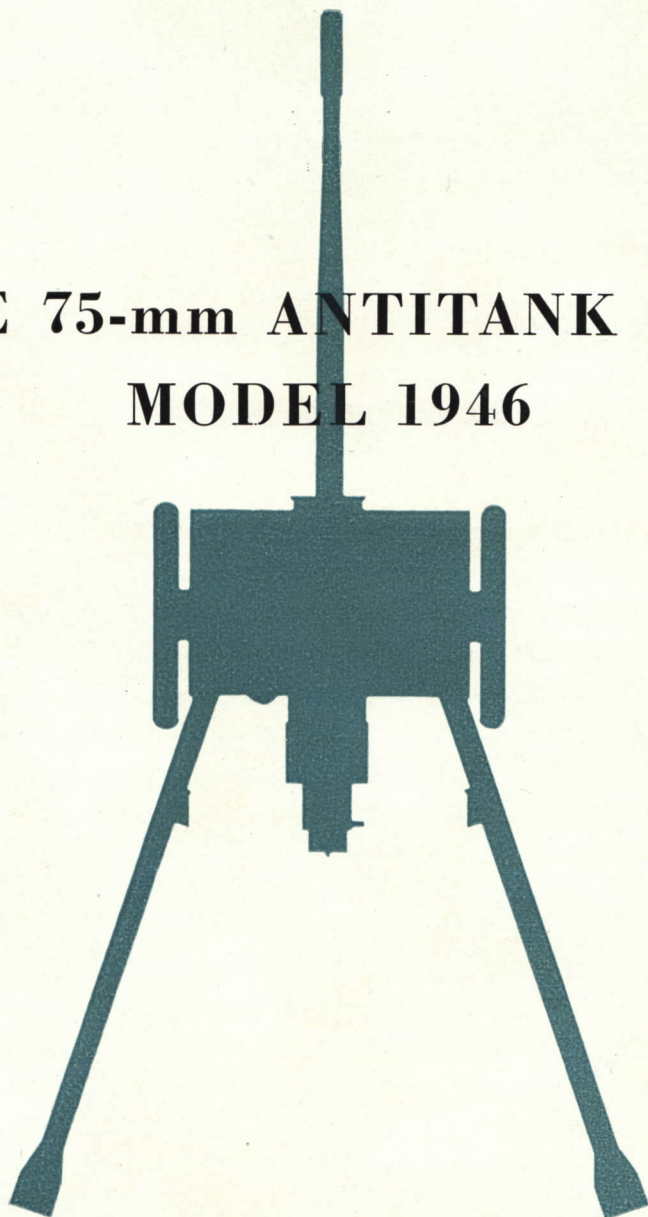


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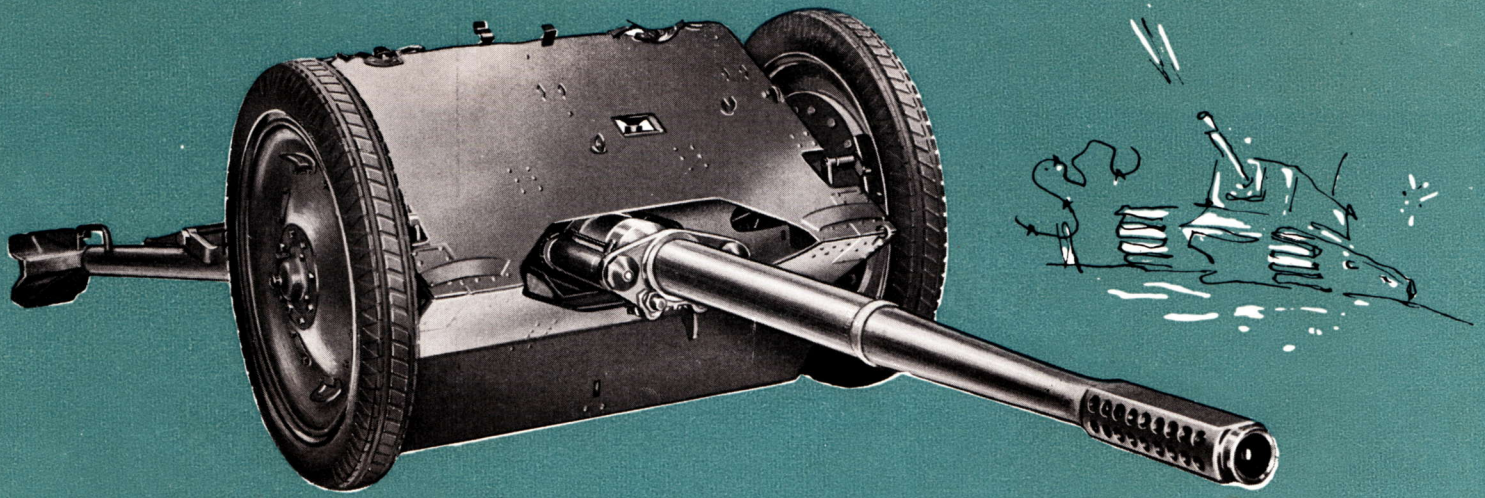


**THE 75-mm ANTITANK GUN  
MODEL 1946**



## I N D E X

		Page
A.	General Description .....	5
B.	The Gun .....	5
	I Main Parts .....	5
	II Detailed Description .....	6
	1. Barrel with Breech Block .....	6
	Functioning of the Percussion and Semi-automatic Mechanism .....	7
	2. Cradle and Recoil System .....	7
	a. The Recoil System .....	8
	b. The Recuperators .....	8
	c. Percussion System .....	8
	d. Semi-automatic Breech Opener .....	8
	3. Axle and Traversing Gear .....	8
	4. Elevating Gear and Legs .....	9,10
	5. Wheels and Brakes .....	10
	6. Shield and its Accessories .....	10
	III Attachment, Tools and Spare Parts .....	11
	IV Transport of the Gun .....	12
	V Going into Firing Position .....	12
	VI Firing .....	13
C.	Adjustment of the Gun Gear .....	13
	I Percussion Mechanism .....	13
	II The Semi-automatic Mechanism .....	13
	III Care of the Recoil and Recuperation System ...	13
	IV Training Gear .....	14
	a. Elevation Gear .....	14
	Damper .....	14
	b. Traversing Gear .....	14
	V Wheels and Brakes .....	14



## Description of the 75-mm Antitank Gun mod. 46

### A. General Description

The principles on which the 75-mm Antitank Gun mod. 46 is based are somewhat different from those found in other similar weapons: long monoblock barrel with integral muzzle-brake and breech, constant length recoil, elevation taken from the left leg by inclination of the traversing axle and reversible traverse. The range is 50—1500 m in normal firing conditions, the ammunition consisting of armour piercing hardmetal core rounds, full bullets with soft metal cap and eventually HE rounds.

Owing to its exceptional power the gun is part of the heavy armament of the infantry. Compared with other weapons of similar calibre the 75-mm Antitank Gun mod. 46 is outstanding because of its lightness and mobility under the most difficult conditions. Total weight of the gun in firing position, including a 250 kg shield is about 1.350 kg.

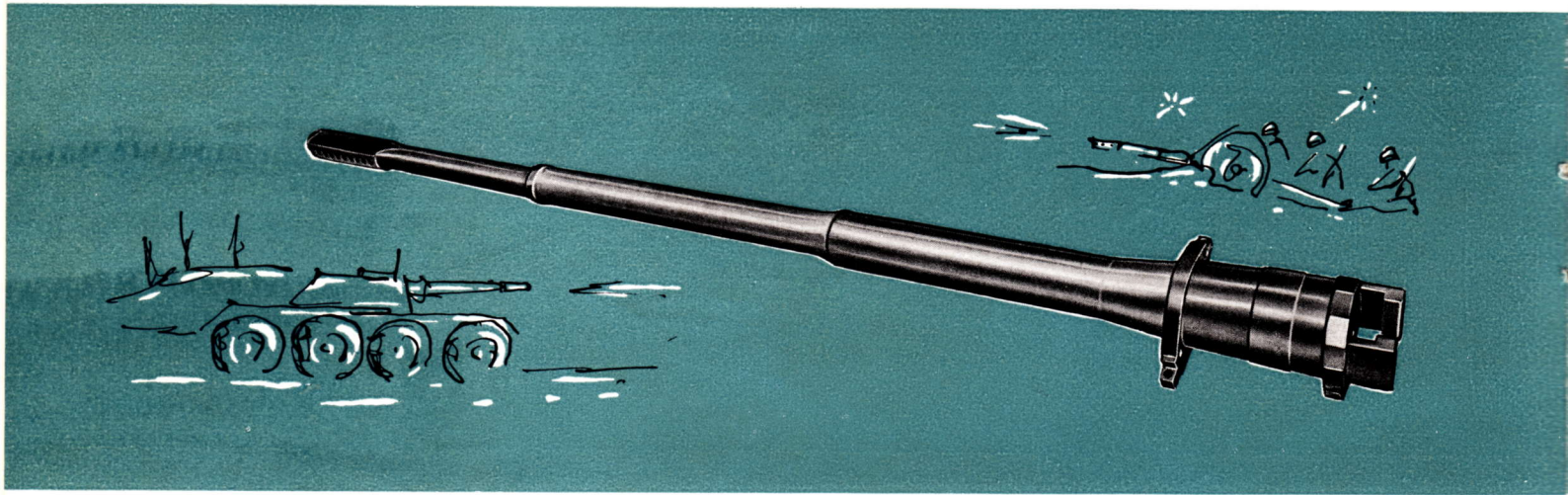
### B. The Gun

#### I. MAIN PARTS:

The 75-mm Antitank Gun is assembled from following main parts:

1. Barrel with Breech Block
2. Cradle and Recoil System
3. Axle and Traversing Gear
4. Legs and Elevating Gear
5. Wheels and Brakes
6. Shield
7. Sights

In addition to this come tools and spare part box and accessories and spares and service box.



## II. Detailed Description

### 1. BARREL WITH BREECH BLOCK

The barrel is a monoblock construction and of 75,2 mm calibre. It is rifled on its whole length, even through the muzzle brake, which embodies 32 horizontal holes placed by four in successive cross sections. The number of rifle grooves is 36 and their final inclination is  $7^\circ$ .

Outside, the muzzle brake is cylindrical with two flats which permit introduction and locking of the muzzle cover.

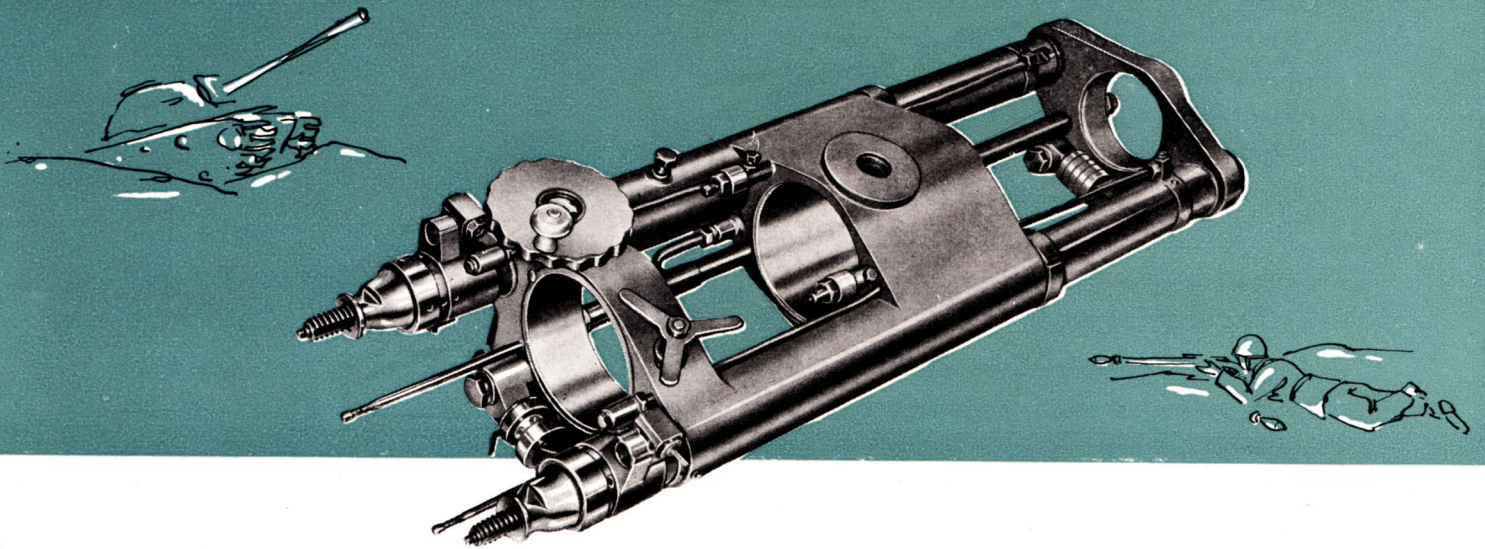
Towards the breech the barrel section grows conically until the first cradle journal. Behind this and somewhat larger in diameter is the second cradle journal. Immediately after this the main barrel bracket is screwed on. This takes the recoil cylinder rod, the recuperator rods, the semi-automatic mechanism housing, the breech block return spring and the percussion arming rod. Further back the barrel has a cylindrical portion which allows its easy adjustment on a machine should this be needed for repairs. Finally comes the integral breech, its outside section cylindrical and the pit fully open to the rear which allows very easy access.

Inside, the breech opening is prismatic with slanting tracks for the breech block. A single transversal axle carries the ejector rocker arms, the breech block moving levers, and on the outside right the breech block manoeuvre lever and left the semi-automatic mechanism lever.

The breech itself carries in its center the percussion pin locked into position by the percussion rocker which becomes free upon removal of the rocker axle.

Underneath, a breech block extension locks the block into closed position when the percussion is not armed.

Under the barrel a special bracket carries the rear end of the percussion housing.



## FUNCTIONING OF THE PERCUSSION AND SEMI-AUTOMATIC MECHANISM

When pulled forward by means of the cocking lever or, at end of recoil of the barrel, by the percussion arming rod, the percussion bolt is brought forward enough to allow the trigger to lock it in place. When the barrel is in firing position this compresses the percussion main spring. An action on the trigger axle carried by the traversing wheel raises the trigger spring and sets the percussion bolt free. The action of the percussion main spring throws the bolt backwards, where it locks the breech block and hits the percussion rocker, which actuates the percussion pin.

At end of recoil the bolt is pulled back by the arming rod, and the breech block is free. The springs of the semi-automatic mechanism are now under full compression, and their action on the manoeuvre rod opens the breech. The ejector rockers are hit by the breech block with full speed downwards and throw the cartridge case back and out, somewhat helped by a rest of momentum in the case itself, the recoil not being absolutely finished.

When open, the breech block is kept in place by hooks at the ends of the ejector arms until a new round is inserted, when the breech block return spring comes in action. A manoeuvre arm allows opening and closing of the breech by hand, except in case of misfire, when the percussion is no more armed.

## 2. CRADLE AND RECOIL SYSTEM

The cradle is a composite construction assembled by electric welding, which pivots around a roughly vertical axle for the traverse. It carries the recoil cylinders, which are united at their front part by the barrel small bearing. The barrel rests in the cradle on two adjustable rollers, which act as bearings during recoil and recuperation movement. The rollers are mounted on the cradle by means of two adjustable eccentric bushings. The front roller is carried by a bracket, which unites the brake cylinders at their front end, carries also the small barrel bearing and the front ends of the recuperators. Near

the rear bearing are two vertical axles: At the left there is a traversing wheel axle, carrying in its center the trigger axle; At the right, the bolting rod, by which the cradle is bolted to the main axle by a notch in the traversing gear sector. Six rods leave the rear of the cradle in nearly axial direction:

- a) Two recoil brake rods,
- b) Two recuperator rods,
- c) The percussion rod,
- d) The semi-automatic breech opener rod.

**a) The recoil system**

The recoil cylinders are carried inside the cradle. The main construction embodies the modern counter rod principle with an x-chaped cross section of the rod. An unusual improvement is a by-pass tubing, by which the packings are relieved from pressure during the recoil itself. The brake cylinders are completely filled with glycerine, and a counter piston compensates for dilatation or loss of liquid.

**b) The recuperators**

The recuperators working with gas pressure and liquid are mounted on the lower part of the cradle at both sides of the barrel. The recuperator is made of a two-part cylinder, the shorter part of which is connected by means of a tube to a receiver, which acts as pressure damper and which is formed by the middle part of the cradle structure. Both recuperators work independently. The normal initial pressure should be 60 at. Inlet valves are in the upper part of the receiver.

**c) Percussion system**

The percussion system is placed under the barrel and is formed by a telescopic tubing system. An exterior protecting tube is fixed by means of a lug to the breech and by the other end to the suspension ring of the barrel. Inside this there is an arming tube which is connected to the cradle arms during the recoil the percussion mechanism by pulling trigger ring over the trigger spring. To eliminate chock effects the mechanism is equipped with spring and rubber dampers. For arming by hand there is an arming lug at the end of the percussion bolt. When firing, the rocker lever transmits the movement of the percussion bolt to the percussion pin.

**d) Semi-automatic breech opener**

The semi-automatic breech opener is composed by three telescopic tubes with buffer springs. An exterior tube is mounted by means of a bracket to the left side of the cradle. At the end of the recoil movement the opener pulls a manoeuver lever, which opens the breech and ejects the cartridge case.

### **3. AXLE AND TRAVERSING MECHANISM**

For the traverse the barrel rotates around a nearly vertical axle with adjustable conical bearings in the wheel axle. This is a welded construction of sheet steel and performs several functions.



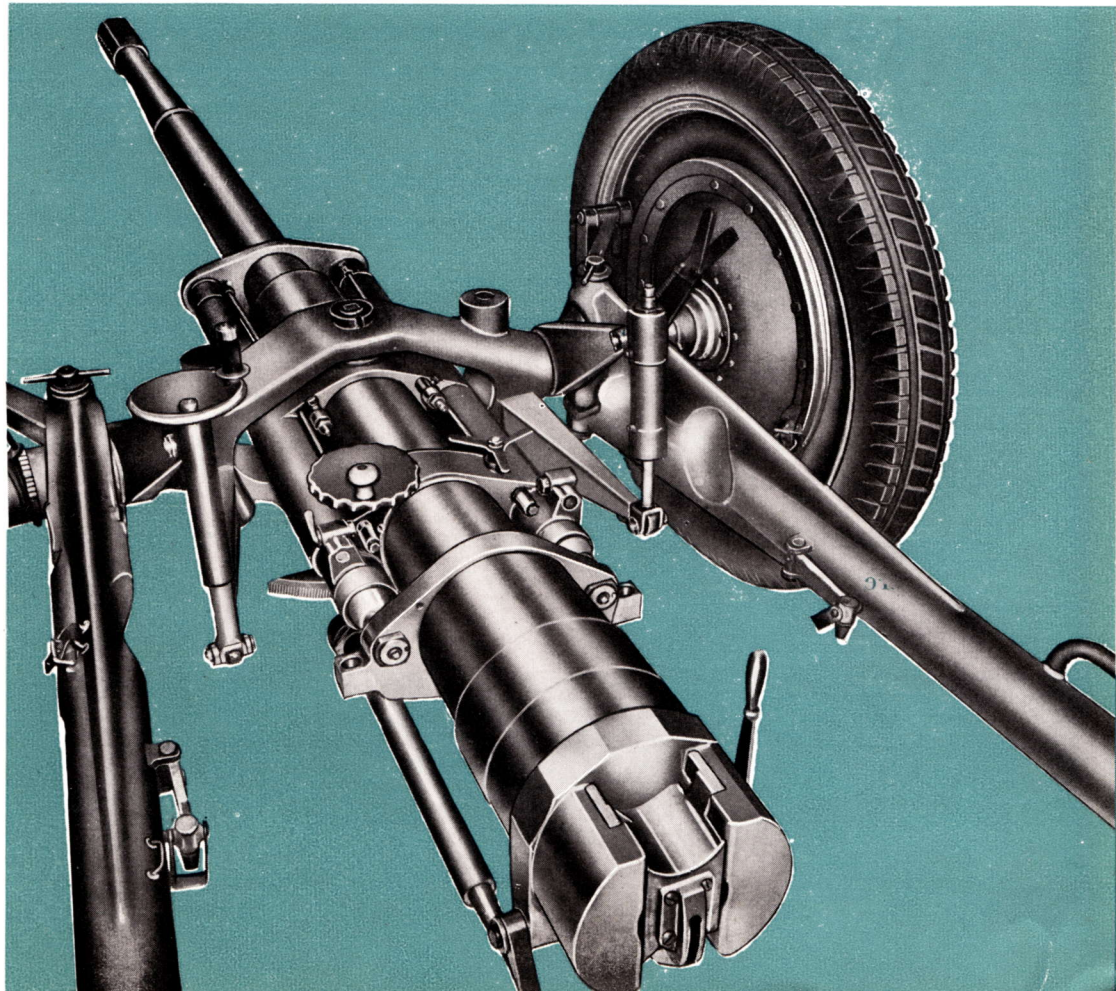
One of this is to carry a horizontal projection, shaped like a balcony, on which a toothed sector with beveled gears is fastened by sturdy bolts. Traverse is obtained by means of a pinion carried at the left rear side of the cradle and whose beveled teeth are in mesh with the gear sector. Rotation of the pinion is effected by a wheel (with handle) forming integral part with the pinion shaft. Side motion is thus reversible, smooth and free from backlag. It can be very fast, if necessary, and requires a minimum of muscular energy. Frictions and losses are eliminated as far as possible and the weight of the barrel is balanced around the axis of rotation.

The axle of the pinion is hollow and contains the vertical rod of the trigger button, by which percussion is released.

Opposite the pinion axle on the right side of the cradle is the traverse bolting mechanism, which is used for clamping the cradle and the barrel in central position during transportation. This is composed of a vertical axle with a head that enters into a depression in the traverse gear sector, when the bolt is pulled upwards by the tightening of a winged lock nut.

#### 4. ELEVATING GEAR

Elevation is obtained by means of a rod connecting a projection of the transversal wheel axle with an arm on a bushing rotating freely on the same axle. Two conical hobs in the bushing receive protruding tapered pins from the left leg and form thus the hinges, around which this can rotate in transversal direction. In this manner elevation of the gun is determined by the position of the left leg. The connecting rod is an assembly formed by a screw carried by oversize ball bearings and rotating in two nuts. The nuts are provided with a system of differential threads, which permit elimination of



backlag. The elevating mechanism is thus irreversible and considerably slower than the traverse, and has quite unusual qualities of simplicity.

Symmetrical to the elevation rod a damper connects a projection from the right side of the transversal axle to an arm on a bushing, which carries the hinges of the right leg.

This damper is composed of two cylinders filled with glycerine, between which a piston is moving. It connects the elevation to the right leg. A second piston keeps the glycerine under pressure irrespective of smaller losses or dilatation and by a bypass relieves the packings from pressure during function. The damper gives added stability to the elevation and a pleasant feel to the elevating gear by elimination of vibrations.

During the recoil the damper transmits part of the unbalanced weight of the recoiling barrel to the right leg.

### **THE LEGS**

The leg is fastened on the wheel axle by two vertical threaded taps acting at the same time as hinges when spreading legs sideways.

The legs are of two parts and foldable for transport.

The legs are clamped together by straps using the Soda water bottle cork system.

### **5. WHEELS AND BRAKES**

The wheels are of full flask type and equipped with sponge rubber tyres. The hub of the wheel is carried by two opposite conical roller bearings, which follow the wheel when removing it. A bushing with bearings is fixed to the wheel hub nut and secured by a tapered pin. A horse shoe shaped cotter (which goes through the bushing) locks by means of two semicircular rings the bushing to the wheel axle.

Each wheel is equipped with independent hand-brake of open type. The braking surface is a conical slot and fixed on the inside surface of the wheel. The brake shoe is carried by a projection of the elevation bushing. A handlever works the brake shoe by means of an adjustable rod.

### **6. THE SHIELD AND ITS ACCESSORIES**

The shield protects the gun between the wheels and is attached to the wheel axle by four detachable screws supported by rubber bushings. The shield proper is V-shaped twofold and made of 5-mm armour-plate, with 30-mm air space between the sheets. The lower part, made of an 8-mm single plate extends to the ground. It is united to the lower shield by means of hinges and can easily be clamped in horizontal position for the road.

At the front side of the shield, hooks for two spades, a mattock and other implements are carried.



### III. Attachement, Tools and Spare Parts

1. Muzzle cover with towing ring.
2. Breech cover.
3. Breech protection plate.
4. Recoil cover.
5. Whisk brush handle (foldable).
6. Whisk brush box:
  - a) Whisk brush.
  - b) Washer head.
  - c) Projectile extractor.
  - d) Bag for rags.
  - e) Greese can.
  - f) Oil container (4 l.).
7. Tow line (2 only).

#### EQUIPMENT BOX

1. Percussion anvil.
  2. Percussion pin.
  3. Percussion springs (2 only).
  4. Cloth bag for the above parts.
  5. Firing line.
  6. Tin for grease.
  7. Oil can with nose.
  8. Grease brush with bag.
  9. Tool container.
  10. Hammer (200 gr.).
  11. File  $\frac{1}{2}$  round fine with handle.
  12. Extractor pin.
  13. Screw driver 5-mm of width.
  14. Pliers.
  15. Extractor pin 12-mm  $\varnothing$  made of copper.
  16. Special spanner for repairing the breech
  17. Locking spring.
  18. Equipment index.
  19. Spare part bag.
  20. Grease can, lub. 120 cm<sup>3</sup>.
  21. Adjustable spanner.
  22. Copper hammer.
  23. Thread triblet for dismantling of the recoil system.
8. Spare part bag.

#### PIONEER TOOLS:

- Eyelet shaft.
- Spades (2 only).
- Pick ax.
- Field saw in box.
- Axes (2 only).



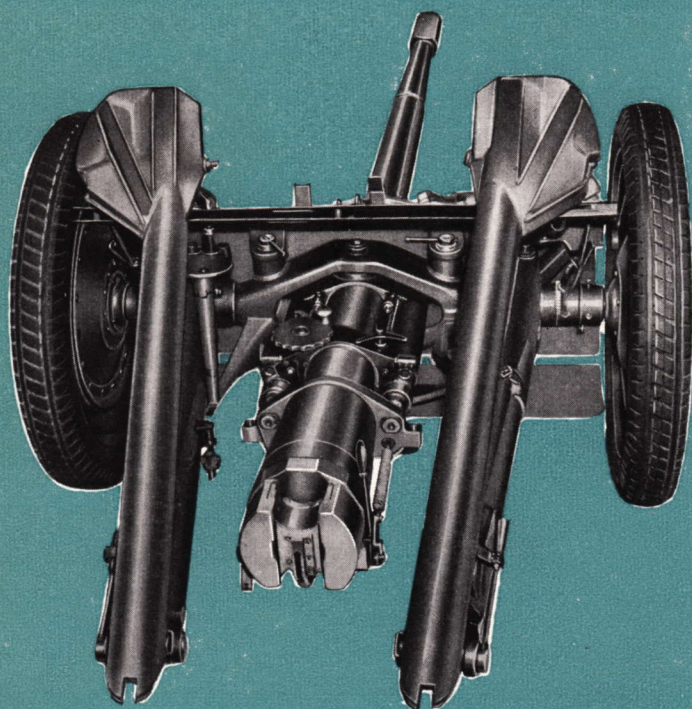
## IV. Transport of the Gun

The gun when transported can either be charged on a lorry or towed from the towing eye at the muzzle cover or drawn by two horses. In the latter case the barrel acts as a pole between the horses.

## V. Going into Firing Position

When the gun has been moved into firing position, it is made ready for the fire in the following way:

- a) The legs are unfolded backwards and sideways.
- b) The leg-spades are set in the ground.
- c) The wheel brakes are tightened.
- d) The traversing gear is released.
- e) The muzzle cover is removed.
- f) The breech cover is removed.
- g) The sights are taken out from their box and fixed in place.
- h) The breech is opened and
- i) The gun is loaded.



# VI. Firing

The gun is loaded. The sights are set at the target readings. The gun is trained on the target and fired by pushing the trigger button at the centre of the traversing gear handle. The weapon is  $\frac{1}{2}$  automatic, ejects the empty cartridge case and arms the percussion leaving the breech open for inserting a new round.

## C. Adjustment of the Gun Gear

### I. PERCUSSION MECHANISM

a) The percussion pin is easily replaceable. The axle of the rocker arm is removed and thereafter the arm and the percussion pin with its spring come out and can be replaced.

#### b) Removal of the breech

The breech return spring is disengaged from the manoeuver lever and the lever removed. Thereafter the transversal axle of the breech is withdrawn and the whole breech with extractor and operating lever is made free.

#### c) Dismounting of the percussion mechanism proper

The stopper at the end of the percussion is removed and the nut at the end of the return rod is removed, whereafter the rod with spring can be withdrawn. The nut of the arming lug is opened and the percussion bolt withdrawn.

The rubber buffer may be replaced by loosening the cover of the housing.

Reassembly of the percussion mechanism is effected in the opposite order.

### II. THE SEMI-AUTOMATIC MECHANISM

The semi-automatic mechanism is mounted in a bracket screwed to the cradle. By means of a nut bushing it can easily be disassembled. The main rod is set free when taking out the breech manoeuver lever axle, which is kept in position by a circlip.

### III. CARE OF THE RECOIL AND RECUPERATION SYSTEM

Disassembly of the recoil brake from the barrel is effected by turning the anchor screw of the barrel bracket in the sector geared bushing, whereafter the shaft is released by turning it 90°.



**The recuperator** is disassembled in the following way:

The cover in the front end of the cylinder is opened and into the same thread is screwed a core bar with threads found in the tool box. The core bar pushes the piston backward 20-mm, whereafter the connecting piece at the rear end can be detached by hand.

#### IV. TRAINING GEAR

a) **Elevation gear** is removed by removing by hand the axles in the upper and lower connecting bearings.

Disassembly of the elevating gear is effected by removing the handle wheel and thereafter by means of special spanner the cover of the bearing housing. Then, after removing the two screws at the lower end of the elevating gear the elevating rod can easily be screwed out.

**Damper** is removed in similar manner as the elevating gear.

The damper is disassembled in the following way:

The outlet screws on the side for glycerine are removed. Thereafter both covers of the damper are removed and the packings with springs can be withdrawn. The bafflers are to be removed with a special spanner, whereafter the double acting piston can be withdrawn.

b) **Traversing gear.** The locking bolt of the trigger mechanism is removed. The spring cotter in the hub of the hand-wheel is removed. The push-button is removed by means of a push-button spanner, which causes the trigger mechanism in the traversing gear axle to loosen.

The traversing handwheel is mounted on a square extension of the pinion shaft and secured there by a nut. When the percussion axle and spring have been removed, this nut appears and can easily be untightened, and removed. At this moment nothing more keeps the axle from falling down through its bearings if the trigger arm is pressed down.

#### V. WHEELS AND BRAKES

Removal of the wheels is easily effected by taking away the horse-shoe shaped cotter at the end of the axle, after which the wheel integral with its bearing and bushing can be pulled out.

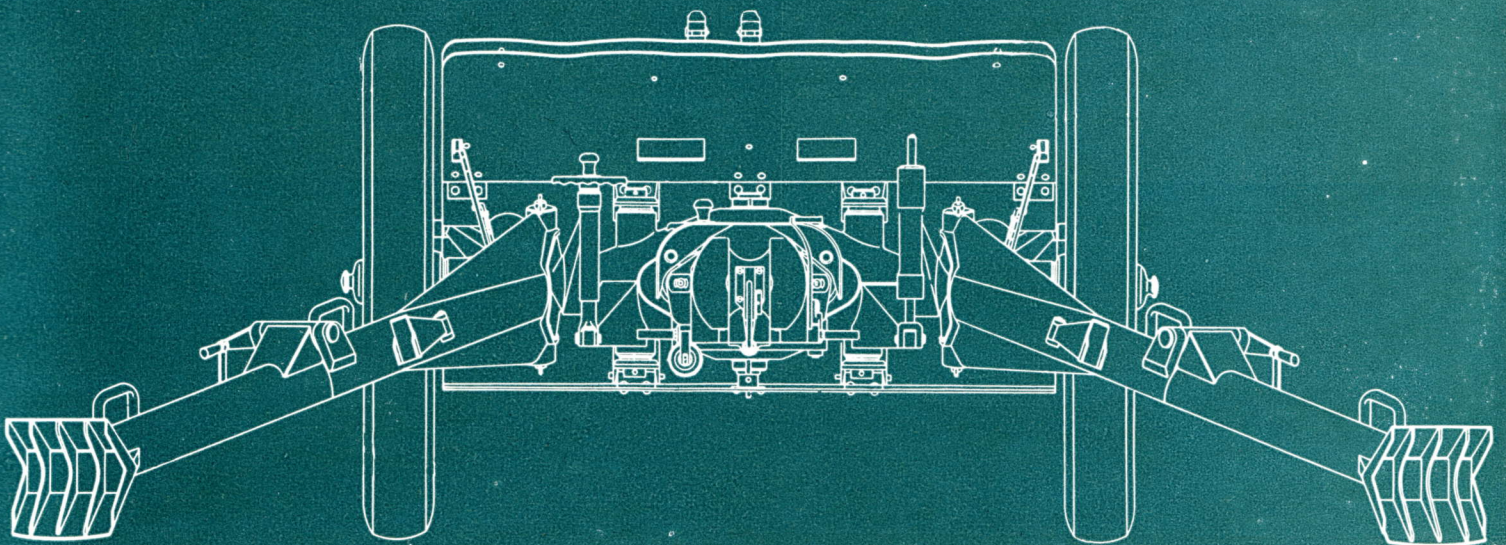
**The brakes** are removed by opening the stop screw at the end of the tail of the bushing and thereafter by removing the driving shaft of the brake shoe.

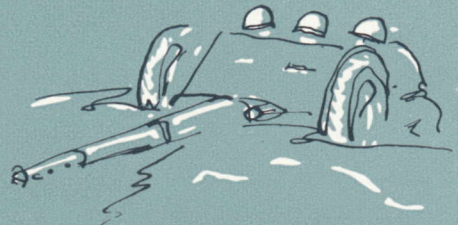
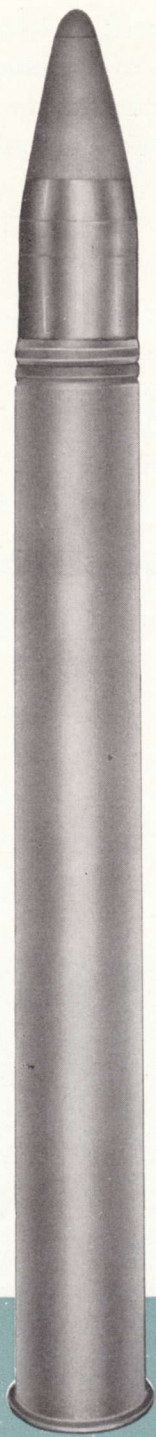
## Ballistic data

Total length of barrel .....	4179 mm
Length of rifled portion (muzzle brake included) .....	3348 mm
Volume of rifled portion of bore (with muzzle brake) .....	15.150 cm <sup>3</sup>
Volume of rifled portion of bore (without muzzle brake) .....	13.260 cm <sup>3</sup>
Volume of powder chamber .....	3.600 cm <sup>3</sup>
Caliber on flutes .....	75.0+0.3 mm
Maximum diameter (bottom of grooves) .....	77.2+0.2 mm
Number of grooves .....	32
Surface or cross section of bore .....	45.25 cm <sup>2</sup>
Angle of rifling .....	7°
Maximum pressure .....	4.500 At
Maximum projectile energy at muzzle .....	400 T×m

## Weights and measurements

Total weight of gun without shield .....	1.080 kg
Weight of gun with 5 mm+5 mm shield at 30° .....	1.350 kg
Track width .....	1650 mm
Ground clearance .....	280 mm
Angle of traverse .....	50°
Elevation .....	-6°+11°









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