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OFFICE OF THE CHIEF OF ORDNANCE

FEBRUARY WASHINGTON, D.C. 1945

RECOILLESS WEAPONS

RIFLE, 57-MM, T15E13 and T15E9

RIFLE, 75-MM, T21

HOWITZER, 105-MM, T9 and CARRIAGE, T9

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INTRODUCTION

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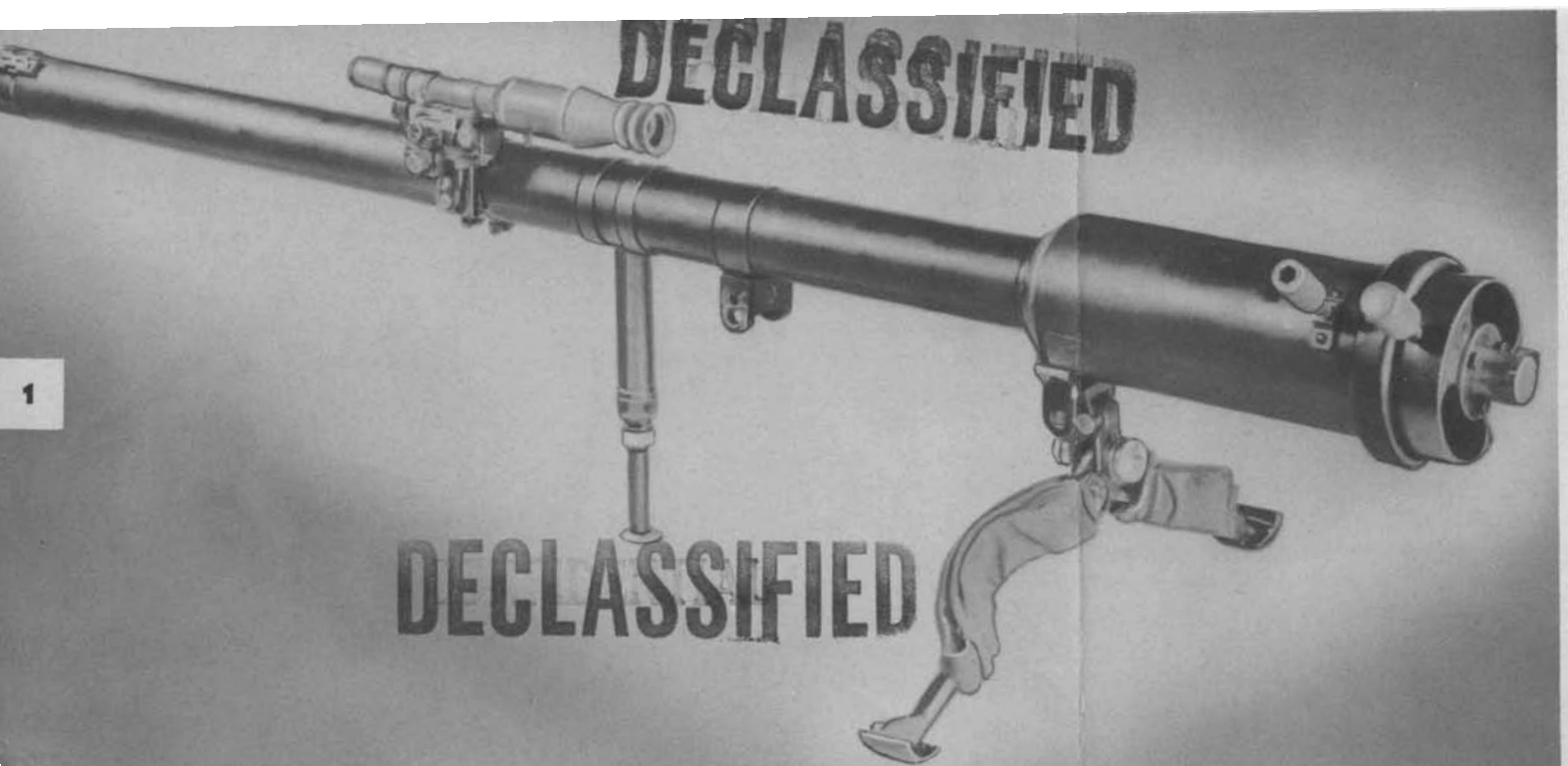
WHILE the necessity of providing our troops with superior fire power has long been recognized, experience in this war has sharply emphasized this principle. Warfare today is not static warfare of position, with great armies confronting each other along well defined lines and relatively small fronts; rather it is fluid warfare, a swiftly changing panorama of break-throughs, airborne and beach-head actions, and frequent isolated engagements. Hence the need for highly mobile and portable weapons quickly became apparent and has resulted in such successful developments as the rifle grenade, the shoulder fired rocket launcher, mortars and similar light weapons. As the urgency for improved accuracy and increased range in weapons of this type grew apace, the Ordnance Department initiated projects to provide equipment capable of firing high explosive shell with these characteristics, yet light enough to accompany infantry in almost every tactical operation. A controlling factor in weapon design has always been that of weight, and weight is inevitably largely determined by the phenomenon of recoil. As recoil increases so must the weight of compensating mechanisms or support increase. To produce equipment that would possess the desired characteristics several weapons have been designed in which recoil has been eliminated. This has been accomplished by balancing the forward and rearward momentum that occurs in firing—the simplest and most efficient method.

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The elimination of recoil and consequent heavy carriages has meant that these weapons are extremely light; that they can be produced rapidly and economically and that they can be readily shipped, an important consideration when supply lines cross oceans.

The recoilless rifles and howitzer presented in this booklet have been produced to provide infantry with assault weapons comparable to artillery. Their light weight, simple design, and ease of handling indicate employment in a great many tactical situations heretofore unsupported by superior firepower.

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RIFLE

57-MM, T15E13 and T15E9

THE 57-mm rifles, T15E13 and T15E9, operating on the recoilless principle, have been designed to provide an antipersonnel and antitank weapon of lighter weight and greater range and accuracy than other comparable light weight weapons.

This rifle operates on principles similar to those of a conventional gun except in the characteristics of the breech. Upon ignition of the propelling charge, a controlled amount of gas is allowed to escape to the rear, which, with the forward momentum of the shell, creates equal and opposing forces within the rifle. The force exerted by the projectile in its forward passage through the tube counteracts the force of the gas escaping through Venturi openings in the breech. Hence, since these two forces are balanced, the rifle does not move appreciably. Moreover, the Venturi openings are designed to exert a rotational reaction which offsets the torque induced in the rifle by the movement of the projectile through the rifling.

The cartridge case of the round for this rifle is smaller in diameter than the interior of the chamber. It is perforated to allow radial escape of gas into the chamber and thence to the rear until controlled by the Venturi openings. The round as thus proportioned is compact and easily transported.

The rifles T15E9 and E13 differ only in the rifling of the tube. The rifling in the T15E9 is one turn in 25 calibers and in the T15E13, one in 30 calibers.

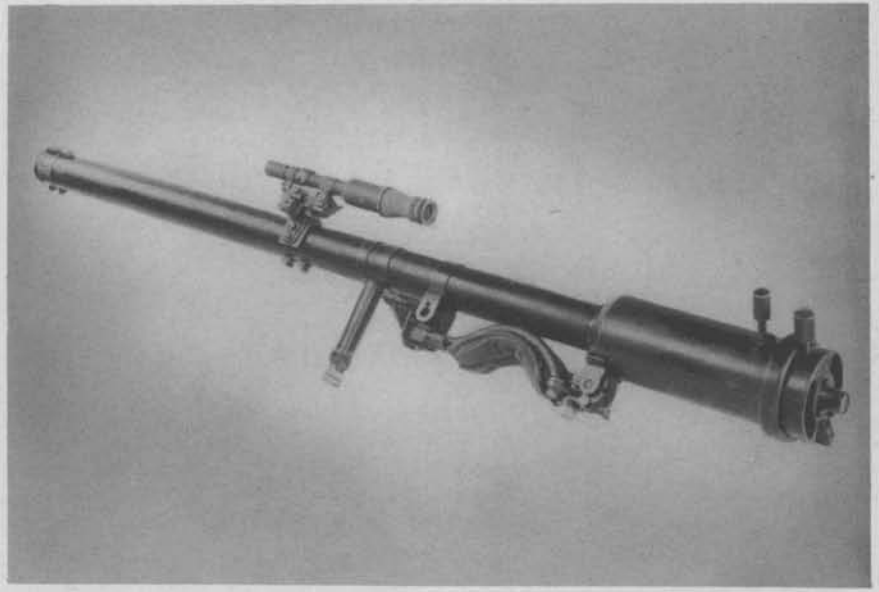
Extendable Front Handle T3E1 and Bipod T3E1 are provided. The latter, when folded, becomes a shoulder rest, permitting the rifle to be fired from the shoulder in standing, sitting or kneeling positions. The front handle may be extended and the bipod unfolded to furnish three point support for prone firing. The rifle may also be mounted on the cal. .30 Machine Gun Tripod. Front Sight, T91 and Sight Mount, T120E2, provide attached iron sights, the rear sight leaf being similar to the cal. .30, M1903 rifle. Telescope Sight T130E2 may be quickly attached to the Sight Mount T120E2.

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On Mount, Tripod, Cal. .30, M1917A1

Bipod, T3E1, Folded for Firing from Shoulder



CHARACTERISTICS

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RIFLE, 57-MM, T15E13

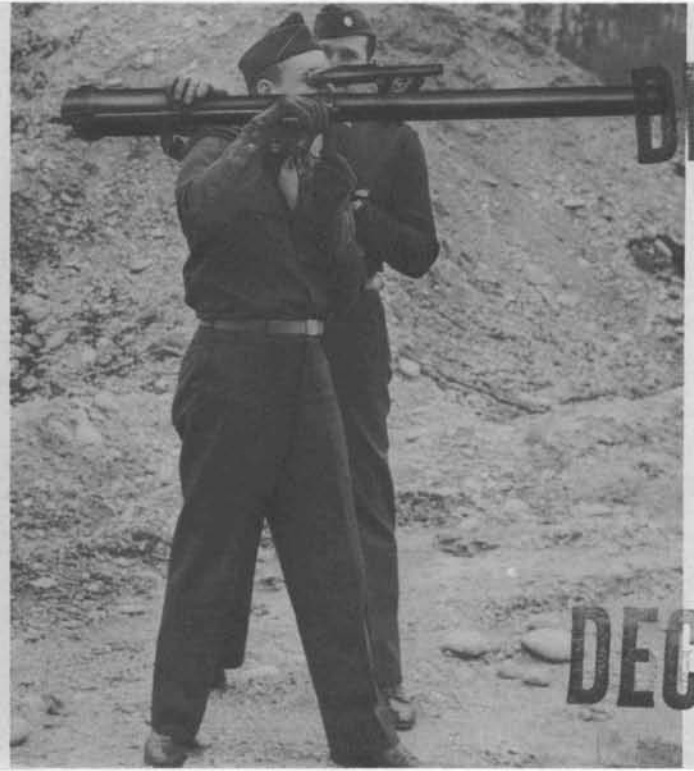
Weight (gun complete—for mounting on tripod).....40.25 lb.
Length, over-all.....60 in.
Recoil mechanism.....None, recoilless
Muzzle velocity.....1,200 f/s
Maximum range.....4,400 yd.
with Shell, H.E., 57-mm, T22
Type of breechblock.....Interrupted lug
Firing mechanism.....Spring loaded hammer, floating firing pin, trigger operated sear
Rifling.....1 turn in 30 calibers—uniform, right hand
Mount...Bipod, T3E1 forms rest for shoulder firing or bipod for prone firing used in conjunction with extendable front Handle, T3E1
Alternate Mount.....Mount, Tripod, Cal. .30, M1917A1
Iron Sights..Sight, Front, T91 and Mount, Sight, T120E2 provide iron sights when telescope is not used
Telescopic sight.....Direct Fire Telescope, T130E2
Elevation (on Mount, Tripod, Cal. .30, M1917A1).....+65°
Depression (on Mount, Tripod, Cal. .30, M1917A1).....−27°
Traverse (on Mount, Tripod, Cal. .30, M1917A1).....360°
Height—in firing position
(on Mount, Tripod, Cal. .30, M1917A1).....0° elevation
34¼ in. to top of breechblock handle
Width—in firing position.....12 in. (gun and sight mounting bracket only)

ACCESSORIES

1. Cover, T27E2
2. Cover, T38 (Muzzle and Breech)
3. Bag, Canvas, Rocket, M6 (for transporting ammunition)
4. Packboard, Plywood & straps w/buckles, quick-release & attachments, cargo
5. Mount, Tripod, Cal. .30, M1917A1

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Firing from Standing Position

Firing from Kneeling Position

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Firing from Prone Position

Carried on Packboard, in Cover, T27E2



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Carried by Two Men in Cover, T27E2, with Slings. Three Rounds Carried in Bag, Canvas, Rocket, M6

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AMMUNITION

The H.E. Shell, T22, was developed to provide a high explosive, antipersonnel round for the 57-mm recoilless rifle. This round is provided with a point detonating fuze, T119E1.

The H.E.A.T. Shell, T20E2, was developed to provide a round for use against armored vehicles. It is provided with a point initiating fuze, T123E1, and has penetrated homogeneous armor plate up to 3 inches at 20° obliquity.

The WP Shell, T23, was developed to provide a round for smoke screening, antipersonnel effect, and for spotting. The T119E1 fuze is used with this round.

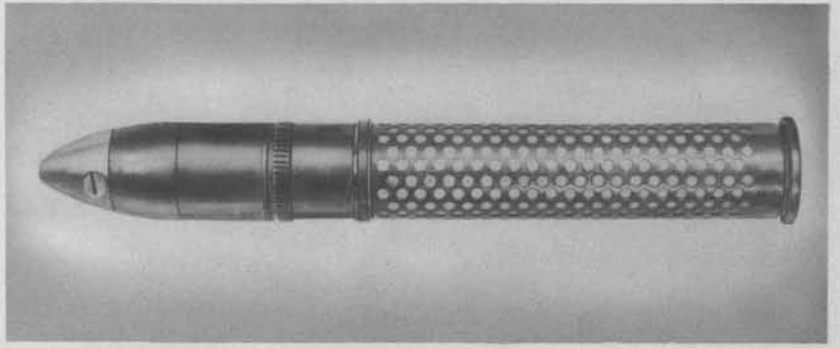
All of these rounds use a perforated steel cartridge case instead of the usual solid case. The case has a paper liner which retains the propellent charge and bursts upon ignition, allowing the release of gases through Venturi tubes in the rear of the gun. All shell have pre-engraved rotating bands in order to reduce the amount of pressure required to expel the shell from the rifle.

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CHARACTERISTICS

Shell	Shell & Fuze Weight	Fuze Type	Primer	Cartridge Case	w/o	Complete Rd. Weight w/container
H.E., 57-mm, T22	2.75 lb.	P.D.	Perc., T37	Steel, T1	5.30	7.12 lb.
H.E.A.T. 57-mm, T20E2	2.75 lb.	P.I.	Perc., T37	Steel, T1	5.30	7.12 lb.
Smoke (WP) 57-mm, T23	2.75 lb.	P.D.	Perc., T37	Steel, T1	5.30	7.12 lb.

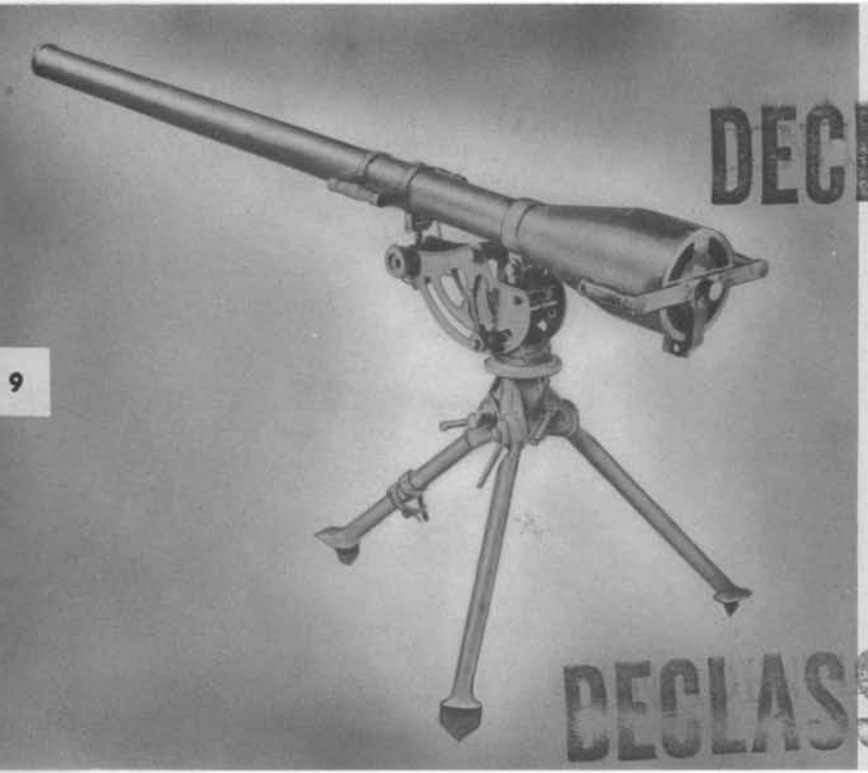
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Cartridge, H.E., 57-mm, T22

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RIFLE

75-MM, T21

THE 75-MM Rifle T21 has also been designed as an antitank and antipersonnel weapon with a range and fire power comparable to a howitzer, the accuracy of small arms, and yet light enough to accompany infantry.

The T21 Rifle operates on the same principles as the 57-mm recoilless rifle and fires, at normal velocity of 1,000 f/s, a standard 75-mm H.E.A.T. projectile with pre-engraved rotating band and other slight modifications. Similarly modified standard H.E. and WP projectiles are also fired at the above velocity.

Weighing but 105 pounds this rifle may be carried short distances by 2 to 4 men. It is quickly and easily mounted on the cal. .30, M1917A1 Tripod Mount. Provided the range is not too great it may be used for supporting artillery fire. Maximum range is approximately 7,000 yards.

Although the T21 Rifle is primarily a direct fire weapon, an elevation quadrant, and leveling jacks to bring the pintle into a level plane, are provided.

Paracrates to allow the rifle to be dropped from airplanes are under development and it is anticipated that it will become an important addition to the equipment of airborne troops.

CHARACTERISTICS

Weight (gun w/o sights or tripod)	105 lb.
Length, over-all	81.78 in.
Recoil mechanism	None, recoilless
Muzzle velocity	1,000 f/s
Type of breechblock	Interrupted lug
Firing mechanism	Spring loaded hammer, floating firing pin, trigger operated sear
Rifling	1 turn in 22 calibers—uniform, right hand
Elevation (on Mount, Tripod, caliber .30, M1917A1)	+27°
Depression (on Mount, Tripod, caliber .30, M1917A1)	−65°
Traverse (on Mount, Tripod, caliber .30, M1917A1	360°

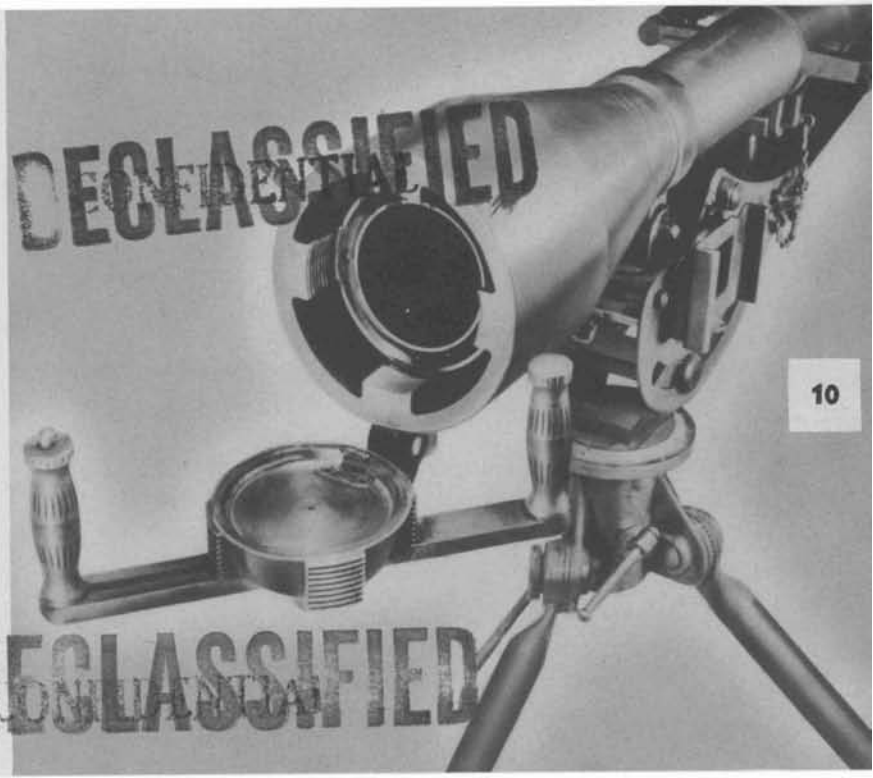
ACCESSORIES

1. Mount, Tripod, M1917A1
2. Jacks, Leveling, T1
3. Cover, T39 (Muzzle & Breech)

OPTICAL FIRE CONTROL EQUIPMENT

Telescope, T126E2

Quadrant, Elevation, T13E1



Breechblock in Open Position

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Cartridge, H.E., 75-mm, T38

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AMMUNITION

Shell similar to those for the 57-mm rifle were developed for the 75-mm T21 Rifle. The Shell, H.E., 75-mm, T38, is an antipersonnel round, and the Shell, H.E.A.T., T39, an antitank round which will penetrate homogeneous armor plate to a depth of 4 to 4.5 inches at all ranges and at all obliquities from 0° to 60°.

The WP shell T23 will be used for smoke screening, antipersonnel effect and for spotting.

The H.E. shell uses the point detonating fuze M48A2, the H.E.A.T., the base detonating fuze M62, A1, and the WP shell, the point detonating M57 fuze.

These rounds also use a perforated steel cartridge case and have pre-engraved rotating bands.

CHARACTERISTICS

Shell	Shell & Fuze Weight	Fuze Type	Primer	Cartridge Case	Complete Rd. Weight
H.E., 75-mm, T38	14.4 lb.	P.D.	M28A2	Steel, T7	21.85 lb.
H.E.A.T., 75-mm, T39	13.08 lb.	B.D.	M28A2	Steel, T7	20.44 lb.
Smoke (WP), 75-mm, T40	15.1 lb.	P.D.	M28A2	Steel, T7	22.61 lb.

HOWITZER

105-MM, T9 and CARRIAGE, 105-MM, T9



HOWITZER, 105-mm, T9 and CARRIAGE, T9 in traveling position behind 1/4 ton 4x4 truck

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HOWITZER T9,

in firing position

THE Recoilless Howitzer T9 has been developed to provide an artillery weapon combining adequate fire power with extremely light weight for use over difficult terrain and by airborne troops. It fires the same shell as the 105-mm Howitzer, M3, and M2A1.

The absence of recoil in the specially constructed howitzer permits the use of an exceptionally light carriage. The rearward movement of the gases through the nozzle balances the forward movement of the projectile. The breechblock which carries the nozzle is of the horizontal sliding block type and the removable breech ring is locked to the tube with interrupted collars. The equilibrator and elevating mechanism are combined in a single unit consisting of two tubes containing both spring and screw elevating jacks connecting the top carriage to the front of the breech ring.

When in firing position, the carriage is supported on three trails which fold up and lock to the tube to form a rigid mount in the traveling position. The wheels are readily removable for emplacement, if desired.

The T9 Howitzer and Carriage have been designed to be readily disassembled into loads suitable for paracrates or pack transports. None of the loads exceed 200 pounds.

The weight of the howitzer and carriage is approximately 750 pounds while the weight of a similar German recoilless howitzer, 10.5 cm. L.G. 12 with shield, is reported as 1,217 pounds.

AMMUNITION

It is anticipated that all standard shell now fired in 105-mm howitzers will be satisfactory for use in the T9. The cartridge case, which has a plastic blow-out plug in the base, has a capacity of approximately 300 cubic inches. Due to its larger diameter there is no likelihood of its being mistaken for regular 105-mm ammunition.

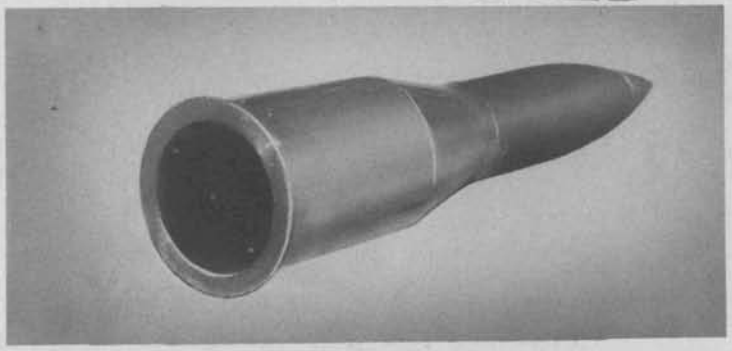
Initial firing tests to date indicate that velocities of approximately 1,050 f/s with the 105-mm Shell, H.E., M1, are obtained with granular powder, within the pressure limits of the T9 Howitzer. Range is approximately 7,500 yards. The ammunition is semi-fixed and the complete round will weigh approximately 51.5 pounds.

The fragments of the plastic blow-out plug in the base of the cartridge case, the rearward flash of the propellant, and the dust and stones picked up by the gases creates an unsafe area directly in back of the howitzer for about 100 yards. Safety restrictions will be determined.



Complete Round for Howitzer, 105-mm, T9

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Three-quarters Rear View Showing Plastic Blow-Out Plug

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CHARACTERISTICS

HOWITZER, 105-MM, T9

Weight	415 lb.
Length, over-all	88.73 in.
Length of bore	15.99 cal.
Rifling	Uniform, right hand, 1 turn in 20 cal.
Firing mechanism	Trip off
Chamber capacity	300 cu. in.
Muzzle velocity	1,050 f/s approx.
Maximum range	7,500 yd. approx.

CARRIAGE, T9

Weight	335 lb.
Traverse	80° (total)

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Elevation	−5° to +65°
Tread width	48 in. (est.)
Time to emplace	1 min.
Road clearance	6⅜ in.
Height	
Traveling	43¾ in.
Firing	46¾ in.
Width	
Traveling	57 in.
Firing	72 in.

SIGHTING AND FIRE CONTROL EQUIPMENT

1. Telescope, Elbow, M62
2. Mount, Telescope, T93
3. Adapter, Telescope, M9