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ENERGA

ANTI-TANK

RIFLE GRENADE

20thCenturyPlatoons.com

(MODEL 48)

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THE « ENERGA »

ANTI-TANK RIFLE GRENADE

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Introduction

The use of large numbers of tanks and other armoured vehicles in modern warfare has created the necessity of equipping the foot soldier with a powerful means of individual defence which, without impairing his mobility nor his facility of concealment, provides him with the possibility of fighting and defeating the tank.

The "ENERGA" anti-tank rifle grenade fully meets all these requirements and offers the infantryman supplied with it an ideal means of defence in close action. Exceptionally powerful for its weight (1.320 lb. = 600 grs.), it can perforate armour measuring up to 8 in. (200 mm) in thickness and is capable of being fired by any type of rifle, provided that the latter is fitted with a small launcher.

The grenade is fired simply and rapidly, it functions with great regularity upon impact even at high angles of incidence. Its piercing efficacy remains constant.

Modern armoured vehicles are generally featured by receding, streamlined or rounded outlines for the purpose of offering oblique surfaces to the adversary. The aim obviously is to provoke ricochets and to prevent the functioning of anti-tank projectiles. Due to this fact, the majority of hits strike the tank at considerable angles of impact.

It is of importance for the defence, therefore, that it should possess projectiles capable of functioning without fail even at great angles of impact incidence.

The "ENERGA" grenade fulfils these conditions, and therefore attains a high degree of efficiency.

Thanks to the properties of its specially compounded hollow explosive charge, the grenade perforates the armour of the heaviest tanks and projects into their interior an incandescent metallic jet travelling at enormous speed and accompanied by a tongue of gases burning under high pressure, resulting from the explosive charge. Additionally, fragments of steel armour plate penetrate into the interior of the tank.

These powerful elements, which strike at the vital organs of the armoured vehicle and wreak havoc in its interior, are sufficient to put the crew out of action. A single round will often set the tank on fire or cause its ammunition to explode.

The power of the "ENERGA" grenade is such as to enable it not only to perforate a single massive armour plate but also a system of spaced plates. This defeats the purpose of the so-called "skirting plates" with which several designers have proposed to fit their tanks in order to protect them against hollow charge projectiles.

In practice this means that the tank becomes a relatively easy prey for the foot soldier. Its crew will be haunted by fear of the grenade-firing infantrymen who may lie in wait for their vehicle all along its route.

Whether in the attack, in ambush or street fighting, the infantryman is thus capable not only of immobilizing the tank, but also of eliminating its occupants. The foot soldier need not fear being injured by fragments from his own grenade even when he fires on the tank from short distances.

The "ENERGA" grenade may successfully be used also against fortifications. It is fully capable of penetrating a reinforced concrete wall or a structure of brickwork and other masonry and of attaining the enemy sheltering behind such protective works.

Owing to its skilfully developed ballistic characteristics, the grenade is highly accurate in spite of its low weight. It functions against any resistant and non-resistant target and presents no hazards of any kind for the grenadier, thanks to the safety devices incorporated in and specially developed for it.

Manufactured of non-corrosive materials and fully air and water tight, the grenade permits protracted storage without suffering any ill-effect concerning its performance or preservation.

The grenade launcher may be retained mounted on the rifle, does not interfere with the firing of bullet ammunition and even serves as a flash-concealing tube.

General characteristics of the grenade

Calibre : 2.95 in. (75 mm).

Weight : 1.320 lb. (600 gr), including 0,660 lb. (300 gr) of explosive charge.

Piercing Power : Approximately 8 in. (200 mm) of armour plate or about 20 in. (500 mm) of concrete when striking at right angles ; more than 4 in. (100 mm) of armour plate at an impact angle of 45 deg.

Range : Fired from an angle of 45 deg., about 285 yds. (260 m).

Firing technique : In direct fire on armoured vehicles up to 250 ft. (75 m) distant.

Functioning : Certain against any hard or soft target, even at high angles of incidence (over 60 deg).

Arming delay (muzzle safety) provides the grenadier with a safety zone of 5 ft. (1.50 m) ; it follows that, should the grenade hit an object of any kind immediately after being fired (such as camouflage, branches of trees, earthwork protection of trenches, shelter walls, etc.), it will not explode ; only the detonating charge of the nose-detonating fuse will function ; grenadiers and supply personnel will therefore be spared injury.

Shock and Drop Safety : The grenade can be dropped safely from any height without exploding. In cases of violent drops on to the nose-detonating fuse, a special internal device remains set on safety.

Firing Accuracy : Excellent. From a distance of 55 yds. (50 m), an average marksman will hit a target measuring 12 in. (30 cm) in diameter. From 250 ft. (75 m), he will hit a target of about 20 in. (50 cm) diameter.

Explosive Weight Ratio : The explosive filler amounts to more than 50 per cent of the total weight of the grenade, ensuring maximum efficacy against armoured vehicles as well as against unprotected personnel.

A very favourable Feature in Combat derives from the fact that the firing of the grenade produces neither smoke, flash nor dust. The firing point is therefore impossible to locate.

Safe Storage and Transport : The grenade is perfectly safe in storage and transport, since all the "live" components, including the fuses, are detachable and can instantly be mounted in the grenade.

Simplicity of Use : No preparation of any kind is required before firing.

Sighting : This is effected by means of a simple, practical sighting grid which is detachably mounted aft of the grenade launcher.

Training and Practice : A practice grenade, extremely solid and capable of being fired a large number of times, enables the foot soldier to be trained quickly and at low cost.



Description of grenade and its operation

The grenade is composed of a body carrying at its front end an ogive-shaped head and at its rear a tail provided with stabilising fins. The thin-walled body encloses a hollow explosive charge (see illustration on page 8). A percussion-fuse, designed to function by direct action and by inertia, even at maximum angles of impact, is fitted to the nose of the grenade and equipped with a primer detonator designed to fire the main detonator located within the explosive charge.

A small, detachable hood protects the fuse from shocks until the moment of firing.

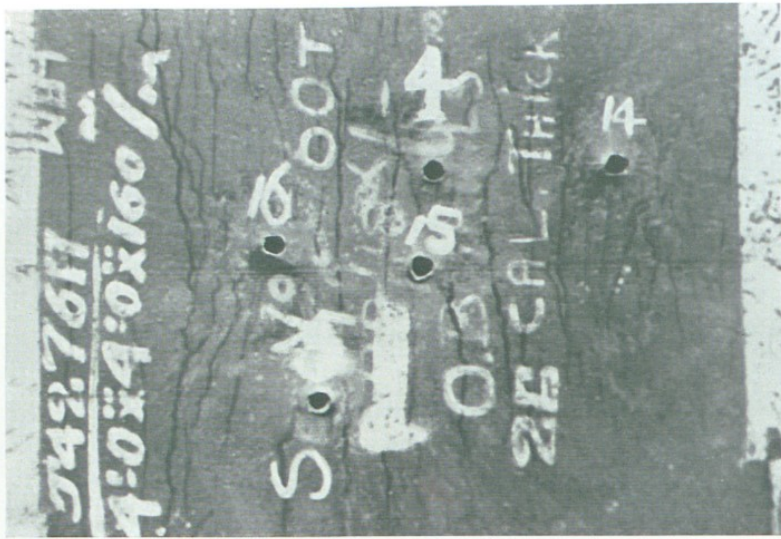
An interior safety device situated in the apex of the cone delays the arming of the grenade, thereby preventing premature discharge against an unforeseen obstacle in the vicinity of the grenadier.

The grenade functions as follows : The gases of the cartridge exert their pressure on the interior of the tail of the grenade which they propel. During the period of acceleration, immediately after the grenade has been fired, the effect of inertia provokes the unlocking of the internal safety device ; however, as a result of spring action, the arming process is not completed until the projectile has cleared the muzzle by about 5 ft. (1.50 m). At that moment, the plug closing the way of access to the main detonator is released and comes to rest in the forward cavity of the projectile.

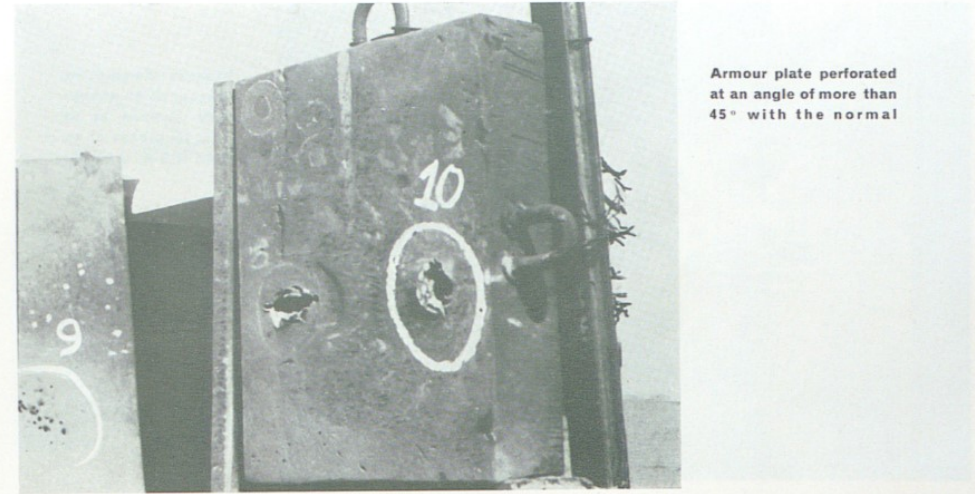
The fuse itself is armed under the effect of propulsion ; it is ready to ignite the rear detonator through the passage which has been freed. This ignition takes place upon the impact by wave transmission, inasmuch as the nose detonator ignites the rear detonator, which in turn sets off the explosion of the main charge.

The cone, which is violently compressed in the manner of an umbrella, is submitted to such a stress that it is partially melted and projects a metallic jet forward along the longitudinal axis of the projectile at considerable speed, amounting to about 33.000 ft. (10.000 m) per second. It is this incandescent jet which performs the vital part of the armour-piercing operation. It is accompanied on its course by the gases from the explosive filler, followed by the hard core resulting from the crushing of the metal cone.

The sudden introduction of these elements into the tank, added to the splinters originating at the point where the projectile leaves the armour plate, produces a devastating effect on the vehicle and its operating crew. As a general rule, the tank is set on fire ; it invariably explodes whenever the ammunition hold is struck.



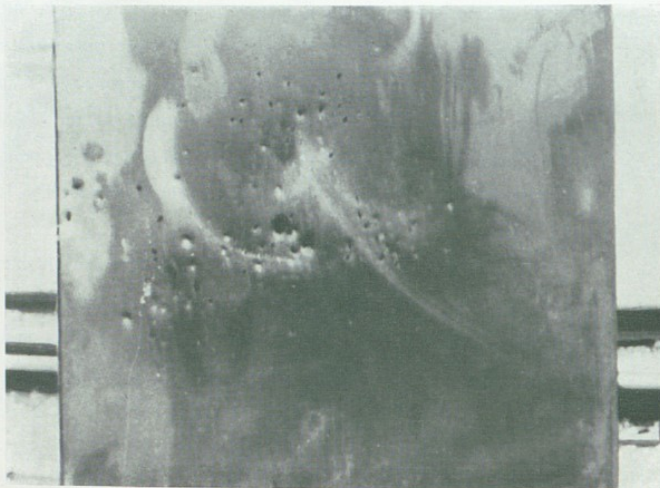
6 in. (150 mm) armour plate pierced from right angles



Armour plate perforated at an angle of more than 45° with the normal

Power of penetration

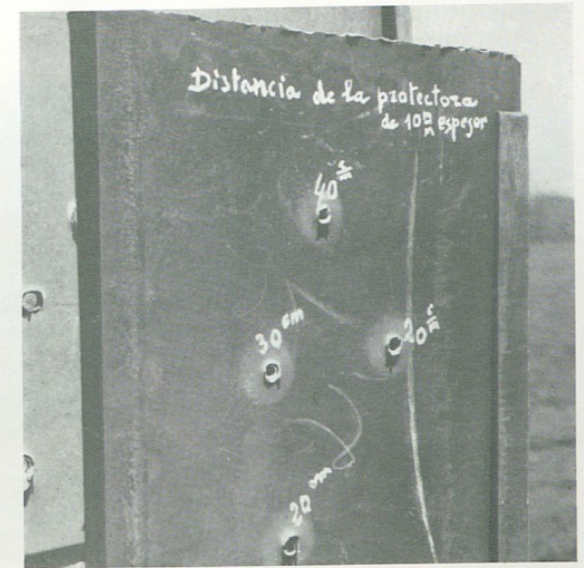
A 6 in. (150 mm) steel armour plate is easily pierced by the "ENERGA" grenade. A witness metal plate was erected at a certain distance to the rear of the plate to record the effect produced by the residue of energy remaining in the round. Repeated firing demonstrates the regularity of entry and exit of the hole in the steel plate.



Group of perforations in a witness plate

Power of penetration

The illustration below shows the effect of an "ENERGA" grenade fired against a 0.4 in. (10 mm) "skirting plate" mounted 8 in. (200 mm) ahead of a 4 in. (100 mm) steel armour plate; the grenade has pierced both the skirting plate and the armour plate itself.



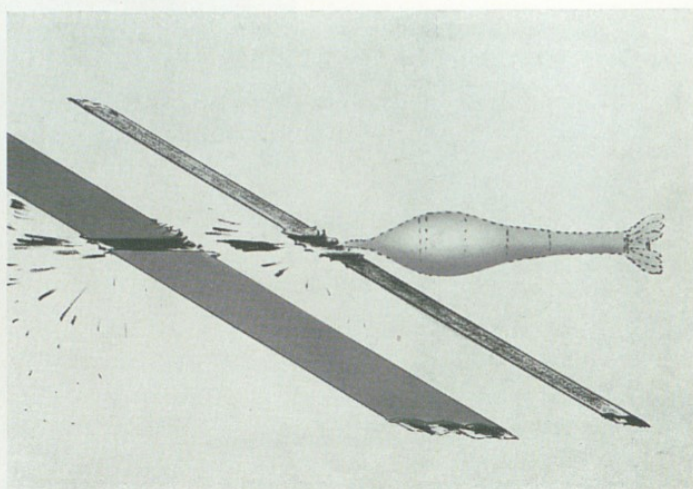
Skirting plate and armour plate. Both are perforated



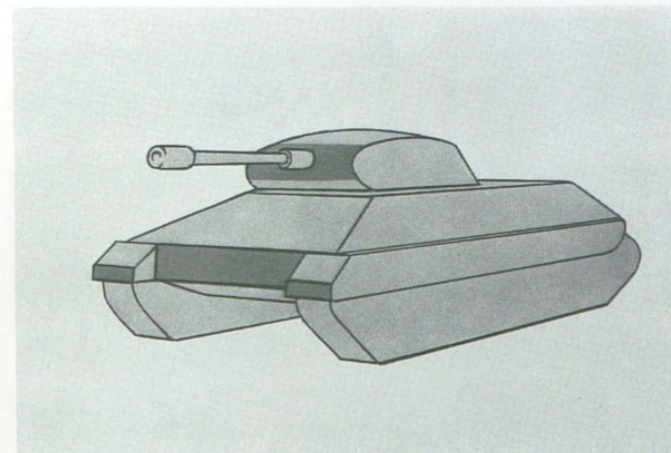
Diagram showing the piercing of an armour plate inclined at 60 deg., by means of an ENERGA grenade

Operation at great angles of impact

The "ENERGA" anti-tank grenade will function even at very great angles of impact. This applies to plates of steel armour spaced at intervals and sharply inclined. As the two illustrations show, the piercing power of the projectile is not impaired.



Spaced plates inclined at 60 deg., perforated by the ENERGA grenade



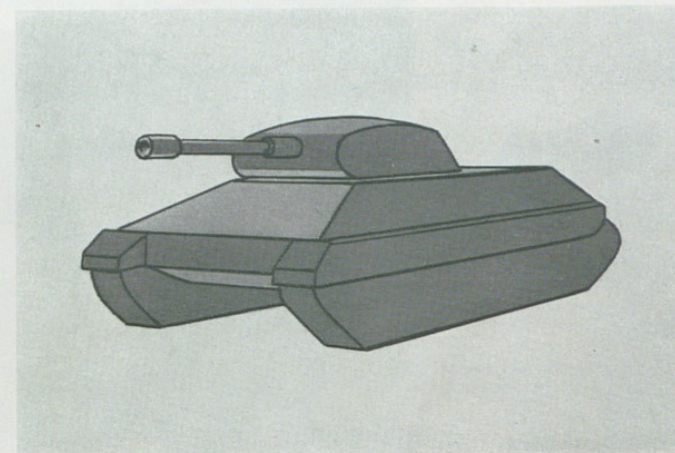
Zone of efficacy at 45 deg. (shaded portion)

Operation at great angles of impact

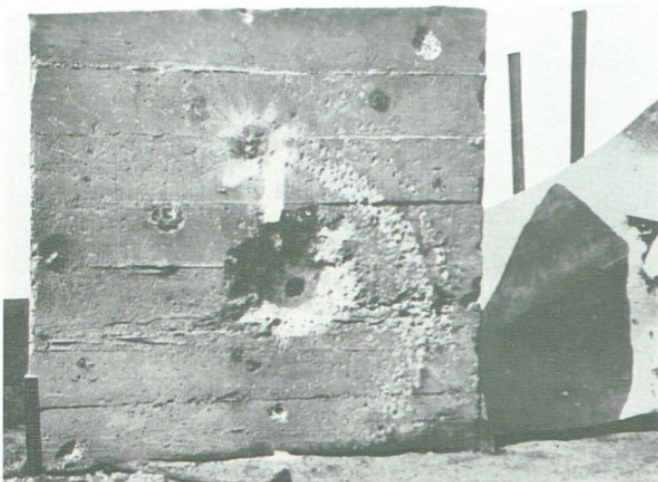
The diagrams above and below enable a comparison to be made of the surface sizes affected by direct hits :

- 1) — at angles of impact up to 45 deg.
- 2) — at angles of impact up to 65 deg. (in relation to the normal)

It is evident that the vulnerability of the tank increases substantially if the defence uses projectiles capable of operating at very high angles of impact. In the case of the "ENERGA" grenade, the potential number of critical hits is therefore considerable.



Zone of efficacy at 65 deg. (shaded portion)



Smashed
concrete wall

Effects on masonry

The "ENERGA" grenade is capable of passing through concrete or brick walls, and eliminating the enemy taking cover or entrenching himself behind such constructions.



Masonry demolished
by grenade fire



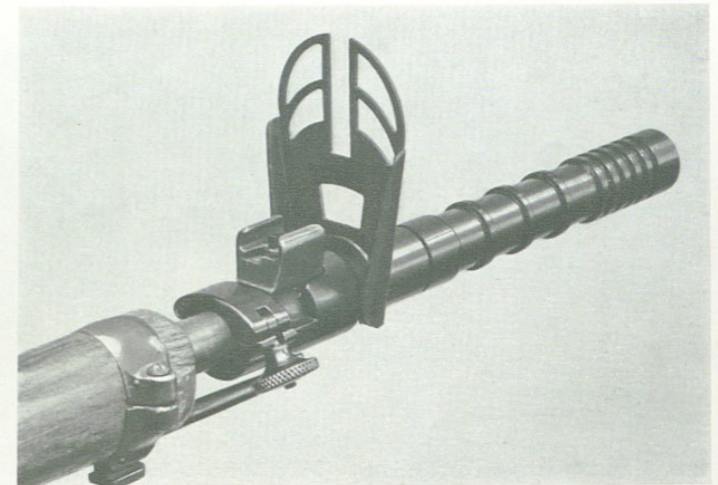
Grenade Launcher, Sight
and Propelling Cartridge

Grenade launcher and sight

For the purpose of firing the grenade, a small launcher is fitted to the barrel of the rifle. The launcher is inserted into the finned tail of the grenade. An elastic ring maintains the grenade in place by friction and prevents it from detaching itself when the rifle is aimed downwards or when the soldier is on the move.

The propulsion of the grenade is obtained by a special blank cartridge housing the desired propellant.

Unfired grenades are readily withdrawn from the launcher.



Launcher mounted
on the rifle

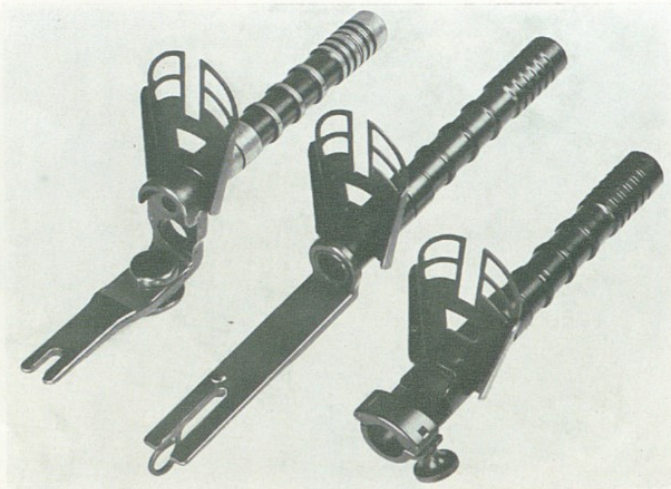


Fitting the grenade on to the launcher

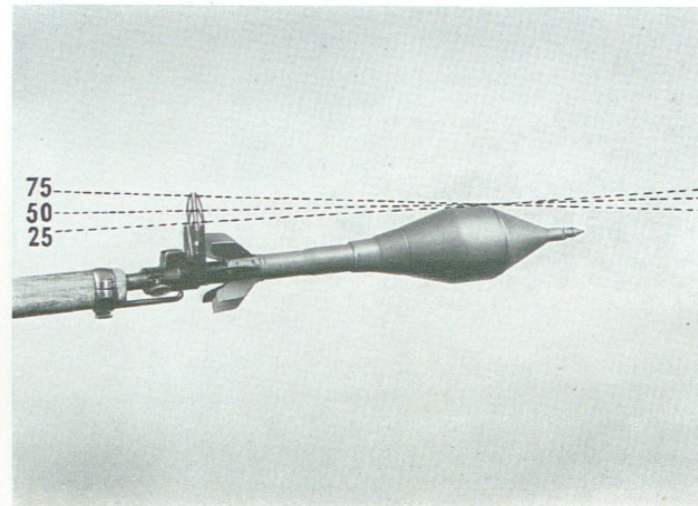
Grenade launcher and sight

The launcher weighs only 0.882 lb. (400 gr). It is quickly mounted on any type of rifle by means of a special locking device and may be left in position indefinitely.

It does not interfere with the firing of bullet ammunition and in this case serves as a flash-concealing tube.



The grenade launcher with locking device for different models of rifle



Using the sight

(The sighting lines, marked by dotted lines, represent various distances)

Aiming

Aiming is made by means of a sighting grid which permits the grenade to be fired over a variety of distances. The sighting grid is mounted on the rear part of the launcher.

For the purpose of taking aim, the grenadier aligns the curve of the grid corresponding to the estimated range with the centre of the upper edge of the grenade and with the target; this alignment gives the required angle of fire.

After a few minutes of training the soldiers take automatically the right position of hands and head (see pages 18 and 19).



Aiming at a target 55 yds. (50 m) distant



Marksman in prone position

Firing position

The grenade may be fired from any position, and the recoil action is easily borne by the grenadier.

A marksman desiring to diminish the recoil effect may do so by passing the rifle sling around his left arm and around the front of his chest.



Marksman concealed behind tree

(Before and while firing)

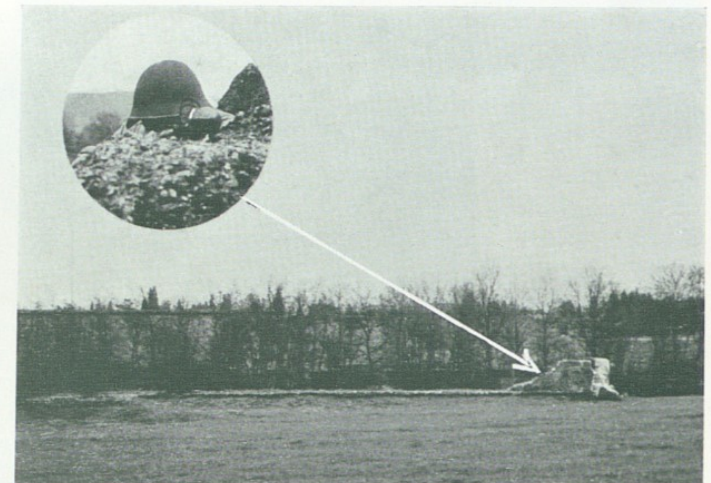
Firing from cover

The cover adopted by the grenadier, regardless of the type of concealment employed, can be excellent even at the moment of actual firing. The infantryman is very difficult to spot by the crews of armoured vehicles who constantly run the risk of entering his field of fire.

Hidden by grass, or at the edge of a forest, lying prone behind the slightest protuberance, the grenadier is free to act at the most favourable moment, frequently by surprise, and with the best results.



Marksman in kneeling position



A marksman in position, facing observer, is invisible from a distance of slightly more than 300 ft.

He is hardly discernible even in the enlarged inset



Firing downwards

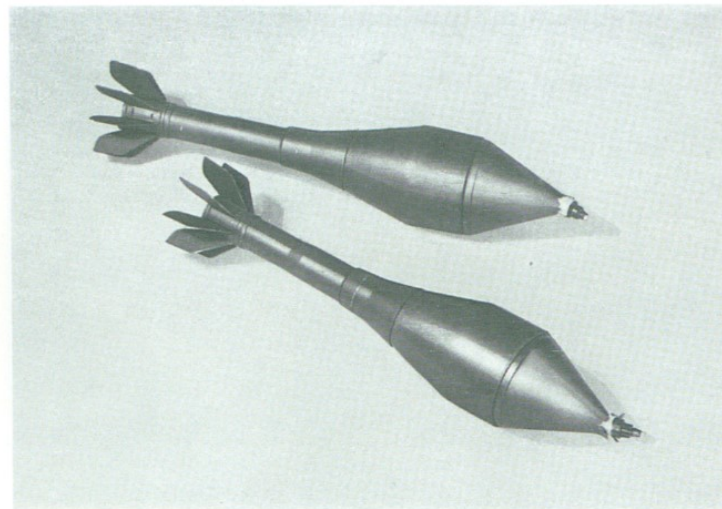
Firing from cover

Without experiencing any inconvenience, the grenadier can raise or lower his rifle and fire from any position, which enables him to station himself on rooftops, in recesses, inside fox-holes or on trees, for the purpose of making surprise attacks on passing tanks.

Using his grenade for curved fire in order to attack entrenched enemy elements, the soldier takes cover behind an embankment or mound, a rock or any other advantage the terrain offers, and is thereby sheltered from the enemy's direct fire.



Using the grenade for curved fire



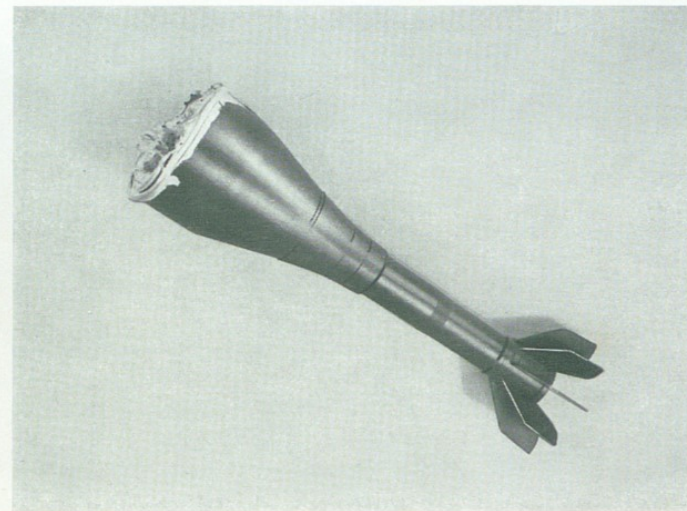
Grenades dropped onto a concrete slab from a height of 33 ft.

Safety of the gunner

During handling, even violent inadvertent blows on the nose of the grenade will neither actuate the fuse nor unlock the inner safety device.

When being fired, no obstacle will provoke the discharge of the grenade until the latter has cleared the muzzle by 5 ft. (1.50 m).

Illustrated below is a grenade fired against a concrete wall from a distance less than the safety zone. The nose portion is completely crushed, without provoking the detonation of the explosive charge. This safety feature gives the grenadier the certainty that a false movement or an error on his part resulting in inadvertent firing of the grenade will present no hazard to his person.



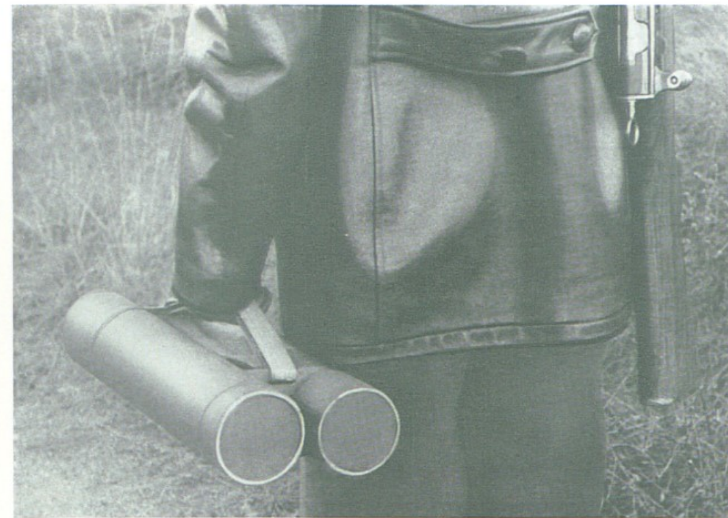
Grenade fired against a concrete wall from less than the muzzle-safety distance of 5 ft.



Container
of insulating
material, water-
tight and sound-
deadening, for
two grenades

Grenade containers

The containers are of extremely rugged construction and provide efficient protection against shocks and effects of bad weather. They are easily transported and stored. (Ten grenades actually weigh less than a single 75-mm round.)



Portable dual
container

Transport

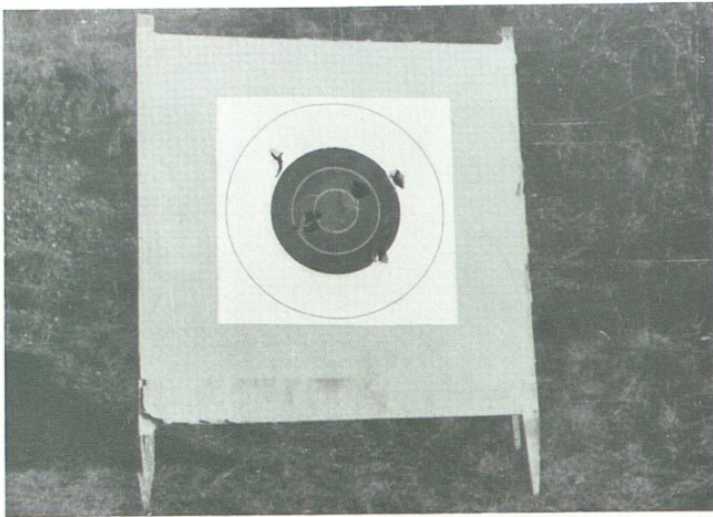
A grip enables the grenade containers to be handled with ease. The same grip is used for carrying the container by hand, on the back, or suspended from the belt; in the last-named case, a special metal hook is used to fasten and remove the containers in a minimum of time.



Metal container
for two grenades



Carriage
of containers with
two grenades each



Paper target erected in front of an embankment

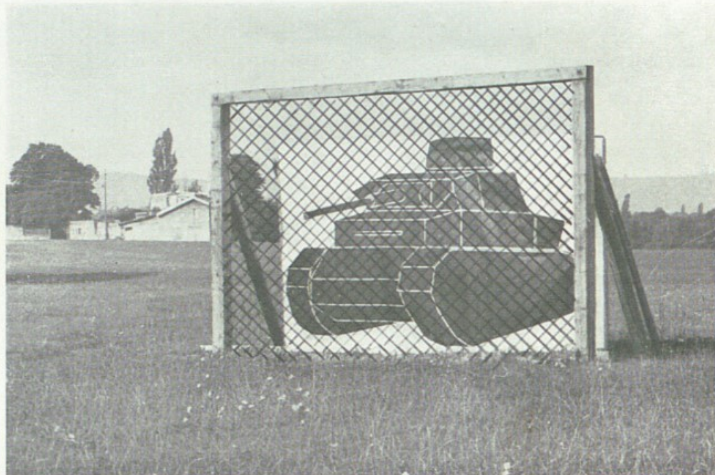
Training and practice

A practice grenade, designed to withstand severe shock and to be salvaged for further use, facilitates the training of grenadiers in a minimum of time and at low cost. At the same time, it provides identical sighting and firing conditions as a live grenade.

It has been found advantageous to place the paper target from 3 to 6 ft. ahead of a sand or earth heap which will stop the grenade after firing and deadens the impact.

The silhouette of a tank, placed behind a solid protective grid, has also been found useful for training purposes.

These measures will allow the rapid recovery of the practice grenades, which will be undamaged and ready for further use.



Silhouette of a tank behind a protective screen

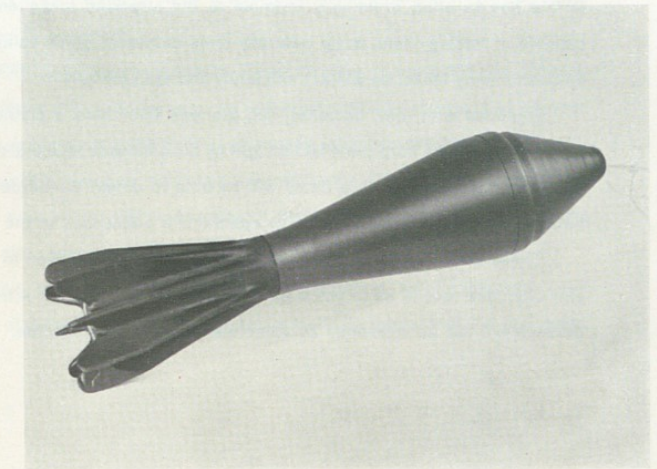


Towed target

Training and practice

The training of the grenadier may be completed by the use of mechanically-towed wooden silhouettes. This type of training aid provides the possibility of judging the distance and the speed of the moving target.

This type of target also gives the instructor a ready means of conducting selecting tests of his recruits.



Practice grenade

x 7

Tactical use

Against a large-scale attack by great numbers of tanks deployed in extended plains or over vast distances, the foot soldier and his conventional armament can no longer provide an efficient defence. It is evident that in such cases the High Command of the defending forces will throw into action every available means of antitank defence it has at its disposal.

Modern anti-tank defence consists of the following elements : tank destroyers, tactical air units, formations of tanks, anti-tank artillery, land-mines etc.

The enemy under consideration here is the small task force of tanks which the first-line defending units have been unable to hold up. Such a detail will consist of light and medium tanks, occasionally escorted by a small number of heavy tanks. Its mission will be to penetrate, by methods of infiltration, to divisional headquarters and to create confusion in the rear of the opposing forces.

Units of this kind must be dealt with by an individual weapon of first-line efficiency and available to a large proportion of the defending infantry.

The "ENERGA" armour-piercing grenade, capable of being fired from rifles and carbines, provides an admirable solution to the problem.

The grenade-firing foot soldier, easily concealed by and adaptable to the advantages the terrain has to offer, practically invisible to the attacking tanks and possessing a weapon capable of halting them, quite naturally feels confident of his value. In excellent position to ambush enemy tanks, he will act efficiently and successfully.

Equipped with four, or better, six, grenade launchers a platoon of infantry will be fully armed to nullify the surprise effect sought by the armoured reconnaissance formations. Operating without support, such a detail will be able to defeat armoured scouting and infiltrating detachments which scored so many spectacular successes in the past.

These advanced armoured forces will no longer be justified in expecting the same effect and offensive results as in years gone by, due to the fact that a modern system of anti-tank defence will not be weakened by vulnerable gaps in the first line.

Armed with "ENERGA" grenades, any formation of troops will be able to provide a continuous first line anti-tank defence in the area it occupies, in addition to an efficient DEFENCE IN DEPTH. The latter fact will be made possible as the reserve companies and battalions are equipped with the same type of weapon. A network of this kind will form an unsurmountable barrier against which any armoured assault will be smashed.

An inadequate line of anti-tank artillery, once it is broken through, leaves the way open to infiltration tactics. With the help of the "ENERGA" there will be a veritable labyrinth of anti-tank fire of extreme power which will settle the fate of the attacking tanks in the first, second and third echelons.

The "ENERGA" projectile and its grenade launcher, both of which, well designed, are easily mounted and operated, constitute the ideal weapon of the infantryman, marine assault formations, airborne infantry, mobile security troops, engineers, artillery spotters and even the cavalry soldier, all of whom, with this equipment, will no longer be the defenceless victims relentlessly pursued by the tank.

On the contrary, the crews of armoured vehicles will be preoccupied with the attempts to evade the powerful missiles of the foot troops, fired unexpectedly from the first line down to the last reserve. Airborne infantry, parachutists, commandos formations and various other elements on advanced missions, cyclists, motorcyclists, enjoy a high degree of freedom of movement and action when equipped with the "ENERGA" grenade, which simultaneously provides them with a powerful anti-tank weapon permitting them to beat off any unforeseen attack by armoured forces.

Furthermore, one should keep in mind the high degree of efficiency of these grenades when used against masonry and reinforced concrete. This qualifies the "ENERGA" projectile as a first class weapon for street fighting, since it will silence machine-gun nests and other enemy elements sheltering in buildings.

In curved fire, the "ENERGA" grenade can be used at ranges of up to 285 yds. (260 m). The demolition blast and moral effect produced by its powerful explosive charge is an efficient means of combating units entrenched in the interior of houses, trenches and fox-holes, etc., or forces using various modes of locomotion, such as armoured trains, motor trucks, locomotives, etc. The grenade is also suitable for the destruction of ammunition dumps, aircrafts on the ground, and a variety of other war material.

With the same launcher the man will be able to fire illuminating, smoke grenades ; the latter hamper the advance of the tank, slow it down and thus facilitate the task of the grenadier.

Conclusion

In view of its high technical and industrial qualities, the "ENERGA" armour-piercing grenade constitutes a defensive weapon of exceptional power in relation to its weight and of unsurpassed efficacy.

Foot troops equipped with this type of ammunition retain their full mobility and simultaneously have the possibility of combating armoured formations in the most suitable places and at the most favourable times.

Since the grenade is fired without flash, smoke nor dust, the grenadier does not betray his position and is therefore practically immune from the enemy's efforts to locate him.

The "ENERGA" anti-tank grenade is especially suited for the establishment of anti-tank defence in depths. It makes possible the immobilisation and destruction of tanks which, without it, could boldly force ahead after breaking through the first lines of defence and successfully complete their mission of creating disorder in the rear and attacking the command units and headquarters of the defending forces.

The fact that the grenade may be issued to a large proportion of the forces of defence, as well as the tactical advantages of easy use and ready camouflage, qualify it as the most rapid weapon for close action, the most efficient and the most economic anti-tank missile.

Its high piercing and destructive power when used against concrete fortifications increases its value still further.

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