



**Automatic rifle SG 510**





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# Automatic Rifle SG 510



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# A Introduction

The tactical employment of nuclear weapons in the field is a likelihood that obligates all defense forces to reassess their organisation, weapons, equipment, and tactics. As a result, greater emphasis will have to be placed on the following:

Increased mobility by extended mechanisation  
Increased flexibility of individual units  
Increased fire power.

Tactical units tend to become smaller and at the same time acquire greater mobility and fire power. But, even in this age of nuclear warfare, one cannot do without conventional weapons to arm the soldiers fighting in small units who would otherwise be unable to attain their objectives.

In order to increase combat efficiency new weapons are required as part of the general equipment of all forces, weapons which so far have been unavailable, or at least not available in sufficient quantities. The Automatic Rifle has been developed as a result of a thorough study at tactical requirements and permits an enormous increase in fire power as compared with previous equipment.

For example, an infantry platoon has so far been equipped with three light machine guns which are the only automatic weapons capable

of firing heavy rifle cartridges. As such they form the actual core of the platoon. If provided with automatic weapons this platoon would have about 30 automatic weapons for heavy ammunition as against only three as before.

Apart from the increase in volume of fire there is also the advantage of fire continuity which now becomes possible. Now, it will make much less difference if one weapon is knocked out than was the case when the platoon had only three automatic weapons.

With the Automatic Rifle it is possible, without adjustment, to fire anti-tank, smoke, or anti-personnel grenades. Thus, the one weapon provides both flat and curved trajectory capabilities.

The Automatic Rifle also simplifies the training problem as it no longer becomes necessary to instruct the soldier in the use of three different arms, i. e. the rifle or automatic carbine, sub-machine gun and light machine gun; all that is required now is the Automatic Rifle. This results in simplification of both training and supply.

Battle experience shows that the presence of automatic arms greatly enhances troop morale. With the Automatic Rifle every soldier can now have such a weapon. The increased fire power resulting effects a corresponding increase in the will to fight. The individual soldier thus

acquires increased significance as a fighter due to the feeling of superiority and security provided by his automatic rifle.

Disagreement exists concerning the mission of the Automatic Rifle in combat. In some forces its primary mission is that of providing semi-automatic fire with full-automatic fire reserved for emergency use only. Under these circumstances the Automatic Rifle will not be required to assume the role of the light machine gun and can therefore be made lighter in construction. On the other hand, those Automatic Rifles designed to replace the light machine gun are more solidly built to allow greater barrel wear. This latter type of weapon requires special training for its use. These two concepts result therefore in the construction of a "heavy" and a "light" version of the Automatic Rifle.

Another idea is to equip every soldier with a rifle capable of both semi-automatic and full-automatic fire. When such is the case the rifle must be of sufficiently robust construction to withstand extended periods of continuous fire. The weapon described in this brochure satisfies both requirements. The heavier type is intended for use as a unit weapon replacing rifle, sub-machine gun and light machine gun, whereas the lighter type is primarily designed for rapid semi-automatic fire. A version for medium ammunition is also shown.



## B Specifications

	Type SG 510-1 (Standard)	Type SG 510-2 (Light)	Type SG 510-3 (for medium ammunition)
Caliber	7.62 mm NATO (.30 NATO)	7.62 mm NATO (.30 NATO)	7.62 mm short
<b>Dimensions:</b>			
Length overall	1048 mm	1048 mm	920 mm
Length of barrel with muzzle brake	545 mm	545 mm	450 mm
Number of rifling grooves	4	4	4
<b>Weights:</b>			
Rifle without sling or magazine, with bipod, carrying handle and rubber butt	4980 g		
without bipod and carrying handle, with wooden butt		3900 g	4050 g resp. 3700 g
Bipod	260 g		
Magazine    Light alloy, for 20 rounds	240 g	240 g	
Steel, for 20 rounds	305 g	305 g	
Steel, for 30 rounds			335 g
Barrel	990 g	860 g	770 g
<b>Sights:</b>			
Aperture rear sight with range adjustable between	100–650 m	100–650 m	100–650 m
in steps of	25 m	25 m	25 m
Lateral adjustment range of the rear sight with 20 intermediate steps	$\pm 2\text{‰}$	$\pm 2\text{‰}$	$\pm 2\text{‰}$
Sight radius	575 mm	575 mm	520 mm
<b>Other Data:</b>			
Rate of firing (depending on type of ammunition), in rounds per minute	450–500	450–500	450–600
Muzzle velocity of bullet (Vo)	820 m/sec	820 m/sec	720 m/sec
Trigger load	4 kg $\pm$ 0,5	4 kg $\pm$ 0,5	4 kg $\pm$ 0,5





# SIG Automatic Rifle

## Type SG 510-4

### Technical Data

Calibre . . . . . 7,62 mm NATO (.30 NATO)

#### Dimensions

Length overall . . . . . 1015 mm  
Length of barrel with muzzle brake . . . . . 505 mm  
Number of rifling grooves . . . . . 4

#### Weights

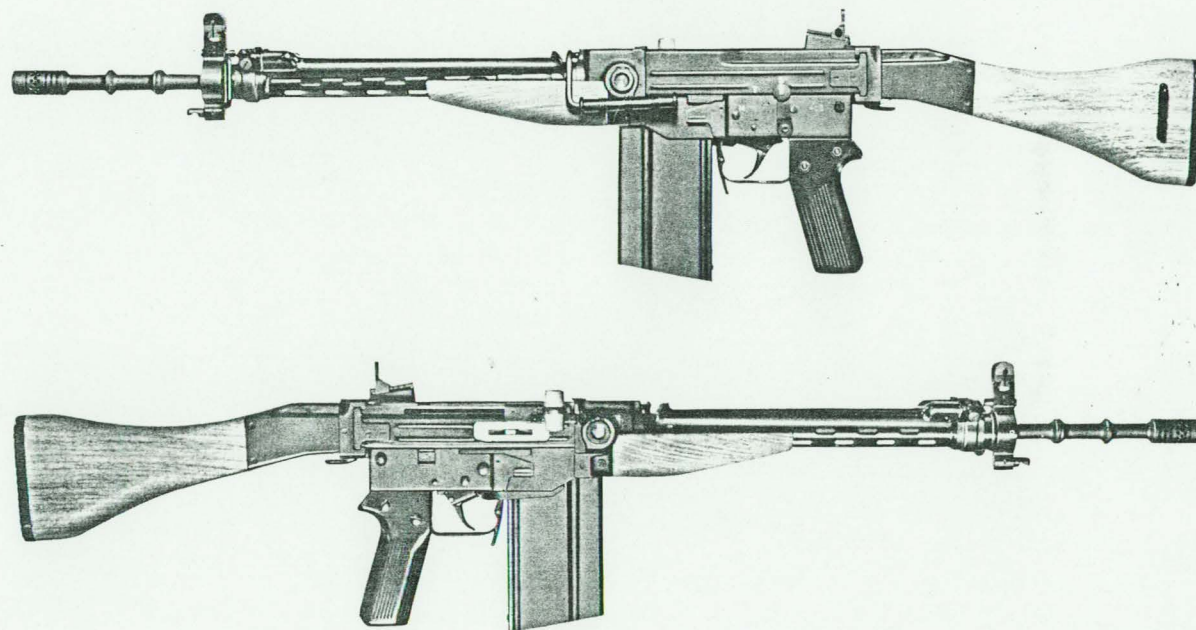
Rifle without sling, magazine or bipod, with carrying  
handle and wooden butt . . . . . 4250 g  
Bipod complete . . . . . 200 g  
Magazine, steel, for 20 rounds . . . . . 300 g  
Barrel . . . . . 760 g

#### Sights

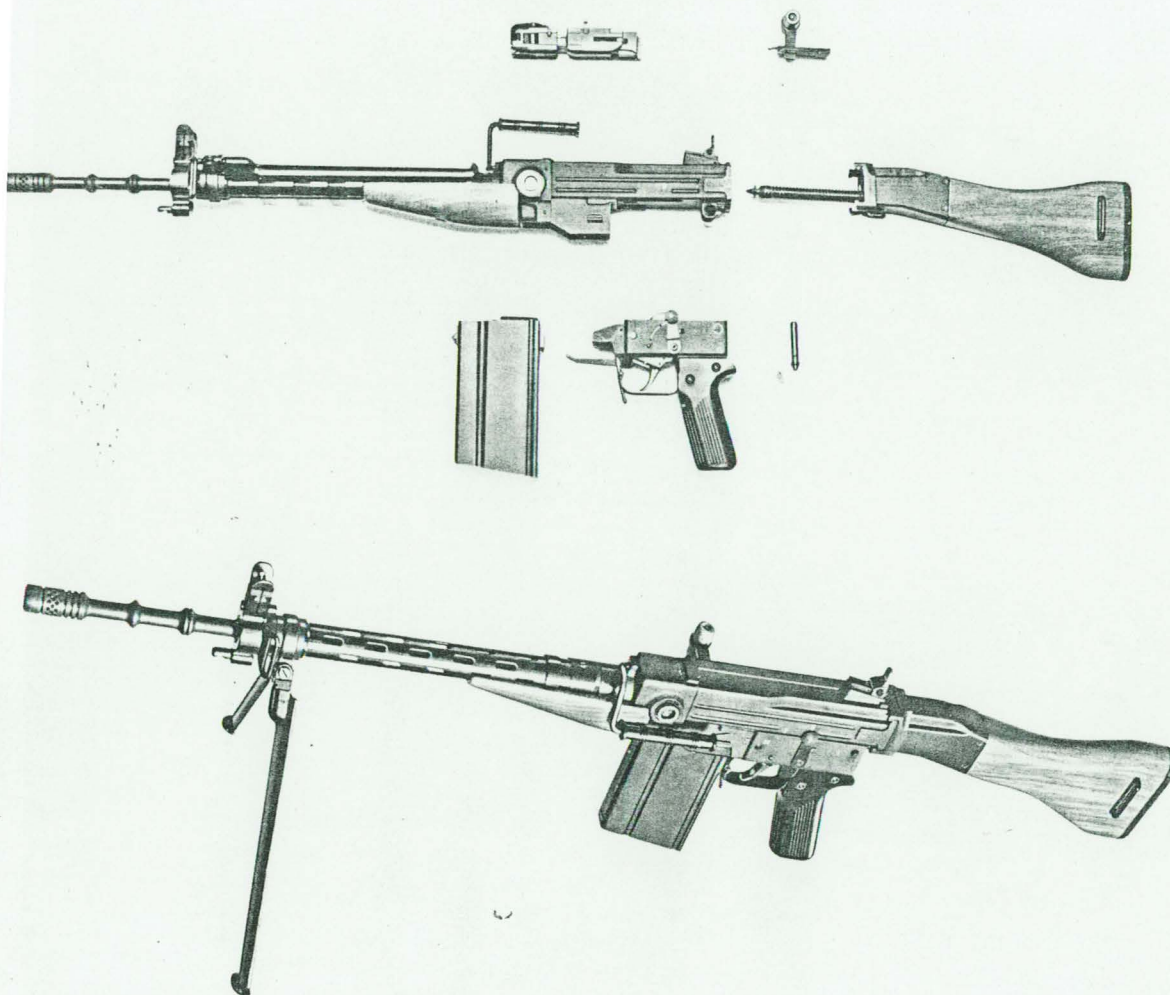
Aperture rear sight with range adjustable  
between . . . . . 100–600 m  
in steps of . . . . . 100 m  
Lateral adjustment range . . . . .  $\pm 2$  ‰  
Adjustable range in elevation . . . . .  $\pm 2$  ‰  
Sight radius . . . . . 540 mm

#### Other Data

Rate of firing (depending on type of ammunition):  
in rounds per minute . . . . . 450–620  
Muzzle velocity of bullet . . . . . 780 m/sec







## General Description

## SG 510-4

Model SG 510-4 is a further development of the SIG automatic rifle to meet special requirements.

Outstanding features of this rifle include

- light weight
- simplified lowered aperture sight,
- provision for mounting telescope sight.

Like the rest of the SG 510 range, Model SG 510-4 is based on the design principle of delayed blow-back. Basic design and operation of the rifle remains unchanged, and the description on page 17 and following apply as before.

The front part of the breech casing incorporates a loading indicator, which projects when a cartridge is in the chamber. The practical carrying handle is also mounted on the breech casing. Barrel and breech casing are rigidly linked, and no special locating of the barrel is required.

The barrel casing protects the barrel against damage and, together with the hand guard, reliably prevents burns to the hands. The bipod, mounted at the front, can be swivelled and folded, and rests at the top of the barrel casing when the rifle is carried.

A simple and reliable bayonet coupling joins the butt, which incorporates the recoil spring, to the breech casing. In contrast to the other models, the butt of model SG 510-4 is stepped to give a slight downward slope. This gives a lower sighting line, without any increased tendency to "climb" when engaged in automatic fire.

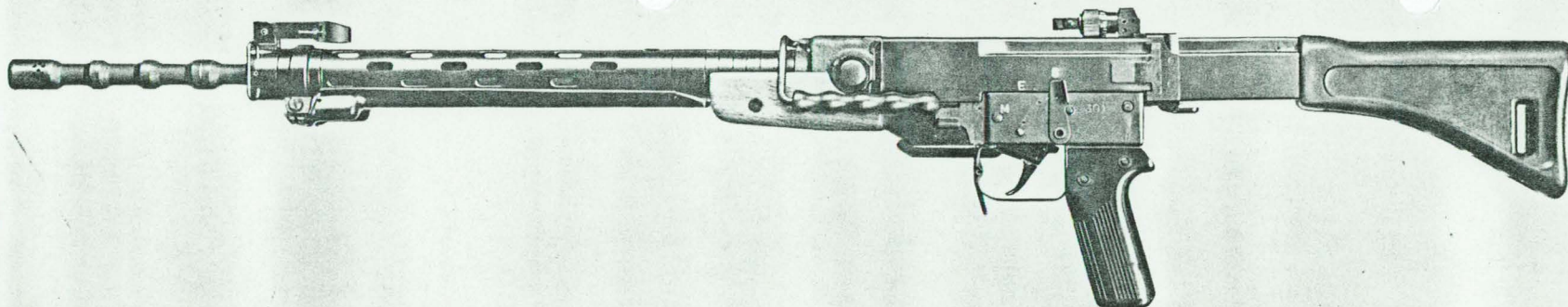
The aperture sight, mounted on the tapered sight carrier can be set for ranges from 100 to 600 metres (330-660 ft approx.). While the aperture sight is not adjustable horizontally or vertically, the front sight has an adjustment by  $\pm 2\%$  in both directions.

Thanks to a barrel end with integral launcher, model SG 510-4 can also be used to fire grenades. A stop on the barrel casing bush is provided for fitting a special grenade sight. The winter trigger, required for firing with heavy gloves, also serves for firing grenades. The very light bayonet fits over the barrel end and is fixed to the casing bush by bayonet clip.

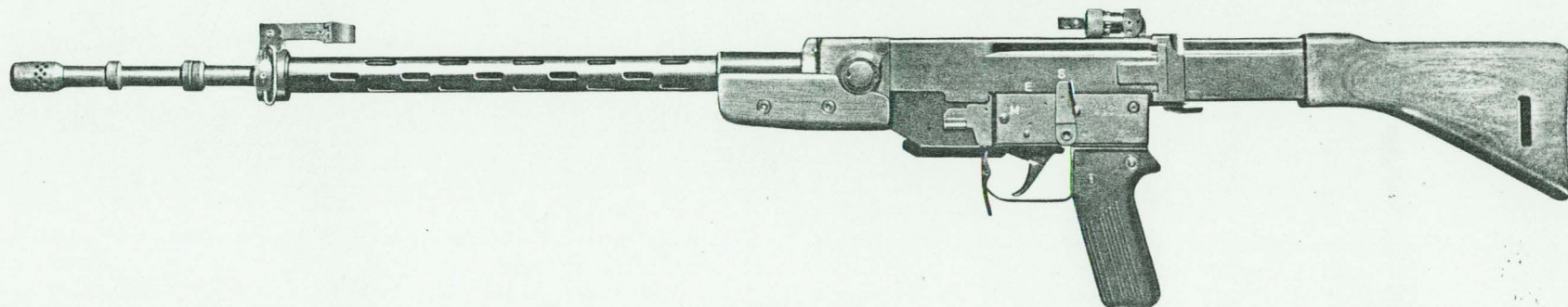
The open sight can still be used even when a telescopic sight is fitted.

For further details and description, please see general brochure SG 510.

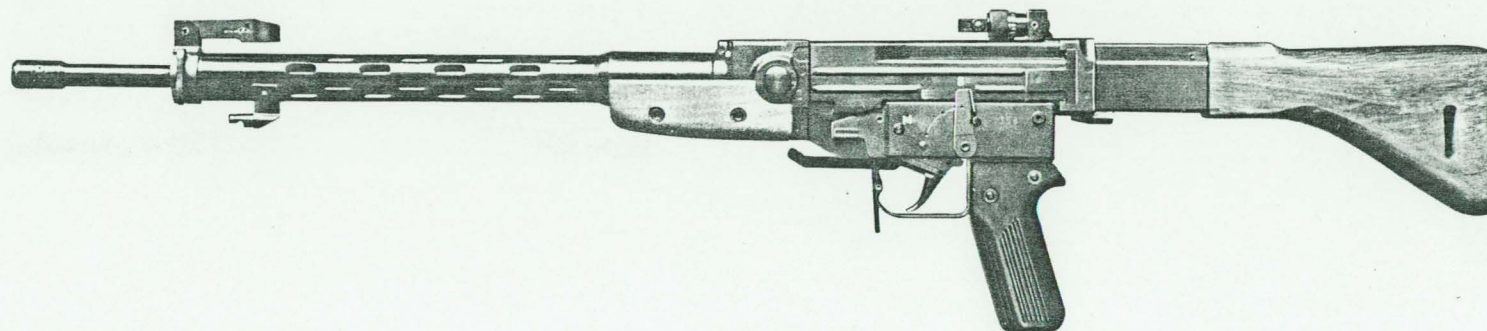




SIG Automatic Rifle SG 510-1 (Standard)



SIG Automatic Rifle SG 510-2 (Light)



SIG Automatic Rifle SG 510-3 (for medium ammunition)





SIG Automatic Rifle SG 510-1

Rear sight and front sight are up.

The bipod is locked in its forward position, thereby giving wider precision.



SIG Automatic Rifle SG 510-1

The bipod is locked in its rear position, thereby giving wider dispersion.

The bipod can be folded in both forward and rear position.



Fixation of the bayonet



Weapon carried on the side



Weapon slung on the back



Weapon carried by means of the carrying handle





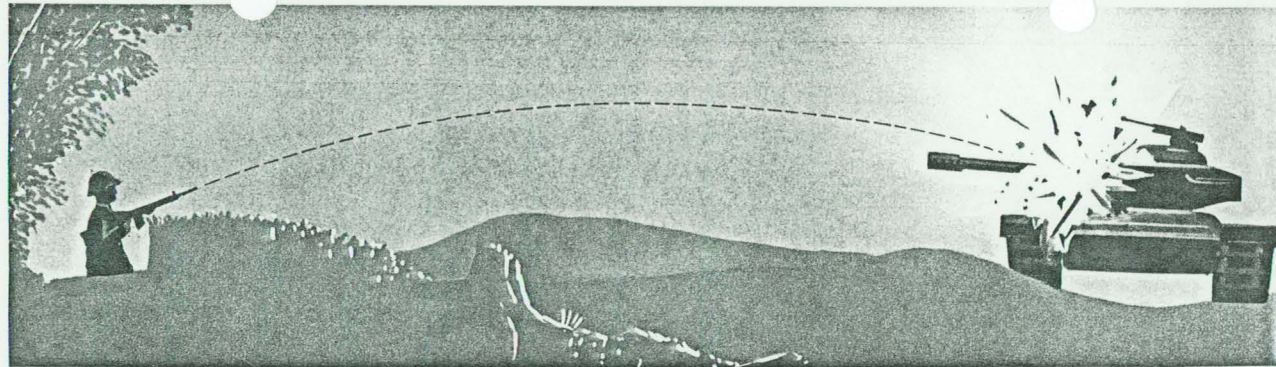


The SIG Automatic Rifle SG 510-1 is designed to fire grenades, and that anti-tank grenades as well as anti-personnel and smoke grenades.

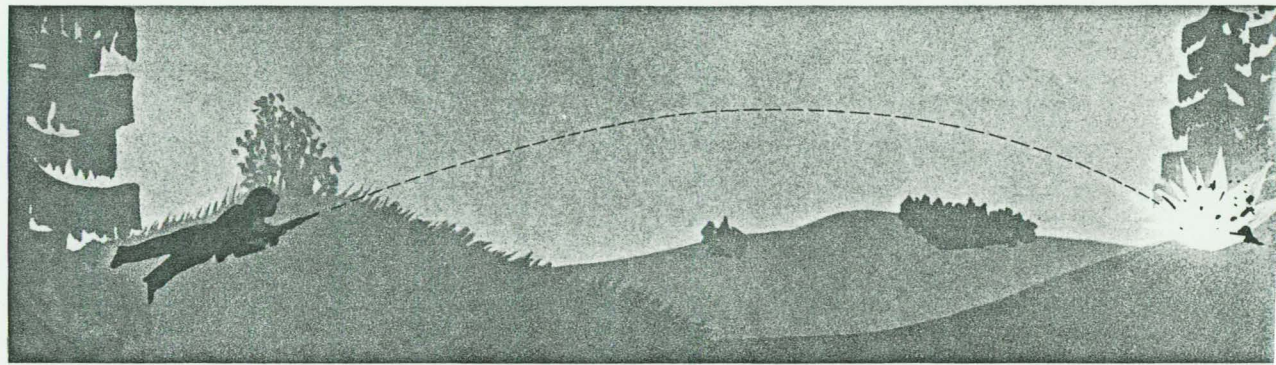
According to the propulsive cartridges disposable, the shooting reach of the grenades can be up to 400 m.

Owing to the rubber butt, the grenades can be fired from a solid base.

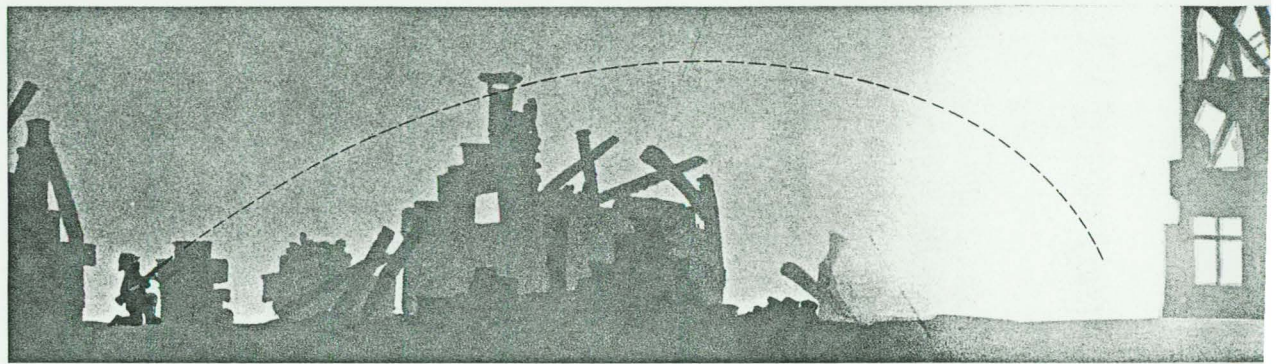
The muzzle incorporates an integral launcher, thus additional parts for this purpose are not required.



Firing of anti-tank grenades



Firing of anti-personnel grenades



Firing of smoke grenades



## C Design Features

### Employment

The Automatic Rifle is used as a unit weapon, i.e. it replaces conventional rifles, self-loading rifles, sub-machine guns and light machine guns.

### Types of Fire

It is possible to fire both semi- and full-automatic with fire selection effected by a simple lever movement.

### Fire Power

The weapon is so designed that very rapid single shots or short bursts with a total of up to 150 rounds can be fired without interruption for cooling and without danger of spontaneous firing (cook-off). This volume of fire is made possible mainly by robust barrel construction. (SG 510-1)

### Reliability

The weapon has been successfully tested under extremely difficult conditions, such as sand, dirt, cold, rain, moisture, heat, etc., and will function reliably.

### Accuracy

When used for aimed fire the accuracy of the Automatic Rifle is comparable to that of a good manually operated rifle; but due to the auto-

matic loading mechanism the rate of fire is much greater. When fired in bursts dispersion is very small despite of the light weight of the weapon, due to the small recoil, and is comparable to that of a light machine gun.

### Recoil

Due to unique breech design recoil of the Automatic Rifle is only about 35% of that developed by a conventional rifle. This reduced recoil increases the accuracy potential of the weapon when fired by individuals sensitive to recoil.

### Straight Buttstock

The straight stock results in straightline delivery of recoil to the shooter's shoulder which eliminates tendency of the muzzle to climb when firing bursts. Effective full-automatic fire can thus be delivered on point targets without waste of ammunition.

### Handling Qualities

Due to optimum weight and shape characteristics the Automatic Rifle does not decrease mobility of the soldier and can be quickly brought into action from any position.

### Carrying

Location of the carrying handle at the center of gravity, or balance point, makes the weapon

convenient to carry. On the march the Automatic Rifle may be slung on the back or in front, or carried on the side.

### Firing of Grenades

The Automatic Rifle with rubber butt is designed to fire anti-tank, smoke, or anti-personnel grenades from a solid base at a steep elevation. The muzzle incorporates an integral launcher, thus additional parts for this purpose are not required.

### Ammunition

Rifles described in this brochure are designed for firing the standard heavy rifle round thereby simplifying ammunition supply and at the same time providing effective flat trajectory fire. The Rifle Type SG 510-3 is designed for lighter, so-called "medium" ammunition.

### Operation of the Weapon

Operation of the weapon is simple and component parts are designed to prevent incorrect assembly. This results in appreciable saving in training time.

### Simple Manufacture

Components can be produced easily and cheaply by modern mass production methods, including welding, punching, etc., and parts



are fully interchangeable. Steel required is mostly unalloyed, or low-quality alloyed. High quality alloys required are available commercially. In short, raw materials required for manufacture of the rifle are likely to be readily available even in times of material shortages.

#### Simple Maintenance

The rifle is readily stripped down for maintenance without use of special tools. Ordinary rifle oil is adequate for lubrication.

#### Safety

The weapon can be loaded, unloaded, stripped, and assembled, with safety engaged. A loading indicator shows presence of a round in the chamber.

## D Description

### General

The Automatic Rifle SG 510 features a novel design principle and can be regulated for firing single rounds or continuous bursts. It is not recoil operated; the barrel is firmly attached to the breech case and does not move. Neither is it gas operated in the conventional sense as no gas piston is present. The cartridge case alone is used to function the breech mechanism. The rifle fires from closed breech position with ammunition magazine-fed from below. Fired cartridge cases are ejected to the right. Anti-tank grenades can be fired with muzzle brake in position and without a special launcher. The bayonet can be fixed with muzzle brake in position.

### Components

#### Breech Case

The central portion of the breech case, which guides the breech, is of sheet steel. The cartridge ejector opening and loading handle guide are on its right side. The rear aperture sight is also present on this portion which is welded to the forged casing head containing the locking sockets for the breech rollers and the loading indicator. The carrying handle is fixed to the front portion of the casing head.

The rear portion of the sheet steel breech casing is joined to the center section by a bayonet attachment. This part supports the butt and recoil spring housing containing the recoil spring.

#### Barrel Casing

The barrel casing is a slotted light alloy tube with front sight carrier and bayonet lug at its front end. The bipod, which can be locked in rear or forward position, slides on the barrel casing.

A bridge connects the barrel casing with the casing head.

#### Barrel

The barrel muzzle, designed as a grenade launcher, also accommodates the muzzle brake. A spring catch secures grenades for minus angle of sight firing.

The cartridge chamber has fluted walls.

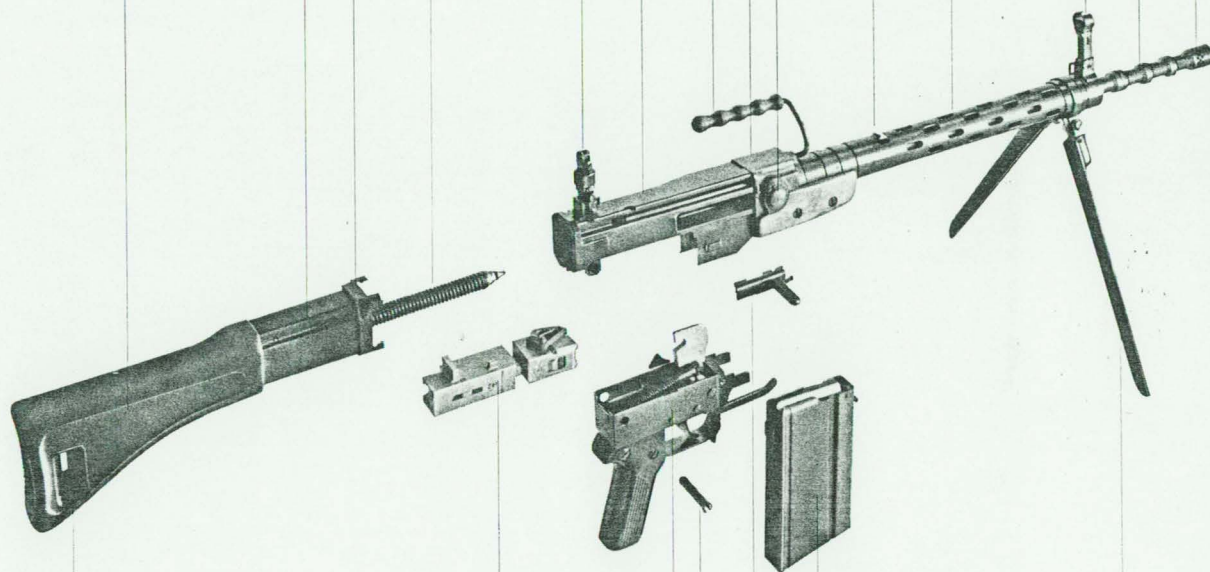
#### Breech

The breech comprises a breech head with ejector, locking rollers with rockers and cartridge holder, rear director shaft with firing pin and firing pin spring, and the firing lever. Breech head and director shaft are connected by a cotter pin.





- 1 Rubber butt
- 2 Rear portion of breech-casing
- 3 Bayonet attachment
- 4 Recoil spring
- 5 Aperture sight
- 6 Center section of breech-casing
- 7 Carrying handle
- 8 Casing head
- 9 Locking sockets
- 10 Spring catch
- 11 Barrel casing
- 12 Front sight carrier with front sight
- 13 Muzzle with integral grenade launcher
- 14 Muzzle brake
- 15 Bipod
- 16 Magazine
- 17 Operating handle
- 18 Bolt to the trigger casing
- 19 Trigger mechanism
- 20 Breech
- 21 Aperture for strap



21

20

19

18

17

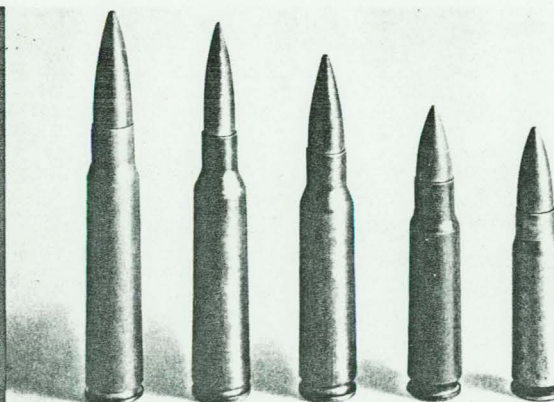
16

15



The SIG Automatic Rifle SG 510 can be adapted to various normal cartridges and medium ammunition. The illustration shows from left to right the following cartridges:

- Caliber 7,9 mm
- Caliber 6,5 mm
- Caliber 7,62 mm NATO
- Caliber 7,62 mm short
- Caliber 7,62 mm short



### **Recoil Spring Assembly**

Dual telescoping springs constitute the recoil spring assembly and are housed in the rear portion of the breech case.

### **Trigger Mechanism**

The entire trigger mechanism is housed in a sheet steel casing hinged to the center of the breech case. The trigger casing accommodates the pistol grip handle with storage cavity for oil bottle, safety catch, magazine holder catch and winter trigger. The trigger mechanism comprises a firing safety device which when inserted in reverse prevents full-automatic fire. The rifle can then be fired semi-automatically

only. The trigger has a pressure stop for both single and full-automatic (continuous) fire. The winter trigger allows firing with thick gloves or mittens.

### **Butt**

The rifle can be used alternatively with rubber or wooden butt.

### **Bipod**

The bipod, which slides along and pivots on the barrel casing, folds up to front or rear.

### **Magazine**

The standard sheet steel or light alloy magazine holds 20 rounds. A 5-round magazine and one

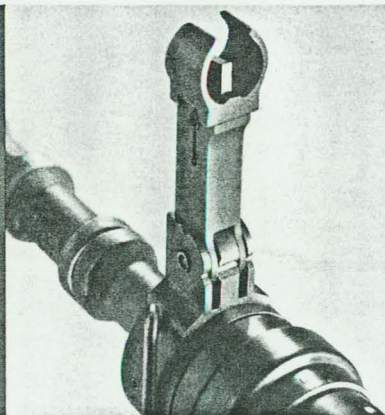
for grenade launching cartridges is also available.

### **Sights**

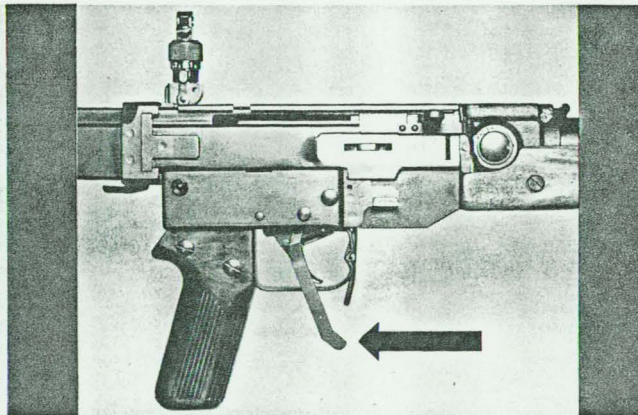
The laterally adjustable square blade front sight is protected by two wings. The aperture rear sight is adjustable for windage and elevation. Elevation adjustment range is from 100 to 650 meters in steps of 25 meters. Elevation adjustments are secured by a catch. The aperture sight can be screw adjusted  $2^{\circ}_{00}$  to left or right of zero. The front sight carrier and column can be folded down.

The rifle has provision for special night sight.

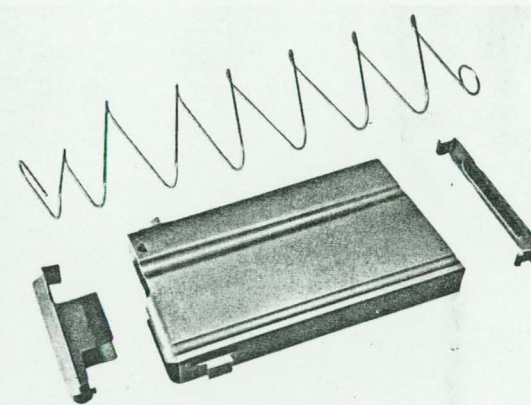




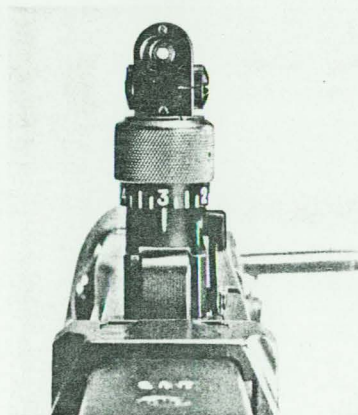
Front sight carrier with front sight



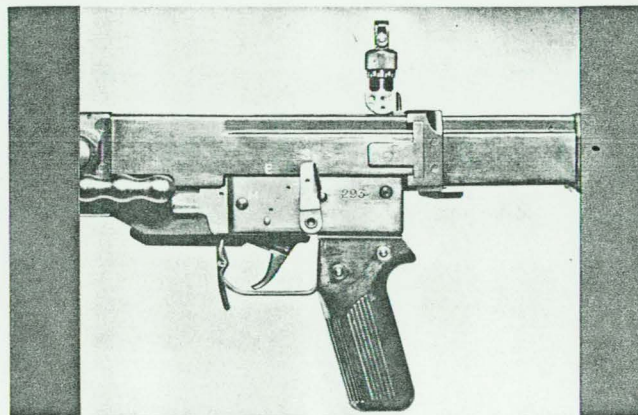
Winter trigger



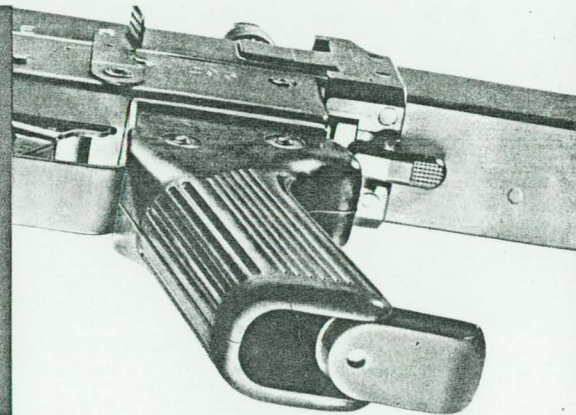
Magazine dismantled



Aperture sight

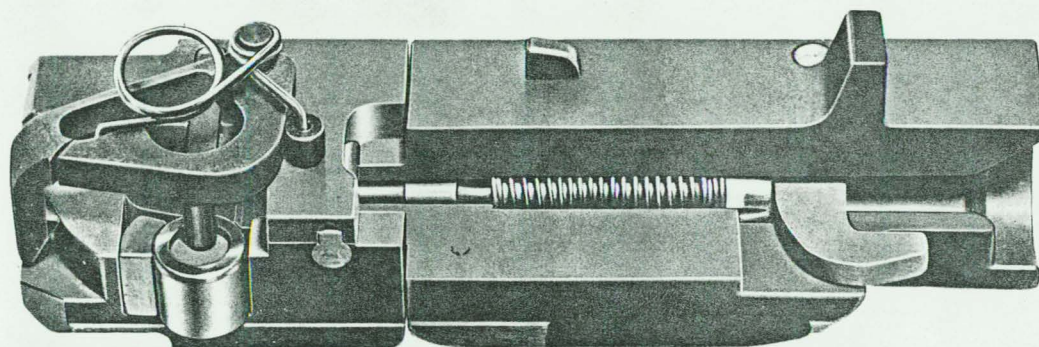
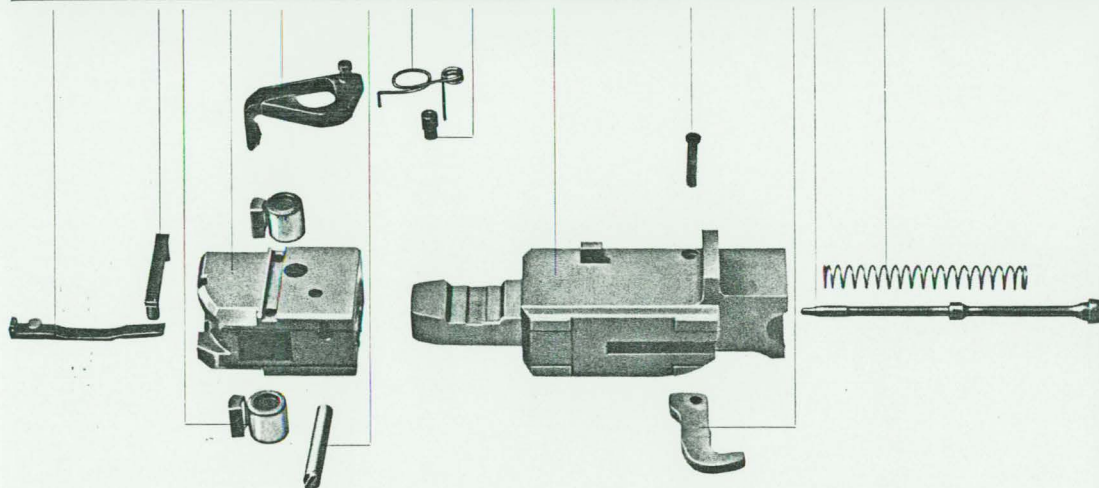
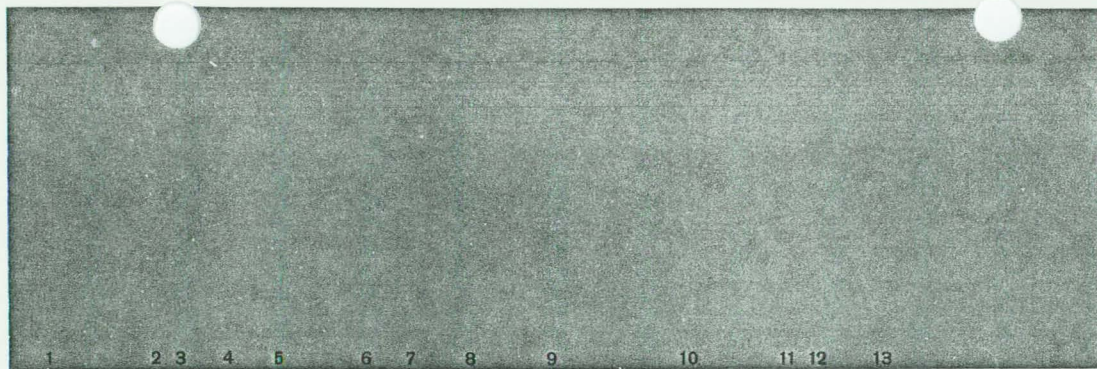


Safety catch



Pistol grip handle with storage cavity for oil bottle or accessories





- 1 Cartridge holder
- 2 Roller catch
- 3 Rollers
- 4 Breech head
- 5 Ejector
- 6 Transverse key
- 7 Ejector spring
- 8 Stop bolt
- 9 Director shaft
- 10 Bolt for fixing the firing lever
- 11 Firing lever
- 12 Firing pin
- 13 Firing pin spring
- 14 Hammer\*
- 15 Recoil spring\*
- 16 Barrel\*
- 17 Cartridge case\*

The parts marked with \* are not components of the breech. They are illustrated on page 17.

◀ The illustration on the left shows a sectional model of the breech of the SIG Automatic Rifle SG 510. This picture shows distinctly how the rollers are forced outwards by the wedge shaped faces of the director shaft, when the breech is locked.



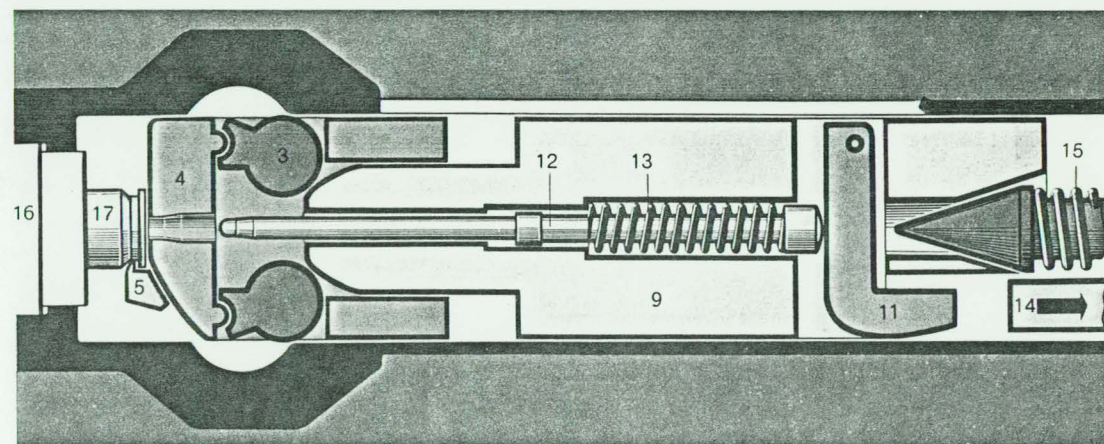
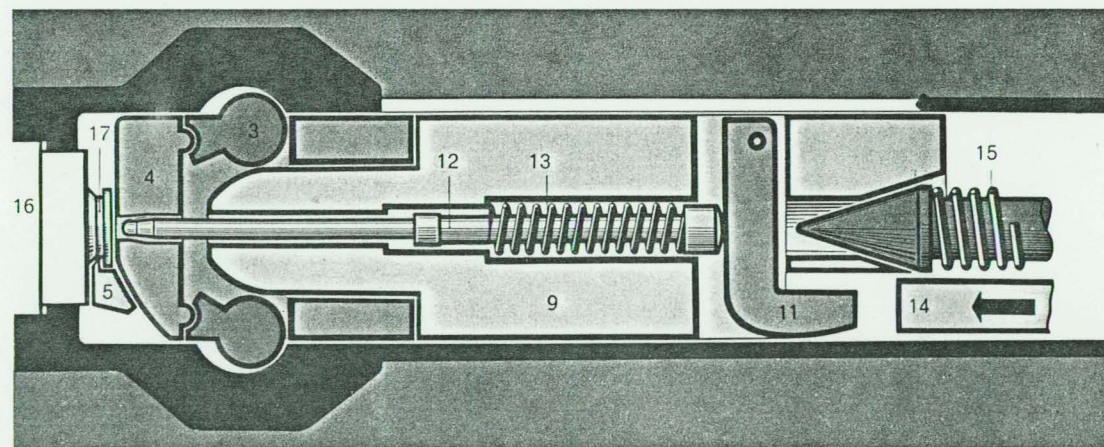
## E Operation

A pull on the trigger releases the hammer to strike the firing lever which drives the firing pin forward, firing the cartridge.

The resultant chamber pressure obturates the cartridge case against the walls of the fluted chamber and also forces the case against the breech head. The rollers lie in their locking sockets preventing the breech head from yielding. This is not a rigid lock as the rollers are forced into their sockets by the wedge shaped faces of the director shaft, which is held in forward position only by pressure of the recoil spring assembly.

As the bullet accelerates up the bore and breech pressure increases, the director shaft is forced to the rear, and after about one quarter inch of travel the locking rollers turn inwards enabling the breech head to move rearwards with the fired cartridge case. The director shaft has stored sufficient energy to completely unlock the breech and pull it back against resistance of the spring. During this rearward movement the cartridge case is extracted.

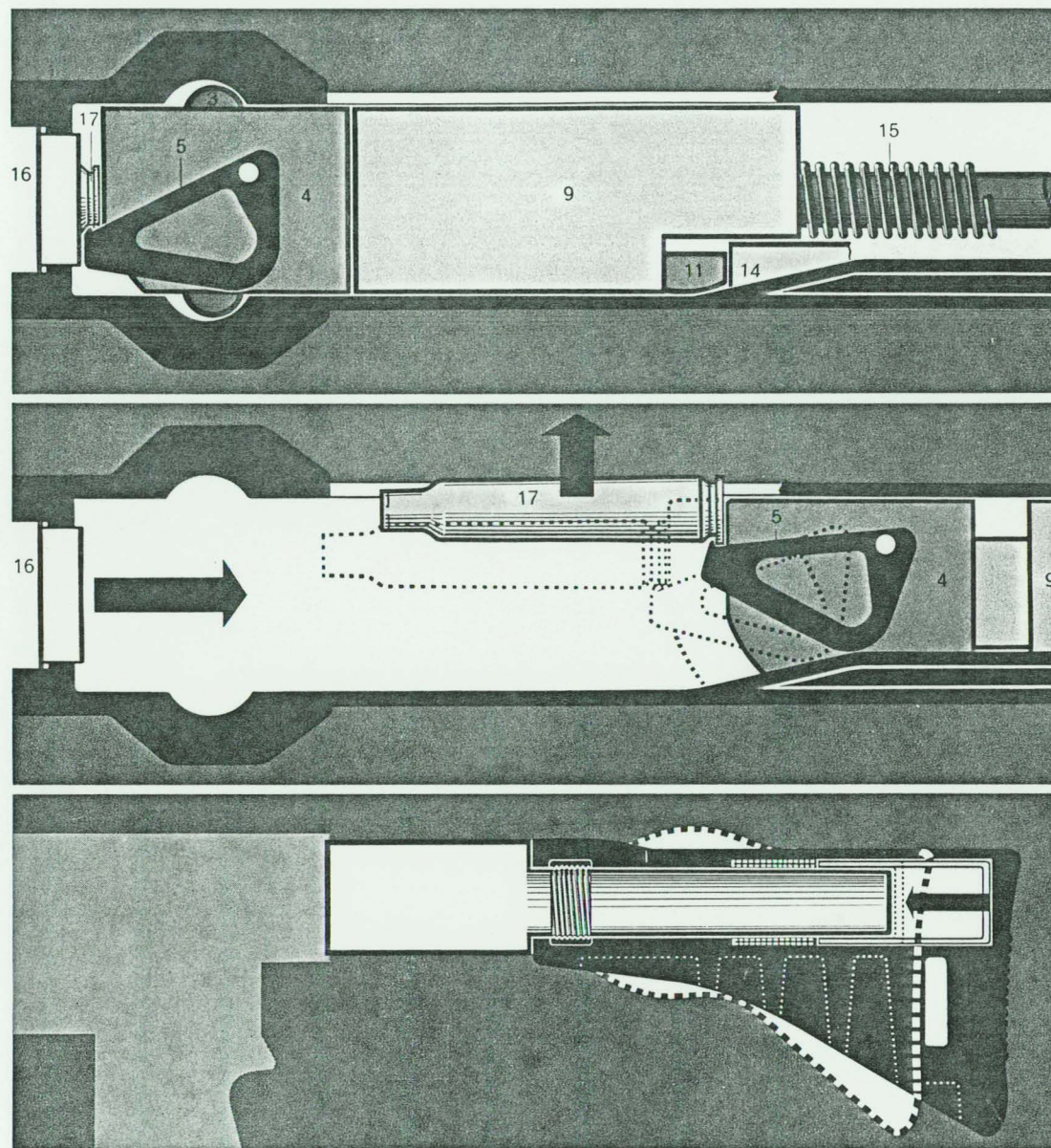
The ejector runs on to a cam pressed into the casing and ejects the case to the right. During rearward movement of the breech the hammer is cocked and the recoil spring compressed.





In its rearmost position the projection of the breech is caught by the buffer.

The compressed recoil spring then forces the breech forward to pick up a cartridge from the magazine and insert it in the chamber. The breech head is stopped against the rear end of the barrel. The director shaft forces the locking rollers into their locking sockets and the weapon is again ready for firing.



The two illustrations above show the function of the ejector. The illustration below shows the potential compression of the rubber butt when grenades are fired from a solid base.



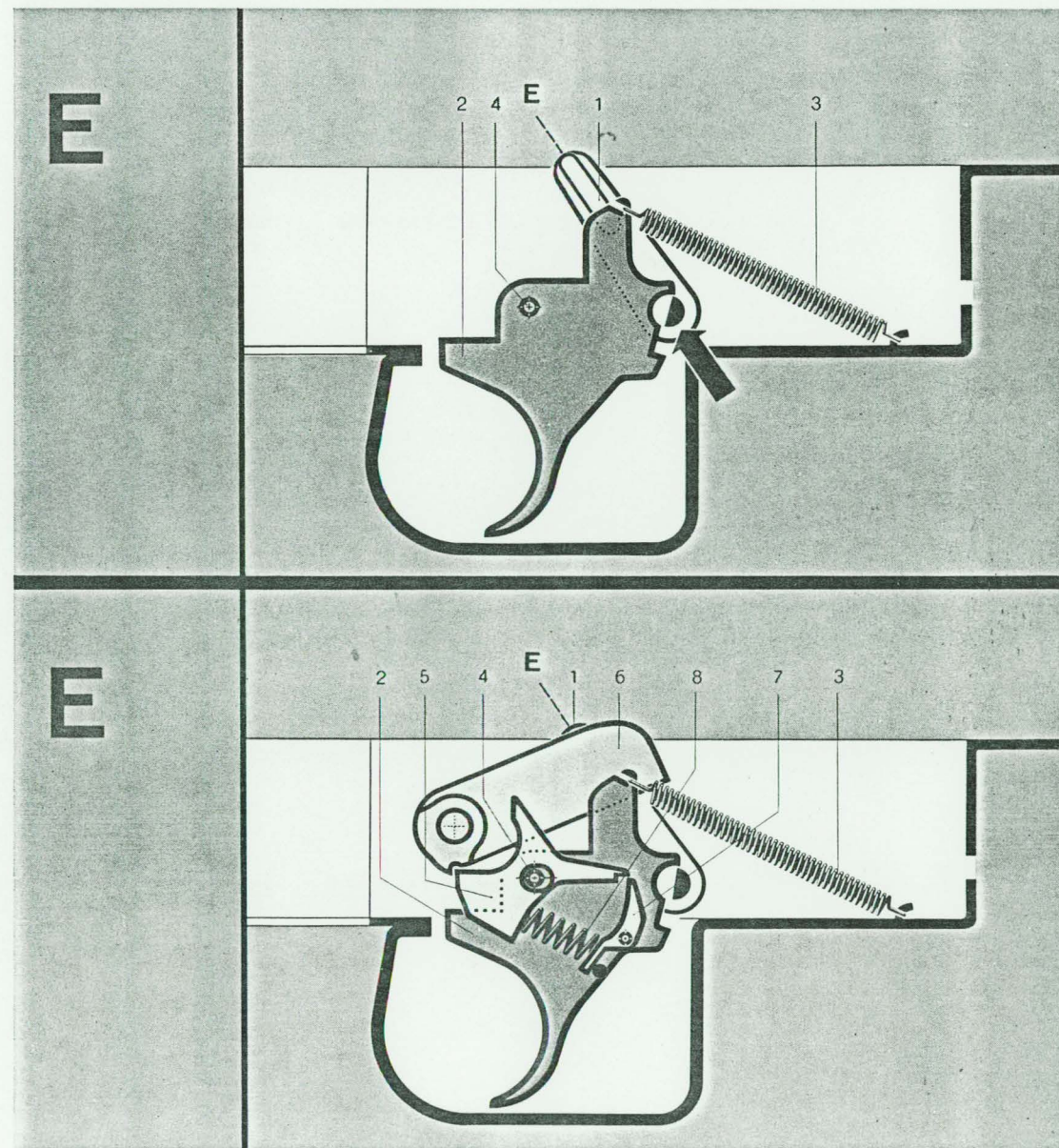
## Trigger Operation

### Semi-Automatic Fire

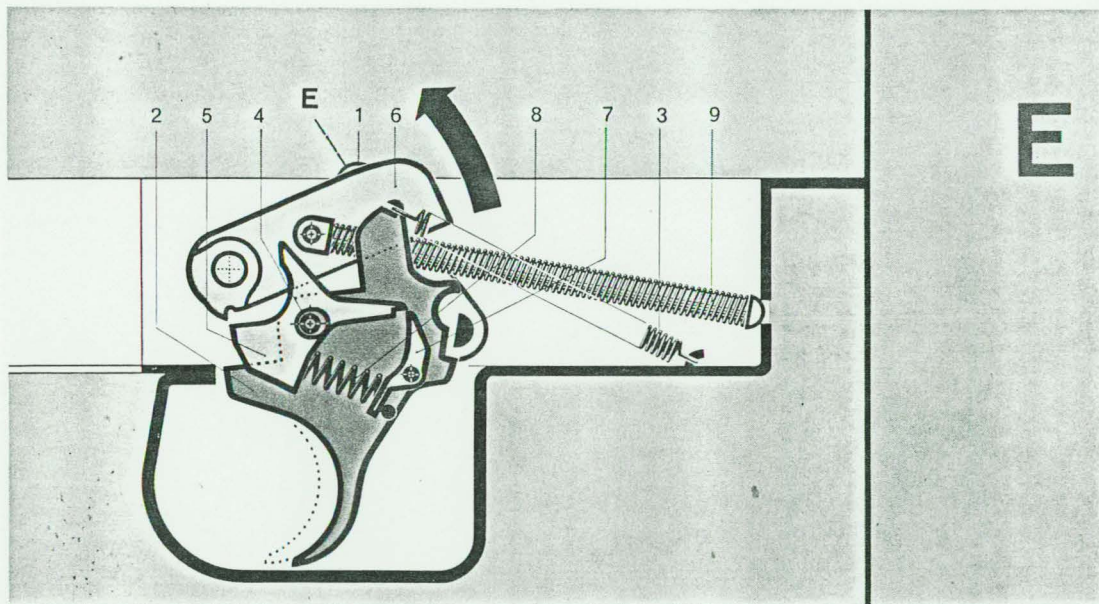
To fire single round the safety catch is set to "E"; the trigger tongue can then be pulled back.

- 1 Safety catch
- 2 Trigger tongue
- 3 Trigger spring
- 4 Axle of trigger tongue and trigger rod
- 5 Trigger rod
- 6 Hammer
- 7 Catch joint
- 8 Trigger rod spring

The catch joint connects the trigger tongue with the trigger rod. The hammer is held back by the trigger rod.



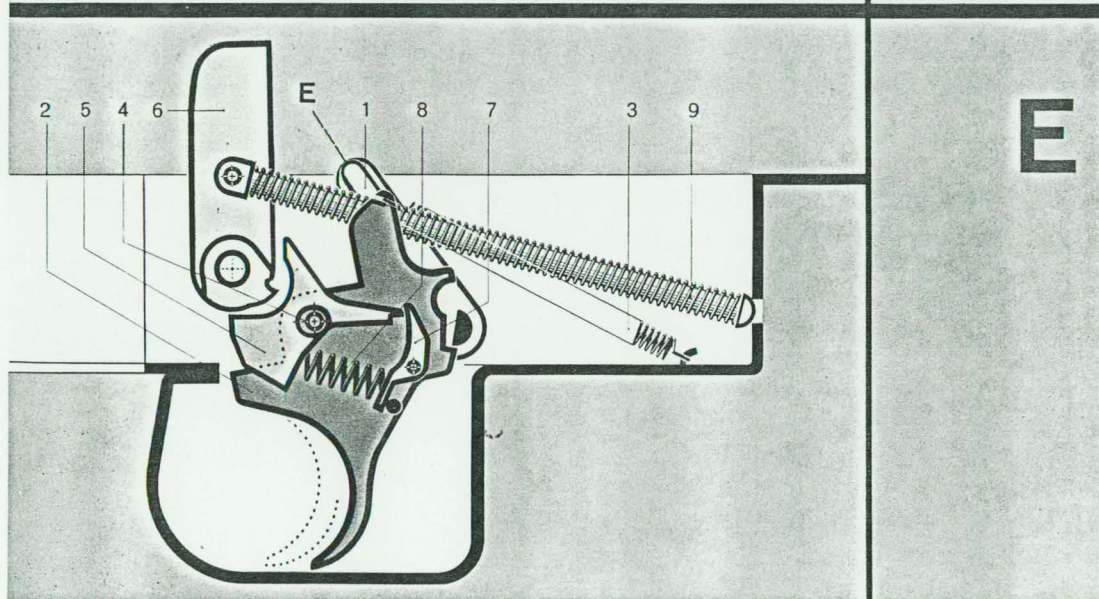




E

When the trigger tongue which pivots on the axle is pulled back, the trigger rod is turned round, since it rests on the same spindle.

The trigger rod then disengages to release the hammer which is struck forward by the cocked firing spring.



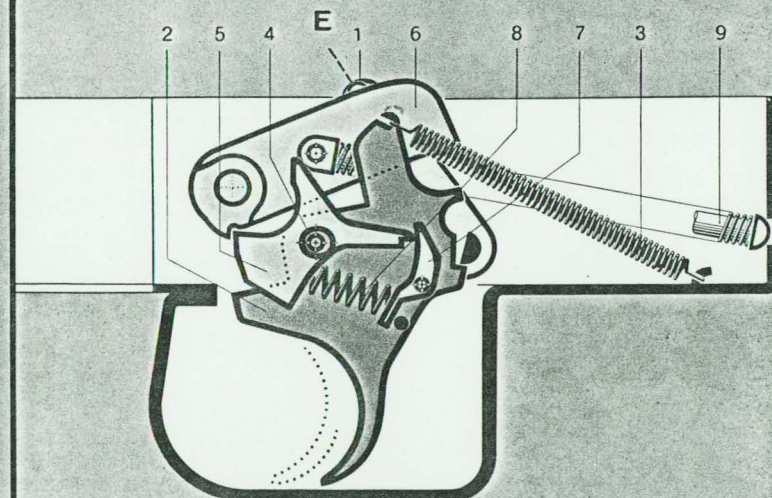
E

- 1 Safety catch
- 2 Trigger tongue
- 3 Trigger spring
- 4 Axle of trigger tongue and trigger rod
- 5 Trigger rod
- 6 Hammer
- 7 Catch joint
- 8 Trigger rod spring
- 9 Firing spring
- 10 Bell crank lever
- 11 Bell crank lever pin
- 12 Full-automatic firing pawl

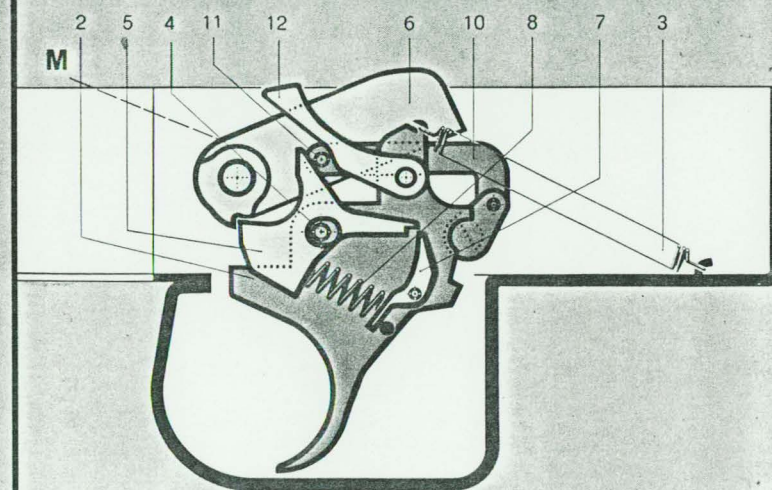
Then, the trigger rod which rests in an oval hole, is pressed forward and upward by the eccentrically supported trigger rod spring, which disconnects the catch joint from the trigger rod. The trigger rod is then repositioned to engage the hammer.



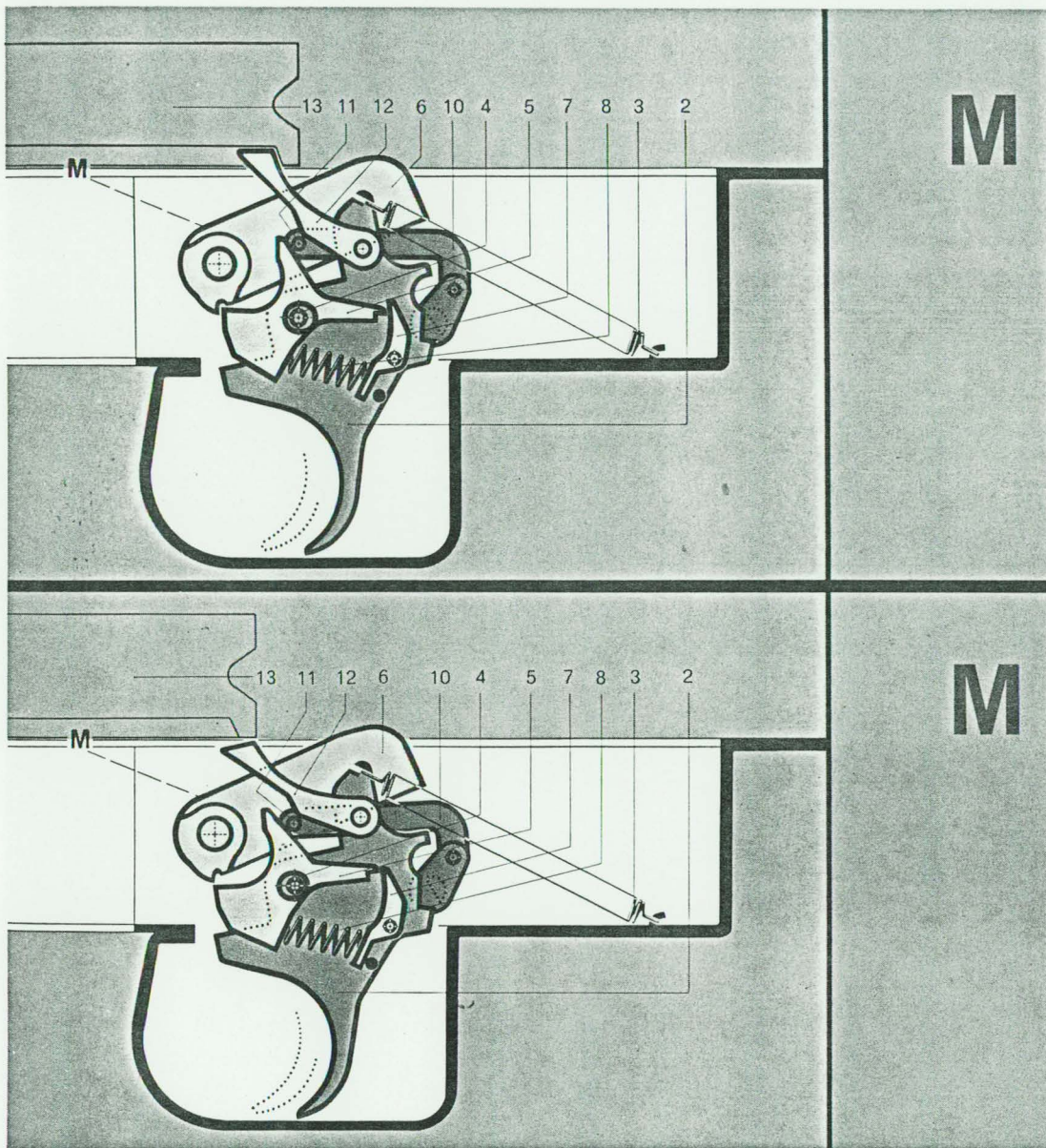
E



M



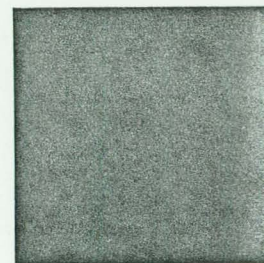




Due to the position of this pin the full-automatic firing pawl extends into the path of the breech when the trigger tongue is being pulled back (thereby releasing the first shot).

- 2 Trigger tongue
- 3 Trigger spring
- 4 Axle of trigger tongue and trigger rod
- 5 Trigger rod
- 6 Hammer
- 7 Catch joint
- 8 Trigger rod spring
- 10 Bell crank lever
- 11 Bell crank lever pin
- 12 Full-automatic firing pawl
- 13 Breech

As long as the trigger tongue is held in its rearmost position the hammer is released by the full-automatic firing pawl, acting through the bell crank lever pin on the trigger rod. When the trigger tongue is released the full-automatic firing pawl is removed from the path of the breech and the normal function of the trigger (as for firing single rounds) is restored.



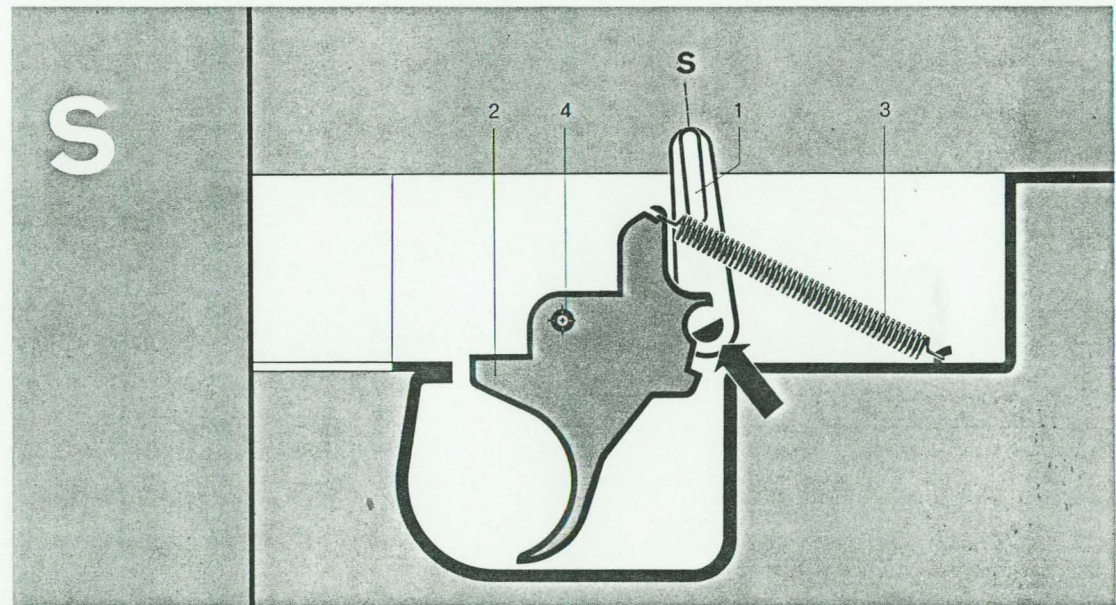


### Safety Catch

When the safety catch is set to "S" (safe) the safety catch shaft locks the trigger tongue so that the latter cannot be pulled back.

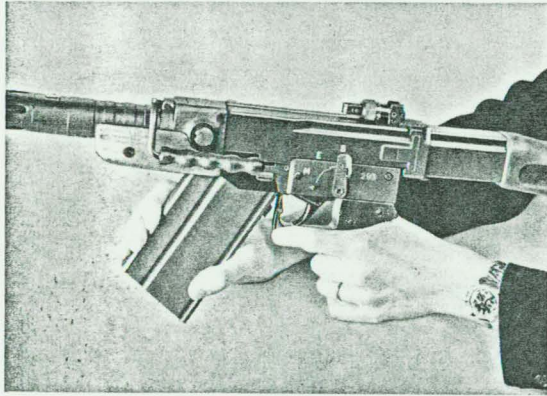
### Safety with partially locked breech

If director shaft were not fully forward and locking rollers not fully engaged, the breech would open prematurely when a shot was fired. To meet this contingency the path of the firing pin is limited by the director shaft. When the breech is not fully locked the firing pin cannot reach the cartridge to fire it. This safety device operates with both single and full-automatic fire.

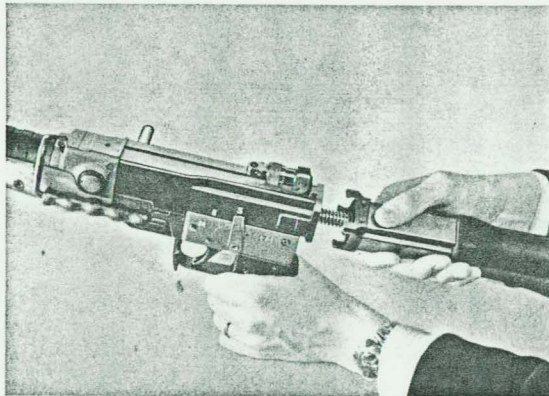




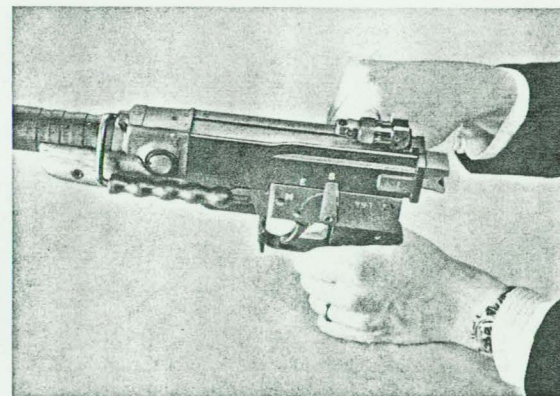
## F Disassembly



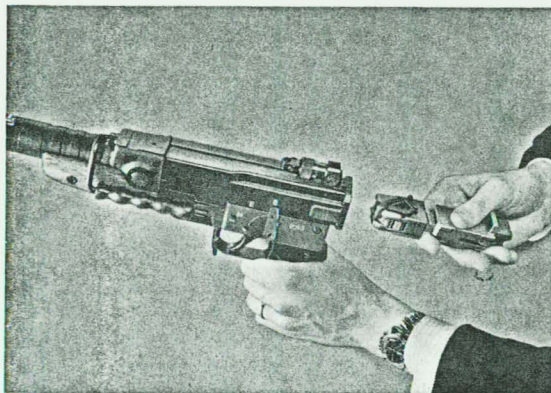
1. Remove the magazine



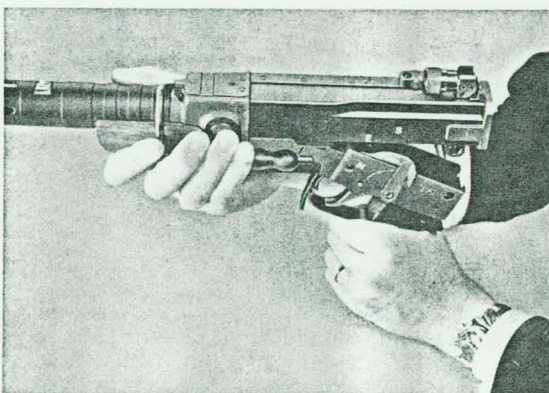
2. Remove the rear portion of the breech casing with butt



3. Pull the operating handle backwards



4. Remove the breech



5. Remove the trigger mechanism





### Disassembly

Hold rifle in left hand by means of pistol grip. Hold magazine with right hand and at same time press forward on magazine catch and remove magazine to front.

Hold rear portion of breech casing with right hand and press catch with index finger. Rotate butt  $\frac{1}{8}$  turn counter-clockwise and withdraw it to rear. Withdraw locking handle and remove towards right.

Remove breech.

Press spring of trigger casing bolt inward and push bolt out to right. Hinge trigger mechanism downward and withdraw it to rear.

No further dismantling is required for cleaning purposes. Care should be taken that hammer is not released until weapon has been completely assembled.

### Stripping the breech

Set breech to stripping position by separating breech head and director shaft about 5 mm

apart. Using tip of recoil spring push transverse key from right to left and remove it. Separate breech head and director shaft.

Release outer ejector spring by drawing longer arm of spring (with twist) across leg of ejector and remove spring. Remove stop bolt.

Turn ejector to left and lift out.

Reverse breech head and tap out roller holder. Rollers and rockers can now be removed.

Smartly tap top edge of director shaft against a wooden surface to dislodge firing lever pin from its support so that it can be removed.

Place a finger on rear portion of director shaft and remove firing lever towards right-hand side. Due to force of the spring the firing pin will be forced backwards.

Remove firing pin and its spring.

### Assembly

To assemble the weapon perform above operations in reverse order. Note: Firing pin is forced to the rear by means of the transverse key, so that firing lever can be inserted.







## Manufacturing Program of the Arms Factory

### Arms

#### **SIG Pistol P 210**

Mechanically locked, recoil-operated weapon, calibers 9 mm and 7.65 mm Parabellum, as well as .22 long rifle.

#### **SIG Machine Pistol MP 310**

Automatic, unlocked weapon, caliber 9 mm Parabellum (other calibers on request), firing single shots or full-automatic, with pivoting magazine and retractable skeleton stock.

#### **SIG Machine Gun MG 710**

Air-cooled weapon fed by metallic belts, calibers 6.5 mm, .30" NATO and 7.9 mm (other calibers on request), firing in bursts or full-automatic fire.

### Machines

Cam Milling Machines

Copying Turret Lathes

Hydraulic Broaching Machines

Machines for the Inside Working of Barrels and Tubes, such as:

Deep Hole Drilling Machines

Combination Deep Hole Drilling and Reaming Machines

Reaming Machines

Honing Machines

Rifling Machines

Cylinder Lapping Machines

Polishing Machines

Chambering Machines

Setting Machines

Milling Tools for Rifling Cutters

Grinding Tools for Rifling Cutters

Lead Oven

Special Machines on request

further:

Screw Pumps for handling pasty and viscous products and for the drive of oil-hydraulic systems

Hydraulic Control Equipment

Pneumatic Tools for Rock and Metal Working





**Swiss Industrial Company   Neuhausen Rhine Falls   Switzerland**