Assault Rifle

CETME

Model C

Abbreviated description and use

Introduction
Final Version 2.0

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Alot of hard work from alot of excellent people went into the making of this manual! Please do not abuse it
This manual is not for sale! We worked long and hard for the benefit of everyone so that it would be available free.

Abbreviated Description and Use

Of

CETME Assault Rifle, Model C

7.62 x 51 mm. Caliber

Center for the Technical Study of Special Materials

Padilla, 46 - Madrid Spain

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I. IN GENERAL

The CETME rifle, caliber 7.62 x 51 mm., is a weapon developed using the most modern fabrication methods.

It may be fired a round at a time with automatic loading, or fired automatically.

Its functioning system is mass recoil with semi-rigid locking and a fixed barrel.

It has a flash suppresser screwed on to the mouth of the barrel which permits rifle grenades to be fired with no other device required.

The feeding is accomplished with a magazine of 20 cartridges. 5 cartridge magazines have also been fabricated, and are useful for instruction, and garrison duty.

In its normal version it is provided with a wood handguard, (fig. 1), but it also can be fitted with a metal handguard and a folding bipod (fig. 2). The weapon equipped with a wooden handguard can also have a telescoping bipod fixed to it when needed (fig. 2 a).

In the interior of the cocking rod guide tube, a cleaning kit can be found.

A knife-bayonet (fig. 3) can also be fitted to the weapon. Optical (fig. 4) or infrared sights can also be mounted.

By substituting the flash suppresser with a special adapter, blanks can also be fired.

A simple and easy to use magazine speed loader can also be provided with the weapon.

FIG 1 - CETME Model C Assault Rifle with wood handguards

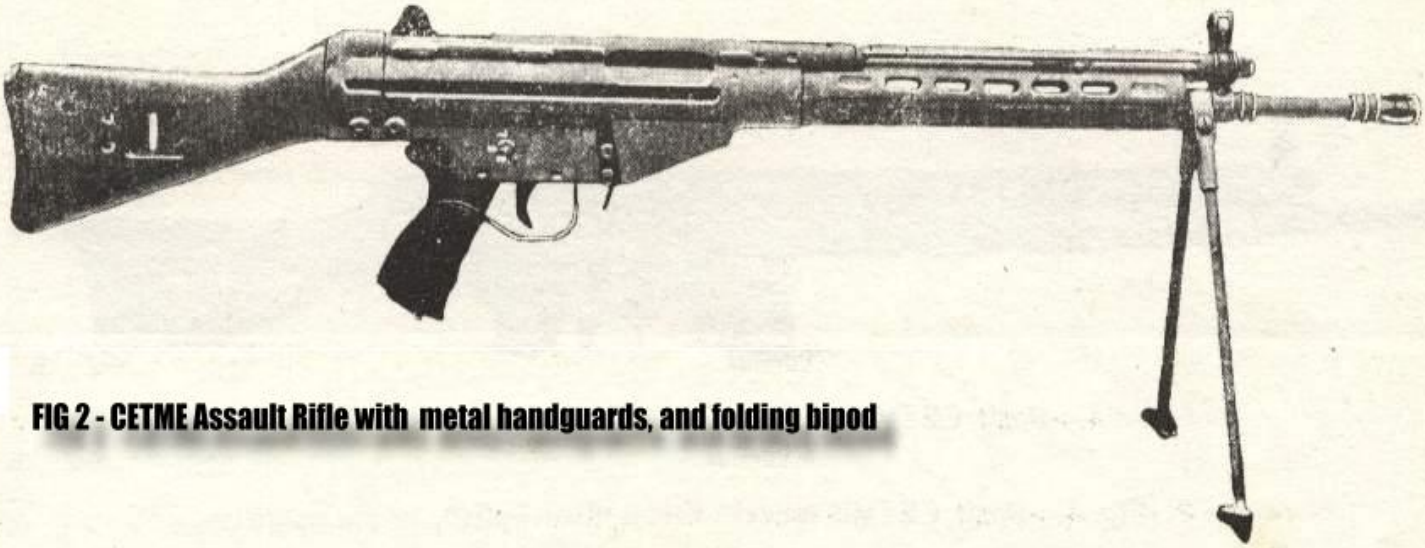


FIG 2 - CETME Assault Rifle with metal handguards, and folding bipod

FIG 2A - Model BR Bipod

FIG 3 - CETME Model C Assault rifle with Knife - Bayonnet

FIG 4 - CETME Model C Assault Rifle with opticle sight

II. Principle Groups

1. Barrel, receiver, cocking mechanism, sights and handguard (eventually bipods).

2. Bolt.

3. Grip with trigger mechanism.

4. Buttstock with recoil spring and buffer.

III. Accessories

1. Magazine.

2. Sling.

3. Attachment for firing blank cartridges.

4. Cleaning kit.

5. Muzzle cover and protective bag.

6. Magazine loader.

7. Knife-Bayonet.

8. Optical Sight

9. Telescopic bipod model BR.

IV. Description

1. Barrel, receiver, cocking mechanism, sights and handguard (eventually bipods) (fig. 5).

***The barrel* is fixed, at its rear portion, to the trunion block. At its fore end it has a threaded flash suppresser.**

***The receiver* is fabricated from a sheet metal stamping. At its fore end it is joined, by welding, to the trunion block. At the rear it is joined to the buttstock by two crosspins. On its lower section it has the magazine well, and to this part the grip assembly is joined by a crosspin.**

***The cocking mechanism* is situated on top of the barrel. The cocking handle folds; it serves to cock and feed the weapon and also permits locking the firing block in its retarded position via a slot cut into the end of the guide tube provided for this purpose.**

***The sighting mechanism* consists of a front point sight and an adjustable rear sight with four positions: one with a rapid acquisition blade for distances up to 100 m. And three of a <<diopter>> type for firing from 100 to 200 m., 300 m. and 400 m.**

***The wooden handguard* is provided, at both of it's ends, with metallic reinforcements to provide attachment points to the weapon. The rear extreme fits into a circular groove on the trunion, and the forward extreme is held via a clamp that encircles the barrel and a screw that locks it in position.**

The metal handguard, **that is only used on weapons that carry a foldable bipod (fig. 2) is held at it's rear extreme in the same way as the wooden handguard; at it's forward extreme it is held on the barrel via a spring clamp that is riveted to the handguard.**

The bipod **is held on the barrel via a clamp and both legs have a device that allows the rapid movement from one position to the other (unfolded or folded). When the bipod legs are folded, they reinforce the clamping of the metal handguard to the barrel.**

The bipod model BR **is installed directly to the weapon at the front sight mount, needing only to close the legs to open the clamp. The bipods legs can be shortened or lengthened telescopically.**

The flash suppresser **permits, with no additional parts added to the weapon, the launching of normalized NATO rifle grenades.**

Fig. 5

The bolt assembly **is found in the interior of the receiver where it travels during the locking, and unlocking sequence of the weapon. It's mission is to feed, lock, and extract the case after it is fired.**

It consists of the following parts:

Bolt carrier with recoil spring support tube.

Bolt head with locking roller, extractor, and extractor spring.

Firing pin holder.

Firing pin spring.

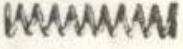
Firing pin.

Bolt

Bolt Carrier with recoil spring support tube

Bolt Head Assembly

Locking Piece



Firing Pin Spring

Firing Pin

Fig. 6

3. Grip with trigger mechanism (fig. 7)

The grip is joined at its front end to the receiver via a crosspin that serves as its rotation point.

At the rear end it is held between the receiver and the buttstock holder.

The grip holds in its upper part the trigger mechanism, that is comprised of the following principal parts:

Trigger.

Disconnector assembly.

Hammer.

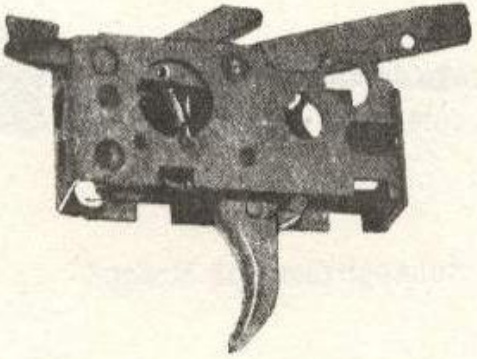
Safety lever.

Ejector.

These parts, with their crosspins and corresponding springs, are mounted in the trigger pack (b).

The grip and trigger pack are held together by the shaft of the safety (c).

a)



b)

c)

Fig. 7

4. Buttstock assembly with recoil spring and buffer. (fig. 8)

The buttstock **is made of tropical walnut, ("nogal"). It has a pad of hardened rubber, with metal reinforcement.**

At the front end of the buttstock assembly is the buttstock housing, which is held to the grip assembly via two crosspins.

The recoil spring support tube **is riveted to the buttstock housing. The end of the recoil spring is retained by a bushing that is held at the end of the tube by a crosspin.**

The union of the buttstock housing with the buttstock is accomplished by the recoil buffer support that, via a screw, is fixed to the buttstock housing. The recoil buffer consists of three hardened rubber disks.

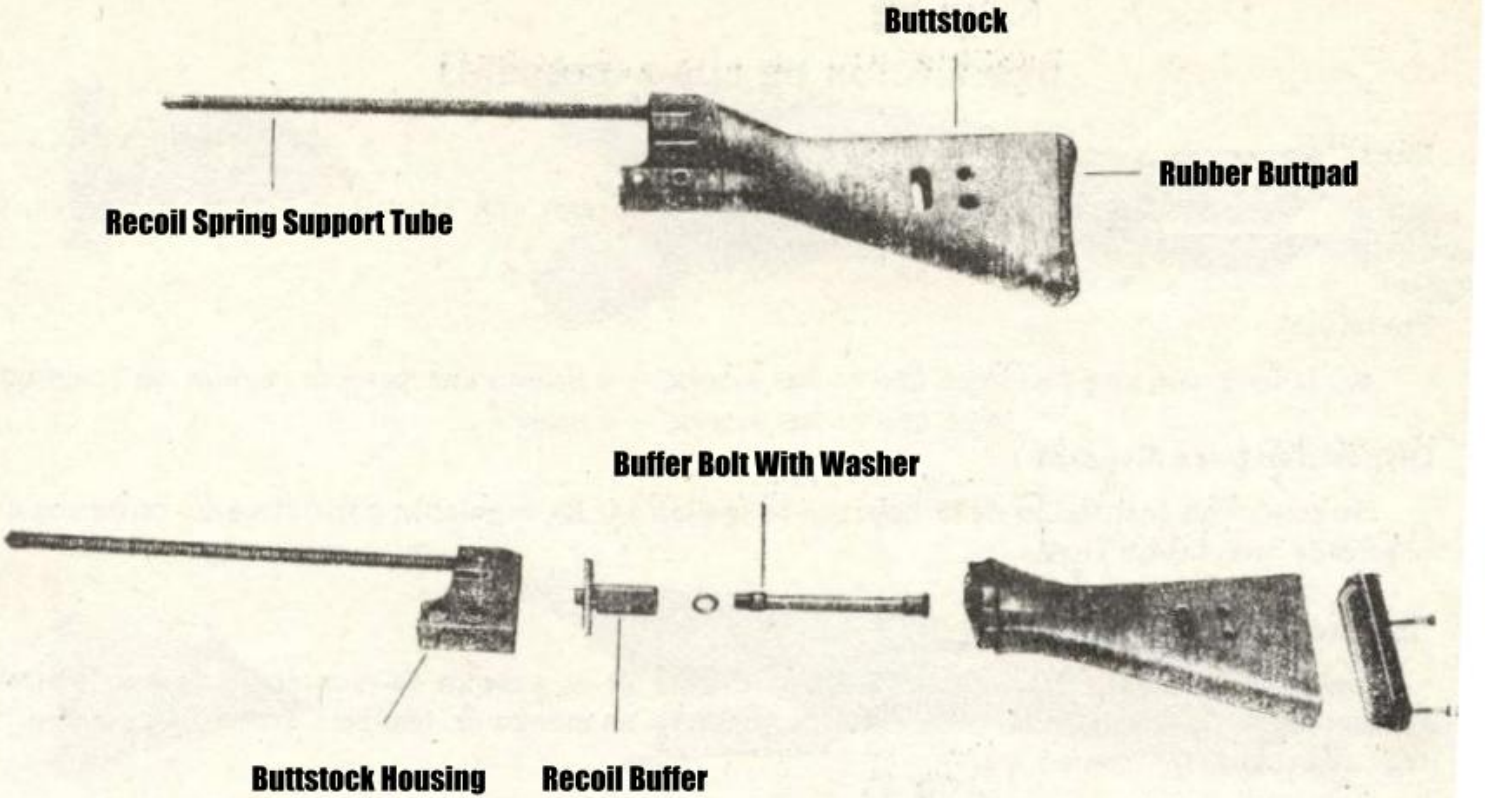


Fig. 8

DESCRIPTION OF THE ACCESSORIES

1. *Magazine*.
Is made of stamped sheetmetal. Two types are fabricated: the normal, with a capacity of 20 cartridges, and another of 5 cartridges for garrison duty.

2. *Sling*.
Is made of web material, with a clip at one of its extremes and a buckle that permits regulation of its length.

3. *Blank firing adapter*.
It is used in substitution of the flash suppresser. It can be regulated, to allow firing blank cartridges of different strengths.

4. *Cleaning Kit*.
It is stored in the forward end of the cocking rod guide tube and is held in place by the cap of the knife-bayonet lug. Contains: a bore brush, an articulating bore rod, held to the cap with hemp string, and four capsules of oil.

5. *Muzzle cap and protective cover*.
The muzzle cap is plastic. It blocks the passage of dirt into the interior of the barrel, and even though it should be removed before firing, if that detail is forgotten no danger exists. The cover is used to maintain the weapon in service ready condition when it must be stored for long periods of time.

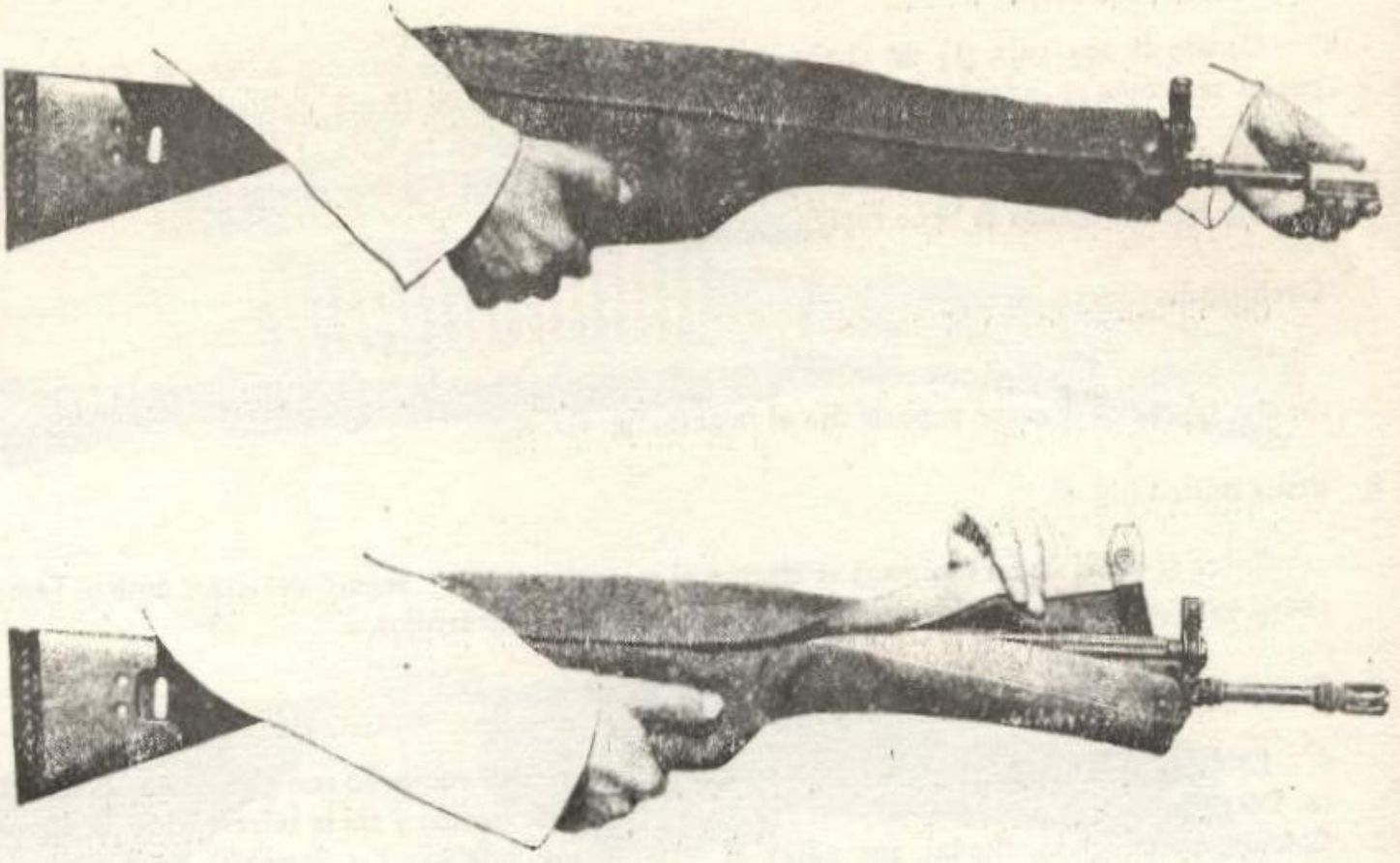


Fig. 9

6. Magazine loader. (fig. 10)

Consists of a sheetmetal box (1) with a cover (2), open at its two extremes, in which at one extreme the magazine is latched (3). A pusher (4), also made of sheetmetal, slides within the interior of the box. Filled with cartridges, as one can see in view a) of the picture, and the box closed, holding the cover with one hand and pressing on the pusher with the other, as indicated in view b), the magazine is filled rapidly and comfortably.

7. Knife-Bayonet.

It mounts, and is held to the weapon via a latch situated at the rear end of the handle, that is attached to the fixed supporting lug of the rifle (a, fig. 1).

8. Optical Sight.

On top of the receiver an optical sight can be securely, and rapidly mounted. The optical sight can also be substituted with an infrared device.

9. Telescopic Bipod model BR (fig. 2a).

It is specially designed to be used with the rifle equipped with wooden handguards. It can be attached or removed from the weapon without wasting time and without needing attachment parts, permitting, with the legs on the ground, the normal recoil movements of the weapon when it is fired, as well as allowing movement of 17° horizontally and 7° vertically.

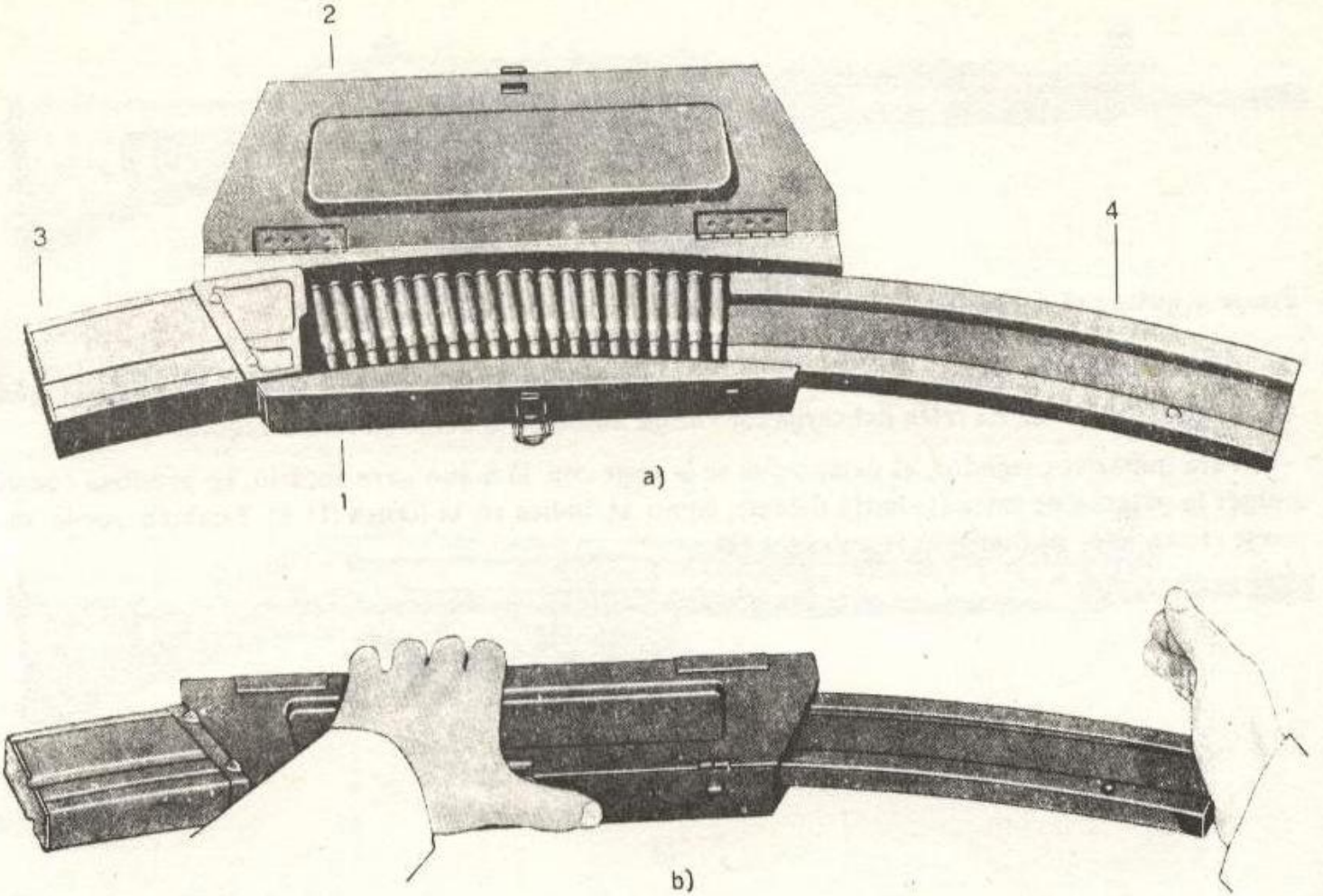


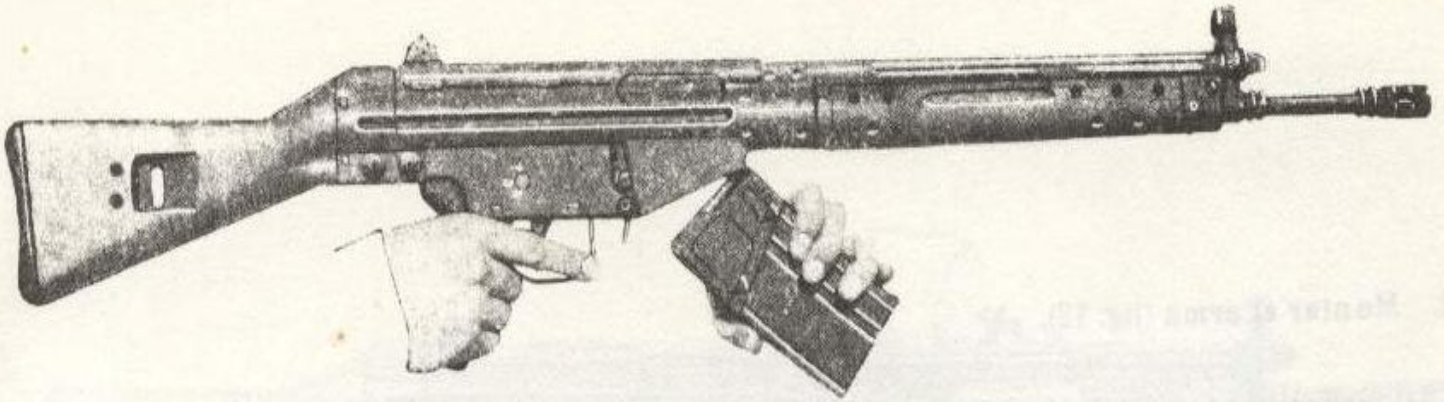
Fig. 10

V. HANDLING

1. Insertion and removal of the magazine (fig. 11).

The magazine is introduced in the weapons magazine well without the need to actuate any mechanism (fig. 11 a). The retaining lip automatically locks the magazine in securely.

To remove the magazine, at the same time that it is gripped by the hand to remove it, the release lever is pressed forward, as indicated in figure (11 b). The magazine can also be removed by pressing on the magazine release button (2).



a)

b)

Fig. 11

2. Load the weapon (fig. 12).

With a full magazine inserted and locked in its well, move the safety to the <<T>> or <<R>> (depending on how you wish to fire. one shot at a time or in bursts), pull back the Cocking Lever completely, and let it go forward with full force, so that the bolt can lock forward, leaving the weapon locked, loaded and ready to fire.

Fig. 12

3. Secure the weapon (fig. 13).

Once the weapon is locked and loaded, if you wish to secure it, place the safety in the <<S>> position.

If you wish to leave the weapon secured but with an open bolt, place the safety in any of the positions <<T>> or <<R>>, pull the cocking lever rearward and, sliding it to the right, allow it to catch in the cutout of the guide tube. Once latched, place the safety in the <<S>> position.

4. Firing.

One shot at a time: Place the safety in the <<T>> position. Every time that the trigger is squeezed a shot will be fired. To fire the next shot, release the trigger and squeeze it again.

In bursts: Place the safety in the <<R>> position and squeeze the trigger.

Semi Automatic

Safe

Fully Automatic

Fig. 13

5. Use of the cleaning kit (fig. 14) (a, b and c).

a) Remove the cleaning kit.

With the point of a cartridge, push in on the spring loaded nipple visible in the drilled hole found at the foot of the front sight (1) and at the same time lightly twist the knife-bayonet lug (2) until said nipple is retained; than squeeze, again with a cartridge, the spring loaded nipple found in the drilled oval at the foot of the sight (opposite to # 1) and continue turning the knife-bayonet lug (2) until this second tit is retained. Pulling now on the knife-bayonet lug will remove the cleaning kit.

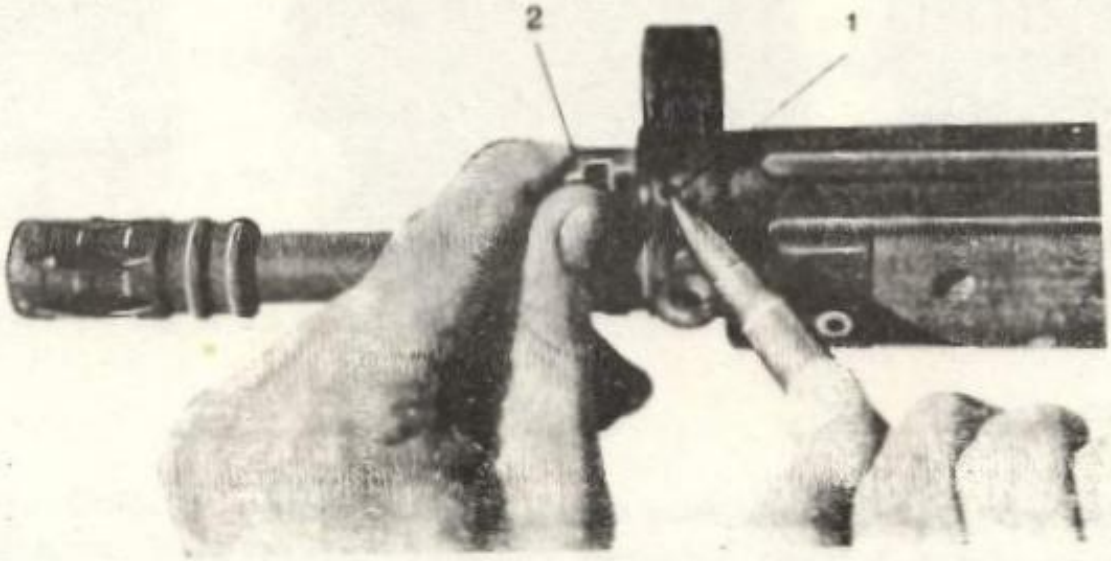


Fig. 14 a).

b) Cleaning the chamber.

Pull the cocking lever to the rear and leave it in the retained position. Screw the chamber brush on the articulated handle and clean the chamber in the manner indicated in figure 14 b, passing the brush various times over the chamber, through the ejection port.

Fig. 14 b).

Fig. 14 c).

c) Cleaning the barrel.

With the bolt assembly locked open, introduce the nylon brush through the muzzle of the weapon and pull it out through the ejection port (fig. 14 c). Repeat this operation two or three times. The last time, lightly impregnate the brush with oil, with one of the oil capsules, use the oil to grease the bolt rollers.

To replace the cleaning kit, squeeze both nipples, and once the knife-bayonet lug is inserted all the way into the sight base, turn it as necessary so that the nipples fall into place in their corresponding holes.

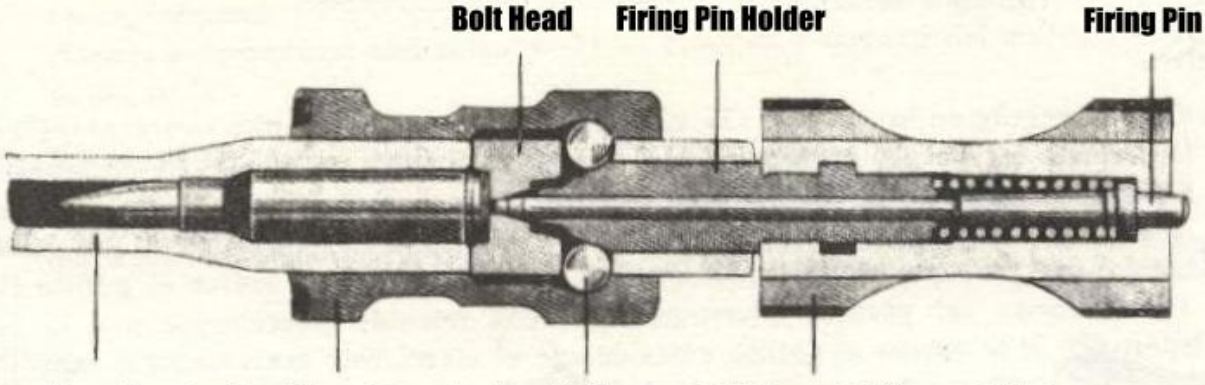
VI. -- FUNCTION

1. Bolt function (fig. 15).

In the locked bolt position, the position of the different parts are as indicated in figure 15 a). The rollers, forced by the inclined flanks of the firing pin locking piece, are pushed out of the windows of the bolt head and introduce themselves into the cavities of the trunion.

Once a shot is fired, the pressure of the gasses acts on the rear of the cartridge, pushing it against the front face of the bolt head, and this force is transmitted to the rollers, which, in turn, press against the inclined flanks of the firing pin locking piece, pushing it rearward. The firing pin locking piece drags along with it the bolt. As a consequence of this movement, the rollers are hidden in the head of the bolt and the diverse parts of the system take the disposition indicated in fig. 15 b), where the separation between the support and the head of the bolt can be seen. From this point forward, the entire system moves rearward freely, due to the impulse gained by the mass of the bolt carrier, overcoming the action of the recoil spring. Finally, the energy stored by this spring makes the bolt carrier move forward again and come back to the position in figure 15 a).

As can be seen from the previous explanation, the weapon remains locked until the bolt support has moved a short distance. The time that it takes for the bolt support to move this distance is much greater than what it takes for the bullet to travel through the barrel.



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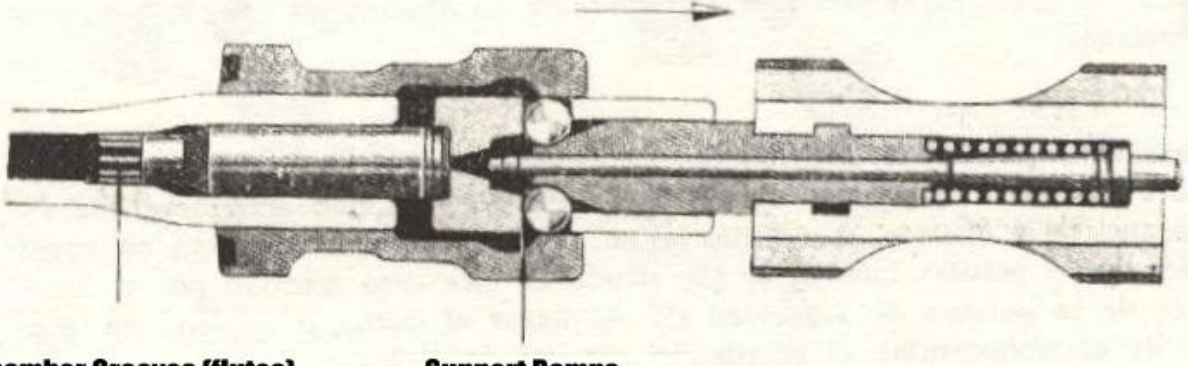


b)

Fig. 15

2. Firing mechanism function (fig. 16).

a) One shot at a time.

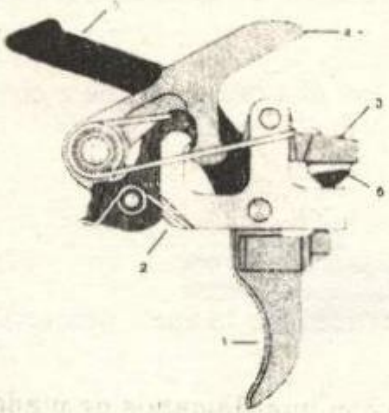
With the safety in the <<T>> position, the rear end of the disconnector (3) fits into a slot in the safety shaft (6) and the forward extreme protrudes. When the trigger is pulled (1), the firing lever (2) releases the hammer (4), that due to the action of its spring hits the firing pin and produces the shot. The bolt assembly, during its rearward travel, mounts the hammer (4), that is then held by the front hook of the disconnector (3). When the trigger (1) is released, the hammer (4) is released from the disconnector and is again held by the firing lever (2). If the trigger is pulled before the bolt assembly is locked, the hammer is retained by the safety lever (5). When the bolt assembly reaches its most forward position, (locked), the protrusion on the rear end of the bolt support hits the safety lever (5), making it rotate on its shaft and in this way freeing the hammer from the hook on said lever. Therefore, it is not possible that a shot can be produced without the weapon being perfectly locked.

b) In bursts.

With the safety in the <<R>> position, the rear end of the disconnector (3) falls on the solid part of the safety shaft (6) and its forward end is hidden. When a shot is produced, the hammer (4) during its rearward travel cannot be retained by the disconnector (3), being in this case held by the inferior arm of the safety lever (5). When the bolt assembly gets to its most forward position (locked), the protrusion on the rear end of the bolt support hits the protruding arm of the safety lever (5), forcing it to rotate and to release the hammer (4). Therefore, as long as the trigger is squeezed and cartridges remain in the magazine, the weapon will fire automatically, only the safety lever acting to retain the hammer.

c) On safe.

With the safety in the <<S>> position, the shaft of the safety (6) blocks the firing lever (2) impeding its rotation and, the release of the hammer.



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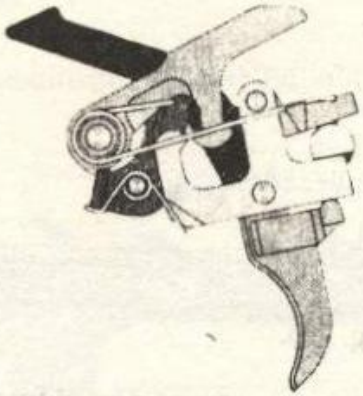

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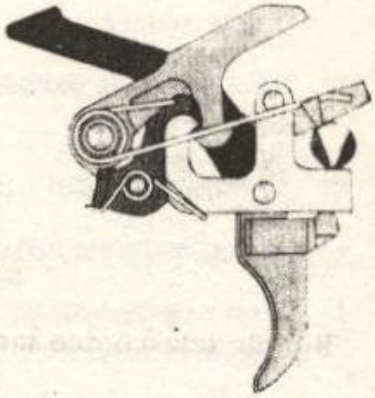


c)

Fig. 16

VII.-- DISASSEMBLY OF THE WEAPON FOR CLEANING

a) Remove the magazine if it is still inserted in the weapon.

b) Be sure that there are no cartridges in the chamber. To do this, pull the cocking lever to the rear and, check that the chamber is empty, let go of the lever so that the bolt assembly moves forward.

c) Remove the two buttstock retaining pins, introducing them into the two drilled holes provided for them in the buttstock.

d) Remove the buttstock assembly with the recoil spring (fig. 17).

e) Rotate the pistol grip forward.

f) With the aid of the cocking lever, move the bolt assembly to the rear and remove it through the rear of the receiver.

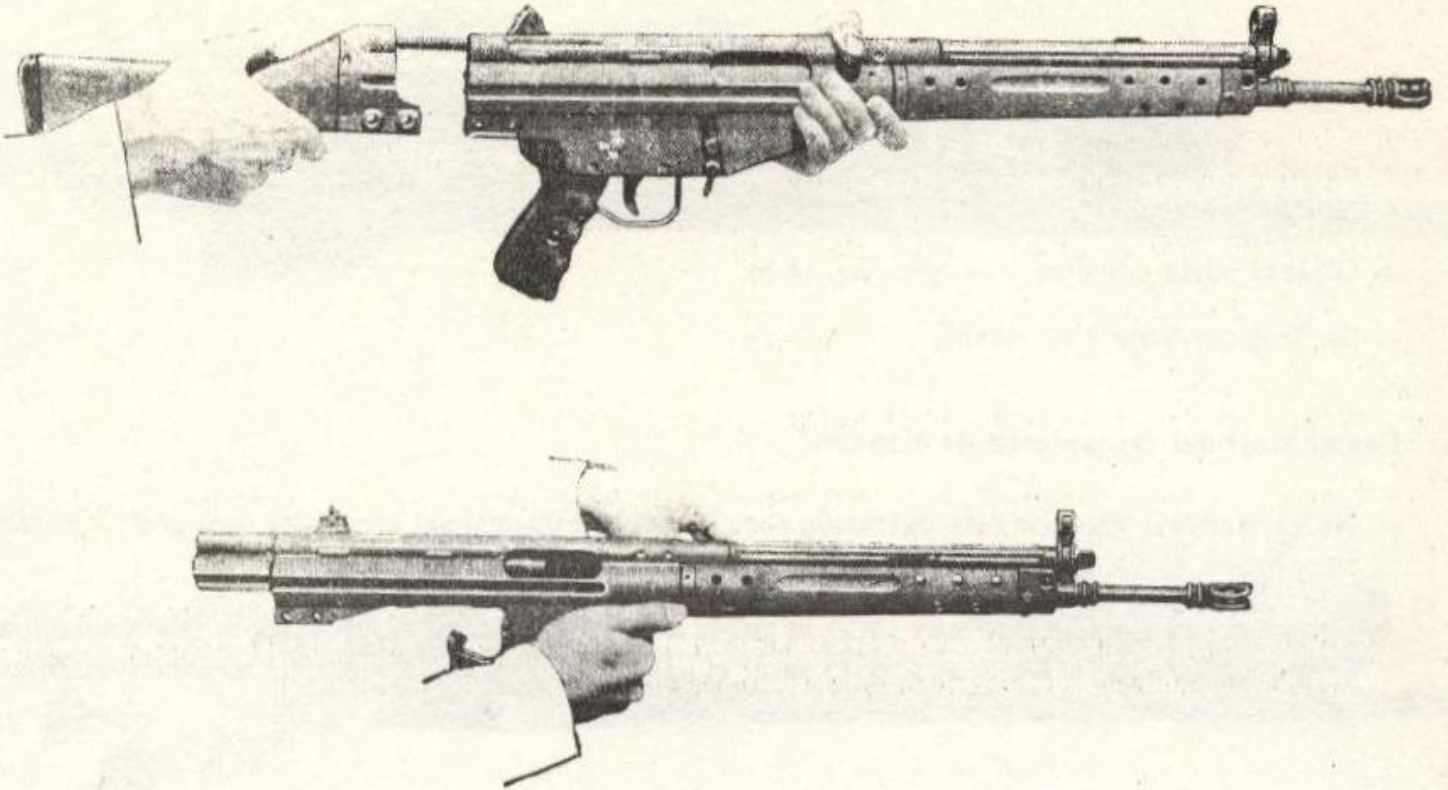


Fig. 17

g) Disassembly of the bolt assembly:

Press down on the head in a longitudinal direction, until it hits against the back of the bolt carrier; rotate the head 180° in a counterclockwise direction and remove it (fig. 18 a).

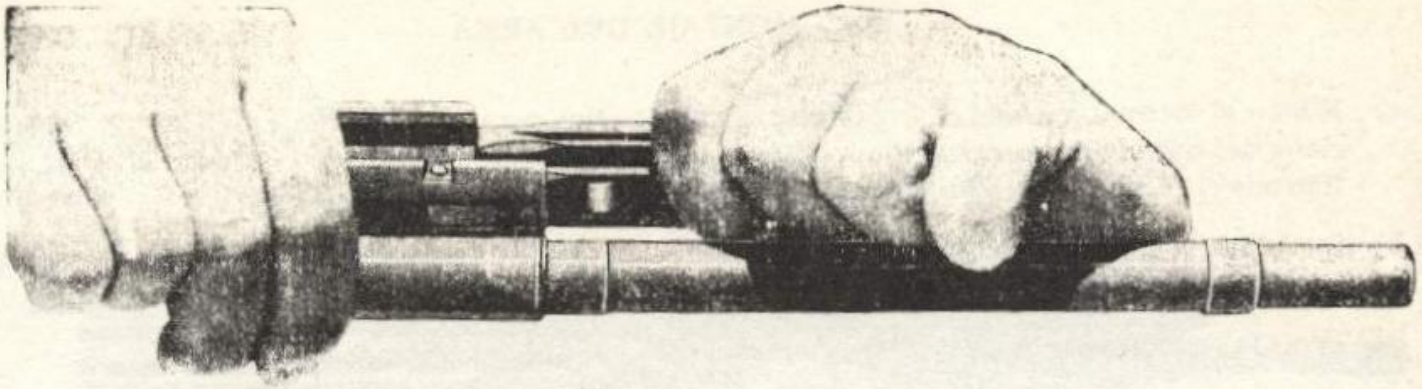
Rotate the firing-pin locking piece, and remove it (fig. 18 b).

Remove the firing-pin and its spring.

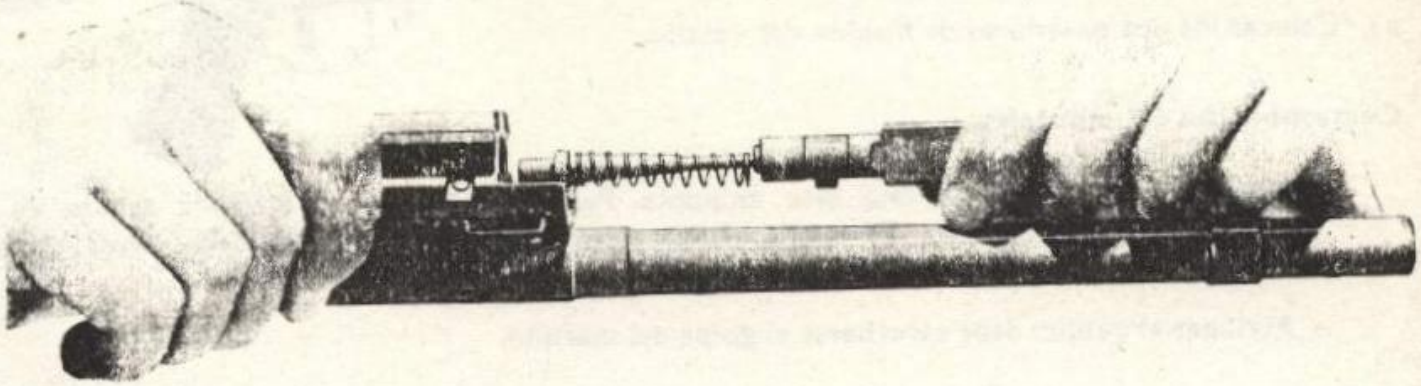
h) Disassembly of the firing mechanism:

-- It is not necessary to perform this operation during the normal cleaning of the weapon. On the other hand, when necessary, the disassembly should be performed by trained personnel.

-- When the mechanism is very dirty, it can be cleaned with petroleum removing the entire pistol grip. All that is necessary is to remove the pin that retains it to the receiver. Once cleaned, dry it perfectly and grease.



a)



b)

Fig. 18

VIII. -- ASSEMBLY OF THE WEAPON

a) Assemble the bolt assembly following the reverse order as described for its disassembly. Separate the bolt head from the support so as to hide the rollers; for this, the best method is to introduce the bolt assembly backwards into the rear end of the receiver and hit it lightly.

b) Introduce the bolt assembly into the receiver in its correct position and let it slide in until it is at its most forward position. (fig. 19).

c) Rotate the trigger pack until it fits completely onto the receiver.

d) Replace the buttstock introducing the recoil spring and tube into the receiver. make sure it goes into the recoil spring support tube on the bolt carrier. Push the assembly forward until the buttstock housing is fully seated on the receiver..

e) Replace the two buttstock support push pins.

Testing the assembly:

Test that the weapon is correctly assembled. To do this, place the safety in <<T>> or <<R>>, pull the cocking lever to the rear and let it go forward. The weapon should close perfectly.

Actuate the trigger: you should hear the fall of the hammer.

Fig. 19

IX.-- TECHNICAL DATA

Caliber..... 7.62 mm. - NATO .308

Length of the weapon..... 1.015 mm. - 39.96 inches

Weight of the weapon with wooden handguards..... 4.2 kg. - 9.25 lbs

Weight with bipod and metal handguards..... 4.5 kg. - 9.92lbs

Length of the barrel..... 450 mm. - 17.71 inches

Travel of the rifling..... 305 mm. - 12 inches

Number of grooves..... 4

Length of the sight radius..... 580 mm. - 22.83 inches

Weight of the empty 20 rd magazine..... 0.275 kg. - .60 lbs.

Weight of the empty 5 rd magazine..... 0.155 kg. - .34 lbs

Graduations of the rear sight..... 100-200-300 and 400 m.

Cyclic rate of fire..... 550 to 650 shots / min.

Initial velocity.....780 m./ sec. - 2559 ft. /sec.

Muzzle energy..... 293 kgm.

X.-- CONSERVATION AND CLEANING OF THE WEAPON

Generally.-- Before putting an Assault Rifle into service the cosmoline, or grease in which it comes from the factory for conservation must be removed. To this effect, it must be broken down and its parts washed with benzene or petroleum and, once it is very clean, a lightly lubricated bore brush should be passed through the throat and chamber.

The Assault Rifle will be maintained in perfect condition through scrupulous cleaning. After firing exercises, it should be broken down and all parts that have been exposed to the effects of the gases of the gunpowder should be cleaned within 24 hours whenever it is possible.

The use of ash, grinding compound, sand or other materials that may scratch the parts is strictly prohibited.

In cases where the dirt is such that it cannot be removed with rags, patches or brushes, the parts will be submerged in petroleum for between 12 and 24 hours and then cleaned, drying them off afterwards.

The throat and chamber, primarily, should be cleaned carefully with the bore brush and after a good cleaning should have a lightly lubricated bore brush passed through them, since the perfect functioning of the weapon depends on the state in which it is maintained.

Excessive lubrication is not necessary. A drop of oil on the rollers, between the head and support of the bolt and on the extractor hook is sufficient for correct functioning.

A weapon excessively lubricated is more likely to jam than one that is clean and dry, without any lubricant at all; for this reason the drops should be as small as possible.
When cleaning the weapon, it is not necessary, ever, to separate the rollers from the bolt head.

When it is necessary to clean the firing mechanism, it should be done without removing it from the pistol grip, as this operation should only be performed by a Master Armorer.

Lubrication.

Lubrication is an indespensible compliment to cleaning, to conserve the weapon, and keep it functioning correctly.

Lubrication is necessary to keep the parts from rusting. It is necessary on the outer surfaces, and on those that are exposed to friction or movement.

Lubrication can convert itself into a dangerous cause of oxidation, and deterioration of the weapon, if the following rules are not followed:

a) No part should be lubricated that isn't perfectly clean and dry.

b) When the weapon is not frequently used, it is important that the lubrication be renewed, because if it is not redone, instead of being preventive it can produce the opposite effect.

c) Excessive lubrication of the weapon is not advised. A drop of oil on each roller and between the bolt head and the bolt support are sufficient for its correct functioning.

d) In rainy or humid conditions or circumstances, lubrication should be kept on the different metal parts, interior as well as exterior. A light coat of lubricant, which will be placed on a rag, should than be rubbed on the weapon.

e) In dry or dusty conditions, a weapon that has been excessively lubricated is more likely to jam than one that is clean and dry, without any lubricant at all.

f) under no circumstances should oil or grease be used in the magazines

GREASES AND OILS

The following greases and oils will be used for lubricating:

Lubricant: Anticorrosive lubricating oil, medium type, as per standard MIL - L - 3150 (ET 45 or SHELL-TURBO OIL 37).

Conservation Grease: General use anticorrosive grease, as per standard MIL - G - 10924 B (SHELL-GREASE S - 6751).

MOST FREQUENT INTERRUPTIONS AND WAYS TO FIX THEM

The most frequent interruptions in the functioning of the Assault Rifle are due to the untrained handling of the weapon and more frequently due to cartridges or magazines defective because of abuse.

Every time that firing is interrupted involuntarily you should wait for 15 seconds before trying to fix the defect. Take into account that the first operation that should be performed in any case is to remove the magazine.

To fix an interruption, it is usually sufficient, in the majority of cases, to cycle the cocking mechanism, paying attention to the following operations:

1. Remove the magazine.

2. Pul the cocking lever back completely to eject the misfed, or stuck defective cartridge from the weapon.

3. Verify that there is nothing in the loading port of the chamber.

4. Release the cocking lever letting the mechanism freely go forward, without following in its movement.

5. Replace the magazine.

6. Cock the lever, pulling back energetically and let it go abruptly., this should introduce a new cartridge into the chamber.

7. Continue firing.

Failures to fire are not frequent if the weapon is clean and well lubricated.

The following table details the failures, causes that motivate them and ways to fix them.

FAILURE	MOTIVATING CAUSE	HOW TO FIX
Failure to fire.	a) Defective cartridge due to manufacture, humidity of the primer or powder. b) Firing pin is broken. c) Due to a foreign body or a dirty firing pin chamber. d) Bent extractor	a) Remove the magazine. Verify the mark of the firing pin on the primer. Introduce an unmarked cartridge directly into the chamber and fire. Repeat the operation with other cartridges. If acceptable marks are found on the primer of the misfired cartridge, change the cartridge lot. If no marks appear the cause is b), c) and d). b) Replace the firing pin. c) Examine the bolt assembly and firing pin support and clean well. d) Replace extractor.
Failure to extract.	1) Not enough gas pressure applied to the bolt head, due to a dirty chamber. 2) Broken extractor. 3) Loss of elasticity in the spring of the extractor hook.	1) Clean and oil sparingly the chamber, bolt head chamber and guides, place a drop of oil on the exterior of the rollers. 2) Replace. 3) Replace.
Failure to eject.	1) Due to a dirty chamber, bolt head and guides that prevent the cartridge base from hitting the ejector. 2) Broken ejector lever.	1) Clean as indicated in step 1) of the failure to extract. 2) Replace the ejector lever.
Weapon does not fire when charged manually.	1) Weapon was not manually charged correctly. 2) Magazine was loaded with more than 20 rounds, forcing it.	1) When loading with the cocking lever manually, *do not follow* the lever forward. The lever should be pulled back energetically and released abruptly. If in spite of this the bolt assembly does not advance forward to its locked position, shake the weapon energetically forward; as a last try, remove the magazine, and carefully lock it in again. 2) Remove the magazine and leave only 20 cartridges in it.

Failure to feed automatically	1) The cartridge is caught between the bolt and the loading port. a) Due to incorrect loading of cartridges in the magazine or the charging lever spring is stuck. b) Defective magazine. c) Due to the lack of tension of the magazine spring or that it is twisted. 2) Chamber, bolt head locking chamber, bolt head or guides dirty.	1) a) Remove the magazine and tap the rear end of it against the palm of the hand so as to correct the positioning of the cartridges. If this does not solve the problem, empty the magazine and reload it. b) Change the magazine. c) Replace the spring. 2) Clean these four parts.

BALLISTICS TABLE OF THE SPANISH ASSAULT RIFLE 7.62 MM.

Ammo: Nato

Weight of the bullet: 9.4 grams Barometric Pressure: 750 mm. Hg.

Vo = 780 m/sec. Temperature 15° C.

Io = 1.04 Kg seg. (impulso) Higrometric State: 50 %

Range in meters	ANGLES		Duration of the trajectory in seconds	Elements of the vertices of the trajectory.		Remaining velocity in m/sec.	Energy of the projectile at its point of drop - In kilograms	Danger zone for a 1 meter target - In meters
	Of projection in thousands	Of drop in thousands						
0	0.0	0.0	0.00	0	0.00	780	292	0
100	0.9	0.9	0.13	52	0.05	712	243	100
200	1.8	2.1	0.28	104	0.10	747	201	200
300	2.9	3.7	0.44	156	0.24	584	164	300
400	4.2	5.5	0.62	210	0.48	524	132	400
500	5.7	8.0	0.83	268	0.85	467	105	500
600	7.5	11.4	1.05	331	1.37	414	82	120
700	9.5	15.8	1.31	395	2.12	365	64	77
800	12.0	21.5	1.60	462	3.17	333	53	52
900	14.9	28.1	1.91	526	4.60	309	46	38
1.000	18.2	35.7	2.25	588	6.46	292	41	30

CENTRO DE ESTUDIOS TECNICOS DE MATERIALES ESPECIALES-INI

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