

DESCRIPTION
OF THE
MADSEN/SAETTER
MACHINE GUN

RIFLE CALIBRE

MARK II

DANSK INDUSTRI SYNDIKAT,
COMPAGNIE MADSEN, A S
COPENHAGEN, DENMARK

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CONTENTS

- I. Characteristics.
 - II. Data.
 - III. Principal Assemblies:
 - A. The Receiver (or Body)-assembly incl. back-sight-group.
 - B. Feed-mechanism.
 - C. Trigger-gear-assembly.
 - D. Bolt-assembly.
 - E. Gas-piston.
 - F. Butt-stock-assembly with return- and buffer-mechanism.
 - G. Barrel.
 - H. Bipod.
 - I. Cartridge-belts, ammunition box, magazines.
 - K. Accessories.
 - L. Mounting.
 - IV. Stripping and assembling.
 - V. Firing.
 - VI. Functioning.
 - VII. Maintenance:
 - 1. Inspection.
 - 2. Possible replacements.
 - VIII. Stoppages and remedies.
 - IX. MADSEN/SAETTER Machine Gun, Rifle calibre, Tankmodel.
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I. CHARACTERISTICS

The MADSEN/SAETTER Machine Gun, Rifle calibre, is a belt fed gas-operated weapon. It is usually mounted on a light field tripod, but can just as well be fired from shoulder and bipod or from the hip. The gun is, in appearance and design, a modern weapon, embodying all the experience gained during the last few years in the structure of machine guns. The designers have particularly aimed at building a gun that is reliable in operation, simple and rapid to manipulate, and the very important feature of easier mass production. For this purpose the component parts are designed to be readily produced by punching, turning and precision casting, without detracting from reliability and durability.

In designing the MADSEN/SAETTER tripod mounting, special importance was attached to achieving a light and stable tripod to give satisfactory accuracy at all ranges in both direct and indirect fire. Moreover, means are provided for mounting and dismounting the gun by a single movement, manipulation being simple and rapid.

Amongst the MADSEN/SAETTER machine gun's other advantages are:

The gas mechanism is constructed to blow itself clean while the gun is firing, thus obviating functioning trouble from gas fouling.

Barrel changing takes less time than on any other gun, the barrel handle acting simultaneously for locking the barrel to the breech.

The barrel is *air-cooled*, is entirely exposed, and thus able to cool quickly.

Loading and unloading are rapid and easy to carry out.

The gun is *fired* by the forward movement of the action. In other words, there is no particular hammer mechanism. The safety catch can always be applied regardless of the position at which the mechanism may have come to rest in the event of a stoppage. When firing ceases the action moves to the rear position, i. e. with no round in the chamber, thus avoiding premature discharge by barrel heat.

Stripping for cleaning is achieved entirely without tools.

Change of calibre during firing is one of the MADSEN/SAETTER machine gun's most remarkable features. By merely changing barrel (5—10 seconds) the same gun can fire any infantry calibre rimless cartridge between 6.5 mm and 8 mm (including the NATO 7.62 mm = .30" T65 cartridge).



MADSEN/SAETTER machine gun

on light tripod mounting, with all the attributes of a heavy and medium machine gun.



MADSEN/SAETTER machine gun

in role of light machine gun, using the bipod and being fired from the shoulder



MADSEN/SAETTER machine gun

with magazine holding 1 cartridge belt of 50 rounds.



MADSEN/SAETTER machine gun

fired from the hip with magazine holding 2 cartridge belts each of 50 cartridges = 100 cartridges.

II. DATA

MADSEN/SAETTER MACHINE GUN RIFLE CALIBRE

Machine gun:

Length of weapon	1290 mm = 50.7 inches
Length of barrel with flash-eliminator	660 mm = 26.0 inches
Length of barrel without flash-eliminator	570 mm = 22.4 inches
Weight of weapon, incl. bipod, standard barrel	11.1 kg = 24.5 lbs.
Weight of weapon, incl. bipod, heavy barrel	11.6 kg = 25.6 lbs.
Weight of barrel, standard	2.7 kg = 6.0 lbs.
Weight of barrel, heavy	3.2 kg = 7.0 lbs.
Rifling	4 grooved-right twist
Pitch of rifling	240 mm = 9.5 inches
Weight of moving parts (bolt-assembly and gas piston)	1.1 kg = 2.4 lbs.
Muzzle height on bipod	265 mm = 10.4 inches

Sights: 1) Fore-sight — blade-type, back-sight — V-shaped notch.

Graduations from 200 to 1200 metres = abt. 200—1300 yards, or

2) aperture backsight as per requirement.

3) accommodation for Dial sight can be fitted.

Cyclic rate of fire as per requirement from 600 to 1000 r/p/m.

Feed: By cartridge-belts of 50 rounds which can be connected to any length desired.

Ammunition:

Calibre: any normal infantry rifle calibre rimless cartridge from 6.5 to 8 mm (including the NATO 7.62 mm = .30" T65).

Ballistics: standard for the ammunition employed.

Tripod-mountings:

1) The standard MADSEN/SAETTER tripod.

Weight

16.5 kg = 36 lbs.

Maximum muzzle height

800 mm = 31.5 inches

Minimum muzzle height

350 mm = 13.8 inches

Traversing angle

30°

Elevation limits

—8° to +8°

Highest and lowest elevation by leg-adjustment

—35° to +40°

2) The light MADSEN/SAETTER tripod which is under development.

II. Data, continued.

Cartridge belt, Ammunition box, Magazines:

Length of cartridge belt at 50 links	850 mm	=	33.5 inches
Weight of cartridge belt at 50 links, empty	0.175 kg	=	0.4 lbs.
Weight of cartridge belt at 50 links, full 6.5 mm ...	1.35 kg	=	3.0 lbs.
Weight of cartridge belt at 50 links, full 7.92 mm ..	1.41 kg	=	3.1 lbs.
Weight of cartridge belt at 50 links, full 7.62 mm (.30")	1.55 kg	=	3.4 lbs.
Weight of cartridge belt at 50 links, full 7.62 mm (.30T65) "NATO"	1.38 kg	=	3.1 lbs.

The ammunition box holds 5 belts each of 50 cartridges = 250 cartridges.

The external dimensions of the ammunition box are:

Height	195 mm	=	7.7 inches
Width	92 mm	=	3.6 inches
Length	365 mm	=	14.4 inches
Weight of the ammunition box	2.2 kg	=	4.8 lbs.

The magazine holds 1 belt of 50 cartridges.

The external dimensions of the magazine are:

Height (as mounted on the gun)	125 mm	=	4.9 inches
Width (as mounted on the gun)	175 mm	=	6.9 inches
Length (as mounted on the gun)	105 mm	=	4.1 inches
Weight of magazine	1.05 kg	=	2.3 lbs.

Another magazine holds 2 belts each of 50 cartridges = 100 cartridges.

The external dimensions of the magazine are:

Height (as mounted on the gun)	165 mm	=	6.3 inches
Width (as mounted on the gun)	215 mm	=	8.5 inches
Length (as mounted on the gun)	105 mm	=	4.1 inches
Weight of magazine	1.6 kg	=	3.5 lbs.

III. PRINCIPAL ASSEMBLIES

The MADSEN/SAETTER machine gun, Rifle calibre consists of the following main groups, or assemblies:

- A. Receiver (or Body)-assembly incl. back-sight-group.
 - B. Feed-mechanism.
 - C. Trigger-gear-assembly.
 - D. Bolt-assembly.
 - E. Gas-piston.
 - F. Butt-stock-assembly with return- and buffer-mechanism.
 - G. Barrel.
 - H. Bipod.
 - I. Cartridge-belts, ammunition box, magazines
 - K. Accessories.
 - L. Mounting.
-

MADSEN/SAETTER machine gun, rifle calibre



viewed from the left



viewed from the right



stripped without tools to main groups.

For daily cleaning disassemble as above and strip down the bolt assembly (as at IIID) and the trigger gear housing (as at IV. Stripping and assembling). No tools are necessary.

A.

RECEIVER (or BODY)-ASSEMBLY
incl. BACK-SIGHT-GROUP

A. Receiver (or Body)-Assembly incl. Back-Sight-Group.

The principal part of the gun is the receiver (A5), on the forward end of which is screwed the barrel-socket (A2). The latter forms a housing for the barrel-socket-block (A3), into which is inserted the barrel-support (A1), and has two trunnions providing a forward seating for the trigger-gear-housing (at C1d). A3 is secured by the two pins A4. In the receiver is rivetted the ejector (A5a). To take the initial shock of discharge pressure-absorbing-blocks (A6) are positioned in slots in the receiver walls (A5b) and are protected by the receiver-clip-ring (A7). In the rear part of the receiver is the feed-lever-recess (A5d) for the feed-lever (B15).

On the top of the forward end of the receiver is the back-sight-seating (A5e) on which is the back-sight-bed (A9) the latter being secured by a screw (A12). The front part of the back-sight-bed (A9) forms the seating for the carrying-handle (A19) held by the carrying-handle-assembly-pin (A18), and also accommodates the back-sight-leaf (A14) hinged on the back-sight-leaf-pin (A8), and actuated by the back-sight-leaf-spring (A13) underneath. The back-sight-slide (A15) fits round the leaf to which it is securely held at the various ranges from 200 to 1200 metres by the spring loaded back-sight-slide-catch (A17). At the rear of the back-sight-bed is fitted the feed-cover-hasp (A11) with its spring (A10) to keep the feed-cover (B1) in position when it is open. Two holes are drilled transversally in the rear of the back-sight-bed (A9) for the feed-cover-hinge-pin (B13).

The front of the receiver provides the housing for the barrel (G) which also seats on the barrel-support-head (A1a), on the left side of which is a groove into which a flange on the foot of the barrel-handle (G3) engages and locks the barrel (G) on assembly.

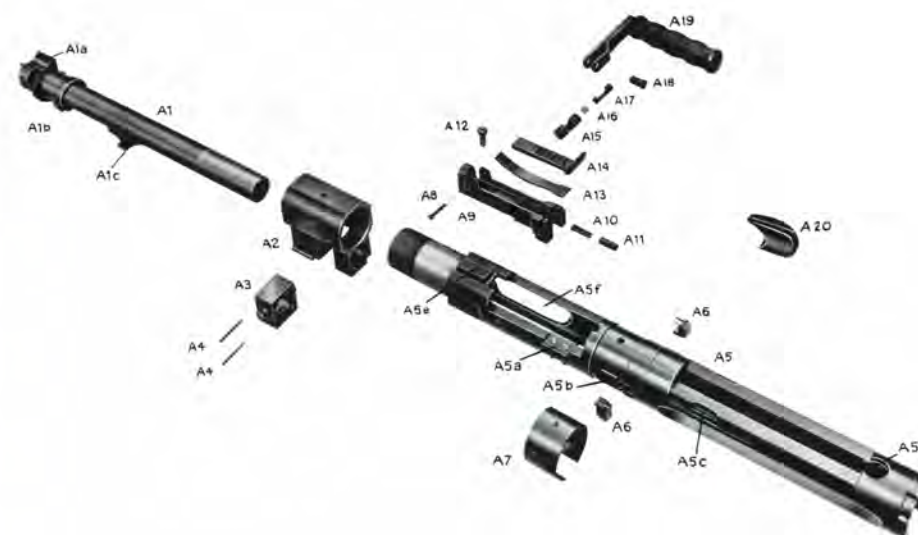
In rear of the barrel-support-head (A1a) is the bipod-seating (A1b) and on the underside of the barrel-support (A1) is the tripod-hook (A1c) by which the fore end of the gun is secured to the tripod (at L10a).

The cartridge-case-buffer (A20) is an *extra* attachment, which is delivered on request. It is desirable for certain types of ammunition to protect the cartridge cases. It is fitted into the Ejection-slot (A5f). See also General Assembly drawing.

A. Receiver (or Body)-Assembly incl. Back-Sight-Group.



Assembled.



Stripped.

incl. Back-Sight-Group.

ceiver (A5), on the forward end of
The latter forms a housing for the
serted the barrel-support (A1), and
seating for the trigger-gear-housing
A4. In the receiver is rivetted the
of discharge pressure-absorbing-
receiver walls (A5b) and are pro-
the rear part of the receiver is the
(B15).

receiver is the back-sight-seating
(A9) the latter being secured by a
ght-bed (A9) forms the seating for
arrying-handle-assembly-pin (A18),
(A14) hinged on the back-sight-
ght-leaf-spring (A13) underneath.
leaf to which it is securely held
metres by the spring loaded back-
back-sight-bed is fitted the feed-
keep the feed-cover (B1) in posi-
ed transversally in the rear of the
nge-pin (B13).

housing for the barrel (G) which
a), on the left side of which is a
of the barrel-handle (G3) engages

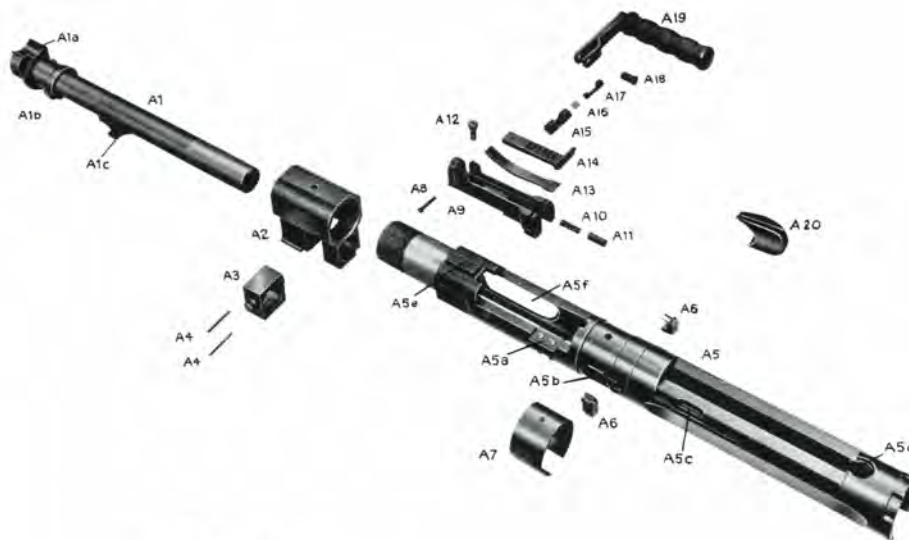
a) is the bipod-seating (A1b) and
A1) is the tripod-hook (A1c) by
o the tripod (at L10a).

tra attachment, which is delivered
es of ammunition to protect the
tion-slot (A5f). See also General

A. Receiver (or Body)-Assembly incl. Back-Sight-Group.



Assembled.



Stripped.

A1—A7. Receiver (or Body)-assembly

- A1 Barrel-support
- A1a Barrel-support-head (seating)
- A1b Bipod-seating
- A1c Tripod-hook
- A2 Barrel-socket
- A3 Barrel-socket-block
- A4 Barrel-socket-block-pin (for A1)
- A5 Receiver (or Body)
- A5a Ejector with rivets
- A5b Receiver slot: Clearance for bolt locking pawls (D8) and housing for pressure absorbing-blocks (A6)
- A5c Feed-lever-cover-slot
- A5d Feed-lever-recess
- A5e Back-sight-seating
- A5f Ejection-slot
- A6 Pressure-absorbing-blocks
- A7 Receiver-clip-ring

A8—A19. Back-sight-group.

- A8 Backsight-leaf-pin
- A9 Back-sight-bed
- A10 Feed-cover-haspspring
- A11 Feed-cover-hasp
- A12 Back-sight-bed-screw
- A13 Back-sight-leaf-spring
- A14 Back-sight-leaf
- A15 Back-sight-slide
- A16 Back-sight-slide-spring
- A17 Back-sight-slide-catch
- A18 Carrying-handle-assembly-pin
- A19 Carrying-handle
- A20 Cartridge-case-buffer (not on all models)

B.
FEED-MECHANISM

B. Feed-Mechanism.

The main parts of the feed-mechanism are the feed-cover (B1) and the feed-way-platform (B12), which actuate on a hinge-pin (B13), and the feed-lever (B15) with its cover (B14). The forward end of the feed-lever-cover forms a seating for the feed-cover, to which it is locked by a spring loaded latch (B3).

Advancing the belt through the feed-way proceeds in two stages by the aid of the pawls in the feed-slide-assembly (B7), — which consists of the feed-slide-lever (B7a), a two armed lever turning on the feed-slide-pivot-pin (B1b) in the feed-cover engaging the feed-arm (B5) with the free end, and two feed-slides carrying spring actuated pawls.

The upper feed-slide (B7c) carries two spring actuated pawls which function on both sides of the double pawl on the lower feed-slide (B7b).

The feed-slides move on the inserted feed-slide-assembly-spacer (B4), which minimizes friction between feed-cover and feed-slides, and are guided by two guide-rollers on the feed-cover-guide-roller-pin (B1a).

The feed-arm (B5) turning on its pin (B1c) in the cover transmits the movement of the feed-lever (B15) to the feed-slide-lever (B7a) by engagement with the roller (B15a). The purpose of the feed-arm-spring (B6) is to position the feed-mechanism when the feed-cover is open to ensure that, on closing the feed-cover, the rearward part of the feed-arm can move down round the feed-lever-roller (B15a) when the latter is as far to the right as it will go; the moving parts having been brought to the rearmost position.

The feed-aligner (B9) is located in the right side of the feed-cover and pivots on the feed-aligner-pin (B8). Its purpose is to hold the cartridge in place on the feed-way-platform and assist in guiding it into the chamber, and it is held in position by the feed-aligner-pin-spring (B11) whilst the two arms on the feed-aligner-spring (B10) press it down against the cartridge-stop (B12a). At the same time, the loop on the aligner-spring (B10) keeps the feed-slide-lever (B7a) in place in the feed-cover (B1).

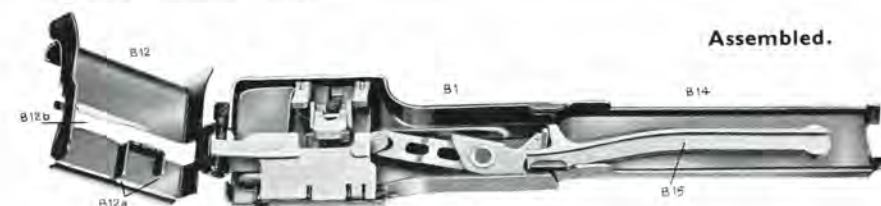
The feed-way platform (B12) is curved outwards on its left side to facilitate easy passage of the loaded cartridge-belt into the feed-way. A channel (B12b) forms the cartridge bed from which the live round is fed into the chamber by the bolt face (D3); the cartridge-stop (B12a) preventing the round from moving further to the right and keeping the belt in position as the round is pushed forward (see illustrations at para V).

Some models have an extra attachment: A spring-actuated plate (B16), hinged by a pin (B18) onto a special feed-way-platform, is pushed to a horizontal position by the belt which is thereby kept away from the receiver in order to prevent the cases of certain cartridge types from hitting the belt during ejection.

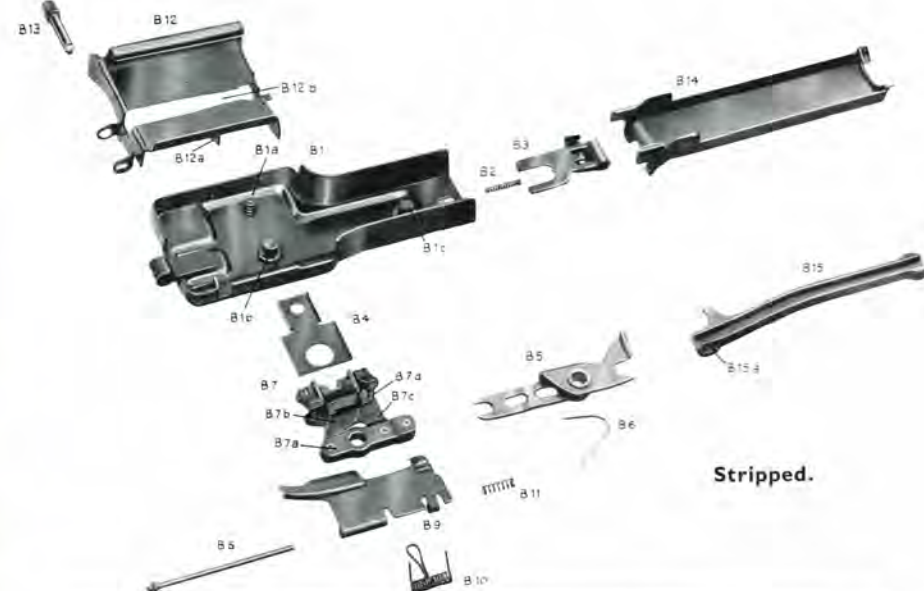
The feed-lever (B15), a slightly curved onearmed lever, links the feed-mechanism to the bolt-assembly (D) and moves in the recess (A5d) with its free end operating the feed-arm (B5). The action-head-roller (D14) travelling in the curved track in the underside of the feed-lever (B15) as the bolt-assembly moves in operation, transfers this movement to the feed-mechanism

which operates simultaneously in the transverse direction. The feed-lever-cover (B14) is assembled at its forward end in slots (A5c) and secured at its rear end by the buffer-housing (F1).

B. Feed-Mechanism.



Feed-way platform (B12) as seen from the top, hinged by the feed-cover-hinge-pin (B13) to the feed-cover (B1), with the actual feed-mechanism as seen from below.



Modified feed-way-platform as described in the text.

Also see the General Assembly drawing and the illustration V. Firing, c. loading item 4.



the feed-cover (B1) and the feed-hinge-pin (B13), and the feed-lever-cover (B14) is assembled at its forward end in slots (A5c) and secured at its rear end by the buffer-housing (F1).

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spring actuated pawls which function the lower feed-slide (B7b), feed-slide-assembly-spacer (B4), and feed-slides, and are guided by the side-roller-pin (B1a).

(B1c) in the cover transmits the feed-slide-lever (B7a) by engagement of the feed-arm-spring (B6) is to ensure that, on the feed-cover is open to ensure that, on the feed-arm can move down the latter is as far to the right as it is brought to the rearmost position.

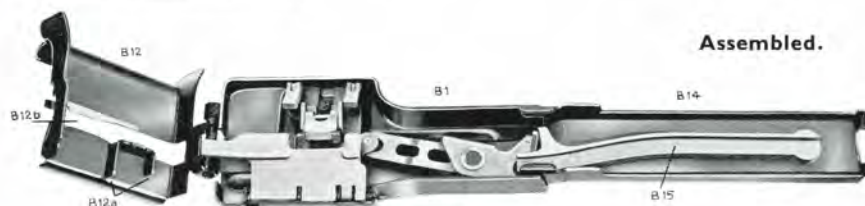
right side of the feed-cover and purpose is to hold the cartridge in position in guiding it into the chamber, aligner-pin-spring (B11) whilst the aligner-pin-spring (B10) press it down against the cartridge loop on the aligner-spring (B10) on the feed-cover (B1).

outwards on its left side to facilitate the belt into the feed-way. A channel with the live round is fed into the cartridge-stop (B12a) preventing the belt and keeping the belt in position (see illustrations at para V).

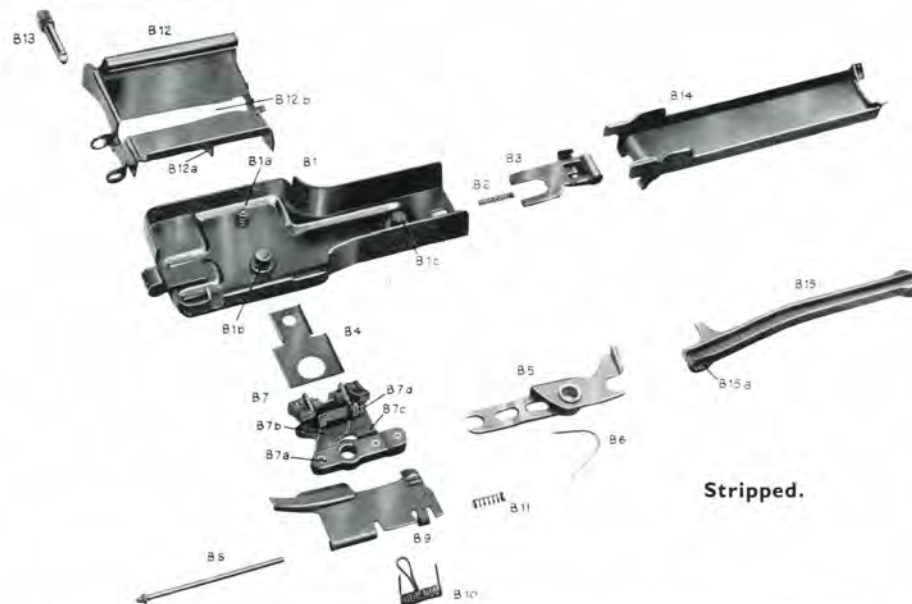
t: A spring-actuated plate (B16), feed-way-platform, is pushed to a horizontal position kept away from the receiver in order to prevent the belt types from hitting the belt

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B. Feed-Mechanism.



Feed-way platform (B12) as seen from the top, hinged by the feed-cover-hinge-pin (B13) to the feed-cover (B1), with the actual feed-mechanism as seen from below.



Modified feed-way-platform

as described in the text.

Also see the General Assembly drawing and the illustration V. Firing, c. loading item 4.



B1—B11, B 13. Feed-cover-group.

B12. Feed-way-group.

B14—B15. Feed-lever-group.

- B1 Feed-cover
- B1a Feed-cover-guide-roller-pin
- B1b Feed-slide-pivot-pin
- B1c Feed-arm-pivot-pin
- B2 Feed-cover-latch-spring
- B3 Feed-cover-latch
- B4 Feed-slide-assembly-spacer
- B5 Feed-arm
- B6 Feed-arm-spring
- B7 Feed-slide-assembly
- B7a Feed-slide-lever
- B7b Lower-feed-slide (with 1 pawl)
- B7c Upper-feed-slide (with 2 pawls)
- B7d Feed-pawl-spring
- B8 Feed-aligner-pin
- B9 Feed-aligner
- B10 Feed-aligner-spring
- B11 Feed-aligner-pin-spring

- B12 Feed-way-platform
- B12a Feed-way-cartridge-stop
- B12b Feed-way-cartridge-bed

- B13 Feed-cover-hinge-pin

- B14 Feed-lever-cover
- B15 Feed-lever
- B15a Feed-lever-roller

Some models are provided with the following:

- B16 Belt-guiding-plate
- B17 Belt-guiding-plate-spring
- B18 Belt-guiding-plate-pin

on a feed-way-platform especially shaped for the purpose — see illustration and text.

C.

TRIGGER-GEAR-ASSEMBLY

C. Trigger-Gear-Assembly.

C1—C4 Trigger-Gear-Housing-group:

The *trigger-gear-housing* (C1) is suspended by 2 hooks (C1d) at its forward end on the trunnions of the barrel-socket-block (A3). At its rear end it is shaped to fit the buffer-housing (F1), which holds it in position under the receiver (A5). On the underside is the trigger-guard (C1b) in which are two holes: the rear one (circular) for a mounting positioning-stud (L11a), the front one (oblong) for permitting the mounting firing-arm (L11c) to engage the trigger (C15). Behind the trigger-guard (C1b), which on some models has a safety guard (C1g), is the pistol-grip (C1c). A hole in the rear wall of the trigger-gear-housing accommodates the trigger-gear-housing-latch (C3), which, actuated by its spring (C2), locks the buttstock and, inside the housing (at C11a), the trigger-group-box (C11) containing all the trigger components. The trigger-gear-housing-latch-stop (C4) holds C3 in position when the gun is being stripped.

C5—C8 Retractor-Group:

The *retractor-slide* (C5) with handle (C7) slides horizontally in a guide on the right side of the trigger-gear-housing. The retractor-slide-stud (C5a) slides in the retractor-slot (C1a) engaging the gas-piston-head (E1c), which on cocking the action, is pulled back with the bolt (D). The spring-loaded cocking-handle (C7) positions itself in the retractor-slot (C1a) and holds the retractor-slide in its foremost position. The cocking-handle-pin (C8) secures the cocking-handle and its spring (C6).

C9—C18 Trigger-Group:

Inside the trigger-gear-housing (C1) is — fixed in front by C11b on C1e — the trigger-group-box (C11) containing all the trigger components. On two pins, the trigger-pin (C9), and the sear-pin (C10), are located the following parts: on C9 the trigger (C15) and safety-lock (C13), on C10 the sear (C17) and the trigger-rod (C18).

The *trigger* (C15) has a downward arm forming the fingerpiece and a forward arm actuating the sear (C17) and the trigger-rod (C18), which is cradled in the slot in the sear (C17).

The *sear* (C17) is a one-armed lever, whose free end, actuated by its spring (C14) is kept raised for engagement with the action-head-bent (D11a).

The *trigger-rod* (C18) is a two-armed lever pivoted on the same pin (C10) as the sear. At the fore end is the trigger-rod-hook (C18a) for engagement with the action-collar-lug (D9a). The rearward, downward pointing arm of the trigger-rod prevents the rod from swinging out when stripping the gun.

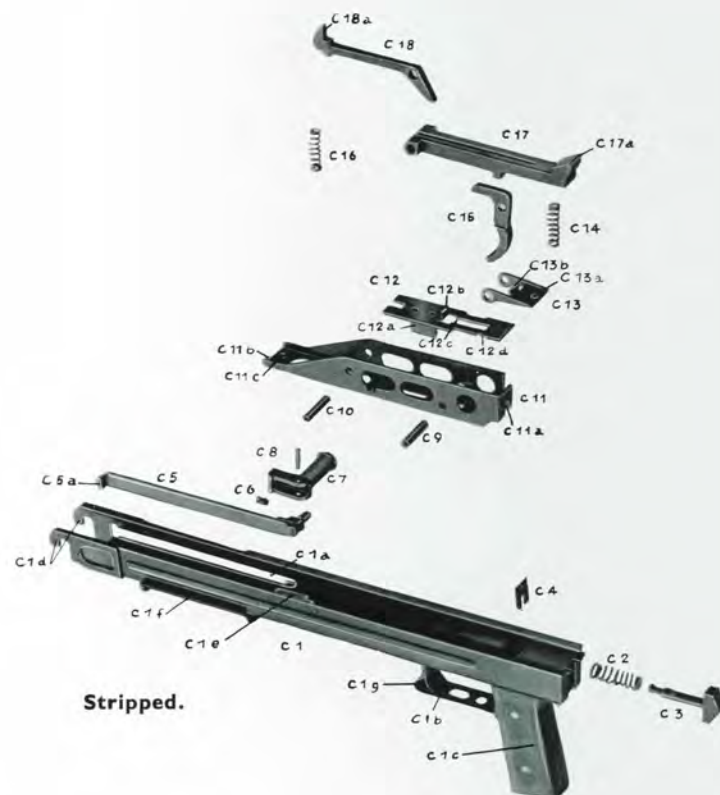
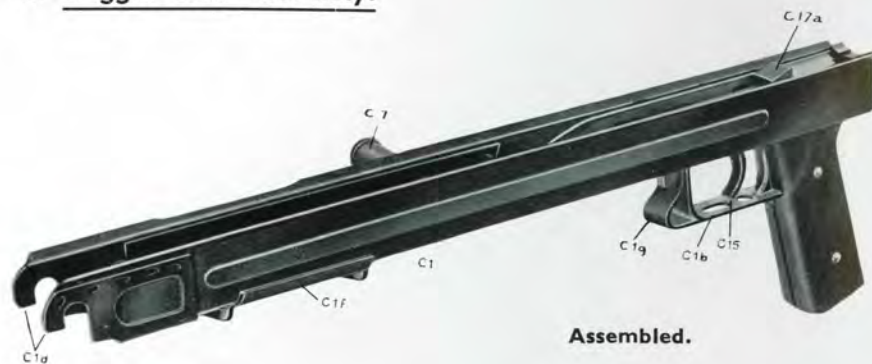
When the trigger has been pulled the trigger-rod (C18), which is actuated by its spring (C16), engages D9a and thereby ensures that the action-collar (D9) is held back, even if pressure on the trigger ceases before the bolt (D) has come to its foremost position.

The *safety-plate* (C12), by means of a downward square flange (C12a) can be moved forward to "Fire" and rearwards to "Safe" and is held in either position by the safety-lock (C13) actuated by the sear spring (C14). In the forward position the safety-stop-lug (C12b) is free of the sear (C17), which can move freely. In the rear position the safety-stop-lug moves under the stud on the underside of the sear and prevents the weapon from being fired.

The safety-lock (C13) prevents the safety from moving off the position "Fire" rearwards to "Safe" during automatic firing. The upward lug C13b is approached during firing by the sear (C17) without being touched. Thereby the safety-lock (C13) cannot get out of its position, and it will prevent the safety-lock-stud (C12d) from moving backwards.

ward square flange (C12a) can "Safe" and is held in either the sear spring (C14). In the free of the sear (C17), which safety-stop-lug moves under the the weapon from being fired. rom moving off the position firing. The upward lug C13b without being touched. There- position, and it will prevent wards.

C. Trigger-Gear-Assembly.



C1—C4. *Trigger-gear-housing-group.*

- C1 Trigger-gear-housing
- C1a Retractor-slot
- C1b Trigger-guard
- C1c Pistol-grip
- C1d Hooks for A3
- C1e Trigger-gear-housing-block
- C1f Magazine-seating
- C1g Safety-guard
- C2 Trigger-gear-housing-latch-spring
- C3 Trigger-gear-housing-latch
- C4 Trigger-gear-housing-latch-stop

C5—C8. *Retractor-group.*

- C5 Retractor-slide
- C5a Retractor-slide-stud
- C6 Cocking-handle-spring
- C7 Cocking-handle
- C8 Cocking-handle-pin

C9—C18. *Trigger-group.*

- C9 Trigger-pin
- C10 Sear-pin
- C11 Trigger-group-box
- C11a Slot for C3
- C11b Engaging Edge for trigger-gear-housing-block (C1e) (riveted at the bottom of the housing)
- C11c Seating for C16
- C12 Safety-plate
- C12a Safety-catch
- C12b Safety-stop-lug
- C12c Safety-plate-slot
- C12d Safety-lock-stud
- C13 Safety-lock
- C13a Seating for C14
- C13b Safety-lock-stop-lug
- C14 Sear-spring
- C15 Trigger
- C16 Trigger-rod-spring
- C17 Sear
- C17a Sear-engaging-face with the action-head (D11a)
- C18 Trigger-rod
- C18a Trigger-rod-hook

D.
BOLT-ASSEMBLY

E.
GAS-PISTON

D. Bolt-Assembly.

The *bolt-carrier* (D1) is the principal part of the bolt-assembly, the front forming a sleeve for the bolt (D3), and the rear closed by the action-head (D11) to which it is fixed by the bolt-carrier-pin (D2). At the gas-piston-coupling-groove (D1a) it is coupled to the gas-piston by the gas-piston-coupling (E1d). Through the bolt-locking-pawl-slots (D1b), on each side of the bolt-carrier, the bolt-locking-pawls (D8) emerge and engage the pressure-absorbing-blocks (A6), which absorb the shock of discharge. During the backward movement the fore edges of the bolt-locking-pawl-slots (D1b) force the bolt-locking-pawls (D8) into the bolt-carrier releasing the bolt (D3) for its rearward journey.

The *bolt* (D3) is faced to fit the cartridge base. In its right side is a seating for the extractor (D6) and its 2 springs (D4 and 5), and at its rear are recesses for the bolt-locking-pawls (D8). In the left side is a clearance D3a for the ejector (A5a). The bolt is longitudinally drilled for the firing-pin (D12) with its spring (D13) and the action-rod (D11b).

The *extractor* (D6) is attached to the head of the bolt by its pin (D7) and, in operation, under the influence of two coil springs (D4 and 5), the extractor claw grips the cartridge in its groove, and at the moment of extraction, the inner face (D6a) of the extractor closes on the corresponding face of the bolt.

The *bolt-locking-pawls* (D8) are shaped at their rear ends (D8a) for engagement under the action-collar (D9).

The *action-rod* (D11b) is the fore part of the action-head (D11). Towards the end of the forward movement its shoulders (D11c) force the pawls (D8) outwards for engagement with the pressure-absorbing-blocks (A6), and its front face strikes the firing-pin (D12), overcoming its spring (D13) resistance and causing it to detonate the cartridge.

The *action-head's* (D11) rear end houses the action-head-pin (D15) with the action-head-roller (D14), which engages with the feed-lever (B15). On its lower side the action-head has a bent (D11a) for engagement with the sear and its rear face forms a seating for the return-spring-guide-tube (F17).

The *action-collar* (D9) is part of the safety-system and, under spring (D10) tension, keeps the bolt-locking-pawls (D8) compressed when the action is in the unlocked position. On its underside is the action-collar-lug (D9a) for engagement with the trigger-rod-hook (C18a).

E. Gas-Piston.

The *gas-piston* (E1) at its fore end has a gas-cup (E1a) forming a movable cylinder which encloses the gas-regulator (G11). When the gun is in action the gas-cup (E1a) moves clear of the gas-regulator (G11), and enables the gas system to blow itself clean and thus obviate fouling. The gas-cup and the fore end of the gas-piston are enclosed within the barrel-support-tube (A1). The rear end of the gas-piston forms the gas-piston-head (E1c), which travels in two longitudinal ways in the receiver (A5) by means of two side studs on E1d, and, at the same time, its upturned cam (E1d) engages with the bolt-carrier at D1a.

D. Bolt-Assembly.



E. Gas-Piston.



D. Bolt-Assembly.

A detailed technical drawing of a bolt assembly, labeled 'D. Bolt-Assembly.' The assembly consists of a long, cylindrical bolt body with a hexagonal head at the right end. The head features a central threaded hole (D14) and a side hole (D11). A washer (D11a) is positioned between the head and the main body. The bolt body has a central longitudinal slot (D1) and a side slot (D17) containing a spring (D9a). A nut (D6) is threaded onto the end of the bolt. A small component (D18) is attached to the side of the bolt body. The word 'Assembled.' is written below the drawing.

Assembled.

Stripped.

E. Gas-Piston.

The diagram shows a long, cylindrical gas piston assembly. The handle at the left end is labeled E1a. The main body of the piston is labeled E1b. The right end of the piston is connected to a bracket or mounting plate, which is labeled E1c. A small, rectangular component is attached to the top of the bracket, labeled E1d.

D1	Bolt-carrier
D1a	Gas-piston-coupling-groove
D1b	Bolt-locking-pawl-slot
D2	Bolt-carrier-pin
D3	Bolt
D3a	Clearance for ejector (A5a)
D4	Extractor-spring, inner
D5	Extractor-spring, outer
D6	Extractor
D6a	Locking inner surface of extractor
D7	Extractor-pin
D8	Bolt-locking-pawls
D8a	Engaging surface for D9
D9	Action-collar
D9a	Action-collar-lug
D10	Action-collar-spring
D11	Action-head
D11a	Action-head-bent (for the sear C17a)
D11b	Action-rod
D11c	Action-rod-shoulders (for pressing out the bolt-locking-pawls (D8))
D12	Firing-pin
D13	Firing-pin-spring
D14	Action-head-roller
D15	Action-head-pin

E1a Gas-cup
E1b Gas-piston-rod
E1c Gas-piston-head
E1d Gas-piston-coupling (to engage
bolt-carrier (D1a))

F.
BUTT-STOCK-ASSEMBLY

F. Butt-Stock-Assembly with Return- and Buffer-Mechanism.

The wooden stock (F3) is drilled longitudinally to accommodate the return- and buffer-mechanism. In the cavity is inserted the return-spring-tube (F12), the fore end of which protrudes through the buffer-housing (F1) and is fixed by the buffer-housing-pin (F2) to the fore end of the stock. At the rear the stock is protected by the butt-plate (F6) secured by the butt-plate-screws (F7). In the butt-plate is the butt-plate-trap (F8) with its pin (F9) covering a housing for certain spare parts for the gun.

The return-mechanism is telescopic and includes the return-spring-guide-tube (F17), which slides on the return-spring-guide-rod (F16), and around which the return-spring (F13) operates, compressed between the return-spring-guide-tube-flange (F17a) and the return-spring-support (F18), in rear of which is the return-spring-base (F19). The return-spring-guide-rod-head (F15) is fixed at the fore end of the return-spring-guide-rod (F16) by the pin (F14) and limits the forward movement of the return-spring-guide-tube (F17). The return-spring-base (F19) is secured to the rear end of the return-spring-guide-rod (F16) by the pin (F20), and to the rear of the return-spring-tube (F12) and the stock (F3) by the stock-screw (F5) with its washer (F4).

The buffer-housing (F1) is provided with 2 lugs (F1b) which, by engagement with 2 corresponding lugs in the receiver (A5), holds the stock. In the buffer-housing is the buffer-spring (F10) which is located around the fore end of the return-spring-tube (F12) and operates between the buffer-head (F11) and the rear face of the buffer-housing, the buffer-head being able to move freely longitudinally around the return-spring-tube (F12).

F. Butt-Stock-Assembly with Return- and Buffer-Mechanism.



Assembled.



Stripped.

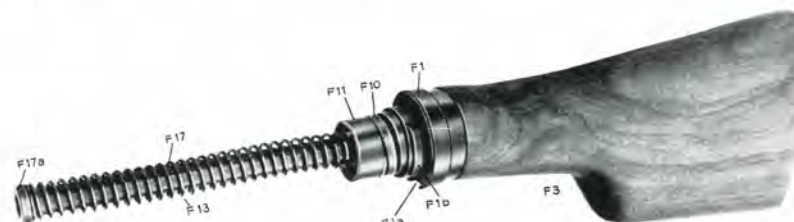
nism.

itudinally to accomodate the return-spring-tube (F12), the buffer-housing (F1) and is fixed at the rear end of the stock. At the rear the buffer is secured by the butt-plate-screws (F7) and the butt-plate-trap-pin (F9) covering a notch (F1a).

and includes the return-spring-guide-rod (F16), and around the return-spring-support (F18), in rear of the return-spring-guide-rod-head (F15) the return-spring-guide-rod (F16) by the pin (F14) and the return-spring-guide-tube (F17). The return-spring-guide-tube (F17) is fixed at the rear end of the return-spring-tube (F12) with its washer (F4).

with 2 lugs (F1b) which, by engagement with the receiver-locking-block (A5), holds the stock. In the buffer housing which is located around the fore end of the stock, the buffer-head (F11) is located between the buffer-head (F11) and the return-spring-tube (F12).

F. Butt-Stock-Assembly with Return- and Buffer-Mechanism.



Assembled.



Stripped.

F1—F9. Butt-stock-group.

- F1 Buffer-housing
- F1a Notch for C3
- F1b Receiver-locking-block
- F2 Buffer-housing-pin
- F3 Stock
- F4 Stock-screw-washer
- F5 Stock-screw
- F6 Butt-plate
- F7 Butt-plate-screws
- F8 Butt-plate-trap
- F9 Butt-plate-trap-pin

F10—F11. Buffer-mechanism.

- F10 Buffer-spring
- F11 Buffer-head

F12—F20. Return-mechanism.

- F12 Return-spring-tube
- F13 Return-spring
- F14 Return-spring-guide-rod-pin
- F15 Return-spring-guide-rod-head
- F16 Return-spring-guide-rod
- F17 Return-spring-guide-tube
- F17a Return-spring-guide-tube-flange
- F18 Return-spring-support
- F19 Return-spring-base
- F20 Return-spring-base-pin

G.
BARREL

G. Barrel.

The barrel is provided with a flash-eliminator (G2) at the muzzle. Midway along the barrel are the foresight-base sleeve (G14), the gas-regulator-socket (G10), and the barrel-handle-sleeve (G8), all of which are secured by the barrel-nut (G15).

The foresight-base-sleeve (G14) carries the foresight-base (G19) which turns on the foresight-base-pin (G18) actuated by the spring (G17). The spring rests on the ball (G16) at the bottom and presses against the top of the foresight-base-spring-pin (G20) inside the hollow foresight-base.

The foresight (G22) is inserted in the foresight-base (G19), which also has foresight-guards (G23) secured by the foresight-guard-screw (G21).

The gas-regulator-socket (G10) encloses the gas-regulator (G11), which is secured by the gas-regulator-nut (G12) and is guided into position in the gas-regulator-socket (G10) by means of three facets on its outer side. The gas-regulator is bored longitudinally, and in its base are three holes of differing sizes, each of which, when brought into alignment with the gas-port in the barrel, allows a corresponding flow of gas to impinge on the gas-piston as required to actuate the mechanism; variation in ammunition velocities can thus be accommodated. Most models are provided with a gas-regulator-cover (G9) for protection of the gas-regulator.

The foresight-alignment-key (G13) fits into the alignment-keyway and secures the gas-regulator-socket (G10) and the foresight-base-sleeve (G14) from turning on the barrel.

The barrel-handle-sleeve (G8) carries the barrel-handle (G3) and is secured from turning by the tongue (G8a) in the groove (G1c). The barrel-handle (G3) can be turned on its pin (G4) into two positions a) at right angles to the barrel and b) folded towards the barrel with which it forms an angle of about 15°. It is held in either position by the spring (G5) loaded barrel-handle-locking-plunger (G6) and pellet (G7), and in the folded position the longer flange on its base engages in a groove on the left side of the barrel-support-head (A1a) and locks the barrel in position. In this locked position the four barrel-locking-lugs (G1b) are in engagement with four corresponding lugs in the receiver (A5) and, when the barrel-handle is at right angles to the barrel, the lugs are completely free from engagement. G1a is a clearance for the extractor (D6), so that the bolt (D3) can move fully forward and the round be fired, when the barrel is in locked position.

G. Barrel.

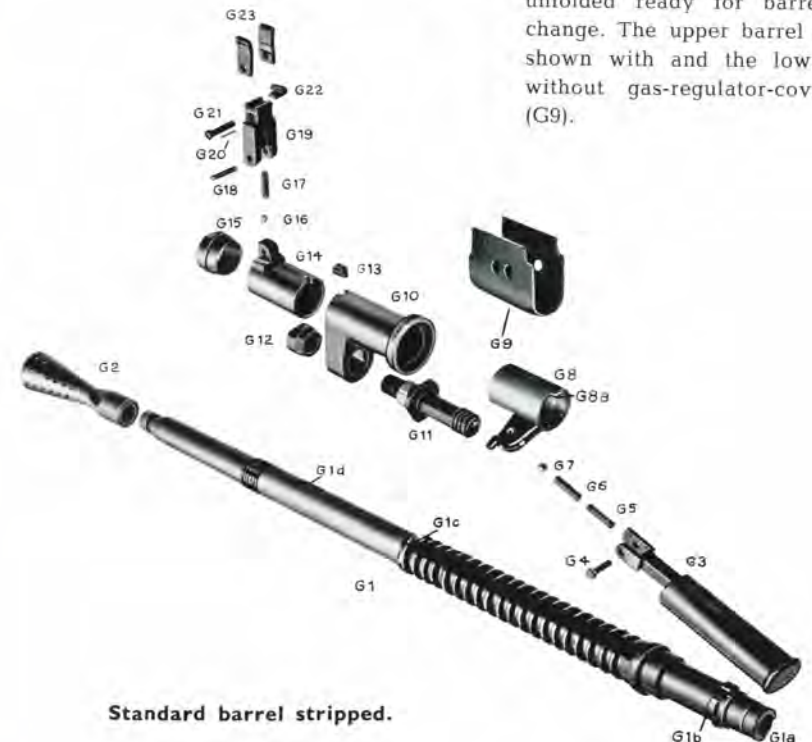


Standard barrel assembled.



Heavy barrel assembled.

Foresight-base (G19) folded down, and barrel-handle (G3) unfolded ready for barrel-change. The upper barrel is shown with and the lower without gas-regulator-cover (G9).



Standard barrel stripped.

nator (G2) at the muzzle. Midway
ve (G14), the gas-regulator-socket
all of which are secured by the

the foresight-base (G19) which
uated by the spring (G17). The
om and presses against the top of
the hollow foresight-base.

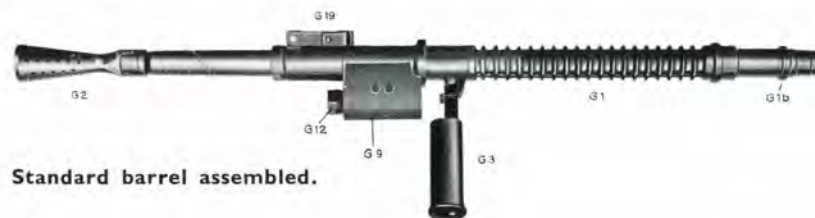
resight-base (G19), which also has
esight-guard-screw (G21).

the gas-regulator (G11), which is
nd is guided into position in the
three facets on its outer side. The
nd in its base are three holes of
ught into alignment with the gas-
ing flow of gas to impinge on the
mechanism; variation in ammunition
st models are provided with a gas-
gas-regulator.

s into the alignment-keyway and
nd the foresight-base-sleeve (G14)

es the barrel-handle (G3) and is
a) in the groove (G1c). The barrel-
G4) into two positions a) at right
rds the barrel with which it forms
position by the spring (G5) loaded
pellet (G7), and in the folded posi-
s in a groove on the left side of the
barrel in position. In this locked
1b) are in engagement with four
and, when the barrel-handle is at
completely free from engagement. G1a
that the bolt (D3) can move fully
barrel is in locked position.

G. Barrel.

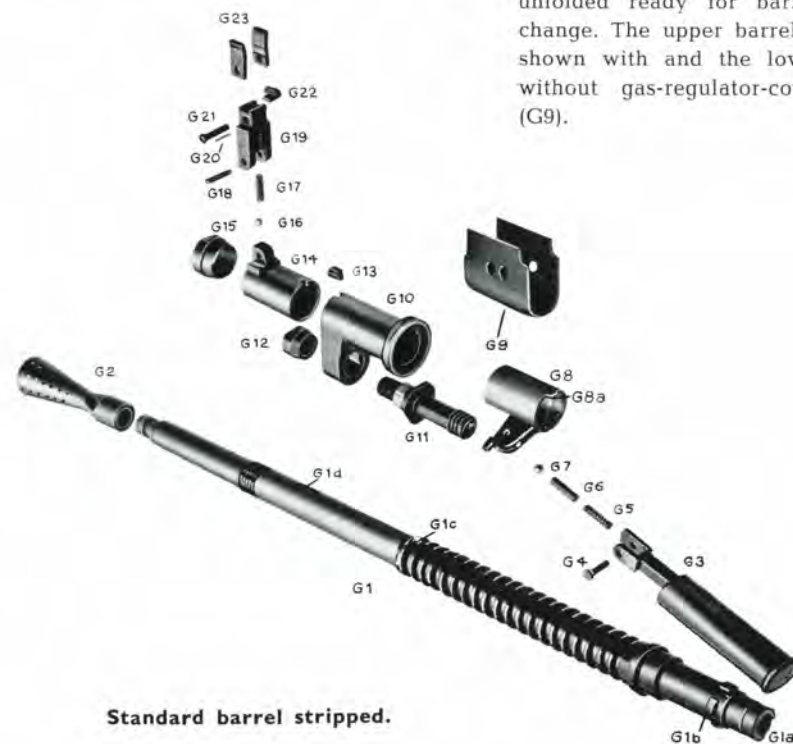


Standard barrel assembled.



Heavy barrel assembled.

Foresight-base (G19) folded
down, and barrel-handle (G3)
unfolded ready for barrel-
change. The upper barrel is
shown with and the lower
without gas-regulator-cover
(G9).



Standard barrel stripped.

G1—G2. Barrel-group.

- G1 Barrel
- G1a Extractor-clearance
- G1b Barrel-locking-lugs
- G1c Groove for G8a
- G1d Foresight-alignment-keyway
- G2 Flash-eliminator

G3—G8. Barrel-handle-group.

- G3 Barrel-handle
- G4 Barrel-handle-pin
- G5 Barrel-handle-locking-spring
- G6 Barrel-handle-locking-plunger
- G7 Barrel-handle-locking-pellet
- G8 Barrel-handle-sleeve
- G8a Tongue for G1c

G9—G13. Gas-regulator-group.

- G9 Gas-regulator-cover
- G10 Gas-regulator-socket
- G11 Gas-regulator
- G12 Gas-regulator-nut
- G13 Foresight-alignment-key

G14—G23. Foresight-group.

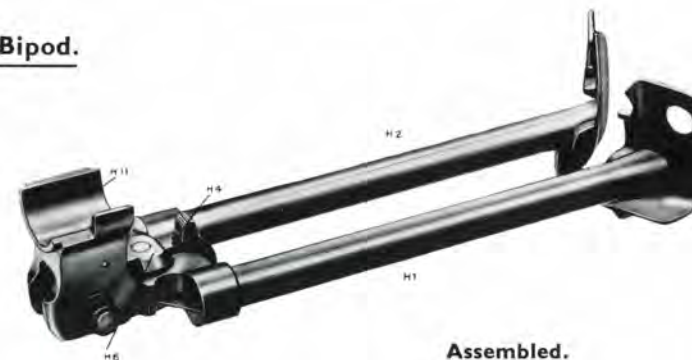
- G14 Foresight-base-sleeve
- G15 Barrel-nut
- G16 Foresight-base-pellet
- G17 Foresight-base-spring
- G18 Foresight-base-pin
- G19 Foresight-base
- G20 Foresight-base-spring-pin
- G21 Foresight-guard-screw
- G22 Foresight
- G23 Foresight-guards

H.
BIPOD

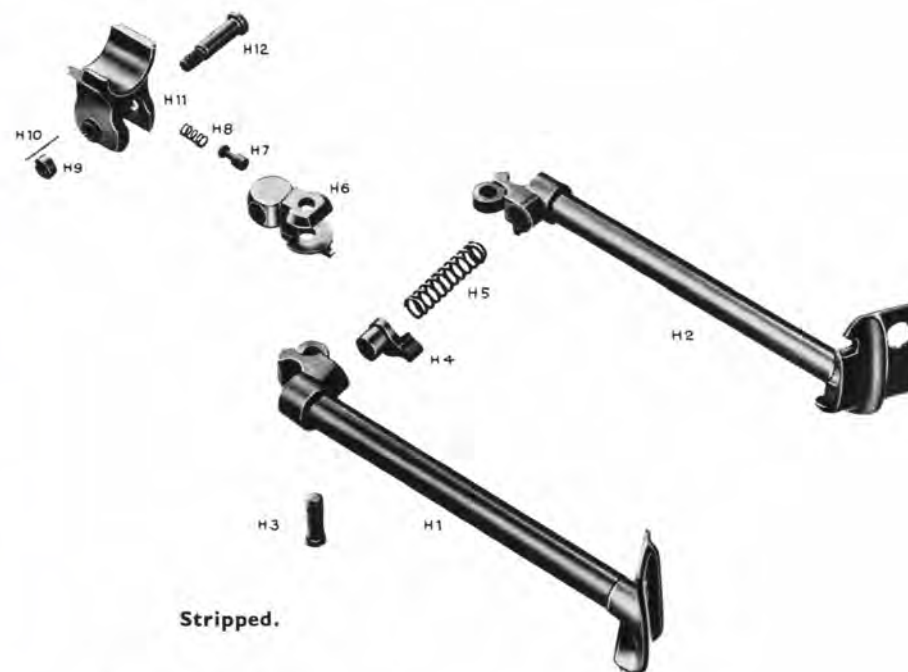
H. Bipod.

The weapon is provided with a detachable bipod (H). The two legs (H1) and (H2) turn on the bipod-pivot-screw (H3). When extended, the legs are kept apart by the bipod-spring (H5) and locked by the bipod-leg-locking-pawl (H4). The bipod-pivot-screw (H3) fits in the bipod-pivot-head (H6) which is a joint permitting the legs a limited movement in relation to the bipod-mounting (H11), to which it (H6) is connected by the bipod-assembling-screw (H12) secured by its nut (H9). The bipod-mounting (H11) can be fixed to the barrel-seating, by the bipod-locking-plunger (H7) with the bipod-locking-spring (H8), both limited in their movement by the bipod-locking-pin (H10). The legs can be turned *forward* or *backward* to horizontal positions. In the latter position they are held up under the barrel-support-tube (A1), by the longitudinal flanges on the barrel-socket (A2).

H. Bipod.



Assembled.



Stripped.

H1—H12. Bipod-group.

- H1 Bipod-leg, left
- H2 Bipod-leg, right
- H3 Bipod-pivot-screw
- H4 Bipod-leg-locking-pawl
- H5 Bipod-spring
- H6 Bipod-pivot-head

- H7 Bipod-locking-plunger
- H8 Bipod-locking-spring
- H9 Bipod-assembling-nut
- H10 Bipod-locking-pin
- H11 Bipod-mounting
- H12 Bipod-assembling-screw

I.
**CARTRIDGE-BELTS, AMMUNITION BOX,
MAGAZINES**

I. Cartridge-belts, Ammunition box, Magazines.

The cartridge-belt

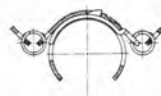
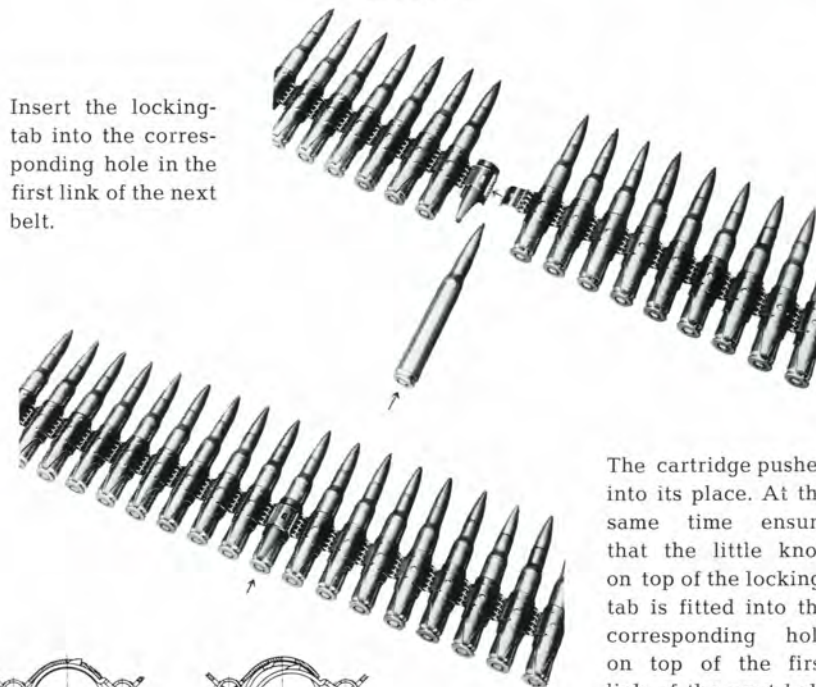
consists of open links connected by wire spirals (see illustrations).

Each link has a backward pointing tongue acting as a spring. Its tip is shaped to catch the groove of the cartridge and keep it firm, until it is stripped off by the bolt on the forward movement. The necessary power required for that is about 4 kgs. Each belt consists of 50 links, and belts can be coupled together for any required length by means of a small locking-tab, which is hinged on the last complete cartridge-link. The locking-tab should be inserted into the corresponding hole in the first link of the next belt and locked firmly (and correctly) by pushing a cartridge into the empty link (see illustrations).

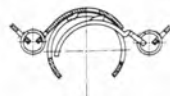
In loading, the first link must be empty in order to give support against the feed-way-cartridge-stop (B12a) (see pictures under V. *Firing*).



Insert the locking-tab into the corresponding hole in the first link of the next belt.



Correct locking.



Wrong locking.

I. Cartridge-belts, Ammunition box, Magazines.

Ammunition box.

In the supply service and during transport in the field, when the gun is used as "heavy" machine gun with its mounting, the loaded belts are kept in ammunition boxes. Each box contains belts with a total of 250 cartridges. The ammunition box is of steel with a rubber packing in the lid to make it watertight.

The weight of the empty box is $2.2 \text{ kg} = 4.8 \text{ lbs.}$ Dimensions are $195 \times 92 \times 365 \text{ mm} = 7.7 \times 3.6 \times 14.4 \text{ inches.}$



Ammunition Box
for 250 rounds.



100 rounds
magazine.



50 rounds
magazine.

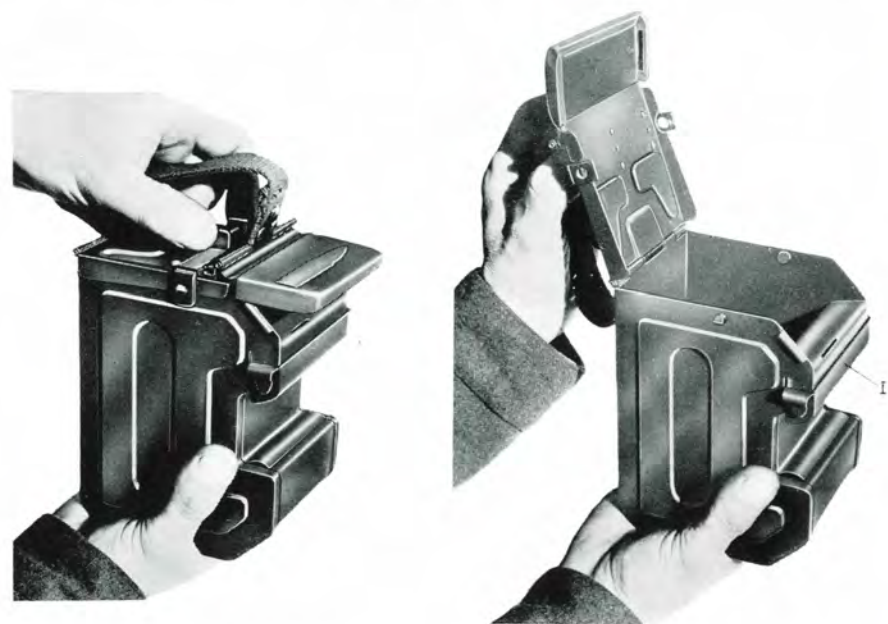
I. Cartridge-belts, Ammunition box, Magazines.

Magazines.

For use, when the gun is used as light machine gun for firing on bipod, magazines can be supplied to hold either 50 or 100 rounds.

The weight of the 50 rounds magazine is 1.05 kg = 2.3 lbs. Dimensions are $125 \times 175 \times 105$ mm = $4.9 \times 6.9 \times 4.1$ inches.

The weight of the 100 rounds magazine is 1.6 kg = 3.5 lbs. Dimensions are $165 \times 215 \times 105$ mm = $6.3 \times 8.5 \times 4.1$ inches.



a. Opening of magazine:

- 1) Hold as illustrated above. The cartridge in the lid-flap pointing forward.
- 2) With thumb and forefinger press together the spring between the 2 fingerpieces on top of the lid.
- 3) Open the lid, which consists of 2 parts: the lid itself and the flap.
- I1 Spring actuated catch for attaching the magazine to the machine gun (C1f).

I. Cartridge-belts, Ammunition box, Magazines.



b. Filling magazine:

Let the cartridge-belt fall in folding layers into the magazine.

NB. The cartridges have to point the same way as the figure in the lid-flap.



c. Positioning the belt.

If the machine gun should not be loaded at once, the first link should be put into the slot.

NB. On some models the first link should be hung on the hook inside the lid.



d. Closing the magazine.

If an immediate loading of the magazine does not follow, the lid-flap should be closed down again, so that the magazine is closed, as illustrated at a.

When loading the machine gun the lid-flap stands open as illustrated at par. V. Firing c. Loading.

K.
ACCESSORIES

K. Accessories.

Supplied with the gun is a webbing spare-barrel-case (K1) which contains the accessories as illustrated. The cleaning-rod (K2) fits in a channel inside the rear wall of the case, and the other accessories are in a pocket (K1a) on the front of the case.

The cleaning-rod (K2) is of steel with a rotating aluminium handle (K2a).

The chamber-rod (K3) is a jointed brass tool. On one end is an eye for cleaning material (K3a), and the other end has a wood handle (K3b).

The oil-can (K4), a flat container with a nozzle, is made of copper-nickel-plated sheet iron. Built into the oil-can-cap (K6) is a brass lubricating rod. Inside the cap is a leather washer (K5).

The case-extractor (K7) comprises the case-extractor-lever (K7a) and the case-clearing-plug (K7c) coupled together by means of the pin (K7b).

The free end of the case-extractor-lever (K7a) is shaped to fit into the groove of the cartridge. It can therefore be used for removing cases or cartridges jammed in the chamber. It can also be used as an accessory tool when spent cases or whole rounds have to be removed from the gun.

The case-clearing-plug (K7c) is used for removing a torn case from the chamber when the case-clearing-bolt (K7d) is drawn out to its extreme position. The case-clearing-plug (K7c) is then pressed right into the chamber and by means of a few light blows, the case-clearing-bolt (K7d) is driven into the case-clearing-plug which expands in front of the neck of the case. The torn case can now be eased out of the chamber by pressure on the case-extractor-lever (K7a) coupled to the case-clearing-plug. The case can be removed from the case-clearing-plug when the case-clearing-bolt (K7d) is withdrawn to its extreme position.

The barrel-key-spanner (K8) is used in the field for changing the flash-eliminator (G2) and grips the barrel-locking-lugs (G1b). The flash-eliminator can then be loosened by means of the open ended spanner (K9e). The barrel-key-spanner (K8) should also be used, when the gas-regulator-nut (G12) has to be loosened and fixed in the field.

The universal-spanner (K9) consists of an open-ended spanner with two cleaning-pins (K9a: 2.8 mm, and K9b: 2.2 mm) riveted loosely to its sides. This tool is for use when the barrel is to be cleaned, the spanner being used for unscrewing the flash-eliminator (G2) and the foresight-alignment-key (G13), whereby the gas-regulator can be taken out and its holes cleaned by means of the two cleaning pins (K9a and K9b). The other end of the spanner is shaped into two screwdrivers placed at right angles (K9c and K9d), fitting the butt-plate-screws (F7) and the stock-screw (F5) respectively.

K. Accessories.



- K1 Spare-barrel-case
- K1a Spare-barrel-case-pocket
- K2 Cleaning-rod
- K2a Cleaning-rod-handle
- K3 Chamber-rod
- K3a Chamber-rod with eye
- K3b Chamber-rod-shank
- K4 Oil can
- K5 Oil can-leather-packing
- K6 Oil can-cap
- K7 Case-extractor
- K7a Case-extractor-lever
- K7b Case-extractor-pin
- K7c Case-clearing-plug

- K7d Case-clearing-bolt
- K8 Barrel-spanner
- K9 Universal-spanner
- K9a Cleaning-pin 2.8 mm
- K9b Cleaning-pin 2.2 mm
- K9c Screwdriver for Butt-plate-screws (F7)
- K9d Screwdriver for Stock-screw (F5)
- K9e Spanner for Gas-regulator-nut (G12) & Flash-eliminator (G2)
- K10 Tow
- K11 For tank model (see IX); tool for assembling return-spring

L.
MOUNTING

L. Mounting.

a. The fixed parts:

The chassis (L1) consists of the chassis-bar (L1c), which, in front carries the chassis-head (L1b), and at the rear 2 diagonal-stays (L1d) which, together with the traversing-arc (L1g), form a rigid triangle.

Fixed to the chassis-head (L1b), which forms a seating for the pivot-pin (L8), is the fore-leg-axle (L1a), on which the double fore-leg (L2) hinges.

At the ends of the traversing-arc (L1g) are serrated discs, traversing-arc-flanges (L1e) which act together with similar serrated discs, rear-leg-flanges (L3a), on the rear-legs (L3), whereby the rear-legs can be clamped in various positions easily distinguished by marks on the traversing-arc-flange (L1e). Clamping is effected by means of the clamping-handles (L4). The fore-leg is secured in its various positions by the adjustable stay-bar (L5), one end of which hinges on the fore-leg and the other end is coupled to the bifurcated head of the stay-bar-spring-guide (L5b). The stay-bar-spring-guide travels inside the chassis-bar (L1c) and can be fixed by means of the stay-bar-braking-handle (L5a), whereby the tripod fore-leg is fixed simultaneously. When the stay-bar-braking-handle is released, the fore-leg is prevented from sliding out by a powerful compression spring, the stay-bar-spring (L5c), built into the stay-bar-spring-guide.

b. The movable parts:

The cross-slide (L6) moves in a curve on the traversing-arc (L1g) with the pivot-pin (L8) as its centre, connected through the cross-slide-rod (L6b). The cross-slide can be fixed rigidly by the traversing-clamping-handle (L6a) or restricted in its lateral movements by the lateral-stop-rings (L1f) on the traversing-arc.

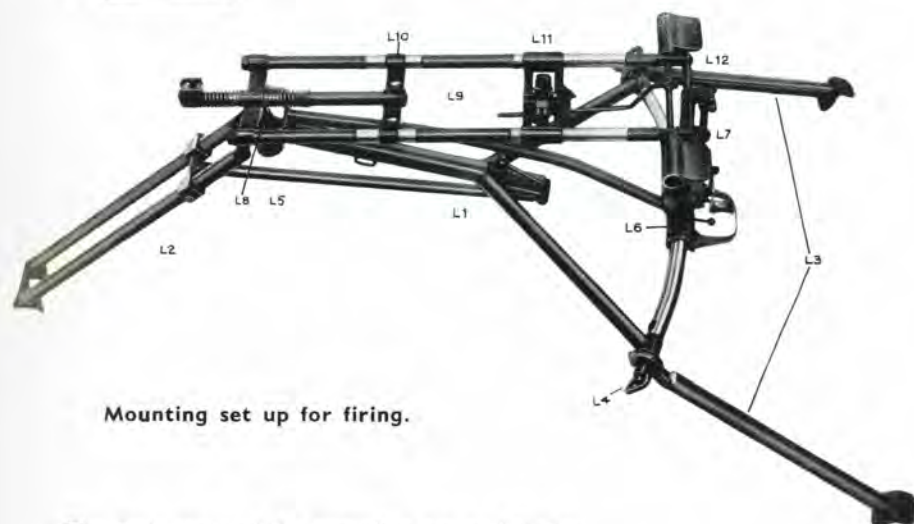
The cradle-support (L7) can turn on a bolt on the cross-slide (L6) and forms a seating for the elevating-spindle (L7a) which carries the rear-end of the cradle. The elevating-spindle is moved by the elevating-handle (L7c). The elevating-spindle-stops (L7b) can limit these movements.

The cradle (L9) consists of two parallel cradle-tubes (L9b) which, at the fore end, are connected by the cradle-bridge (L9a) and, at the rear, by the cradle-bolt (L9c) and cradle-bolt-sleeve (L9d). At the fore end the cradle turns on the pivot-pin (L8), so that its rear end, which turns on the elevating-spindle (L7a), can move both laterally and vertically.

Moving on the cradle are the gliders: front-glider (L10) and rear-glider (L11). The front-glider carries the rear end of the gun-seating-spindle (L10c), which simultaneously runs through a hole in the cradle-bridge (L9a), and, on its fore end, has the gun-seating (L10a). Compressed on the gun-seating-spindle (L10c) are two springs, the glider-springs, (L10b) which absorb the recoil of the gun in action and lessen the subsequent return movement.

The rear-glider (L11) is furnished with a positioning stud (L11a) for engagement with the gun's trigger-guard (C1b), round the edges of which the locking-hooks (L11d) can grip and hold the gun fast. The locking-hooks (L11d) are worked by the locking-lever (L11e). The gun-trigger (C15) is actuated by means of the upturned limb of the firing-arm (L11c), of which the downward arm, through the firing-bar (L12a) and the firing-handle-axe (L12b), is actuated by the firing-handles (L12c).

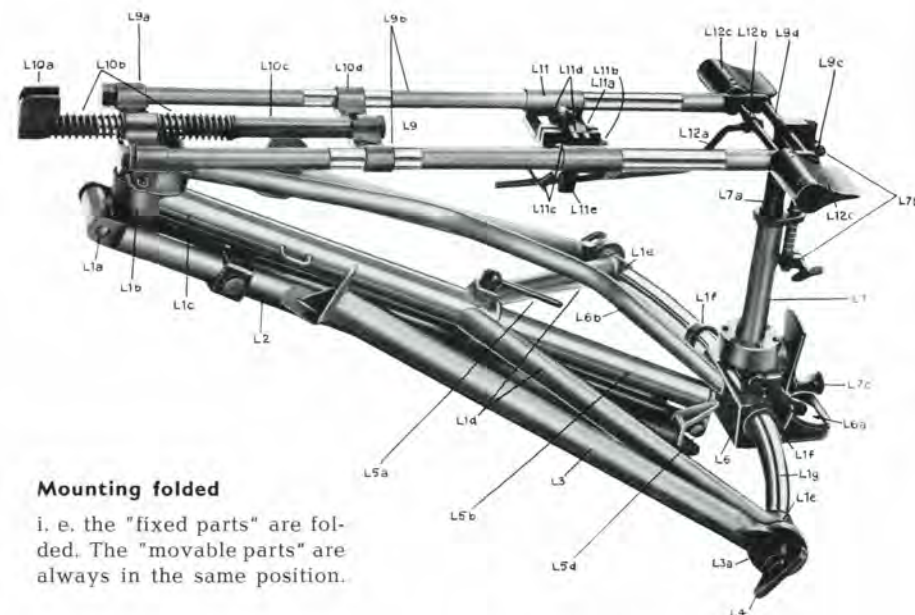
L. Mounting.



Mounting set up for firing.

The main parts of the mounting are as follows:

- a. The fixed parts:
(used for setting up)
 - L1 Chassis
 - L2 Fore-leg
 - L3 Rear-legs
 - L4 Clamping-handles
 - L5 Stay-bar
- b. The movable parts:
(used during firing)
 - L6 Cross-slide with
 - L7 Cradle-support, and connected through the cross-slide-rod (L6b) by the
 - L8 Pivot pin
 - L9 Cradle with:
 - L10 Front-glider-system
 - L11 Rear-glider
 - L12 Firing-system



Mounting folded

i. e. the "fixed parts" are folded. The "movable parts" are always in the same position.

L1—L5. Chassis-group.

- L1 Chassis
- L1a Fore-leg-axe
- L1b Chassis-head
- L1c Chassis-bar
- L1d Diagonal-stay, right & left
- L1e Traversing-arc-flange
- L1f Lateral-stop-ring
- L1g Traversing-arc
- L2 Fore-leg
- L3 Rear-legs, right & left
- L3a Rear-leg-flanges, right & left
- L4 Clamping-handles, right & left
- L5 Stay-bar
- L5a Stay-bar-braking-handle
- L5b Stay-bar-spring-guide
- L5c Stay-bar-spring, which is situated inside the Stay-bar-spring-guide (L5b)
- L5d Stay-bar-spring-base

L6—L8. Cross-slide-group.

- L6 Cross-slide
- L6a Traversing-clamping-handle
- L6b Cross-slide-rod
- L7 Cradle-support

- L7a Elevating-spindle
- L7b Elevating-spindle-stops
- L7c Elevating-handle
- L8 Pivot-pin

L9—L12. Cradle-group.

- L9 Cradle
- L9a Cradle-bridge
- L9b Cradle-tubes
- L9c Cradle-bolt
- L9d Cradle-bolt-sleeve
- L10 Front-glider-system
- L10a Gun-seating
- L10b Glider-springs
- L10c Gun-seating-spindle
- L10d Front-glider
- L11 Rear-glider
- L11a Positioning-stud
- L11b Stock-holder
- L11c Firing-arm
- L11d Locking-hook
- L11e Locking-lever
- L12 Firing-system
- L12a Firing-bar
- L12b Firing-handle-axe
- L12c Firing-handles

L. Mounting.

Tripod features:

The design of the MADSEN/SAETTER tripod mounting enables it to fulfil any requirement in the mounting of a heavy machine gun.

The tripod, which weighs 16.5 kgs = 36 lbs., can be folded quite flat, making it easy to carry on the back.

By means of its adjustable legs the tripod can be set up however undulating the ground, and the muzzle height can be varied from 350 mm to 800 mm, = 13.8 inch. to 31.5 inch., enabling the gun to be operated in the prone, kneeling or sitting position.

In case of a rapid change of position the tripod, with the gun mounted, can be carried by one man, gripping the tripod fore-leg in the left hand and the right half of the traversing arc with the right, and holding the gun close to the body. In changing position over a somewhat longer distance, the tripod and mounted gun should be carried by two men, one lifting the tripod foreleg and the other gripping the two rear legs, one in each hand; with this form of transport movement can be made over long distances, the tripod and gun together weighing no more than 27.6 kgs = 60.7 lbs.

A factor contributing to the particularly good accuracy attainable with the MADSEN/SAETTER gun on the MADSEN/SAETTER tripod is that the gun rests on gliders, both of which move in the same plane, parallel with, and at a short distance from, the axis of the gun; another factor is that the gun trigger is so manipulated that vibrations of the gun are not disturbed in its longitudinal movement of the cradle. During firing the gun itself is entirely un-touched by the gunner's hand.

In order to make the tripod suitable for both indirect firing and firing over, or through gaps or openings in own troops, it is provided with graduated scales and movement stops for both traversing and elevating.

The traversing scale is situated on the traversing arc, and is of such order that a traversing slide movement of one big mark (10 mils) corresponds to 10 metres movement in the point of impact at a range of 1000 metres.

Between successive big marks is a smaller five mils mark. For each 50 mils a number is engraved.

The graduated scale for elevation is placed on the elevating spindle and is of the same order as the direction scale on the traversing arc, i. e. one big mark on the spindle corresponds to 10 metres' vertical movement of the point of impact at 1000 metres; but as one big mark corresponds to $2\frac{1}{2}$ turns of the elevating handle, it is possible to move the point of impact by 1 metre at 1000 metres (1 mil) by giving the elevating handle a quarter turn.

If more effective sighting possibilities are desired than those obtainable by using the gun's own sights, the tripod can be furnished with optical sights, which can be mounted on a bracket on the cradle.

IV. STRIPPING AND ASSEMBLING THE MACHINE GUN

a. Stripping.

1. Ensure that the chamber is empty by opening the feed-cover (press the feed-cover-latch (B3) and pull back the cocking-handle (C7).
2. Remove the butt-stock: Seize the pistol-grip (C1c) with one hand, with the thumb press the trigger-gear-housing-latch (C3). The butt-stock (F3), now released, should be turned 90° with the other hand and pulled straight back out of the receiver (A5).
3. Remove the trigger-gear-housing (C1): The cocking-handle (C7) should be pulled fully back and then pushed forward again. This brings the bolt-carrier (D1) to its rearmost position. The trigger-gear-housing can now be turned downwards and taken out of engagement with the two trunnions on the barrel-socket-block (A3).
4. The trigger-group-box (C11), containing the trigger-mechanism, is taken out by maintaining thumb pressure on the trigger-gear-housing-latch (C3), turning the pistol-grip (C1c) up, and letting the trigger-group-box fall out into the other hand and at the same time pulling it free of the trigger-gear-housing-block (C1e) in the bottom of C1, in which it is secured at C11b. Take out the stop (C4). The trigger-gear-housing-latch (C3) and spring (C2) are now free and are taken out.
5. Remove the gas-piston (E): When the bolt-assembly (D) is in its rearmost position, the gas-piston-head (E1c) is just outside a clearance at the end of its tracks in the bottom of the receiver (A5), and can be withdrawn — at the same time freeing it from its coupling groove (D1a) —. It can then be withdrawn rearwards from the barrel-support-tube (A1).
6. The bolt-assembly (D) is taken out by letting it slide rearwards out of the receiver (A5).
7. The feed-cover (B1) and the feed-way (B12) are turned upwards to a vertical position, the feed-cover-hinge-pin (B13) is withdrawn to the left, freeing the feed-mechanism.
8. The feed-lever-cover (B14) is lifted up and the feed-lever (B15) removed.
9. To remove the barrel (G), turn the barrel-handle (G3) forward and to the right vertically, push the barrel forward and it is free.
10. To remove the bipod (H), press the bipod-locking-plunger (H7) and turn the bipod-mounting round until it is free of its track in the bipod-seating (A1b).
11. The receiver-clip-ring (A7) can be removed by opening it slightly and moving it rearwards.

IV. Stripping and Assembling the Machine Gun, continued.

12. To strip the bolt-assembly (D), press out the bolt-carrier-pin (D2), pull back the action-head (D11), and remove components. Press the extractor (D6), take out the extractor-pin (D7), and remove the extractor and its 2 springs (D4 and D5).

b. Assembling.

Reverse the above order. It should be noted that:

1. On assembling the bolt-assembly, the firing-pin-spring (D13) is put on the firing pin (D12), which then is inserted, into the bolt (D3). The action-rod (D11b) is then pushed through the action-spring (D10) and collar (D9) into the bolt (D3). The assembled bolt is replaced in the bolt-carrier (D1) and locked with the bolt-carrier-pin (D2). Finally the bolt-locking-pawls (D8) are inserted.
 2. The feed-cover (B1) should *not* be closed, *unless* the moving parts are in the rear position, i. e. first perform a cocking motion, then close the feed-cover, and finally let the mechanism go forward, if no shooting is to take place.
 3. The weapon should be at "Safe" as any other weapon when not in use.
-

V. FIRING

a. The machine gun mounted (see the following illustrations).

1. Hold the gun butt upwards at an angle of abt. 45°.
2. Insert the tripod-hook (A1c) into the foremost gun-seating (L10a).
3. Place the pistol-grip (C1c) in the stock-holder (L11b), the rear-glider (L11) being slid to the right position so that the positioning stud (L11a) can be pushed upwards into the rearmost hole of the trigger-guard.
4. Close the locking-hook (L11d) round the trigger-guard by means of the locking-lever (L11e), which is pressed upwards, and ensure that the firing-arm (L11c) is placed in front of the trigger of the gun (C15).

If mounting is not used, the bipod legs are unfolded, unless the weapon is to be fired in some other way.

b. Safety (see illustrations).

1. To put gun at "Safe", The safety-catch (C12a) is pressed back as far as it will go.
2. To put gun at "Fire", The safety-catch (C12a) is pressed forward as far as it will go.

c. Loading (see illustrations).

1. Put the weapon at "Safe" (safety-catch back).
2. Perform a cocking motion: Pull back the cocking-handle (C7) as far as it will go so that the mechanism (by D11a) engages the sear (C17a) and cocks the action. Push the cocking-handle fully forward again.
3. Open the feed-cover (B1): Press the feed-cover-latch (B3), and lift the cover.
4. If magazine is used, it should be put on, as illustrated in following pages.
5. Put the cartridge-belt in position on the feed-way-platform (the first link must be empty).
6. Close the feed-cover.

d. Firing.

1. Put forward the safety-catch (C12a) to "Fire".
2. Press the firing-handles (L12c) (see illustrations on following pages).
3. If without the mounting: Trigger (C15) is pulled in the usual way.

e. Unloading.

1. Put safety-catch to "Safe".
2. Open the feed-cover.
3. Remove the belt.
4. If magazine: Remove magazine (see illustrations on following pages).
5. Control: Mechanism back and the chamber empty.
6. Close the feed-cover: When the mechanism is in rearward position (see illustrations).
7. Let the mechanism go forward again under control.
8. Put the safety-catch to "Safe" (catch in rear position).

f. Barrel-change.

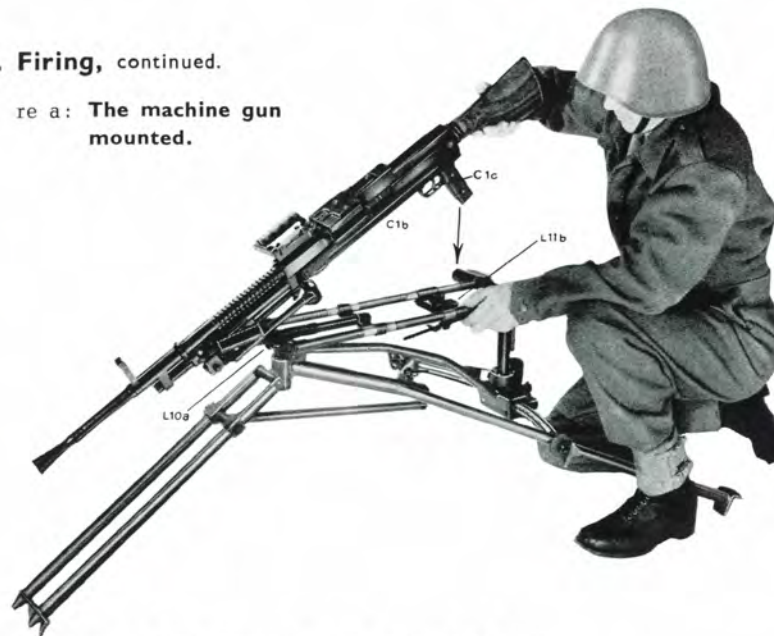
1. Make a cocking motion and put safety to "Safe".
2. Turn the barrel-handle (G3) forward and to the right vertically. Push the barrel forward and it is free.
3. Insert a new barrel by reverse operation.
NB. The trigger must not be pulled when the barrel is out of the gun.

g. Dismounting the machine gun.

1. Turn down the locking-lever, (L11e) releasing the locking-hooks (L11d) from the trigger-guard (C1b).
2. Raise the butt-stock, pull and lift the gun back clear of the gun-seating (L10a).

V. Firing, continued.

re a: **The machine gun mounted.**



1. Hold the gun butt upwards at an angle of abt. 45° .
2. Insert the tripod-hook (A1c) into the foremost gun-seating (L10a).
3. Place the pistol-grip (C1c) in the stock-holder (L11b), the rear-glider (L11) being slid to the right position so that the positioning stud (L11a) can be pushed upwards into the rearmost hole of the trigger-guard (C1b).



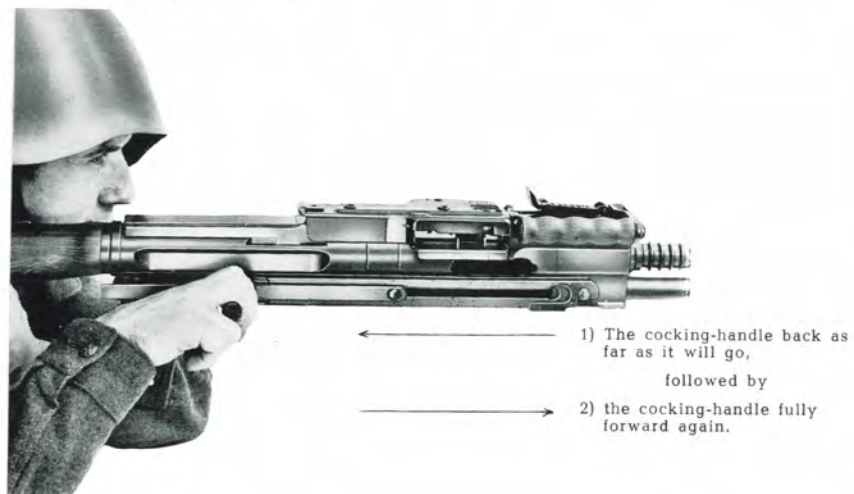
4. Close the locking-hook (L11d) round the trigger-guard by means of the locking-lever (L11e), which is pressed upwards to ensure that the firing-arm (L11c) is placed in front of the trigger of the gun (C15).

V. Firing, continued.

re b: **Safety.**



re c: **Loading, item 4.**



Cocking motion:

1. Pull back the cocking-handle (C7) as far as it will go, so that the action-head-bent (D11a) engages the sear (C17a) and cocks the action.
2. Push the cocking-handle *fully* forward.

V. Firing, continued.

re c: Loading, item 4.



The cartridge-belt is put in position on the feed-way.

The foremost end link must be empty.



Loading with 50 rounds magazine. For filling of magazine (see under III Principal Assemblies, I Cartridge-belts etc). For attaching magazine: see following illustrations.

NOTE. These illustrations show how the parts should always be, when the feed-cover is to be closed:

The bolt-assembly is in its rearmost position, the front end of the feed-lever with the feed-lever-roller (B15a) is therefore to the right ready for engagement with the feed-arm's (B5) rear claw.

Ref. III Principal Assemblies, B Feed-mechanism.

V. Firing, continued.

re c: **Loading**, item 4.



Attaching magazine:

The Lid-flap should be closed when attached for transport.

For loading, the lid-flap is opened (as shown in III Principal Assemblies, I Cartridge-belts, Ammunition box, Magazines), and the cartridge-belt is placed on the feed-way-platform. (As shown of foregoing page).

1. Place the magazine in the magazine seating first on the right side and
2. then move the left side of magazine up whereby its catch clips into engagement.

re d: **Firing.**



When the machine gun is mounted it is fired by pressing the firing-handles (L12c) as illustrated above. The gun itself is not touched by the gunner's hand during firing and therefore its normal vibrations are undisturbed.

V. Firing, continued.

re e: **Unloading,**
item 4.



To remove the magazine:

Press in the magazine catch (I1) with two fingers and the magazine will be free.

re f: **Change of barrel.**



1. Perform a cocking motion, and put safety to "Safe".
2. Turn the barrel-handle (G3) forward and to the right vertically. Push the barrel forward and it is free.
3. Insert a new barrel by reverse operation.

NB. The trigger must not be pulled when the barrel is out of the weapon.

VI. FUNCTIONING

The weapon is loaded and ready for firing. The bolt-assembly is in its rearward position with the action-head-bent (D11a) engaging the sear (C17). The bolt-locking-pawls (D8) are compressed at D8a by the action-collar (D9). The firing-pin (D12) is held back by the firing-pin-spring (D13). The first cartridge is in position in the feed-way (B12b) between the cartridge-stop (B12a) and the lower feed-slide-pawl (B7b).

On firing, the following takes place: — The trigger (C15) is actuated and presses downwards the sear (C17) which is disengaged from the Action-head-bent (D11a). The hook (C18a) of the spring actuated trigger-rod is raised ready for engagement with the action-collar-lug (D9a).

The bolt-assembly (D) is now free and is pressed by the return-spring (F13) towards its foremost position. During this movement, the bolt (D3) pushes the cartridge in front of it out of the belt towards the chamber. The upper-feed-slide (B7c) with its two pawls, brings the next round a half link space to the right, while the lower-feed-slide (B7b), with one pawl, moves a half link space to the left and grips the round, ready to move it on to its place on the feed-way (B12b).

Towards the end of the forward movement of the bolt-assembly (D) the trigger-rod-hook (C18a) engages the action-collar (D9), thereby freeing the bolt-locking-pawls (D8). The bolt (D3) pushes the cartridge home into the chamber, and stops, whereas the bolt-carrier (D1) with the action-head (D11), action-rod (D11b) and firing-pin (D12) continues. The action-head-shoulders (D11c) press out the bolt-locking-pawls (D8) into their clearances in bolt-carrier (D1b) and receiver (A5b) to engage with the pressure-absorbing-blocks (A6), positively locking the bolt.

The forward movement stops, the firing-pin (D12) igniting the cartridge. The gas-cup (E1a) on the gas-piston has simultaneously moved right forward and enclosed the gas-regulator (G11).

The bullet on its way through the barrel (G1) passes the gas-port, through which part of the gasses following the bullet escapes through the gas-regulator (G11) and forces the gas-piston (E1) rearwards together with the bolt-assembly. The return-spring (F13) is thereby compressed.

During the rearward movement the sequence of events is as follows: The bolt carrier (D1) with the action-head (D11), action-rod (D11b) and the firing-pin (D12) under pressure of its spring (D13), begins to move, the bolt (D3) meanwhile remaining motionless. The front edges of the slots (D1b) of the bolt-carrier act upon the bolt-locking-pawls (D8) and force them out of

engagement with the pressure-absorbing-blocks (A6), thus releasing the bolt, which then moves back with the bolt-carrier.

The empty case will be pulled out of the chamber by the extractor (D6) and carried back in the cartridge-seating on the bolt face. The action-collar (D9) is now pressed forward by its spring (D10), thereby locking the bolt-locking-pawls (D8) in their withdrawn position.

During the further rearward movement, the base of the empty cartridge case hits the ejector (A5a), and the case is forced to the right and ejected through the opening (A5f) in the right side of the receiver.

By this time the lower-feed-slide (B7b) with its pawl has pushed the next round to the right into position on the feed-way-platform (B12b), while the 2 pawls of the upper-feed-slide (B7c) have moved to the left and are now behind the next round, ready to move the belt on, when the mechanism moves forward again. The bolt assembly (D) completes the rearward movement, rebounds against the buffer-mechanism (F10--11), and will continue operating until brought to a stop.

VII. MAINTENANCE

1. Inspection:

a. Before shooting ensure:

1. that the barrel has been cleaned,
2. that the correct gas-hole is used,
3. that the ammunition is correctly fixed in the belts.

b. During shooting ensure:

1. that the cartridges are protected from dirt,
2. that the barrel is changed for each 200 rounds in case of sustained firing.

c. After shooting ensure:

1. that the machine gun is unloaded,
2. that the barrel is oiled,
3. that cleaning is performed as soon as possible,
4. that possible faults are corrected and necessary changes made.

VII. Maintenance, continued.

2. Possible replacements.

(For stripping and assembling see IV).

a. Barrel (G) changed (see picture under V Firing).

1. Make a cocking motion and put safety to "Safe".
2. Turn the barrel-handle (G3) forward and to the right vertically. Push the barrel forward and it is free.
3. Insert a new barrel by reverse operation.
NB: The trigger must not be pulled when the barrel is out of the weapon.

b. Firing-pin (D12) and firing-pin-spring (D13).

1. Stripping: press out the bolt-carrier-pin (D2), pull back the action-head (D11), and the remaining parts are easily removed. Remove firing-pin and spring from the bolt.
2. Change components, if considered necessary.
3. Assemble in the reverse order.
N.B. Remember to first insert the spring followed by the firing-pin.

c. Extractor (D6) and extractor-springs (D4 & D5).

1. Stripping: press in the extractor (D6) against the bolt (D3), remove the extractor-pin (D7). Extractor and the 2 extractor-springs can then be taken out.
2. Change components, if considered necessary.
3. Assemble in the reverse order.

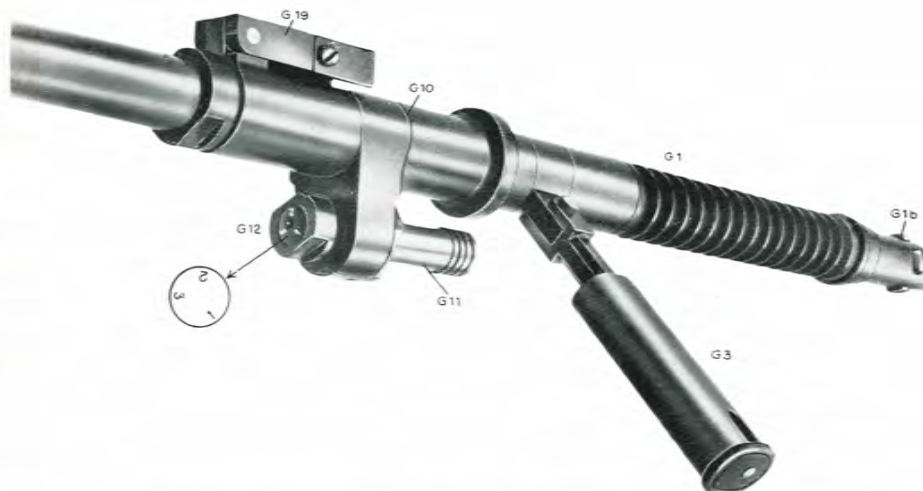
d. Feed-mechanism-springs.

1. Fold back feed-cover (B1) and feed-way (B12) and pull out to the left feed-cover-hinge-pin (B13). Place the feed-cover in left hand with the thumb on the feed-aligner (B9) pressing it down and, at the same time, backwards, take out the feed-aligner-pin (B8), freeing the components and springs (B10 and B11).
2. Change components, if considered necessary.
3. Assemble in the reverse order.

VII. Maintenance, continued.

2. Possible replacements, continued.

e. Change of gas-holes.



The gas-regulator has 3 gas-holes of varying sizes, marked 1, 2 and 3, in order to adjust the recoil to the available ammunition.

Whether or not the barrel is provided with gas-regulator-cover (G9), changing of gas-holes is effected as follows:

NB: The barrel should be removed from the gun.

1. Unscrew gas-regulator-nut (G12) with universal spanner (K9e) — see III Principal Assemblies, K. Accessories.
2. Carefully knock the gas-regulator (G11) rearwards.
3. Rotate the gas-regulator until the required gas-hole is in its correct position to the barrel (and the parts fit to each other).
4. Knock the gas-regulator forward into position.
5. Replace the nut, and tighten with special spanner.

Under field conditions, where a vice is not available, the barrel-spanner (K8) should be used as counterhold on the barrel-locking-lugs (G1b).

VIII. STOPPAGES AND REMEDIES

Should the gun stop while firing, the gunner must always

1. Move the safety-catch back to "Safe".
2. Perform a cocking motion.
3. Look through the ejection slot to see if there is a round or an empty case in front of the bolt or in the chamber.

The gunner will then be able to ascertain one of the following stoppages, which should be remedied in the manner described:

1. A whole round was ejected by the cocking motion.

The cocking motion required *normal* exertion.

Cause: Missfire.

The missfire may be due to a defective charge in the percussion cap or defective fire-holes in the cartridge.

Remedy: The fault has been remedied by the cocking motion already performed.

Note: If the fault is repeated: examine the ejected round. If there is no mark from the firing-pin, the latter may be broken. Examine the firing-pin and replace it if necessary. (See under VII Maintenance, 2. Possible Replacements).

2. A whole round was ejected by the cocking motion.

The cocking motion required *more than usual* exertion.

Cause: Foreign body in the chamber.

The cartridge must have been jammed inside a torn case or other foreign body in the chamber.

Remedy: Remove the barrel. Examine the chamber. If the half of a torn case has remained in the chamber, remove it with the aid of the case-extractor (K7) (refer K. Accessories). Replace the barrel. Unload the gun. Raise the feed-way and see if the base of the case is lying inside the gun, in which case it must be removed. Close the feed-way and reload the gun.

If there is any foreign body such as powder grains or the like in the chamber, clean the chamber with the chamber-rod (K3). Also see if there are any foreign bodies as above lying inside the gun; if so, the gun must be stripped and cleaned before firing is continued.

VIII. Stoppages and Remedies, continued.

3. An empty case was ejected by the cocking motion.

- Cause:*
- a) Bullet lodged in barrel,
 - b) loose bullet, or
 - c) short recoil.

In all three cases the ammunition is at fault.

- a. In the first case the propellant charge was too weak, or entirely missing, in which case the bullet would probably have stopped somewhere in the barrel.
- b. In the second case the bullet was loose in the case and fell out during loading.
- c. Short recoil, due to a low charge, causing the case to be half extracted and then pushed back into the chamber.

Remedy: Remove the barrel and examine both chamber and bore. If there is a bullet in the bore, use the cleaning-rod (K2) to push it back and out of the chamber. Replace the barrel and continue firing. If there are powder grains in the chamber, remove them with the chamber-rod (K3). Replace the barrel, unload the gun, and raise the feed-way and see if there are any powder grains inside the gun. If so, strip the gun and clean it before continuing firing.

In the following it is assumed that nothing was ejected when the cocking motion was performed.

4. No cartridge or empty case in front of the bolt or in the chamber.

Cause: Faulty feed.

Faulty feeding may have been caused by the failure of the driving mechanism, or the bolt not having been behind the round in the feed-way.

In both cases the cause may have been short recoil owing to faulty ammunition.

Remedy: The fault has been remedied by the cocking motion already performed.

Note: If the stoppage is repeated:

The cause may be that the gas holes in the gas-regulator (G11) are choked owing to an excessively fouling ammunition. In that case, remove the gas-regulator from the barrel (see instructions under VII Maintenance, 2. Possible Replacements) and clean the gas holes with the cleaning-pins on the universal-spanner (K9) designed for the purpose.

VIII. Stoppages and Remedies, continued.

5. A whole cartridge in front of the bolt.

Cause: Faulty insertion.

On its way the nose of the bullet has struck the back end of the barrel and has thus been prevented from moving on.

Remedy: Open the cover. Remove the cartridge-belt. Open the feed-way. Remove the round by means of the case-extractor (K7). Close the feed-way and reload.

6. An empty case in front of the bolt.

Cause: Faulty ejection or loose bullet.

Remedy: Unload the gun. Open the feed-way and remove the case by means of the case-extractor (K7). See if there are powder grains inside the gun; if so, strip the gun and clean it before continuing firing. Otherwise, close the feed-way and reload.

7. An empty case in the chamber.

Cause: Faulty extraction.

This may be due to a torn flange, the flange having been too weak, or the case is heat-jammed in the chamber.

Remedy: Remove the barrel and eject the case either by means of the case-extractor (K7) or the cleaning-rod (K2). Examine the flange of the case; if it is intact the faulty extraction may have been due to the extractor being damaged or broken. If so, it must be replaced. Return the barrel, and if necessary strip the gun and change the extractor (see instructions VII Maintenance, 2. Possible Replacements).

IX. MADSEN/SAETTER MACHINE GUN RIFLE CALIBRE

TANK-MODEL



MADSEN/SAETTER MACHINE GUN constructed for installing in tanks.

It differs from the infantry model as follows:

1. no butt-stock, only buffer housing.
2. no carrying-handle and barrel-handle (the barrel is fixed by a barrel-catch, a spring-steel-catch which engages a notch in the barrel).
3. no bipod.
4. no front and back sight.
5. return-spring is placed round the gas-piston.
6. There are special fittings for installment in a tank.



MADSEN/SAETTER Machine Gun, Rifle Calibre, tankmodel,
stripped without the use of tools to the main groups.

For daily cleaning disassemble as above and fully strip the bolt-assembly (as shown at D in III Principal Assemblies). Furthermore refer to IV Stripping and Assembling.

IX. MADSEN/SAETTER Machine Gun, Tank-model, continued.



MADSEN/SAETTER Machine Gun, Tank-model firing on "special lightweight" tripod outside the tank.



"Special lightweight" Tank-tripod unfolded.



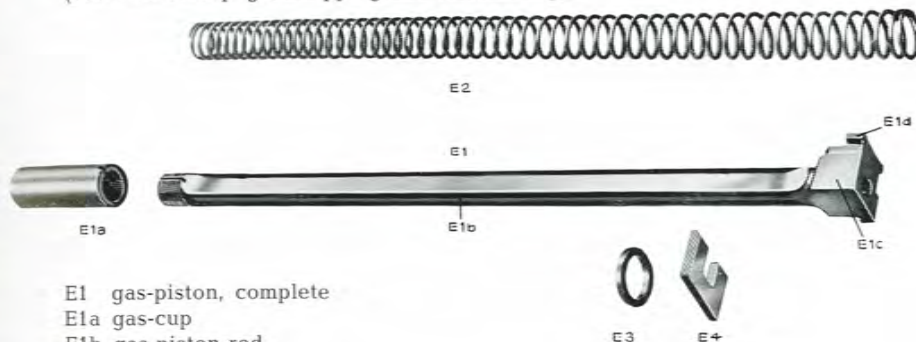
"Special lightweight" Tank-tripod folded for transport in the tank.

IX. MADSEN/SAETTER Machine Gun, Tank-model, continued.

Parts different from MADSEN/SAETTER Machine gun, infantry-model.
Compare with III Principal Assemblies.

E. Gas-piston with Return-spring.

(see also next page, Stripping and Assembling).



- E1 gas-piston, complete
- E1a gas-cup
- E1b gas-piston-rod
- E1c gas-piston-head
- E1d gas-piston-coupling (for engaging D1a)
- E2 return-spring
- E3 return-spring-washer
- E4 return-spring-stop (fits into a special clearance in the barrel-socket (A2))



F. Buffer-mechanism.

- F1 buffer-housing
- F1a notch for trigger-gear-housing-latch (C3)
- F1b receiver-locking-blocks (for engaging with, and locking in, the rear of receiver (A5)).
- F2 buffer-bolt-nut
- F3 buffer-spring
- F4 buffer-head
- F5 buffer-bolt

IX. MADSEN/SAETTER Machine Gun, Tank-model, continued.

Stripping and Assembling.

(Ref. Infantry-model, IV. Stripping and Assembling.)

The mode of proceeding for stripping and assembling is the same with the exception of: Item 5. "Removal of the gas-piston" will now be replaced by

5. "The gas-piston with return-spring (E) will be removed as shown below".

The return-spring-stop (E4) is taken out of its clearance in the barrel-socket (A2) as illustrated. Here the receiver is seen from below. Continue in the same way as for the infantry-model.



Assembling: Inserting the gas-piston with return-spring (E).



A small tool, as shown, is most suitable. It is incorporated as accessory for the tank-model as K11 under K. Accessories. It is placed on the gas-piston in front of the gas-piston-head (E1c).

The return-spring is pressed forward until it is on the other side of the clearance in the barrel-socket (A2), when the return-spring-stop (E4) is inserted.

