are set in the base of the bomb, one facing in each direction. A nose fuze of the instantaneous percussion type and an instantaneous type tail fuze are both present. The propelling unit is composed of a steel case charged with tubular stick powder, an igniting charge of granular powder, and a percussion type primer.

At Aberdeen two bombs were statically detonated against the face and end of 7-inch homogeneous armor plate. The first penetrated completely, while the second penetrated the armor for 9 inches, bulging the plate in the process. Twenty-seven additional bombs were fired from a captured 37mm Pak Gun. Two types of such bombs are under investigation. One employs a 20-pound fragmentation bomb with an M111 fuze, while the other is a 10-pound Hollow Charge Shell 6 inches in diameter.

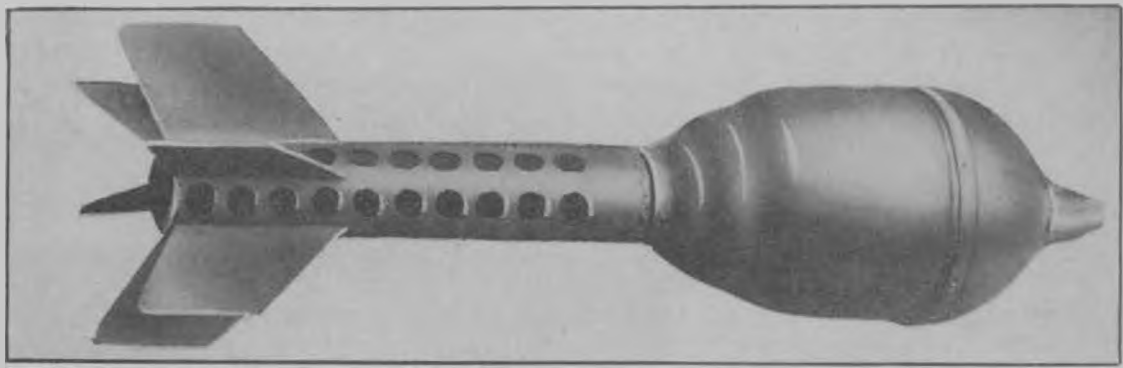
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PRINCIPAL CHARACTERISTICS

OF

37MM GERMAN SPIGOT BOMB

| | |
|--------------------------------|----------------|
| Caliber of rod | 37mm |
| Weight of bomb as fired | 18 lbs. 12 oz. |
| Weight of explosive charge | 5 lbs. 5 oz. |
| Weight of propelling cartridge | 1 lb. 6 oz. |
| Overall length of round | 29 1/8 ins. |
| Diameter of projectile body | 6 1/4 ins. |
| Fuzes | |
| 1. P. D. Instantaneous | |
| 2. B. D. Instantaneous | |
| Muzzle velocity (average) | 350 f/s |
| Pressure (average) | 18,600 p.s.i. |
| Range | |
| 5° elevation | 203 yds. |
| 25° elevation | 857 yds. |



37MM. GERMAN SPIGOT PROJECTILE

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SUBMACHINE GUN, CAL. .45, M3

The Submachine Gun, Cal. .45, M3, is an all metal machine pistol fabricated chiefly from stamped parts. Weight was held down in the design of this gun for ease of carrying and handling and to conserve materials. A simple break-down permits packing the weapon in a carton measuring 7-3/8" x 3-1/8" x 12-5/8".

Submachine Gun, Cal. .30, M3, is a light, compact arm with high accuracy when fired offhand at 50 yards or from a fixed rest at 100 yards. It functions excellently even under conditions in which dust or mud is prevalent. Its cyclic rate of 450 rounds per minute is constant. It is easily disassembled, and its design permits conversion from caliber .45 to 9mm. It may be fired either as a pistol or, with the metal stock extended, as a shoulder weapon.

The working parts of the M3 submachine gun are fully enclosed for protection against dirt, water, and mud. There are no projecting or exposed parts to endanger the operator. It employs a fixed firing pin. The excess energy from the forward motion of the bolt is expended simultaneously with the explosion of the cartridge, the energy being employed to counteract the muzzle rise and recoil of the weapon, with consequent improvement in accuracy.

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CHARACTERISTICS

SUBMACHINE GUN, CAL. .45, M3

| | |
|---|--|
| Weight complete with magazine, oiler, and sling | 8 lb. 15 oz. |
| Weight less magazine, oiler, and sling | 8 lb. 1 oz. |
| Weight of magazine, empty | 0.8 lb. |
| Weight of recoiling parts | 2.0 lb. |
| Weight of barrel | 10 oz. |
| Weight of barrel assembly | 22.8 oz. |
| Length over-all, stock extended | 29.8 ins. |
| close | 29.8 ins. |
| stock closed | 22.8 ins. |
| Length of barrel | 0.8 ins. ? |
| Length of rifling | 7.2 ins. |
| Rifling: | |
| Number of grooves | 4 |
| R.H. twist, 1 turn in | 16 ins. (alternate 15") |
| Depth of grooves | .0035 in. |
| Cross-sectional area of bore | 0.1581 sq. in. |
| Type of mechanism | Straight blow-back, fully automatic |
| Feeding device | 30-rd. magazine |
| Cyclic rate | 450 rds./min. |
| Cooling | Air |
| Mean sight radius | 10.8 ins. |
| Type of sights | 100 yds., fixed peep |
| Trigger pull | 5-7 lb. |
| Pull to retract bolt | 18-23 lb. |
| Ammunition type | Ball |



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57MM RECOILLESS GUN

There is under development by the Ordnance Department a recoilless gun of 57mm caliber which may be used as a shoulder-fired weapon, or be adapted to firing from a machine gun tripod, caliber .30, M2.

The project for the 57mm Recoilless Gun was initiated early in 1943. The first pilot model was tested in July 1943, and the first completed service test model was demonstrated on November 9, 10 and 11, 1943.

It is believed that the maximum range of approximately 5,000 yards possessed by this arm, with its accuracy and powerful hollow charge projectile, will permit it to be utilized at ranges up to 4,000 yards for many of the functions now performed by light artillery.

The gun is breech loading, and has a rifled tube. It weighs 36 pounds, fires a special 2.75 pounds projectile of the H. E., A. T. type (now under development) at a muzzle velocity of about 1,200 feet per second, and has sufficient accuracy to hit a rectangle 25" x 33" at a range of 600 yards.



57MM. RECOILLESS GUN

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ORDNANCE ITEMS
FOR
ARMY AIR FORCES

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LAUNCHER, ROCKET, 3-TUBE, 4.5 INCH, AIRCRAFT, T30

The Launcher T30 is an aircraft weapon which can be utilized for either plane-to-plane or plane-to-ground fire. It consists of two clusters, each of which is composed of three tubes. The clusters are suspended from the wing, with one cluster on either side of the fuselage of pursuit planes.

The clusters of the Launcher T30 are of the plastic type, expendable, and capable of being jettisoned by means of a special release. Steel clusters, which weigh four times as much as those of plastic construction, will be issued for training and possible combat use, although the excessive weight of the steel tubes is an objectionable feature.

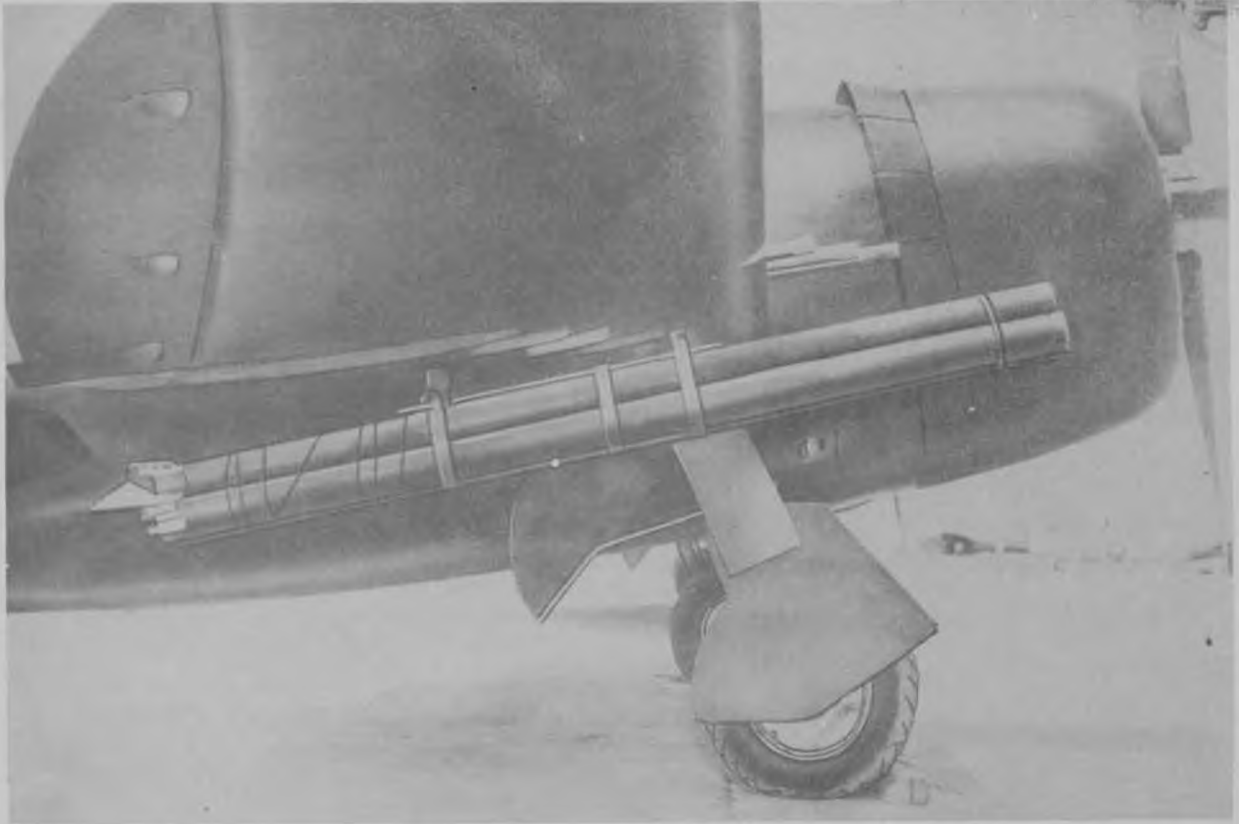
The tubes are fired by electrical contacts controlled from a firing selector box located in the cockpit of the plane.

In anticipation of Rocket requirements in excess of present production facilities, efforts were made to find methods of manufacture and provide for the use of substitute materials which would facilitate an expanded Rocket program. In order to satisfy these requirements, a project was approved for development of Launcher, Rocket, 3-Tube, 4.5 Inch, Aircraft, T31, which would differ from Launcher T30 only in the materials and manufacturing methods employed. This launcher is still in the design stage.

PRINCIPAL CHARACTERISTICS

| | |
|----------------------------------|--|
| Length of tube | 10 ft. |
| Inside diameter of tube | 4 9/16 ins. |
| Weight of tube (plastic) | 15 lbs. |
| Weight of each cluster (plastic) | 80 lbs. |
| Method of fire | Electric, selective |
| Ammunition | Rocket, H.E., 4.5", M8 Rocket, Practice, 4.5", M9 |

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LAUNCHER, ROCKET, 3-TUBE, 4.5", AIRCRAFT, T30

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ROCKET, H. E., 4.5 INCH, M8

Rocket, H.E., M8, is a general purpose, folding fin-type, unrotated projectile for use in 4.5" launchers. It has an explosive and destructive effect similar to a 105MM Howitzer H.E. Shell. The motor is 4.5" in diameter and 23.3" long, employing a propellant of double base powder. The propellant as issued in the rocket is for low temperature fire, 30 sticks of double base powder constituting the charge usable when the temperature is from 20° F. to 90° F. For a temperature range of from 50° F. to 130° F., the number of powder sticks is reduced to 27.

PRINCIPAL CHARACTERISTICS

OF

ROCKET, H.E., 4.5 INCH, M8

| | |
|--|------------|
| Weight, total | 38.5 lbs. |
| Length (overall) | 32.5 ins. |
| Type of head | H. E. |
| Weight of head (w/o filler) | 10.5 lbs. |
| Weight of filler, plus auxiliary booster | 5.3 lbs. |
| Weight of head with PD fuze | 17.9 lbs. |
| Muzzle velocity, High charge | 840 f/s |
| Muzzle velocity, Low charge | 760 f/s |
| Range, High charge | 4,000 yds |
| Range, Low charge | 3,600 yds. |

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ROCKET, 4.5", M8, WITH FUZE, ROCKET, P.D., M4, DISMANTLED TO SHOW MOTOR BODY, TAIL LOCKING SHELL, AUXILIARY BOOSTER, FUZE PRIMER CUP AND PROPELLANT CHARGE IN CUP

CLUSTER, T8 (6-85 lb. FRAGMENTATION BOMBS)

The cluster T8 is composed of 85 pound Fragmentation Bombs, T9, each 6 inches in diameter and intended for clustering rather than for individual suspension. The general construction of the bomb is similar to that of the 260 pound Fragmentation Bomb T10. Six of these bombs equipped with fin assemblies, or three bombs equipped with parachute assemblies, can be combined in a 500 pound station size cluster by using the Adapter-Cluster T3.

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BOMB (BUTTERFLY), 4-LB, T11

and

CLUSTER, T10 (24-4Lb. BUTTERFLY BOMBS)

The 4-lb. Bomb, T11, is an antipersonnel bomb to be dropped from airplanes. It is patterned very closely after the so-called German "Butterfly" Bomb. The T10 Cluster carries 24 of these bombs in a 100-pound bomb station.

The clusters are fuzed with a nose mechanical time fuze to permit the cluster to open at the desired point along its trajectory. The individual bombs then scatter and drift slowly to the ground, being retarded by the butterfly wings which act like miniature autogyros.

The small bombs, which have considerably more lethal fragmentation than a hand grenade, are provided with a variety of fuzes. Some bombs will therefore explode in the air soon after opening of the cluster, some will explode upon impact with the ground, and others will explode at irregular intervals up to thirty minutes after impact. Still other bombs will remain apparently harmless until they are disturbed, either purposely or accidentally, by a slight movement, which will cause immediate detonation.

A cluster T11, composed of 90 of these 4-lb. fragmentation bombs to be carried in the 500-lb. bomb station has been ordered.

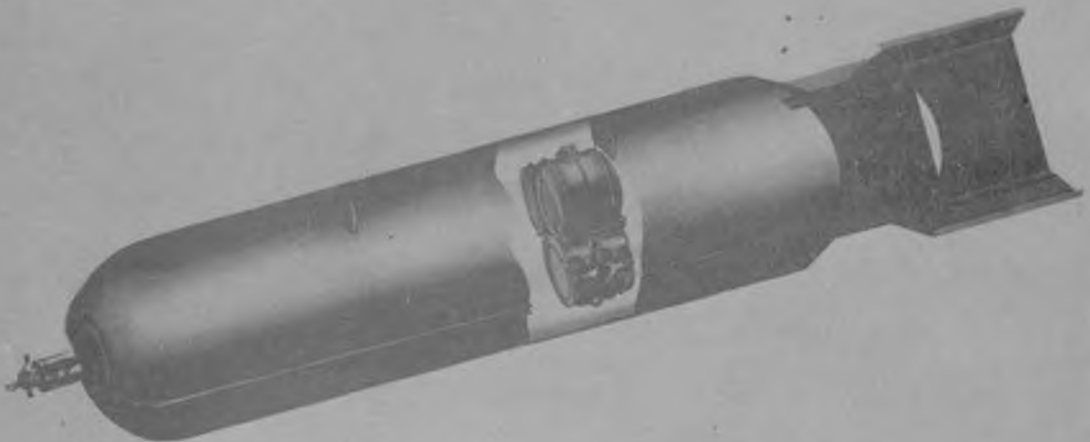
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BOMB T11 (4LB. BUTTERFLY)



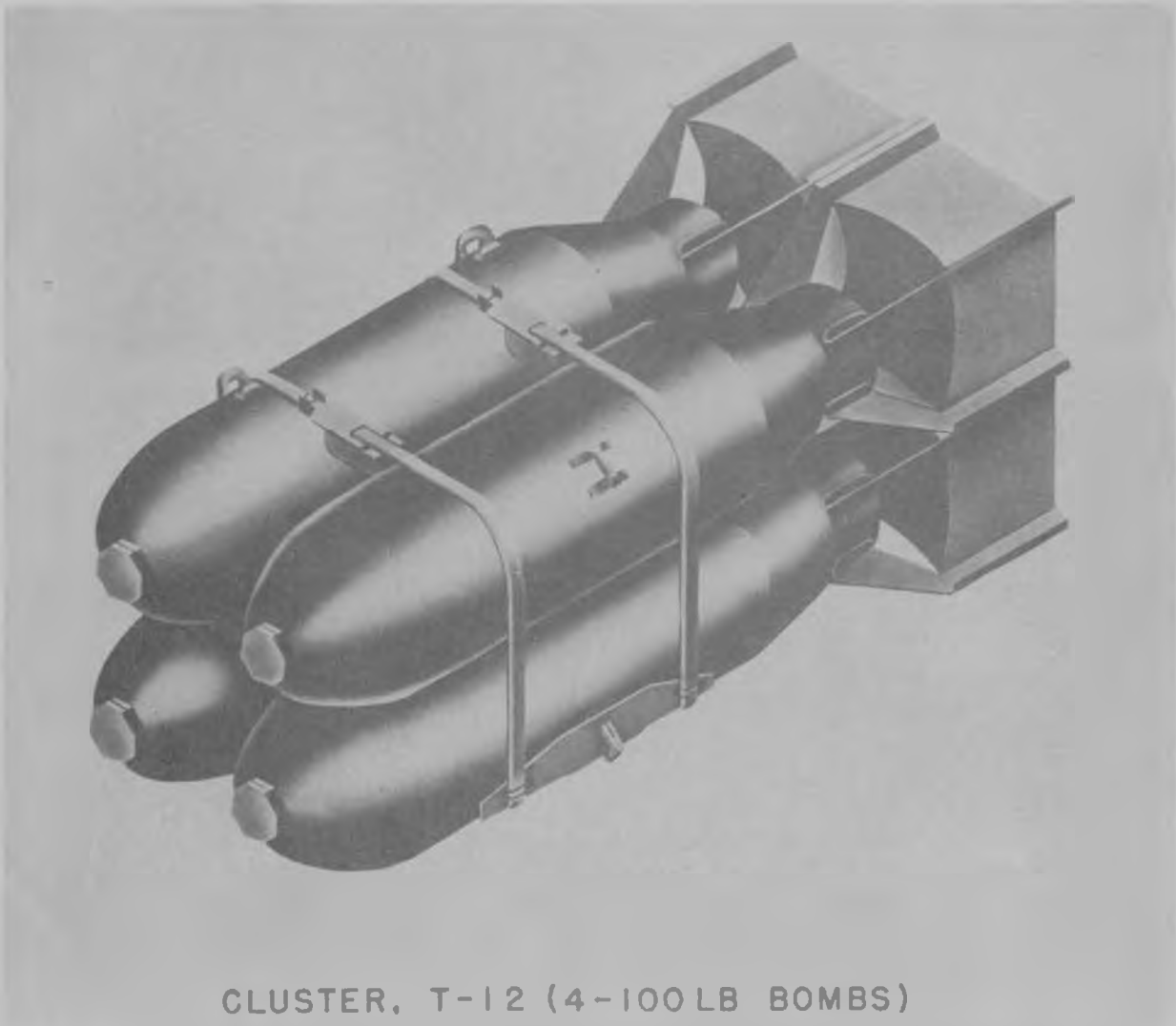
CLUSTER, T10 (24 4LB. BUTTERFLY BOMBS)

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CLUSTER, T12 (4-100 lb. Bombs)

This cluster permits greater payloads to be carried in large bombing planes when 100 pound bombs are used instead of the 500 pound bombs for which the bomb racks are primarily designed.

Either G.P. or Chemical bombs can be loaded in the Cluster, T12. The cluster is instantaneous opening, but all of the few parts which make up a cluster remain permanently attached to one or two of the bombs to eliminate all danger of their damaging planes in a formation.



CLUSTER, T-12 (4-100 LB BOMBS)

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BOMB, 500 LB., INCENDIARY (PYROTECHNIC MIX), T2E1
PROCURED BY CHEMICAL WARFARE SERVICE

The 500 Lb. Bomb, WP, T2E1, is an incendiary bomb which may be used in jungle operations. It utilizes a 500 pound G.P. bomb case with a special double-compartment burster and a special welded-in base plug. The central burster contains high explosive which projects white phosphorous from the outer burster compartment through the main pyrotechnic mix filler of the bomb, at the same time bursting the bomb case. The incendiary filler is ignited by the particles of white phosphorous as it strikes air.



BOMB, INCENDIARY, 500-LB., T2E1

EXTENSION, FUZE, 9" and 18", T1

While the T1 Extension was designed for lengths of from 6" to 36", the sizes now being manufactured are 9" and 18" lengths. This simple extension can be added to any G.P. or S.A.P. bomb just before hanging the bomb in the bomb rack. Its purpose is to detonate the bomb 9" or 18" above the ground surface instead of having the bomb explode with the nose in contact with the ground as it normally does with instantaneous setting of the AN-M103 fuze.



FUZE, EXTENSION, T1-(18 IN.)

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FUZE, BOMB, NOSE, MECHANICAL TIME, T56

The T56 Bomb Nose Fuze will fit any bomb with which the AN-M103 fuze can be used. The T56 Fuze is a combination of the M111A2 mechanical time flare fuze and the AN -M103 nose bomb fuze in which the former fuze has been assembled to a modified body and booster portion of the AN-M103 fuze. The time range of the fuze is 5 to 92 seconds and can be accurately adjusted to the nearest tenth of a second. The time graduations are calibrated every one half second and numbered every three seconds. A 10-division vernier scale is located on the non-rotating part of the fuze so as to be used for setting the time graduations to the nearest tenth of a second.

A removable striker stop located between the striker and the safety block prevents the safety block from falling out prematurely. The arming vane operates a gear mechanism which releases the safety block after approximately 750 feet of air travel. The arming pin, which is held by a safety cotter pin during shipment and by the arming wire when installed in the bomb rack, starts the time mechanism at the moment that the arming wire is withdrawn from the fuze.

The body and booster portion of the fuze is essentially a modified body of the AN-M103 fuze. The time adjustment pin has been removed and a spring loaded lower arming pin put in its place. The lower arming pin operates a mechanical safety mechanism in the body of the fuze.

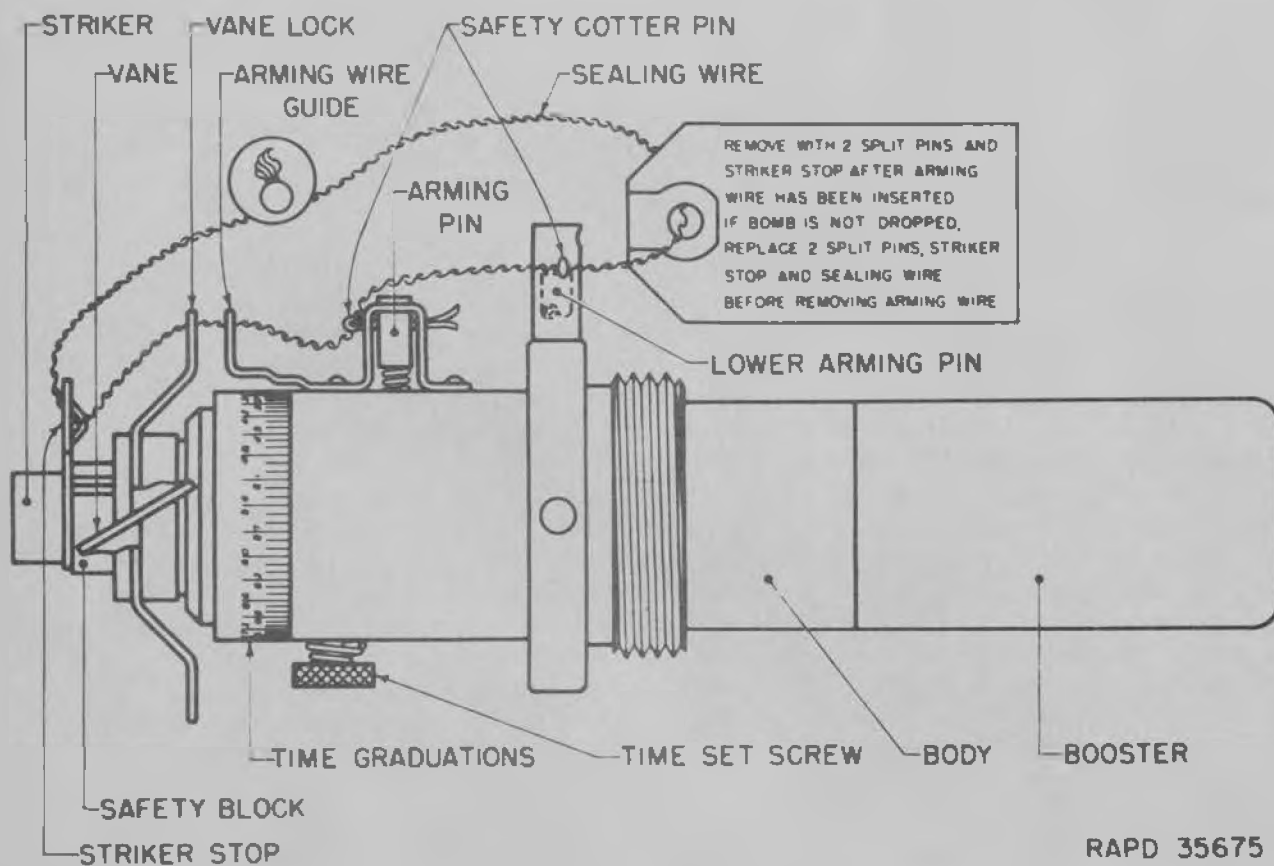
As the bomb falls the vane spins, and after approximately 750 feet of air travel the safety block is released from the fuze. At the moment the time expires, the spring loaded firing pin is forced rearward to strike the primer and detonate the bomb. When the bomb is dropped safely, (with the arming wire attached), the arming pin and the lower arming pin will not be

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released and the vane will not spin. This prevents the time mechanism from moving into the armed position. In this case the bomb will drop unarmed.

The Fuse, T56, weighs approximately 4 pounds and has an exposed length of 4 inches after installation.



FUZE, BOMB, NOSE, MECHANICAL TIME, T56

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CARGO CARRIER M29

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1. GENERAL

Cargo Carrier, M29, is an airborne, highly mobile carrier for operation under all types of snow conditions and limited operation on bare ground. The standard production M29 can be converted into a completely amphibious vehicle by addition of a field kit consisting of bow and stern cells, track side panels, sponson air tanks, and cable controlled rudder gear. Provision is made for power take-off at the front of the engine to drive the capstan located on the deck of the bow cell.

2. CARGO CARRIER, M29

This is a full track-laying vehicle with a gross weight of approximately 4,925 pounds, and is propelled by a Studebaker 6-170, 75-horsepower engine. The total weight includes a crew of two (2) men and a cargo of 860 pounds. The overall dimensions are: Length, 125-1/4"; width, (using 15" track), 60"; height, 70-5/8". The unit ground pressure, using the 15" track at 5" penetration is considered as 1.75 pounds per square inch, and under the same conditions with the 20" track, 1.31 pounds per square inch. The vehicle is capable of a maximum speed of 36 miles per hour and can climb a 100% grade on hard packed snow. The gasoline carrying capacity is 35 gallons, giving the carrier a cruising range of 175 miles. One radio, SCR-694, or SCR-714, is provided.

3. CARGO CARRIER, M29, AMPHIBIOUS CONVERSION

This vehicle, modified for amphibious operation, has a total gross weight of 5,685 pounds, including a crew of two (2) men and a cargo of 860 pounds. The overall dimensions are: Length, (to end

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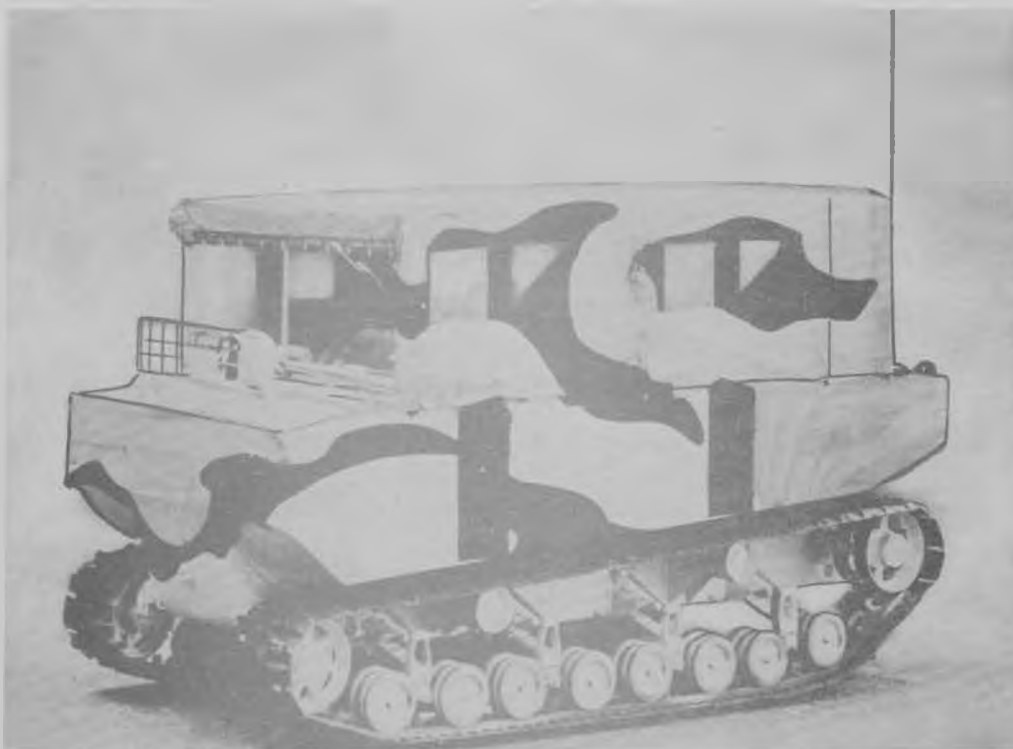
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of hull), 173-1/2"; width, 62" (15" track); height, 70-5/8".

Propulsion in water is by means of the tracks only, and steering is accomplished by means of twin rudders at the stern. The speed in water is approximately four (4) miles per hour.

NOTE: Complaints have been received that the suspension system of this vehicle is too fragile; subsequently, Studebaker redesigned the suspension and track on one vehicle. This model was operated at Aberdeen for 2,200 miles before any failures occurred. A final mileage of 2,484 was covered before the track was inoperable.



CARGO CARRIER M29

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QUARTERMASTER CORPS ITEMS

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PACKBOARD, PLYWOOD TYPE

Packboards for manual transportation of various weapons, accessories and ammunition have been developed. While the packboards are at present restricted to the carriage of a limited number of items, they may be adapted to the portage of other materiel as necessity arises.

The Packboard, constructed of plywood, is rectangular, with the long sides curved inward. The packboard is 24 inches high, 15 inches wide, and weighs four pounds. A canvas secured by lashings through holes in the curved sides fits the back of the soldier carrying the pack. A space of two inches exists between the canvas and the Packboard. Shoulder straps, with a quick release for removing the loaded packboard, are provided. Equipment now supplied for suspension of loads on the packboard permits the following items to be transported by this means:

- Light Machine Gun.....2 loads
- Heavy Machine Gun.....2 loads
- 60 MM. Mortar.....1 load
- 81 MM. Mortar.....3 loads
- 105 MM. Mortar.....4 loads
- Boxed cargo and general loads
- Other items are being added to this list constantly.

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PACKBOARD IN CARRYING POSITION,
WITH 60MM. MORTAR



PACKBOARD IN CARRYING POSITION,
WITH LIGHT MACHINE GUN

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ROCKET KITES

Rocket Kites were originally devised to support long aerials for field radio sets. Painted in various brilliant colors, they are now used for visual signalling where the usual signal devices would be obscured from view by tall trees or other obstructions.

The Kite is a box kite which is folded compactly when fired, but opens into a three foot kite upon reaching an altitude of 200 feet, at which height it is maintained by a shock cord controlled from the ground. The folded kite is projected by means of a rocket ignited by a special cartridge, through the medium of a pistol equipped with an adapter.

The contents of a complete Rocket Kite Kit are as follows:

| Item | No. | Weight |
|-----------------|-----|----------------|
| Kites | 3 | 3.75 lbs. |
| Rockets | 3 | 4.25 lbs. |
| Pistol | 1 | 2.00 lbs. |
| Adapter, barrel | 1 | 1 lb 2 oz. |
| Cartridges | 5 | 0.25 lb. |
| Shock cord | 1 | 0.25 lb. |
| Case, fiber | 1 | 5.00 lbs. |
| Total weight | | 16 lbs. 10 oz. |

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SIGNAL CORPS ITEMS

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WATERPROOFING SETS FOR RADIOS

During the course of the present war, it has become necessary to operate radio and wire signal equipment in tropical areas where temperature and humidity are very high. Much of this equipment was designed without regard for tropical operation or proper protection against prolonged excessive humidity. As a consequence, many communications failures resulted. In order to remedy this situation as much as possible, a moisture-proofing treatment has been devised which, if properly applied, will supply a reasonable degree of protection against humidity. This treatment involves the application of a moisture and fungus resistant air-dry varnish by means of a spray gun.

Two kits, differing in their contents, are supplied for waterproofing communications equipment. The basic kit is Moisture and Fungus Proofing Kit MK-10-()/GSM, used for initial treatment of radio and ground signal equipment. This Kit, packaged in six equal packages, contains the following items:

| Article | Quantity |
|---|----------|
| Brushes, Paint, 1" wide | 18 |
| Brushes, Artist, soft camel hair, 3/8" wide x 1" long, Eugene Dietzgen Co., 2920 No. 11, or equal | 6 |
| Moisture proofing varnish | 60 gals. |
| Instruction Book | 10 |
| Remover, Paint and varnish | 2 gals. |
| Spray gun, hand operated, continuous pressure, 1 qt. Brown All-purpose, E. C. Brown Co., Rochester, N.Y., or equal | 6 |
| Tape, masking, 1" x 60 yds. Scotch "wetordry" #2105 MN 35E63W as made by Minn. Mining and Mfg. Co., or equal | 24 rolls |
| Thermometer, 0-220° F. Weston- Elmer and Amend Co. #15076 or equal | 6 |
| Thinner | 30 gals. |

The materials in this kit are sufficient for one infantry, cavalry, or

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motorized division. The amount of varnish and thinner must be increased by one-third to meet the requirements of an armored division.

The second kit, essentially for maintenance of equipment previously treated with Kit MK-10-()/GSM, is Maintenance Kit MK-2/GSM. This kit is packaged to contain the following:

| Article | Quantity |
|---|----------|
| Brackets (for mounting lamps) | |
| Adjusco adjustable lighting bracket #264L, fitted for clamp, complete with portable wiring Graybar Electric Co., or equal | 4 |
| Brushes, Paint, 1" wide | 3 |
| Brushes, Artist, soft camel hair 3/8" wide x 1" long, Eugene Dietzgen Co., 2920 #11, or equal | 2 |
| Circuit Diagram | 1 |
| Moisture-proofing varnish | 10 gals. |
| Infra-red Lamps, 250-watt, G.E. Co., Model R-40, or equal, 4 in use, 4 spare | 8 |
| Instruction Book | 1 |
| Remover, paint and varnish | 1 qt. |
| Spray gun, hand operated, continuous pressure, 1 qt. Brown All-purpose, E.C. Brown Co., Rochester, N.Y., or equal | 1 |
| Switch, single pole #8255, 19/32" bushing, Cutler - Hammer, Milwaukee, or equal. | 6 |
| Tape, masking, 1" x 60 yds., Scotch, "wetorary" #2105 MN 35E63W as made by Minn. Mining and Mfg. Co., or equal | 4 rolls |
| Thermometer, 0-220° F., Weston-Eimer and Amend Co., #15076, or equal | 2 |
| Thinner | 5 gals. |



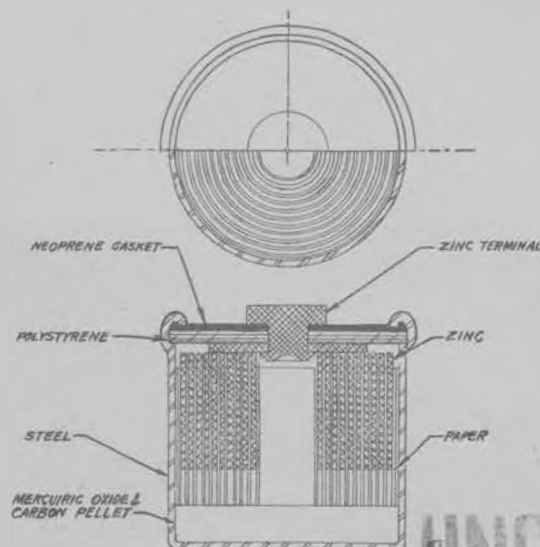
PARTIAL CONTENTS OF MOISTURE AND FUNGUS PROOFING KIT, MK-10-()/GSM

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Reports from the field, particularly the Southwest Pacific area, have indicated that the Battery BA-38, as ordinarily supplied with a conventional dry cell, is very unsatisfactory for use in conditions of high temperature and high humidity. One of the least satisfactory qualities of this battery is its poor shelf life.

A new type cell, for convenience given the designation "RM", has been developed to supplant the dry cell in this battery, when used in torrid climates. At temperatures of 70° to 140° it has a life about four times that of the BA-38 battery. It is expected that the BA-38 battery, equipped with the RM cell, will have a service life under jungle conditions eight to ten times that of the ordinary BA-38 battery. A superior shelf life is also expected to be obtained.

The BA-38 battery equipped with the RM cell will be ready for distribution to the services within the next few months, and studies are under way to adapt a cell for use in other batteries.



RM CELL

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REFRIGERATION AND MOISTURE PROOFING OF BATTERIES

Certain dry cells are known as "critical types," in that they are extremely susceptible to deterioration under conditions of high temperature and humidity. The moisture in the air in some cases corrodes the terminals; in others it reacts with the chemicals in the battery, resulting in changes in their composition. To remedy this situation, two projects are under way, refrigeration and moisture proofing.

The aim of the refrigeration project is to provide for the most critical batteries refrigerated storage places at the various depots and on route to the ports of embarkation. Either chilled or refrigerated storage is to be provided on shipboard and refrigerated storage is to be supplied in jungle areas.

Work is now going forward in the development of a moisture proof paper which, if satisfactory, is to be used in vapor seal wrapping of each individual dry cell of the critical type.

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JUNGLE WARFARE WEAPONS

| ORDNANCE | ITEM AMMUNITION | SWPA | SPA | CPA ^a | Deliveries | | Proc. & Allo. Sched. | | Feb. |
|--------------------------------|---|--------|--------|------------------|------------|--|----------------------|------|-------|
| | | | | | In USA | | Dec. | Jan. | |
| | Shell, H.E., 37mm M63 - For T32 Gun | | 80,000 | 66,600 | 160,199 | | 160,000 | | |
| | Canister, 37mm, M2 - For T32 Gun | | 20,000 | 16,600 | 40,199 | | 40,000 | | |
| | Shell, Smoke, 60mm, (WP), T6 | | 10,000 | 8,300 | | | | | |
| | Canister, 75mm, T30 ^d | | 5,000 | 4,100 | | | | | 5,000 |
| | Canister, 105mm, T18 ^d | | 5,000 | 4,100 | | | | | 5,000 |
| | Shell, H.E., .105mm T17-w/Inst. Fuze +30% Delay+10% T&SQ | 50,000 | 50,000 | 41,000 | | | | | |
| | Shell, H.E., 155mm T-w/Inst. Fuze +30% Delay+10% T&SQ | 12,000 | 14,400 | 12,000 | | | | | |
| <u>GRENADERS & SIGNALS</u> | | | | | | | | | |
| | Grenade, Rifle, Smoke, (WP), T5 | 13,000 | 50,000 | 34,000 | 1,000 | | 100,000 | | |
| | Grenade, Rifle, Smoke, T8E1 (Violet) | 300 | 450 | 375 | | | 2,125 | | |
| | Grenade, Rifle, Smoke, T8E1 (Red) | 300 | 450 | 375 | | | 2,125 | | |
| | Grenade, Rifle, Smoke, T8E1 (Yellow) | 300 | 450 | 375 | | | 2,125 | | |
| | Grenade, Rifle, Frag., M17 ^d | | 90,000 | 75,000 | 60,000 | | | | |
| | Adapter, Grenade Projection, M1 ^d | | 90,000 | 75,000 | 100,000 | | 100,000 | | |
| | Signal, Ground, Red Smoke, T38 | 300 | 450 | 375 | | | | | |
| | Signal, Ground, Yellow Smoke, T40 | 300 | 450 | 375 | | | | | |
| | Signal, Ground, Violet Smoke, T42 | 300 | 450 | 375 | | | | | |
| | Signal, Ground, WSP, M17A1 ^d | 300 | 450 | 375 | | | | | |
| | Signal, Ground, WSC, M18A1 ^d | 300 | 450 | 375 | | | | | |
| | Signal, Ground, GSC, M19A1 ^d | 300 | 450 | 375 | | | | | |
| | Signal, Ground, GSP, M20A1 ^d | 300 | 450 | 375 | | | | | |
| | Signal, Ground, ASP, M21A1 ^d | 300 | 450 | 375 | | | | | |
| | Signal, Ground, ASC, M22A1 ^d | 300 | 450 | 375 | | | | | |
| | Signal, Ground, RSP, M51A1 ^d | 300 | 450 | 375 | | | | | |
| | Signal, Ground, RSC, M52A1 ^d | 300 | 450 | 375 | | | | | |

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JUNGLE WARFARE WEAPONS

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| <u>AUTOMOTIVE ITEMS</u> | <u>SWPA</u> | <u>SPA</u> | <u>CPA^a</u> | <u>Deliveries</u> | | | |
|---------------------------------------|-------------|------------|------------------------|-------------------|--|-------------|-------------|
| | | | | <u>In USA</u> | <u>Proc. & Allo. Sched.</u> <u>Dec.</u> | <u>Jan.</u> | <u>Feb.</u> |
| Kit, Capstan - for Jeep | | 950 | 790 | | | | |
| Tractor, D4-TD9 w/winch Art'y. Type* | 410 | 410 | | | | | |
| Tractor, D4-TD9 w/blade Art'y. Type* | 88 | 88 | | | | | |
| Tractor, D6-TD14 w/winch Art'y. Type* | 115 | 115 | | | | | |
| Tractor, D6-TD14 w/blade Art'y. Type* | 34 | 34 | | | | | |
| Tractor, D7-TD18 w/winch Art'y. Type* | 17 | 17 | | | | | |
| Tractor, D7-TD18 w/blade Art'y. Type* | 4 | 4 | | | | | |
| Kit for modifying One-Ton Trailer | 269 | 269 | | | | | |
| Trailer, Athey, Six-Ton, ES451 | 54 | 54 | | | | | |
| <u>AIR FORCE ITEMS</u> | | | | | | | |
| Cluster T8 - 85 lb. Frag. Bombs | 1,200 | 400 | | | | | |
| Cluster T10 - 24 bombs, 4 lbs. T11 | 650 | 350 | | | 1,000 | | |
| Cluster T11 - 90 Bombs, 4 lbs. T11 | 1,000 | | | | | 1,000 | |
| Cluster T12 - 4 bombs, 100 lb., M30 | 700 | 300 | | 1,000 | 1,000 | | |
| Adapter, Cluster, Hook & Cable, T10 | 650 | | | 650 | 650 | | |
| Bomb, Frag., 265 lbs., T10 | 1,500 | 500 | | 500 | 2,000 | | |
| Rocket, H.E., 4.5", M8 w/PD M4 | 24,000 | 12,000 | | | 36,000 | | |
| Launcher, Rocket, A.C., 4.5", T30 | 2,000 | 1,000 | | | 3,000 | | |
| Extension, Fuze, M1 (9") <u>d</u> | | 2,000 | | 2,000 | | | |
| Extension, Fuze, M1 (18") <u>d</u> | | 2,000 | | 2,000 | | | |
| Fuze, Bomb, Nose, T56 | 5,000 | 15,000 | | 20,000 | | | |

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JUNGLE WARFARE WEAPONS

| <u>SMALL ARMS</u> | <u>SWPA</u> | <u>SPA</u> | <u>CPA^a</u> | <u>Deliveries</u> | <u>Proc. & Allo. Sched.</u> | | |
|---|-------------|------------|------------------------|-------------------|---------------------------------|-------------|-------------|
| | | | | <u>In USA</u> | <u>Dec.</u> | <u>Jan.</u> | <u>Feb.</u> |
| Launcher, Grenade, M7 - M1 Rifle ^d | 5,896 | 8,844 | 7,370 | 12,777 | | | |
| Launcher, Grenade, M8 - M1 Carbine ^d | 1,660 | 2,340 | 1,950 | 4,000 | | | |
| Gun, SMG, Cal. .45, M3 ^d | 473 | 540 | 450 | 1,013 | | | |
| Accessories, 9mm, for SMG-M3 | 47 | 108 | 90 | | | | |
| Sight, Rifle, Grenade Launcher, T59 | 6,700 | 9,384 | 7,316 | 10,000 | | | |
| Cartridge, Grenade, Aux. Cal. .30, T13 | 500,000 | 500,000 | 410,000 | 1,003,900 | | | |
| Cartridge, Carbine, Tracer, Cal. .30, T24 | 44,000 | 100,000 | 83,300 | 45,000 | | | |
| <u>ROCKETS & LAUNCHERS</u> | | | | | | | |
| Rocket, Smoke, (WP), 2.36", T26 | 10,000 | 5,000 | 4,100 | 4,424 | 10,000 | | |
| Rocket, H.E., 2.36", T30" T30 | 40,000 | 5,000 | 4,100 | | | | |
| Sight, Optical Ring, T29E2 | 500 | 500 | 410 | 1,000 | | | |
| Launcher, Rocket, 2.36", M9 ^d | 2,228 | 3,342 | 2,780 | | | | |
| Launcher, Rocket, Arty., 4.5", T35 - W/Rocket M3 W/PDM4 & 1/5 Machine, Blasting | 500 | 500 | 410 | | | | |
| <u>ARTILLERY ITEMS</u> | | | | | | | |
| Gun, 37mm, T32 on Mount T9 | | 100 | 83 | 1 | 200 | | |
| Mortar, 60mm, T18 ^a | 354 | 540 | 450 | | 300 | 500 | |
| Mortar, 105mm, T13 ^d | 97 | 164 | 136 | | | 300 | 500 |
| Mortar, 155mm | 24 | 48 | 40 | | | | |
| Setter, Fuze, Hand, T37E1 | 48 | 68 | 48 | | | | |

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JUNGLE WARFARE WEAPONS

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| <u>CHEMICAL WARFARE SERVICE</u> | <u>SWPA</u> | <u>SPA</u> | <u>CPA^a</u> | <u>Deliveries</u> | <u>Proc. & Allo. Sched.</u> | | <u>Feb.</u> |
|---|--------------------|---------------------|------------------------|-------------------|---------------------------------|---------------------|-------------|
| | | | | <u>In USA</u> | <u>Dec.</u> | <u>Jan.</u> | |
| Grenade, Hand, Smoke, (WP), M15 ^d | | 50,000 | 50,000 | 50,000 | | | |
| Mortar, Chem. 4.2", M2A2 w/access. ^d | 48 | 68 | 14 | 200 | | | |
| Cart, 4.2" C.M. Ammunition | 136 | 68 | 14 | | 261 | | |
| Unit of Maintenance - 4.2" C.M. ^d | 24 | | | | | | |
| Pack, Man, E6 - 4.2" CM | 48 | 96 | 48 | 144 | | | |
| Pack, Mule, E7 - 4.2" CM | | 48 | 48 | 48 | | | |
| Carrier, Shell, 4.2" - Man Pack | 268 | | | | 268 | | |
| Shell, H.E., 4.2", E53 w/PD M3 | 14,000 | 15,000 | 24,000 | 10,000 | | | |
| Fuze, T & SQ, E39 | 2,500 | 1,500 | 1,500 | 200 | | | |
| Fuze, P.D. Delay, T89 | 5,000 | 7,500 | 12,000 | 11,000 | | | |
| Flamethrower, E3 | 240 | 224 | 414 | | 200 | | |
| Kit, Service for E3 | 40 | 38 | 69 | | | | |
| Bomb, Incend., 500 lb., T2E1 | 750 | 250 | | 1,000 | 1,000 | | |
| Pot, Smoke, Floating, M4A1 | | | 12,000 | | | | |
| <u>ENGINEER ITEMS</u> | | | | | | | |
| Detonator, Delay, 15 sec. | 5,000 | 185,000 | 154,000 | | 10,000 | | |
| Kit, Demolition, M5 ^d | 500 | 18,500 | 15,400 | 1,000 | 10,000 | 15,000 | |
| Kit, Demolition, M7 ^d | 25 | 1,200 | 1,000 | 50 | | | |
| <u>QUARTERMASTER ITEMS</u> | | | | | | | |
| Packboard, Plywood Type w/attachments | 5,600 ^f | 13,200 ^g | 10,700 ⁱ | 3,000 | 12,000 | 18,000 | 23,000 |
| Carrying attachments for: | | | | | | | |
| Light Machine Gun 1/weapon | 135 | 325 | 270 | | | | |
| Heavy Machine Gun 2/weapon | 144 | 800 | 666 | | | | |
| 80mm Mortar 1/weapon | 135 | 450 | 375 | | | | |
| 81mm Mortar 3/weapon | 252 | 900 | 750 | | | | |
| 105mm Mortar 18/weapon ^h | 2,600 | 4,200 | 3,200 | | 6,000 ^k | 10,000 ^k | |
| Boxed Cargo | 1,830 | 4,550 | 3,790 | | | | |

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EXPLANATION OF REFERENCE LETTERS USED ON SHEET #1

- *. To be procured by the Engineer Corps
- a. Quantity estimated to be 5/6 of SPA requirements.
- b. 152 shipped to manufacturer of T38 Launcher
500 shipped to manufacturer of T6 Sight Mount
- c. Standardization status:
 - STT - Service Test Type
 - LP - Limited Procurement Type
 - S - Standard Article
 - SS - Substitute Standard Article
 - LS - Limited Standard Article
- d. Denotes item is listed in the Army Supply Program
- e. This includes the standard mortar tube; the mechanical firing base cap; the detachable base plate w/split nut; Bracket, Sight, T6 w/Sight T59, and mortar carrying strap.
- f. 3000 covered by cable requisition.
- g. 9000 covered by requisition 1089
- h. 10,000 covered by ASF Directive
- i. Requirements estimated except 4200 for 105mm Mortar.
- j. Trailer is the One-Ton, Two-Wheel, Cargo.
- k. Delivery to be made to the Ordnance Department.

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