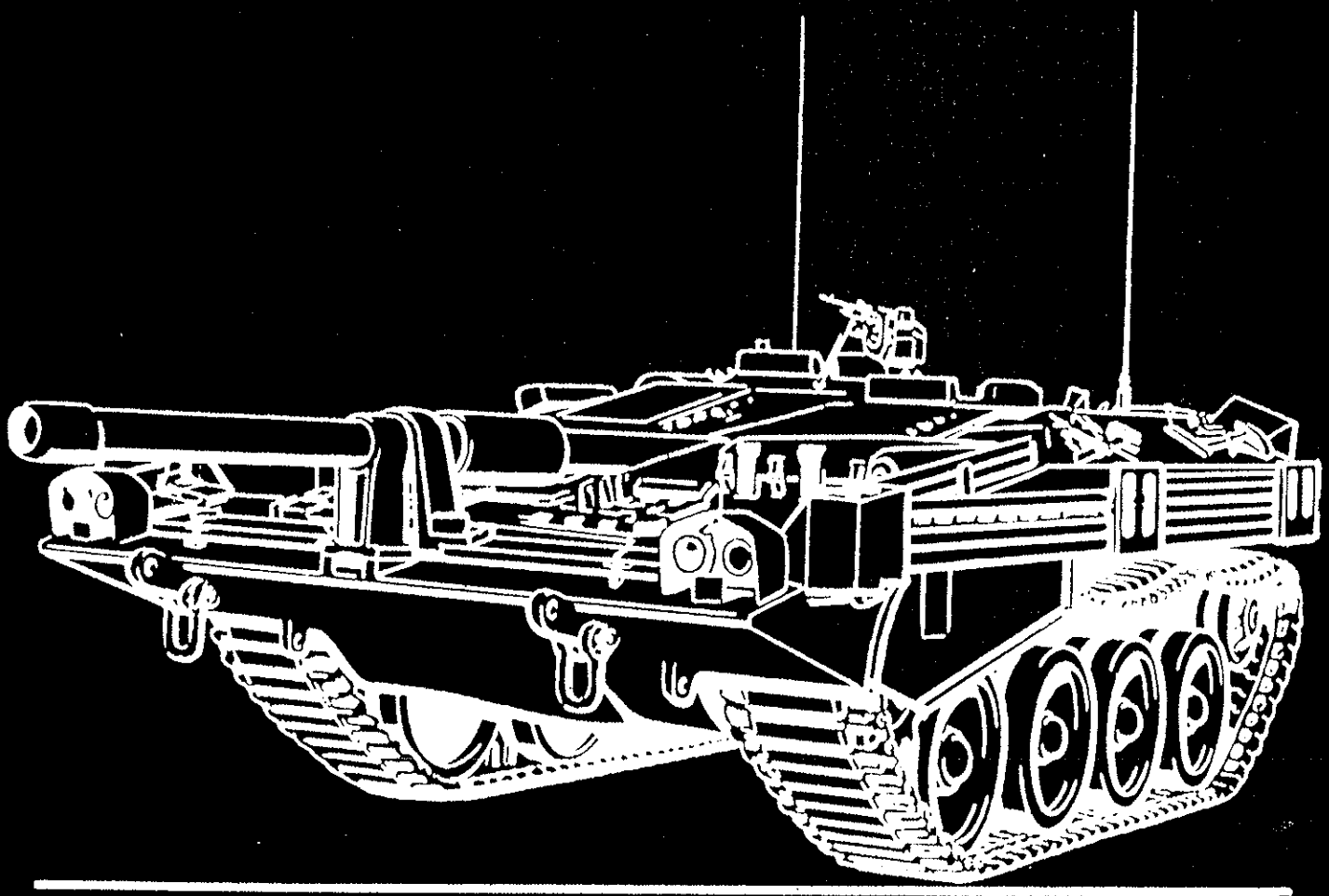
Tank 103B
User Handbook



The Defence Materiel Administration of Sweden
May 1975

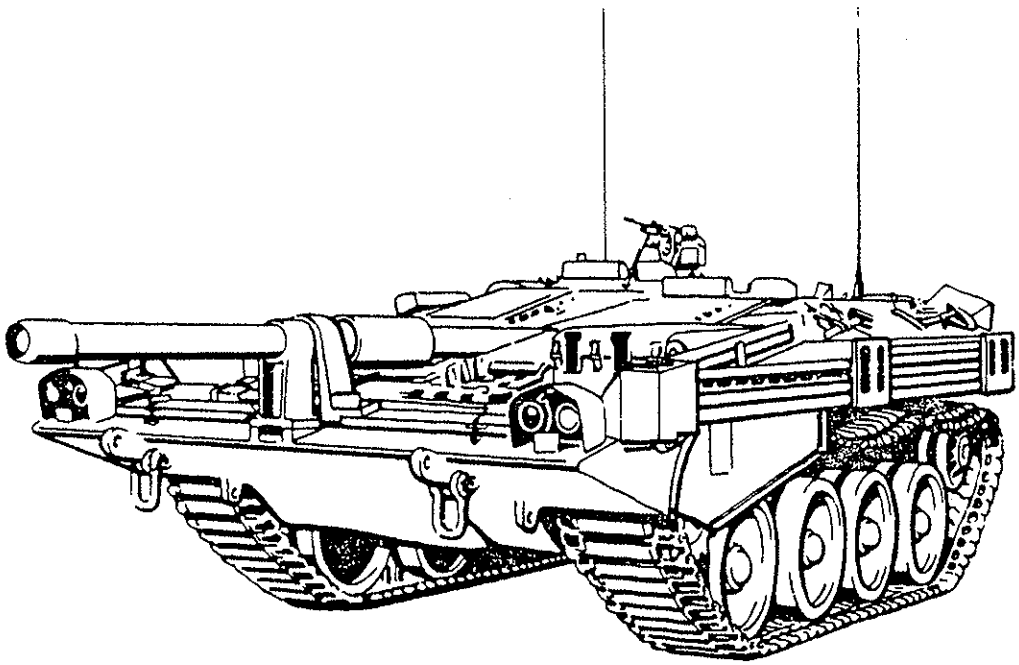
Tank 103B
User Handbook

The Defence Materiel Administration of Sweden
May 1975

Tank 103B

Description Part 1

1. INTRODUKTION



The Defense Materiel Administration of Sweden

May 1975

TABLE OF CONTENTS

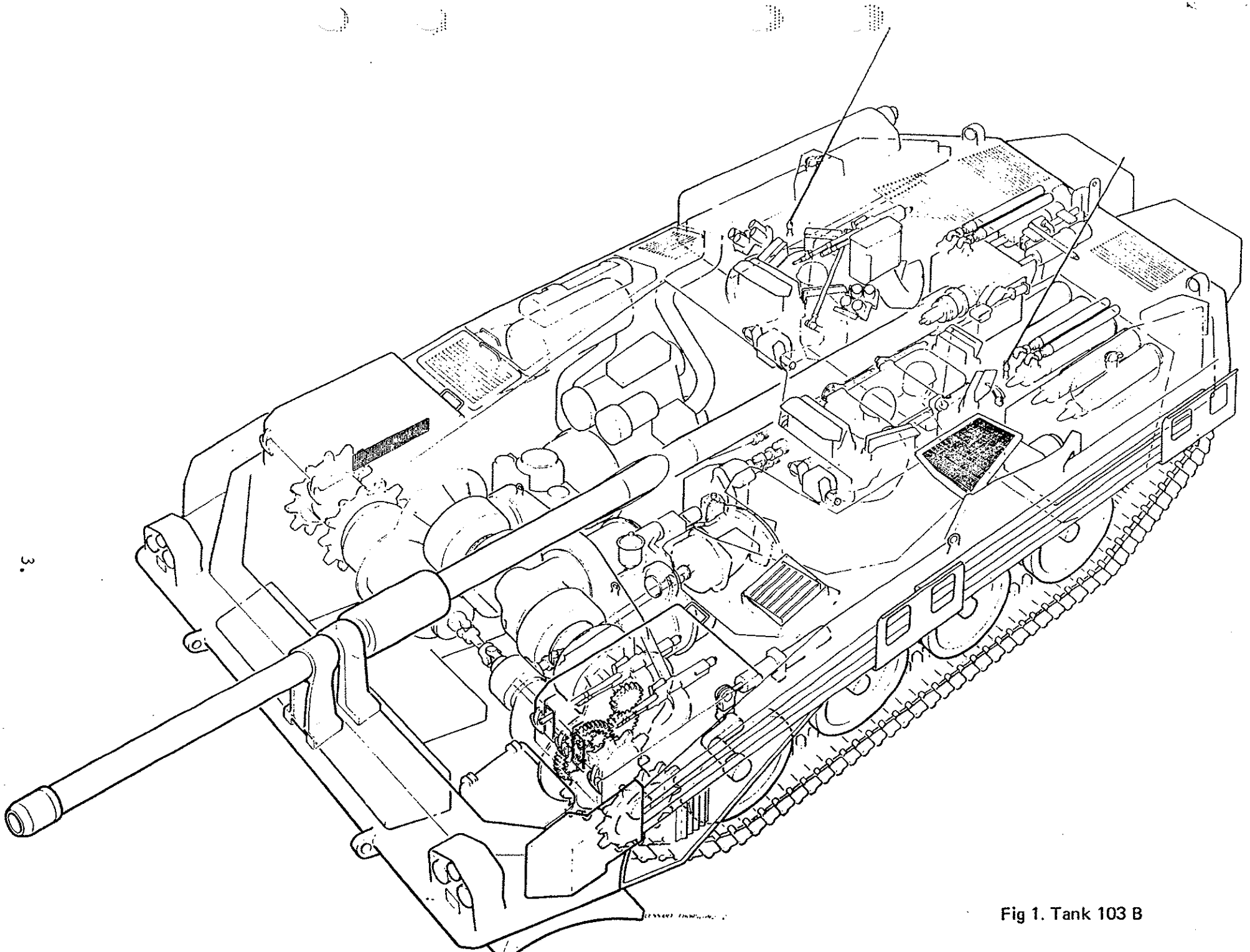


Fig 1. Tank 103 B

General

Tank 103 B has a combat weight of 39, 7 tons. The weapons consists of a 10.5 cm cannon, two fixed and one outside machine gun. The cannon and the two fixed machine guns are mounted in the vehicle body in such a manner that they can be aimed at the target with the entire vehicle. In addition to the outside machine gun there is a smoke ejector for protection of the vehicle.

The engine aggregate is constituted of a diesel engine and a gas turbine, both of the multi-fuel type. The engines can be utilized individually or in combination. The power transmission includes an automatic gear box as well as a manually operated gear box with two forward speeds and two reverse speeds.

The vehicle springs are hydropneumatic which means that the spring mechanisms operate with oil and gas (nitrogen gas).

The vehicle is operated with the aid of a hydraulic and an electro-hydraulic servo system. The maneuverings (driving, aiming, loading and firing) can be performed by one man.

The radio equipment consists of two radio transmitters (Ra 421) as well as an intercom system, an outside telephone and remote control equipment.

The vehicle carries a fording equipment. Forward movement and maneuvering through water is accomplished with the ordinary aggregate for driving.

The crew consists of three men: the tank commander (also a gunner/driver), gunner/driver and the backwards driver.

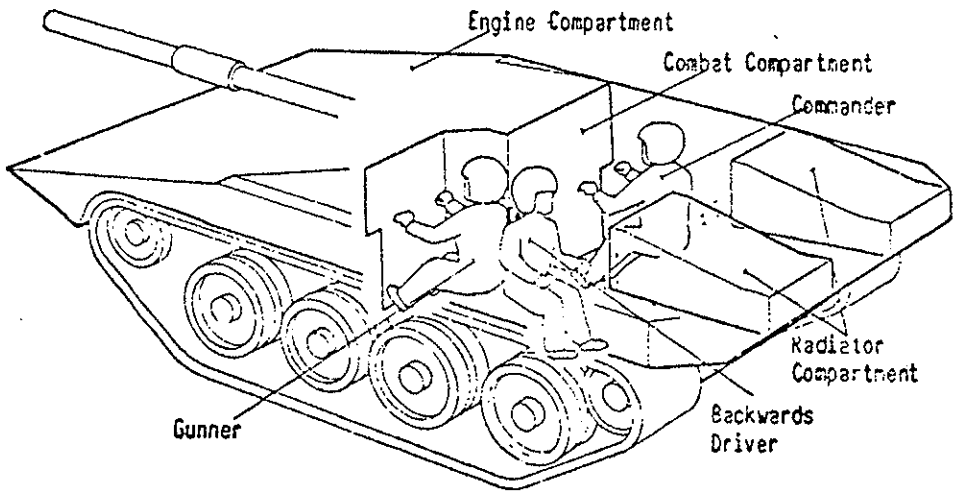


Fig. 2. Positions of the Crew

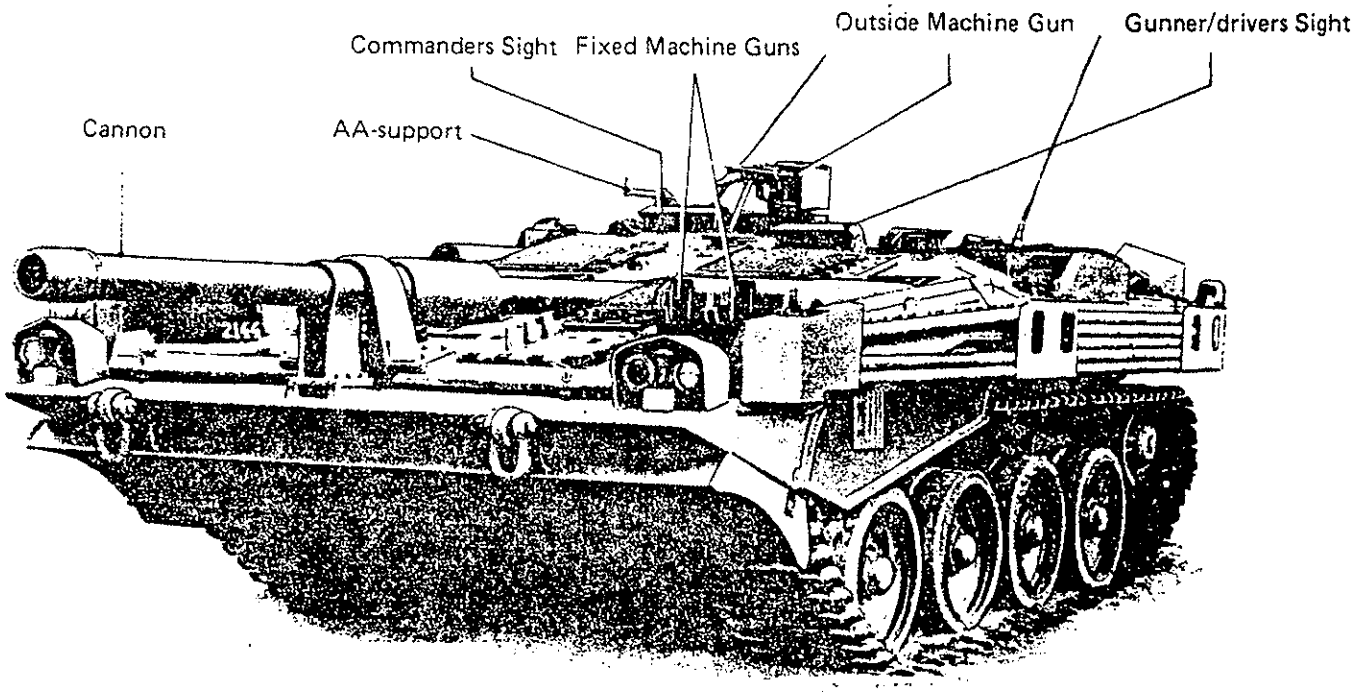


Fig. 3. Left Front View of Vehicle

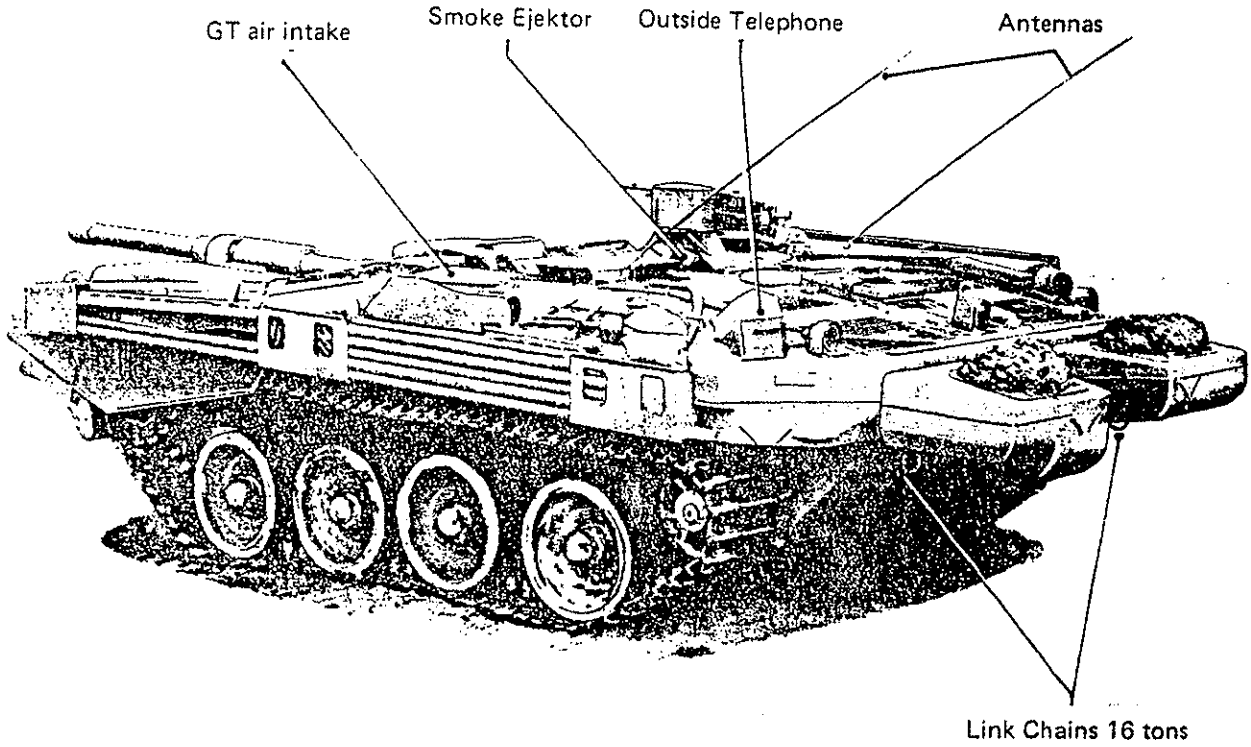


Fig. 4. Left Rear View of Vehicle

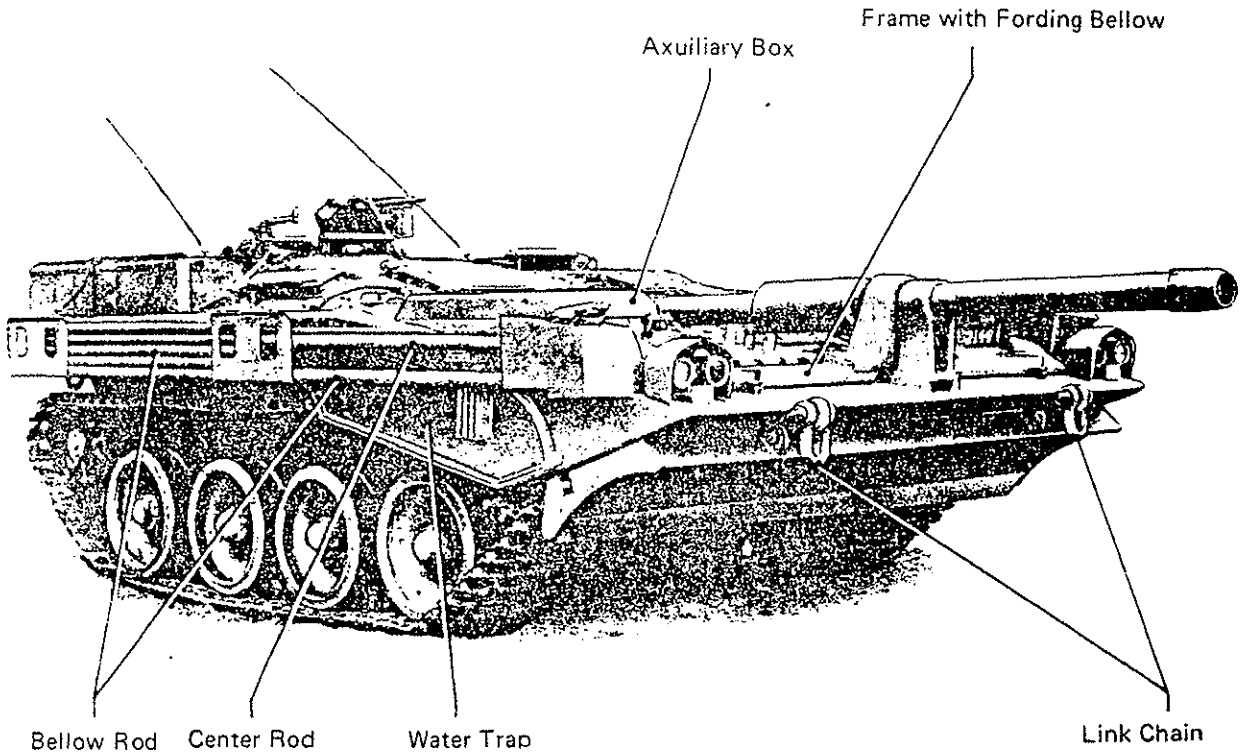


Fig. 5. Right Front View of Vehicle

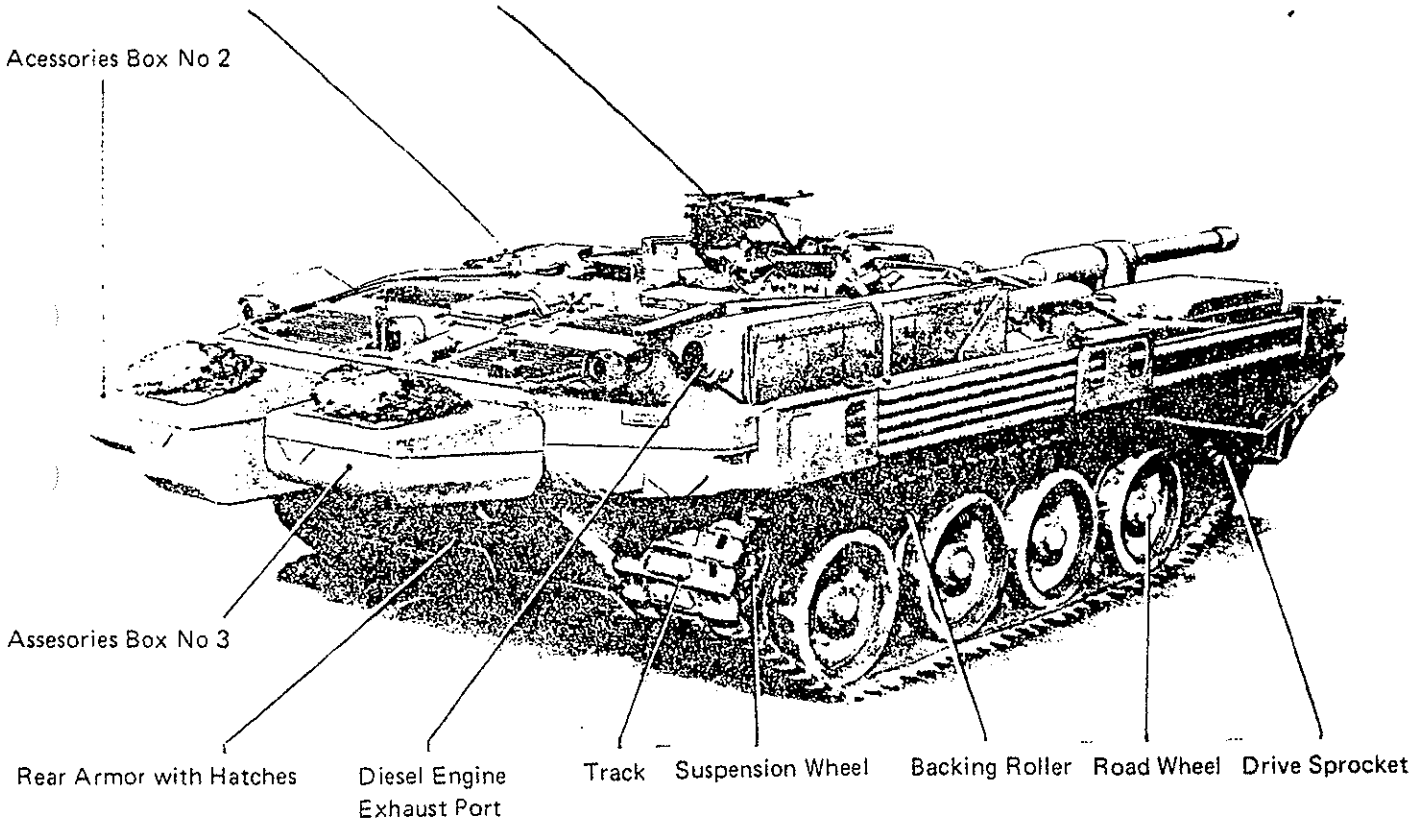


Fig. 6. Right Rear View of Vehicle .

Weight and Dimensions, etc.

Vehicle Supply Identification M5230-103021
Vehicle Supply Name ..... STRV 103 B MT
Combat Weight (without fording equipment) ..... 39,7 tons

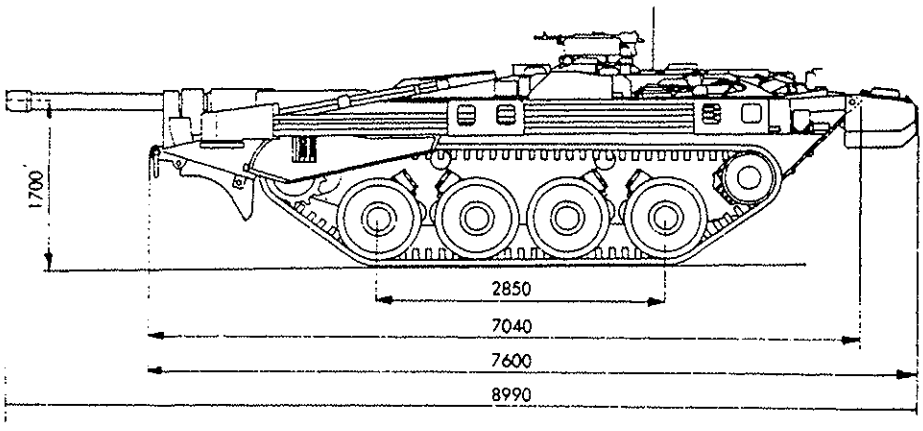


Fig. 7. Vehicle, side view

Length
- with the cannon ..... 8.99 m
- without the cannon ..... 7.60 m
- without cannon and accessories boxes ..... 7.04 m

Width
- without fording equipment ..... 3.42 m
- with fording equipment ..... 3.63 m

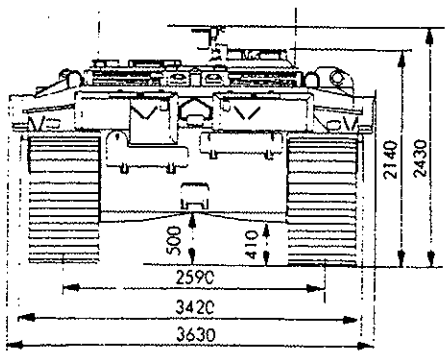


Fig. 8. Vehicle, rear view

Height
- with observation cupola ..... 2.14 m
- with observation cupola and machine gun ..... 2.43 m
- up to barrel center line at the muzzle, horizontal vehicle ..... 1.70 m

Normal vehicle clearance with vehicle in horizontal position
- under vehicle center ..... 0.50 m
- at inner track edge ..... 0.41 m

Low vehicle clearance: Height gauge reduced by ..... 0.12 m

Center height on the front wheel (vehicle in horizontal position) ..... 0.90 m

Distance between tracks (between track center lines) ..... 2.59 m

Track
- width ..... 0.67 m
- number of links per track (new) 86
- ground contact length ..... 2.85 m

Specific track pressure
- maximum pressure ..... 2.85 kp/cm^2
- mean pressure ..... 1.04 kp/cm^2

Specific engine power, gross ..... 18.4 hp/t

Performance

Road speed, max ..... 50 km/h

Turning radius, min. with superposition system
- shift in neutral position ..... 0 m
- at maximum speed in high gear ..... 70 m
- at maximum speed in terrain gear ..... 26 m

Trench crossing capability, the trench having firm edges ..... 2.3 m

Climbing capacity forward ..... 30°

Climbing capacity backward ..... 26°

Lateral stability ..... 35°

Fording capability without special equipment .. 1.5 m

Capacities

Fuel
- in each side tank ..... approx. 425 liters
- in the front tank ..... approx. 110 liters
- total ..... approx. 960 liters
- remaining fuel when monitoring light FUEL LEVEL comes on ..... approx, 90 liters

Coolant ..... 70 liters

Servo oil, total ..... 140 liters
- in the tank ..... 57 liters

remaining oil when monitoring light EMPTY TANK comes on	approx. 25 liters
remaining oil when monitoring light FILLING LEVEL can come on	approx. 10 liters

Other oil, see Lubrication Chart

Engine Aggregate

Piston Engine

Manufacturer	Rolls Royce
Type	K60 diesel
Power at 3,650 rpm	240 hp (SAE)
Number of cylinders	6
Cylinder diameter	3.4375 in (87.3 mm)
Stroke length	3.6 in (91.4 mm)
Piston displacement	6.57 liters
Injection sequence	1-5-3-4-2-6
Fuel (normal)	Diesel oil

Gas Turbine

Manufacturer	Caterpillar
Identification	553
Power at 39.000 rpm (normal rating)	400 hp (SAE)
Power at 41.000 rpm (emergency rating)	490 hp
Compressor	Axial- and radial type
Turbine wheel	Axial type
Fuel (normal)	Diesel oil

Automatic Gear Box

Manufacturer	Volvo
Identification	DRH - 1 M
Type .....Three stage	Fully automatic

Converter Gear

Manufacturer	Volvo
Identification	Sv 2

Forward-Reverse Gear Box

Manufacturer	Volvo
Identification	FBTV - 2B

Caliber	7.62 mm
Number of cartridges per magazine	500

Observation Cupola with Outside Machine Gun and Smoke Ejector

Observation cupola weight, complete	approx. 500 kg.
Traversing field from lashed position (mechanical sighting)	± 270 degrees[1]
Maximum traversing speed	60 degrees/sec.
Name of machine gun	ksp 58 strv
Caliber	7.62 mm
After replacing the barrel	6.5 mm
Elevation field	-5 to + 15 degrees
Machine gun in AA-support	-5 to + 70 degrees
Number of cartridges in belt box	500
Number of smoke ejector batteries	2
Number of ejector pipes in each battery	4

Sighting and Observation Equipment

Sight - manufacturer	Jungner
designation	OPS-1 and OPS-1L[2]
weight, complete	38.5 kg
field of elevation	-11 to +16 degrees
elevation speed (observation cupola)	28 degrees/sec
sight, degree of magnification	6, 10 and 18 ggr
sight, field of view	175, 104 and 58 lines
field of view in observation window horizontally	100 degrees[3]
vertically	20 degrees
Observation periscope, manufacturer	Jungner
designation	OP-2
weight	9.5 kg
field of view, horizontally	85 degrees
vertically	20 degrees

Ammunition see Chapter Weapons

Communications Equipment

Radio transmitter, name	Ra 421
number	2

---

1) ± 210 degrees earlier vehicles

2) Prepared for laser

3) Less field wiew for Laser prepared sight

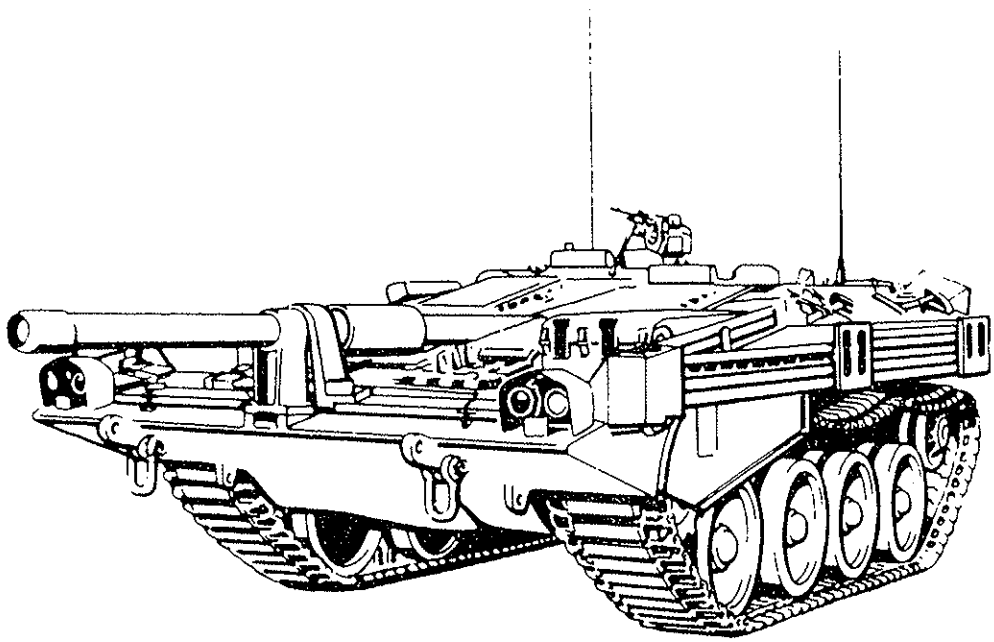
Electrical System

Voltage		24 V d.c.
Batteries (lead type),	voltage	12 V
	capacity	114 amps
	number (series-connected)	2
	weight	44 kg/each
Charging aggregate with piston engine operation:		
Generator,	manufacturer	Rotax
	designation	BA 2804
	type	Alternating current
	gear change on piston engine	2.95:1
	power	2.85 kW
Rectifiers,	manufacturer	Rotax
	designation	ZA 13302
Regulator,	manufacturer	Rotax
	designation	U 6117
Charging aggregate with only gas turbine operation:		
Generator,	manufacturer	Caterpillar
	designation	10-40051-1
	type	Direct current
	power	0.8 kW
Regulator,	manufacturer	Am Bosch
	designation	RGR 2440-H124
Transformers,	manufacturer	Bofors
	type	Static converters
	powered with	24 V d.c.
	power	115 V, 400 Hz 250 VA

Tank 103B

Description Part 1

2. VEHICLE



The Defense Materiel Administration of Sweden

May 1975

TABLE OF CONTENTS

Vehicle Body

The vehicle body consists of a welded-together unit. A center wall divides the vehicle body into two main parts: the engine compartment and the combat compartment. In the rear part of the combat compartment there is the cannon magazine and a loading mechanism. Two spaces on top of the magazine in the combat compartment are subdivided and are used as a radiator compartment.

In the track covers -- the parts of the vehicle body which extend out over the tracks -- there are the fuel tanks, mechanisms for the engine intake and exhaust system, the machine gun, the accessories boxes and the reserve compartments.

Openings, Grids and Plugs

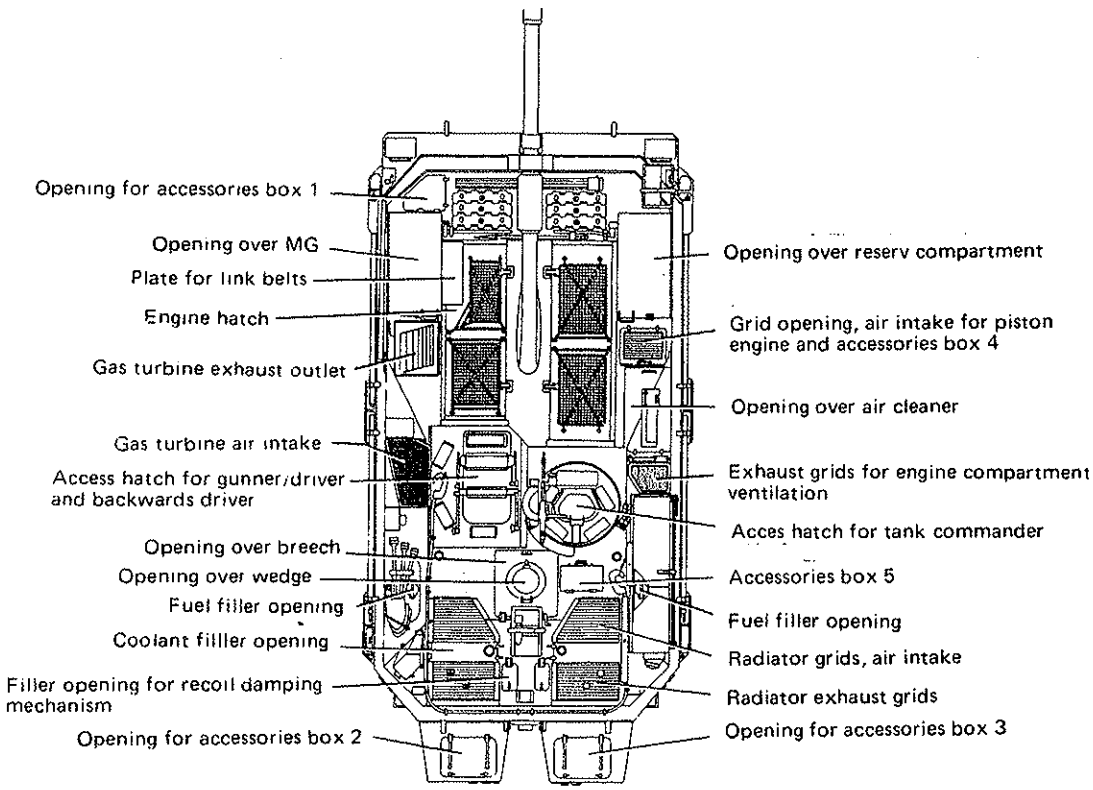


Fig 1. Hatches and grids on top side of vehicle

ACCESS HATCHES

There are two access hatches: one in the observations cupola intended for the tank commander, and one in the vehicle roof for the gunner/driver and the backward driver. Both hatches are balanced to facilitate opening and closing. Commanders hatch can be locked from within and can be locked in observation position as well as in a fully opened position. The hatch is locked automatically in fully opened position. In a emergency situation you can speedly throw up the hatch fully without it is locked in observation position. The hatch for the gunner/driver and the backwards driver can be locked in four different positions.

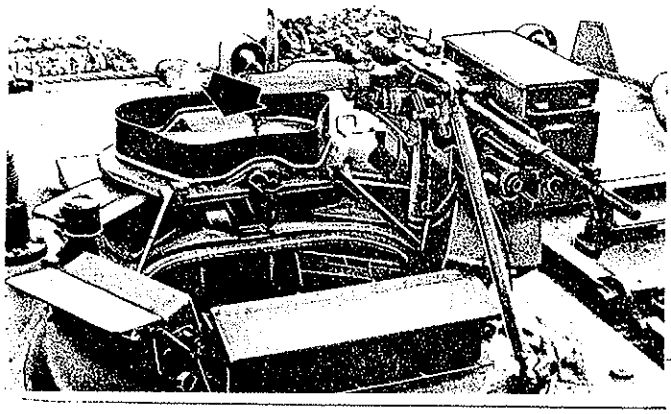


Fig 3. Commander´s hatch

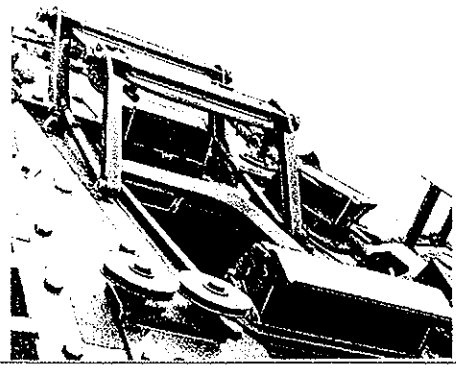


Fig 4. Gunner/drivers and backwards driver´s hatch in observation position

HATCHES OVER THE CANNON BREECH AND WEDGE

The hatches over the cannon breech have hinges and a handle and are fastened with screws to the vehicle roof. In the hatches there is a smaller aperture for the wedge. The smaller hatch has a hinge, a handle and a locking knob.

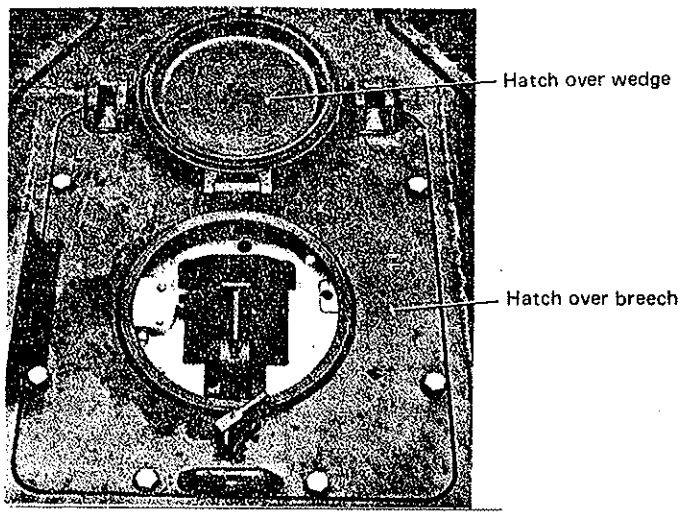


Fig 5. Hatches over cannon hatch and breech

For ventilation of engine compartment there is an intake grid on left side of the opening wich cover the reserve compartment. The grid is covered with a fine net. In the front of the silencer there is an exhaust outlet grid.

The grid opening for accessories box 4 is even an air intake for piston engine. On the rear of the vehicle there are two grids for radiator air intake and two grids for radiator exhaust outlet. In the exhaust grids there are two plugs over the dipslicks of radiator fan transmissions and two plugs over taps for measuring fan revolutions.

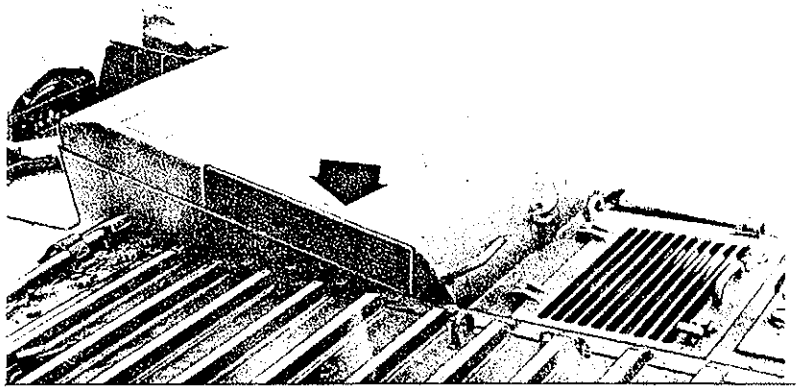


Fig 9. Intake grid for engine compartment ventilation

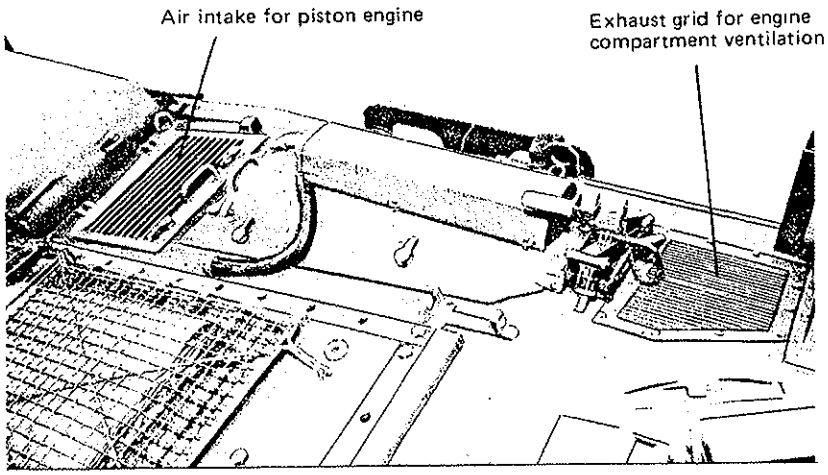


Fig 10. Air intake and exhaust grid

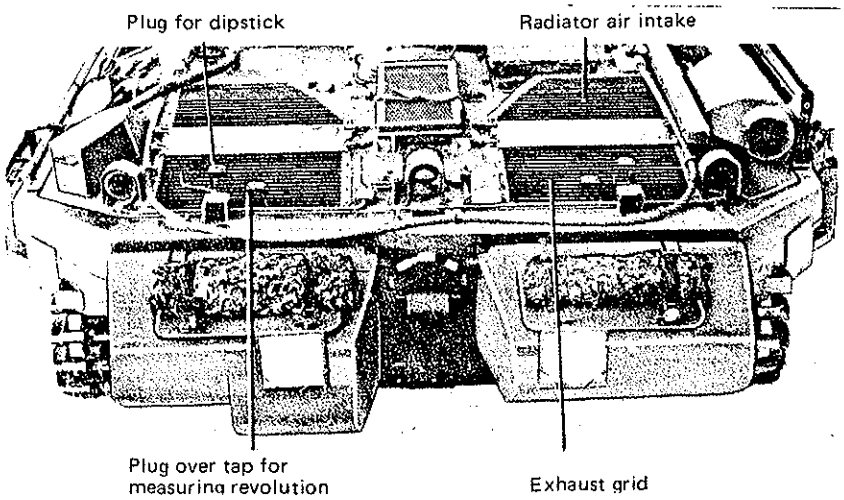


Fig 11. Grids and plugs in the rear of the vehicle

HATCHES AND PLUGS ON THE UNDERSIDE OF THE VEHICLE

The drainage plugs which are shown in the Figure below are accessible by removing 10 outer plugs in the armor plating.

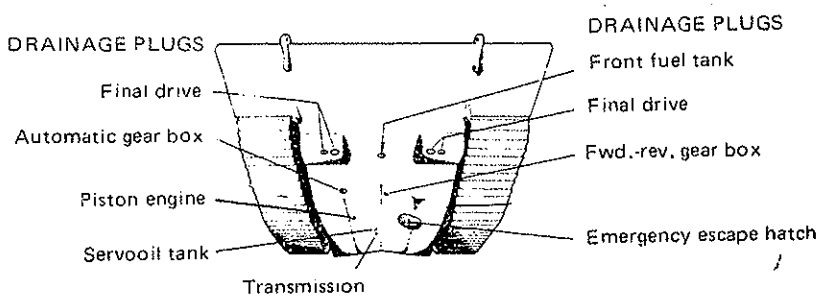


Fig 14. Hatches and openings on underside of vehicle

EMERGENCY ESCAPE HATCH

The emergency escape hatch is situated at the location of the gunner/driver. The arrow should point straight ahead when the hatch is closed. The locking handle is then turned to the right which facilitates opening the hatch.

On the outside of the hatch there is an eye for a iron bar which is used when the hatch must be opened from the outside.

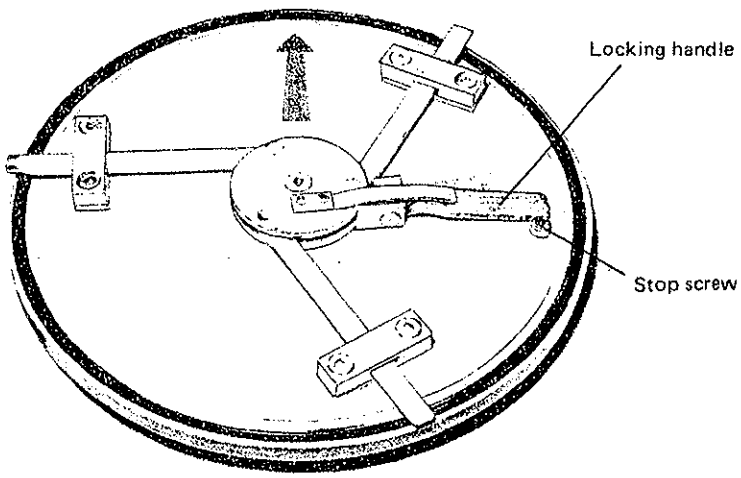


Fig 15. Emergency escape hatch

The side tank vents are situated in necks under the filling cover. From the front tank, a venting tube goes to the left side tank.

The fuel flow from the side tanks can be shut off with cocks in the combat compartment if, for any reason, it is desired to interrupt the flow to the front tank.

Normally, both cocks should be open.

The side tanks can be emptied by opening the drain cocks and removing the plugs in the outer walls of the track cover.

The front tank is emptied by removing its bottom plug (to be done by a mechanic).

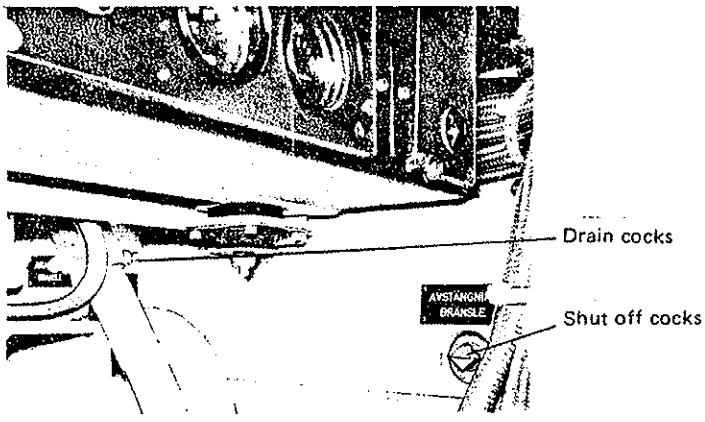


Fig 17. Fuel cocks in the combat compartment (left side)

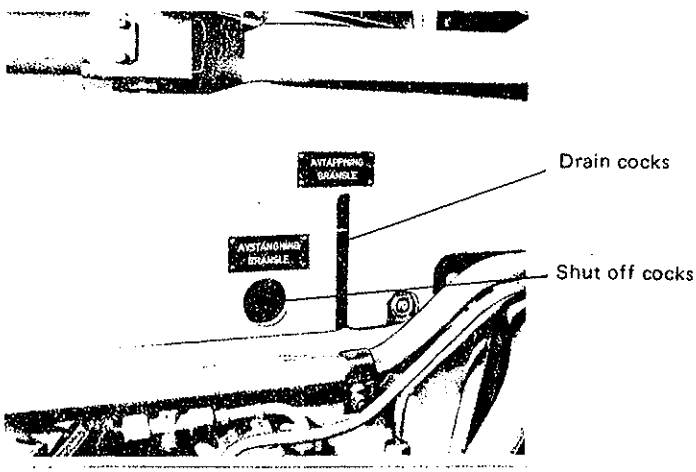


Fig 18. Fuel cocks in the combat compartment (right side)

Chairs

The chairs consist of a frame with removable seating areas. Commanders and gunner/drivers chairs can be rased and lowered. They can be locked in lowered position with a security clamp. Backwards drivers chair can not be rased and lowered. The chair seats can be moved forward or backward, or adjusted to four different inclination position. In addition, the chair for the tank commander can be turned.

Pigeonhole and Holder

In the combat compartment there is a pigeonhole and a holder for accessories and personal equipment.

Location of the accessories, see chapter 8 Tools and equipment.

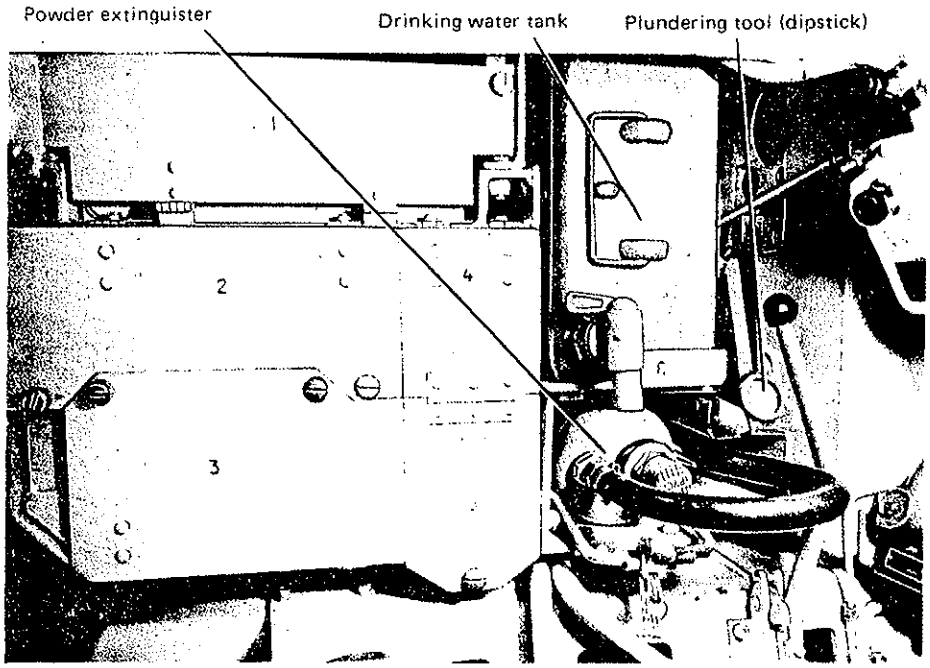


Fig 21. Pigeonehole behind tank commander

Common Control Mechanisms and instruments

The following control mechanisms are common for the entire crew: hand gas control, control valve for wedge opening and certain control mechanisms on the starter panel.

Tank commander´s place

The tank commander sits in the right part of the combat compartment. The control mechanisms for driving, sighting and firing are situated there.

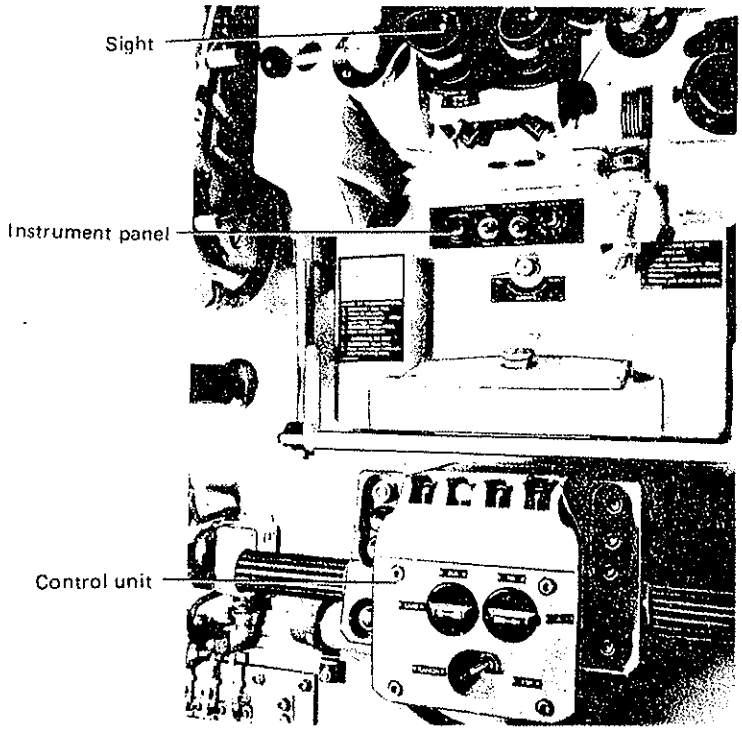


Fig 24. Tank commander´s controls and instruments

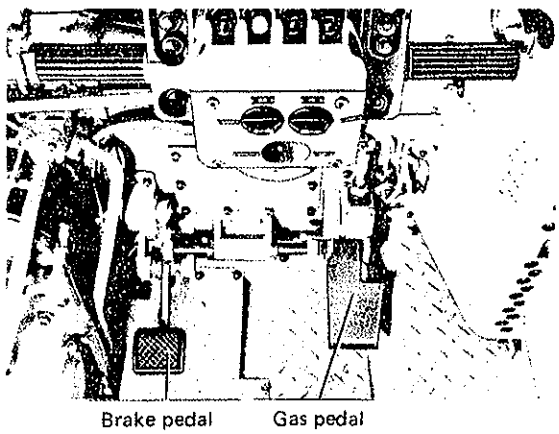


Fig 25. Tank commander´s controls

The control unit has two red warning lights; one for the function of piston engine and one for transmission. Furthermore there are one yellow control light for function of the gas turbine and a white control light for overspeed of the transmission. The warning light shall be turned out at normal operation.

Following functions are connected up on the lights:

Light	Function	
PISTON ENGINE	Oil temperature	piston engine automatic gearbox
	Coolant temperature	piston engine
	Oil pressure	piston engine automatic gearbox
TRANSMISSION	Oil level	servo tank
	Oil temperature	servo oil
		Forw-Backw-Terr-Gearbox
	Oil pressure	servo oil
		Forw-Backw-Terr-Gearbox
		Injection oil
OVERSPEED	Overspeed	engines transmission
GAS TURBINE	Oil temperature exhaust gas temperature oil pressure	

The warning lights KOLVMOTOR and TRANSMISSION lights, when the switch KOLVMOTOR on the starter panel is set in position TILL and when the oil pressure is too low or oil temperature is too high. Furthermore the light KOLVMOTOR comes on when coolant temperature is too high and the light TRANSMISSION when the level is too low in the servo oil tank.

The light GASTURBIN comes on when the switch GASTURBIN on starter panel is set in position TILL and when exhaust or oil temperature is too high or when oil pressure is too low.

The light ÖVERVARVN comes on when the revolution of the piston engine exceed at 3930 rpm in gear positions N, FD. FT and BD and at 3600 rpm in gear selection BT.

BRAKE PEDAL

The brake pedal influence through the hydraulic system steering - and driving brakes.

NOTE. The brake pedal is functioned only when the piston engine is running.

Fire Alarm Light

See chapter 8 Fire Extinguishers.

Gunner/Driver's Place

The gunner/driver sits in the left front part of the combat compartment. Control unit for driving, sighting and firing are located there.

Control Unit

The control unit near the gunner/driver is just like that of the tank commander and is used in the same way. see page 18.

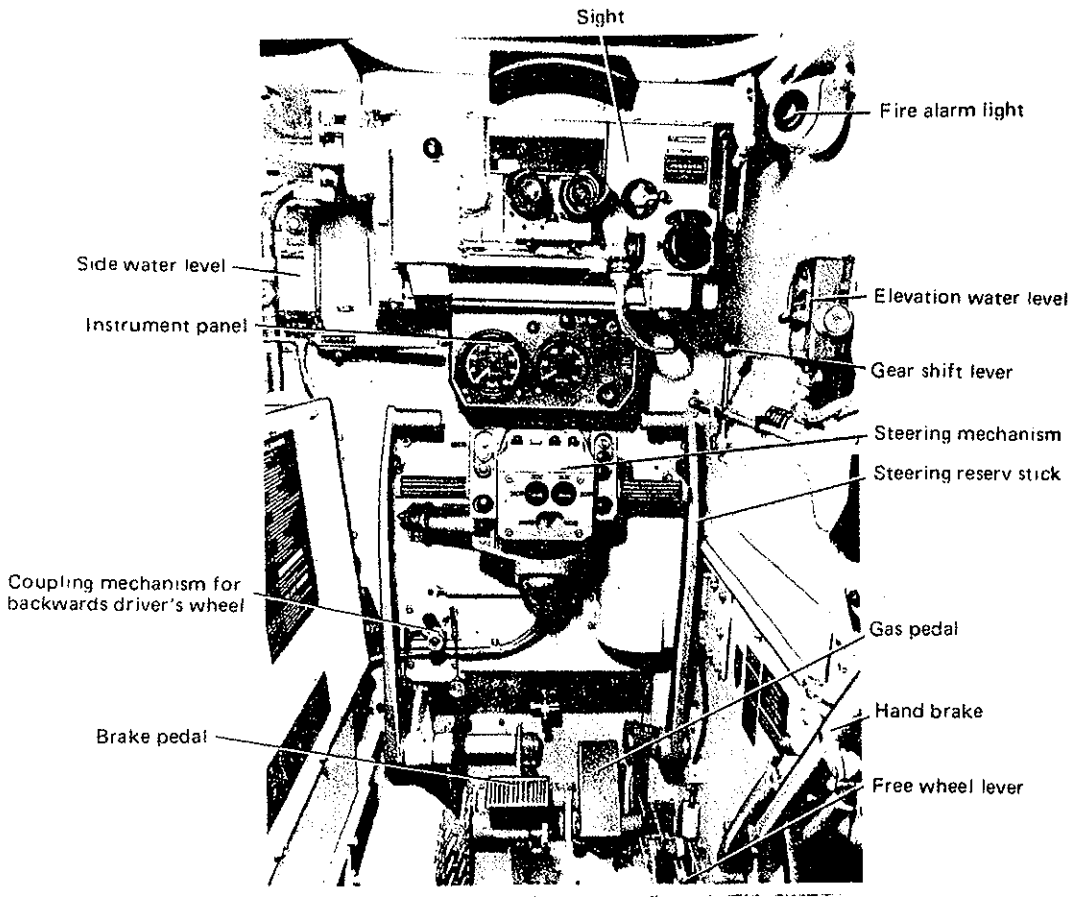


Fig 29. Gunner/drivers controls and instruments

BRAKE PEDAL

The brake pedal influence steering- and drivingbrakes through the hydraulic system, see commander´s control mechanism. The brake is furthermore connected with backwards driver´s pedal through a linkage system. That means gunner/driver´s and backwards driver´s brake pedal influence the same servo valve in the hydraulic system.

HAND BRAKE LEVER

The hand brake influence mechanically the steering- and driving brakes. The brake lever is located to the right of gunner/driver. The lever is linked at the middle to make it easier to pull it. First the hole lever is pulled up and then the rear part of the lever is pressed down. Control light on gunner/driver´s panel comes on when the lever is influenced. When releasing the hand brake, the catch in the rear part is pressed in. The rear part is pulled down until it is connected with the front part. The hole lever is then pushed to its lower position. At the same time the control light on the panel is going out.

FREE WHEEL LEVER

The lever is located on the centre wall to the engine compartment near the gas pedal at the right. The lever has positions LÅST (lower position) and ÖPPET (upper position). Free wheel shall normally be locked. When driving only with gas turbine shall the lever be in position ÖPPET.

CHANGEOVER SWITCH FOR OUTER ROAD WHEELS

The switch is located upon and in front of the junction box C11. It has the positions H:JDR TILL, H:JDR FRÅN, V FRAMHJUL, V BAKHJUL, V SIDA, H FRAMHJUL, H BAKHJUL and H SIDA. The switch shall normally be positioned in HÖJDR TILL, which means that elevating system is engaged.

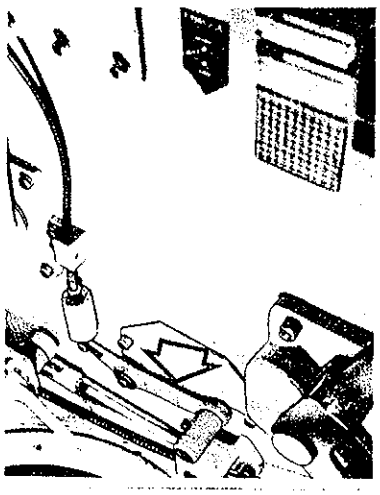


Fig 31. Free wheel lever

Fig 32. Changeover switch for outer road wheels

-- Switch (Changeover) for headlights bright (HEL) and dimlight (HALVLJUS).

-- Control light (yellow) for handbrake.

-- Rserve firing button.

-- Through a contact device on the left side of the panel signals can takes out to warning and control lights on separate panel.

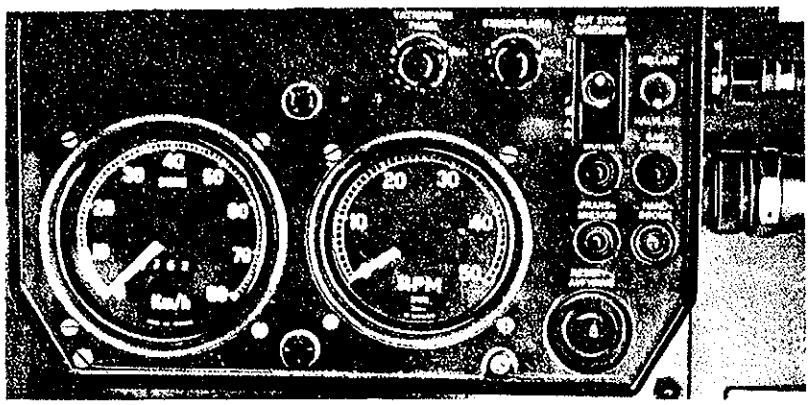


Fig 34. Instrument panel, gunner/driver

Backwards Driver's Place

The backwards driver sits in reversed position in the left rear section of the combat compartment. On the backwards driver's place there are individual control mechanisms for driving and certain control devices for loading the cannon. The main part of the vehicle instruments, together with warning and monitoring lights, are situated on the instrument panel near the backwards driver.

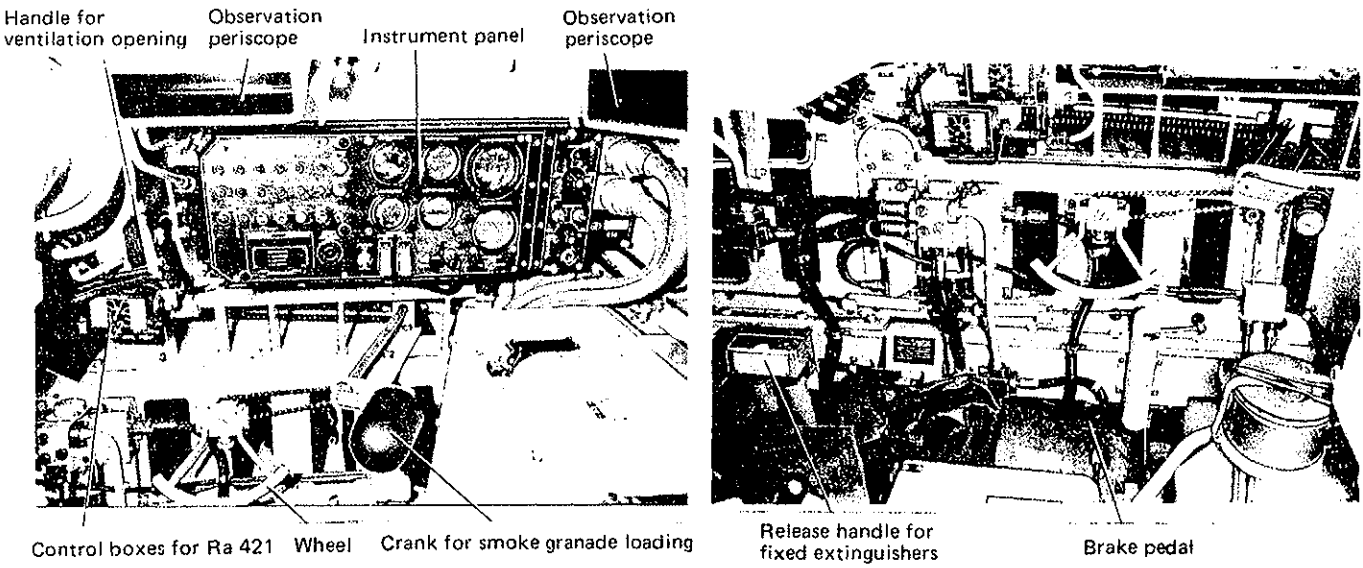


Fig 35. Backwards driver´s controls and instruments

On the hinged part of the panel there are:

Warning- and Control lights	Light come on	
Oil pressure (red)	INJECTIONSOLJA SERVOOLJA KOLVMOTOR AUT-VX- LÅDA TERRÄNG-VX-LÅDA GASTURBIN	to low oil pressure in a system
Oil temperature (red)	SERVOOLJA KOLVMOTOR AUT-VX-LÅDA TERRÄNG-VX-LÅDA GASTURBIN	to high oil temperature in a oil system
Coolant temperature (red)	KYLVÄTSKETEMP	to high coolant temperature at max allowed temp at 108° C
Servo oil empty tank (red)	SERVOOLJA TOM TANK	Servo oil tank empty approx less 25 litres
Filling - level (red)	PÅFYLLN - NIVÅ	approx less 10 litres Note. Check the level with piston engine stopped.
Smoke Granades magazine engaged (yellow)	RÖKMAGASIN INKOPPLAT	holding blockings in smoke granades is released
Fuel level (yellow)	BRÄNSLENIVÅ	approx 90 litres fuel in the front tank. Note. If fuel level is low in the side tanks the light can come on if the vehicle under long time is driving elevated
Battery loading (yellow)	BATTERI LADDNING	The batteries gets no loading from piston engine´s generator. NOTE! With separate driving on GT the light dont go out
115 V 400 Hz (white)		Alternative current circuit is alive
Gas turbine starting (yellow)	GASTURBIN START	The gas turbine automatic starting sequence is going on
Overspeed (red)	ÖVERVARV	Overspeed protection for gas turbine is released

Instrument		Function
Bilge pumps Combat Compartment Engine Compartment	LÄNSPUMPAR STRIDSRUM MOTORRUM	The switches is functioning a automatic fuses and has pro- tective covers. When the covers is felld down the swit es turn off. NOTE! The piston engine mu be running when the bilge pumps are used.
Illumination Forward OFF Backward	BELYSNING FRAMÅT FRÅN BAKÅT	For alternate illumination. see Operation
Panel light Controlling	PANELBELYSNING ÖVERVAKNING	For setting desired candle Automatic returning to posi- tion TILL. Is used when max value comes up on GT instru ments. See Operation.
Four lights		For panel illumination
On the panels fixed part there are:		
Fire Alarm	BRANDVARNING	A knob with positions DRIFT TESTL 2 and 3. The knob must be in position DRIFT except at testing. A red war: ing light lights at fire and test
Extinguishers	BRANDSLÄCKARE	A knob with positions MAN AUT 1 and 2. NOTE! The knob must be set in position MAN before the engine hatch es are raised. Two yellow control light shows wich of the extinguishers has auto- matically released
Insepction lamp junctions 24 V		
Light		For panel illumination

Fig 37. Not actual for this case

Engine Aggregate

By the engine aggregate we mean the prime mover and the transmission components which are situated on a separate frame and can be lifted out of the vehicle as a unit. Fig. 41 shows which main components are included.

The prime movers are two independently operating engines, the piston engine and the gas turbine. Both engines are connected to the converter gear, the piston engine by means of an automatic gear box. The combined torque of both engines is conducted over the forward-reverse gear box to the angle gear. From here it is transmitted by means of the steering clutch and the final drives to the drive sprocket.

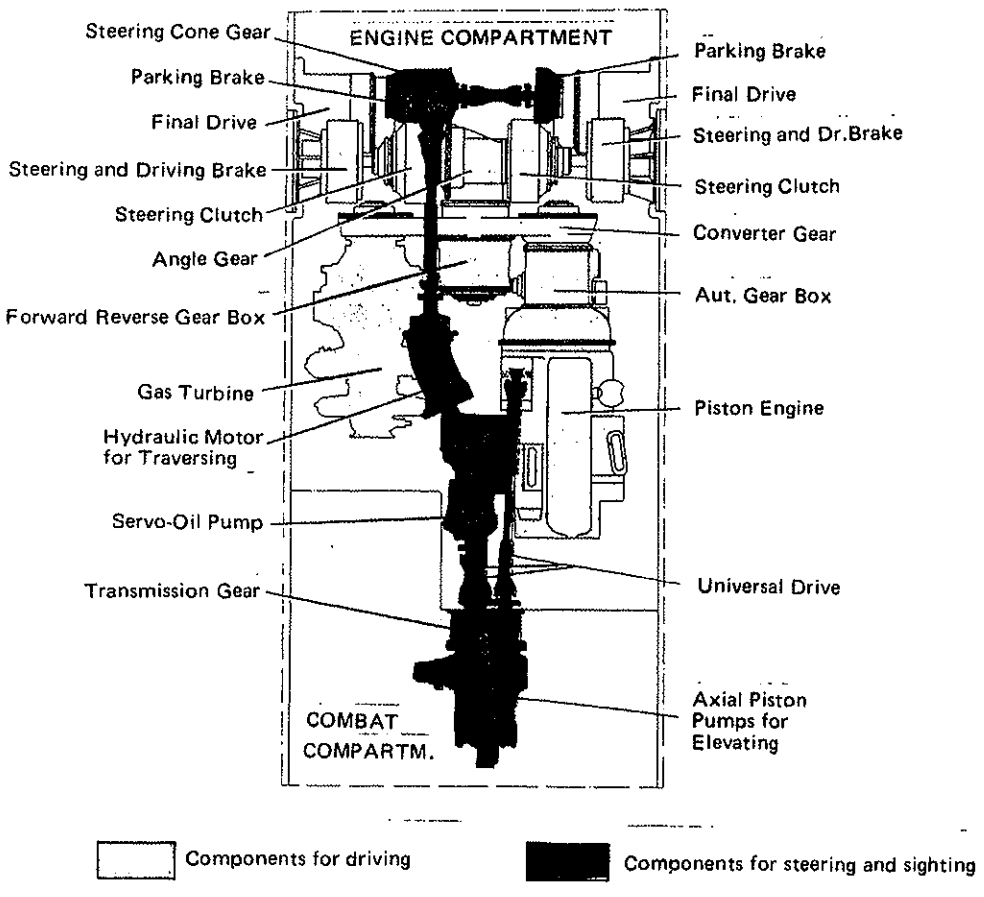


Fig 40. Main components in engine compartment

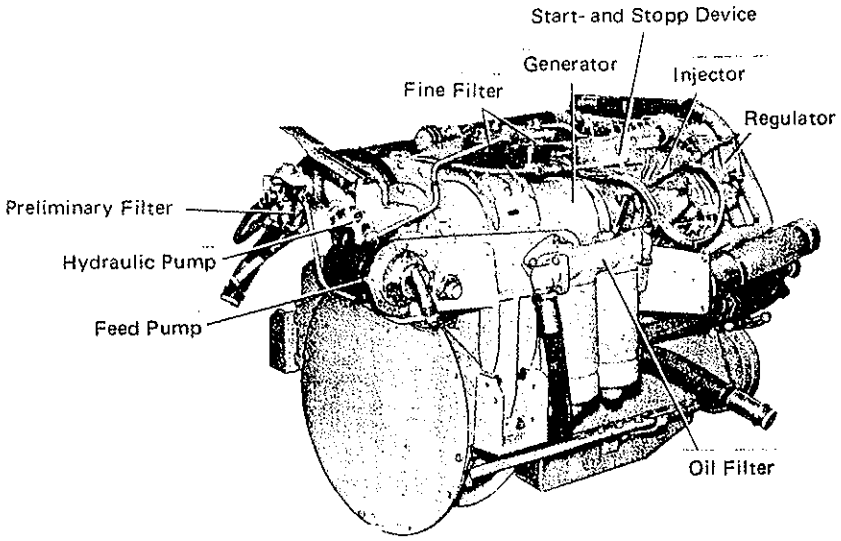


Fig 43. Piston engine

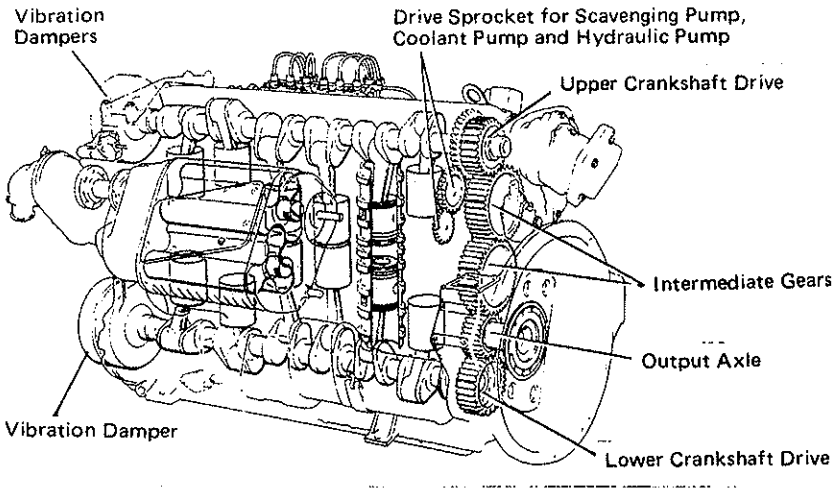


Fig 44. Piston engine, principle

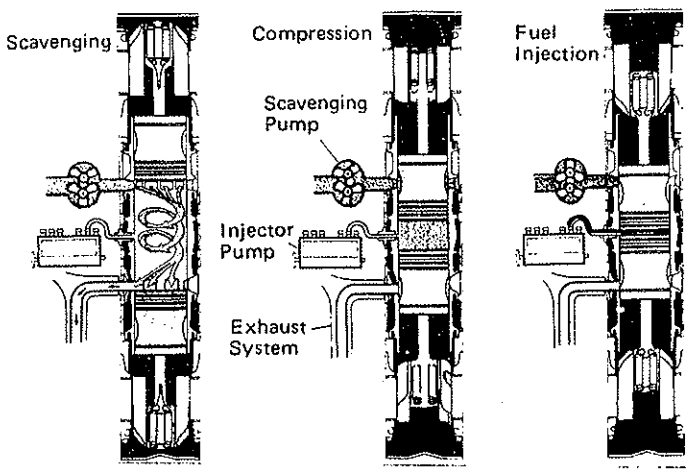


Fig 45. Piston engine, method of operation

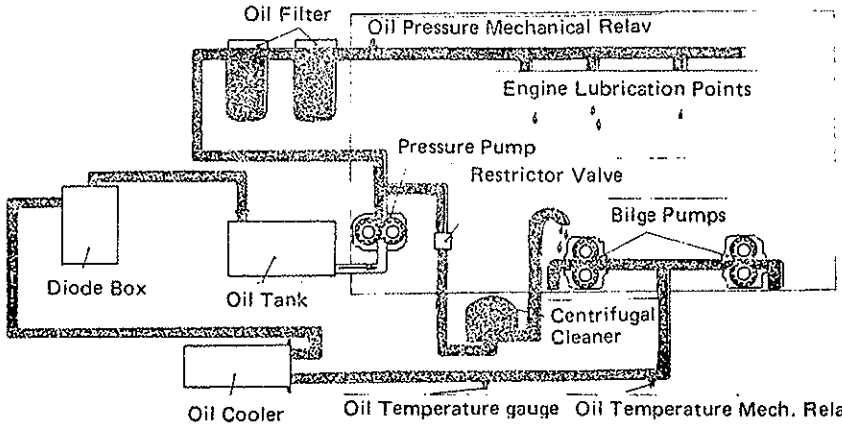


Fig 47a. Piston engine lubrication system

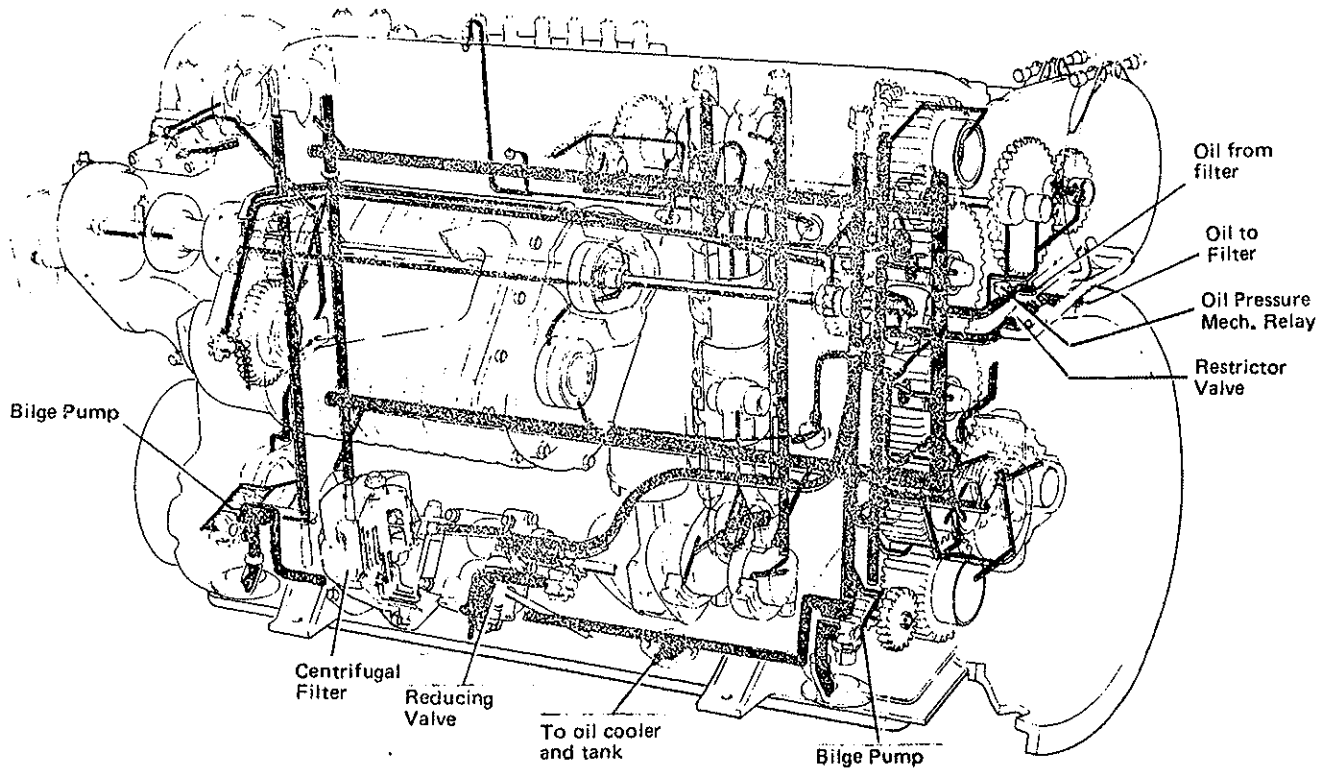


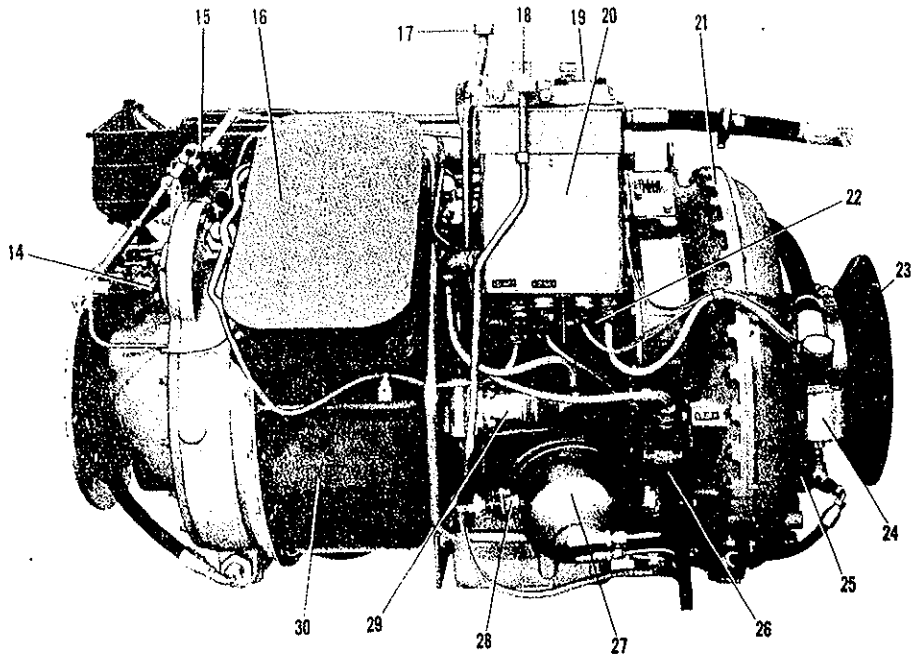
Fig 47b. Pistone engine lubrication system

Cooling System

The piston engine is liquid cooled and connected to the vehicle central cooling system.

Electrical System

The electrical units mounted on the piston engine are the starter motor, the fuel pump, the fuel magnet valve, the a.c. generator with rectifier (diode box), the radio junction box, as well as gauges and mechanical relays for monitoring. See also the chapter entitled Electrical System.



14. Rpm reducer
15. Throttle mechanism
16. Exhaust outlet
17. Oil dipstick
18. Oil drain pipe
19. Hour runmeter
20. Junction box
21. Compressor housing
22. Start generator
23. Cover, air intake
24. Oil pressure gauge
25. Oil pressure sender
26. Ignition unit
27. Combustion chamber
28. Spark plug
29. Fuel magnet valve
30. Exhaust collector

Fig 49. Gas turbine

Since there is no firm connection between the compressor turbine and the drive turbine; their rotational speeds can vary independently according to engine load which gives the engine a common torque curve.

From the fine filter, the fuel goes to the high pressure pump. This is driven by the gear wheels on the compressor axle and generates the high pressure which is required for injection. The fuel regulator is driven in the same manner; it furnishes the correct amount of injected fuel. The regulator is actuated mechanically by the gas control and regulates the fuel delivery, compressor pressure and the centrifugal regulator of the drive turbine.

From the fuel regulator the fuel is forced through a magnet valve and an injector nozzle out into the combustion chamber. When the gas turbine stops and consequently the flow to the magnetic valve is interrupted, a slide moves in the magnet valve and stops the fuel delivery.
A valve in the fuel pipe will then open and the fuel will ran back into the inlet side of the fuel pump.

The shaping of the fuel injectors are shown in fig 51b.

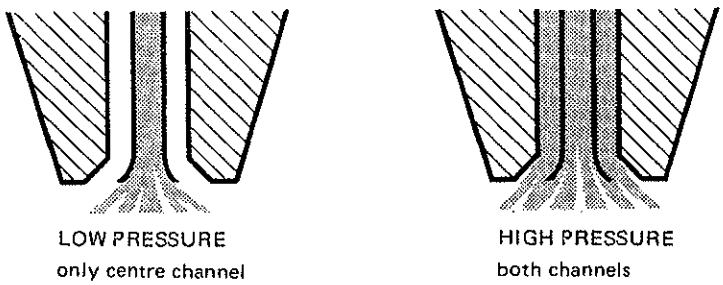


Fig 51b. Gas turbine fuel injectors

Lubrication system

The gas turbine lubrication system is shown in principle in fig 52.

The system consists of a three element gas producer oil pump, a tow element power output section oilpump and a full-flow filter.

System operation is monitored by an electrical oil pressure transmitter, an oil temperatur thermocouple and an electrical low oil pressure switch. There is also an oil cooler in the system.

The gas producer oil pump consists of one pressure and two scavenge elements. The pressure element supplies oil from the engine sump to the oil cooler, back to the oil filter and then circulates oil throughout the engine. An internal engine pressure relief valve prevents excessive oil pressure on the oil cooler. One of the two scavenge pump elements scavenges the gas producer rotor housing and the other scavenges the power section which is of dry sump design.

AIR FILTER

Gas turbine air cleaning system consist of a dynamic filter (cyclone) and a static filter (paper).

Dynamic filter (cyclone)

The filter is located in an armored box which can be lifted up, see fig. 53a.

The filter is cleaned by means of a scavenge fan. The dynamic filter can be lifted up so that the static filtercan be reached. In raised position the filter will be sucured by means of a hook.

Static filter (paper)

The filter consists of six pieces of paper filters. The filters are mounted on a frame.

The filters can be removed for cleaning. This should be done when the pressuredrop indicator will show red field when the engine is stopped.

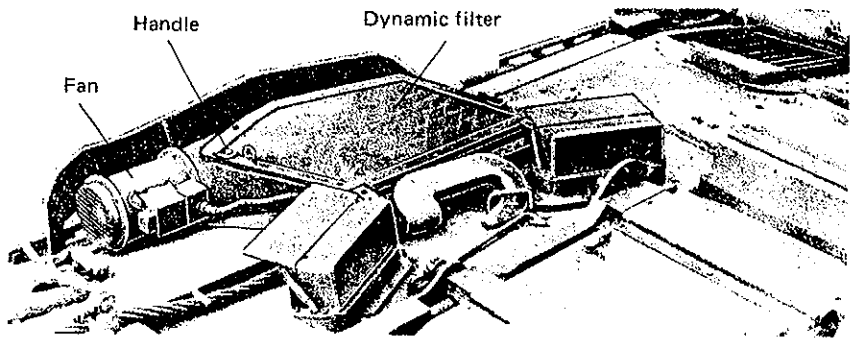


Fig 53a. Gas turbine air filter

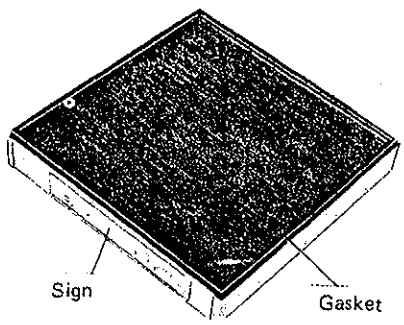


Fig 53b. Paper filter

AUTOMATIC GEAR BOX

In connection with the piston engine there is a hydraulic and an automatic gear box. It has two hydraulic gears and a mechanical high gear. The main parts of the gear box are: a hydraulic torque converter operating with oil -- henceforth to be called a converter, a planetary gear together with a hydraulic control system. A mechanical control system and a control organ also belong to the gear box.

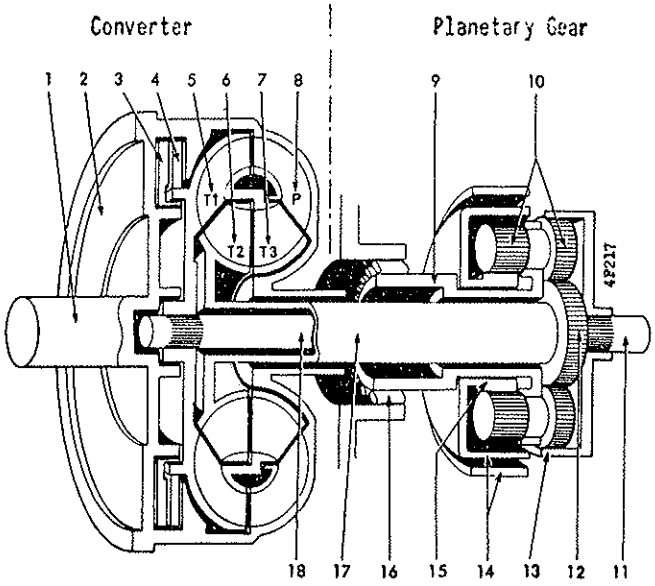


Fig 54. Automatic gear box.

1. Input axle (engine crankshaft)
2. Converter housing with flywheel
3. Piston, disk clutch
4. Disk
5. 1st turbine (T1)
6. 2nd turbine (T2)
7. 3rd turbine (T3)
8. Converter pump (P)
9. Planetary retainer
10. Planetary gear
11. Output axle
12. Rear sun gear
13. Ring gear
14. Brake drum with brake band for front sun gear
15. Front sun gear
16. Free wheel
17. Outer turbine axle
18. Inner turbine axle

Converter

The converter functions both as a clutch and as an extra hydraulic gear between the engine and the gear box. Its gear reduction changes in proportion with the rotational speed on the output axle of the gear box and the engine. The gear reductions are maximum at low and minimum at high rotational speed. During idling the converter functions as a safety clutch. When the converter is coupled with the planetary gear, two gear reduction ranges are achieved in the following called the first and second gear.

The movement of T1 and T2 is transmitted directly to the output axle by the inner turbine axle. The movement of T2 which occurs in the opposite direction due to the construction of the blades, is transmitted by the outer turbine axle to the rear sun wheel. Since the free wheel prevents the planetary retainer from rotating, movement is transmitted by the planetary gear to the ring gear and the output axle. It consequently obtains the combined turning moment of both turbine axles.

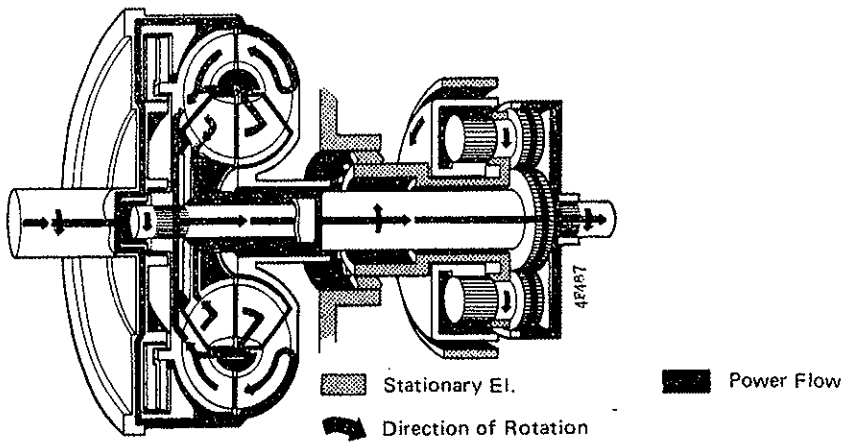


Fig 55. First gear

As the rotational speed of the output axle is increased, the difference in speed between the pump and turbine wheels is decreased which is why the moment change between the engine and the output axle decreases. When this is reduced to about 2:1, the control system automatically effects a shift to second gear.

Second Gear

Second gear is engaged by application of the brake band which locks the front sun gear. Just as in the case of first gear, the movement of the inner turbine axle is transmitted directly; the movement of the outer turbine axle is transmitted over the planetary gear to the output axle. But since the front sun gear is locked, one cog of the planetary gear moves over it and conducts the planetary gear and the free planetary retainer in the direction opposite that of the outer turbine axle. In this manner, the planetary gear and the ring gear obtain great speed which provides less reduction than in the case of first gear.

When reduction has dropped to about 1:1, the control system automatically achieves a shift to third gear.

When only the piston engine is operating, the input axle of the converter gear is driven as shown in Fig. 59. The function of the free wheel is dispensed with, and the outer track is turned along in rotation. The movement is transmitted by means of an intermediate gear to the input axle of the forward-reverse gear box and to the outer track of the other free wheel. This free wheel then begins to function and the output axle of the gas turbine is allowed to stand still.

If only the gas turbine is in operation, the relations are reversed. If both engines are being driven under load, the combined drive moment is transmitted to the forward-reverse gear box.

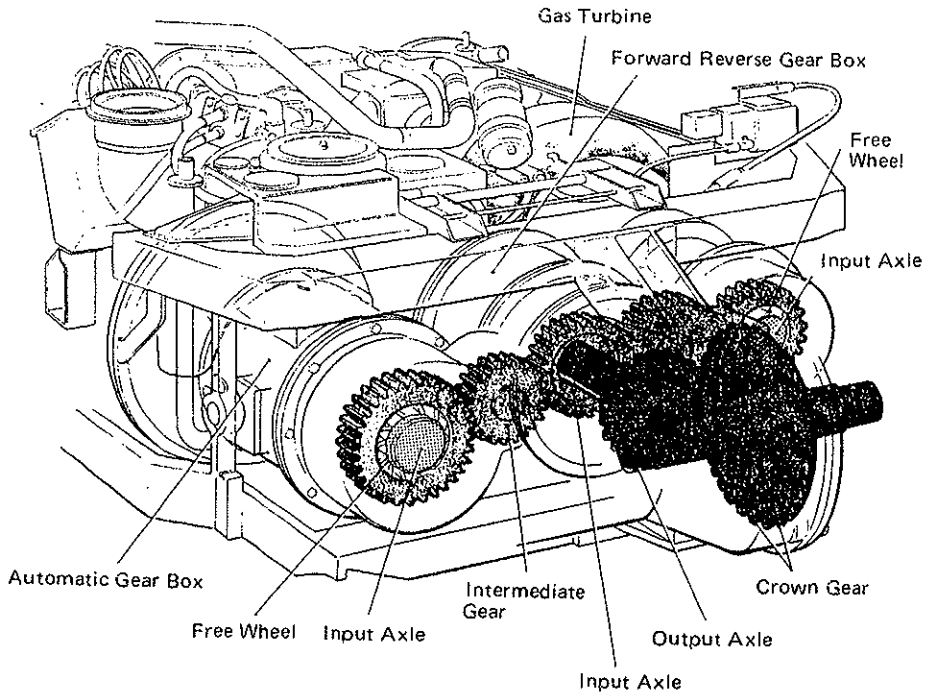


Fig 58. Converter gear and angle gear

Both free wheels are equipped with clutch housings for direct coupling. The free wheel clutch housing on the piston engine side is operated with a control mechanism in the combat compartment. Readjustment of the free wheel clutch housing on the gas turbine side occurs directly on the converter gear. Under normal driving conditions the free wheel on the piston engine side should be locked. One then has access to the engine brake and it is easier to prevent overheating when driving on steep gradients. If the vehicle is being driven with only the gas turbine, the free wheel must be unlocked so that the piston engine is not rotated.

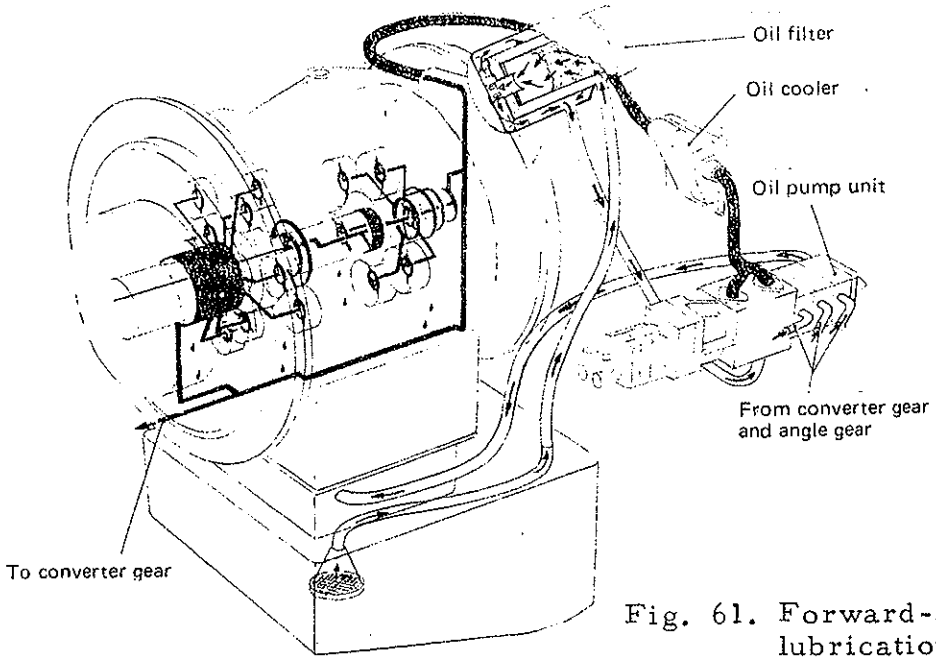


Fig. 61. Forward-Reverse Gear Box lubrication system

Engagement of the various gears takes place by locking the planetary retainer or the ring gear in relation to the respective drum of the gear box housing. Locking occurs with the aid of disk clutches which are hydraulically operated with a manually controlled system which includes two mechanically controlled slide valves.

The oil pressure for the hydraulic system of the gear box is obtained from a hydraulically driven pump, see Hydraulic System. The oil is utilized partially as a pressure medium and partly for lubrication. From the control system, the oil is conducted under high pressure to the servo-cylinders for the disk clutches. The lubricating oil goes through channels to the lubrication points in the forward-reverse gear box, the converter gear and the angle gear. The oil is cleaned by an oil filter of the flow-through type situated on top of the gear box.

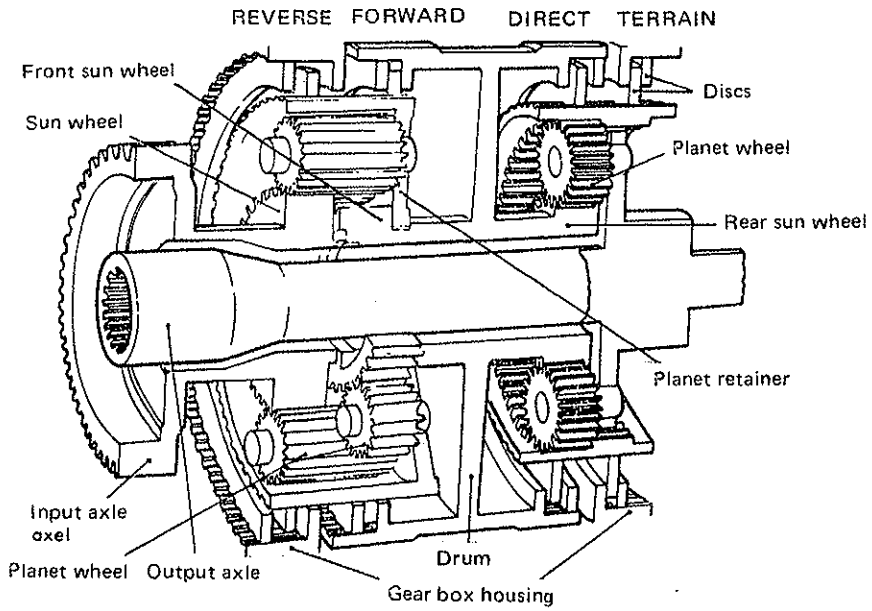


Fig. 62. Forward Reverse Gear Box

Forward High Gear

When forward-high gear is engaged, disk clutches F and D are closed and the planetary retainer of the rear planetary gear, as well as the ring gear of the terrain planetary gear, are locked to the drums. The planetary retainer of the rear planetary gear then cannot move in relation to the drum which is why the planetary gear remains locked. When the input axle turns, the axle with its sun gear, planetary gear and retainer, as well as the drum and the sun gear begin to rotate as one unit.

Since in this case the sun gear of the terrain planetary gear and the ring gear rotate with the same speed, the stationary planetary gear follows in rotation. The planetary retainer and thus the output axle obtain the same speed and rotational direction as the input axle.

Forward-Terrain Gear

Disk clutches F and T are engaged. Since the planetary retainer of the rear planetary gear is locked to the drum, it, just as the previously described gear, begins to follow with the rotation of the input axle. But since in this case the ring gear of the terrain planetary gear is standing still, the sun gear causes the planetary gear to "roll" in the ring gear. The planetary retainer and thus the output axle obtains a motion in the same direction as the input axle, but at lower speed.

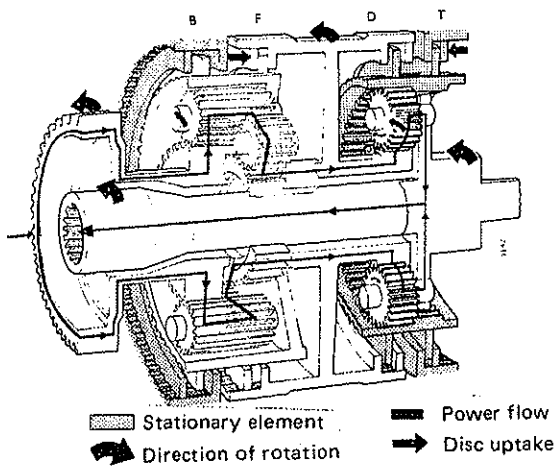


Fig. 65. FT Gear in operation

ANGLE GEAR

The angle gear is mounted on the converter gear opposite the forward reverse gear box. The gear is of the conventional type with a pinion and a crown wheel mounted on the transverse axle. The pinion is coupled with the output axle of the forward-reverse gear box. Steering clutches are mounted on the outer ends of the transverse axle.

The angle gear is lubricated with oil from the control system of the forward-reverse gear box.

Fig. 68. Not actual for this case.

HYDRAULIC SYSTEM

Both engines as well as the automatic gear box provide oil circulation for their own requirements. The oil system is connected to the common oil cooler. A separate pumping unit provides oil circulation in the forward-reverse gear box, the converter gear and the angle gear. It includes three bilge pumps, the suction pipes of which are connected to the angle gear and to both ends of the converter gear. A pressure pump and a drive mechanism also belong to the pump unit which constitutes a hydraulic engine. There is a hydraulic pump on the piston engine and one on the gas turbine to drive the hydraulic motor of the pump unit. Which pump is to be driven is controlled by the electrically operated magnet valve. An overflow valve keeps the pressure constant from the driven pump.

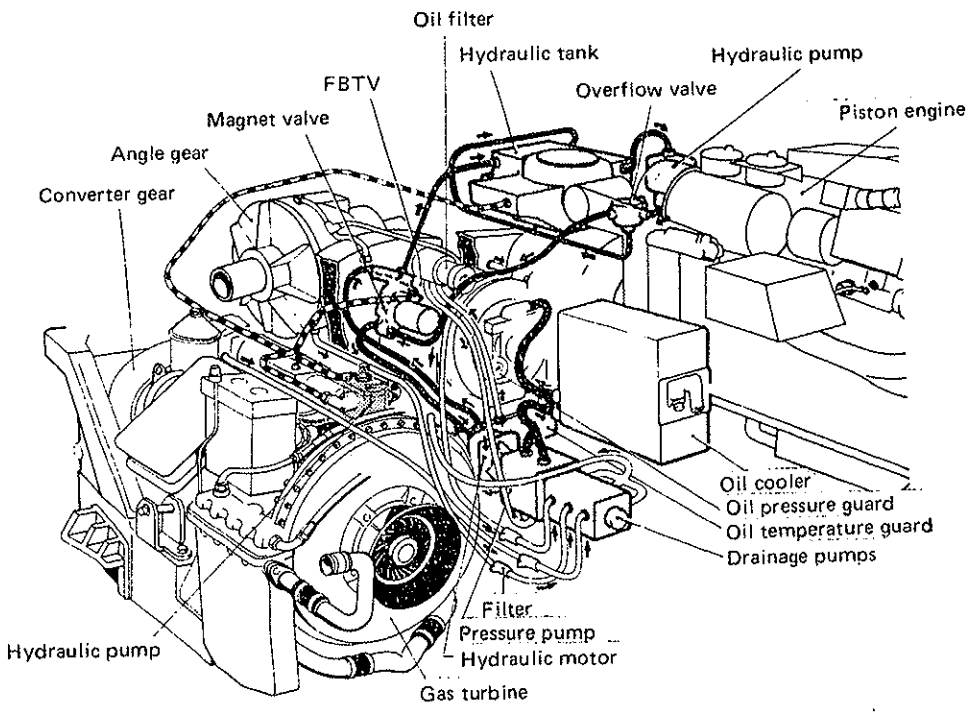


Fig. 69. Hydraulic System

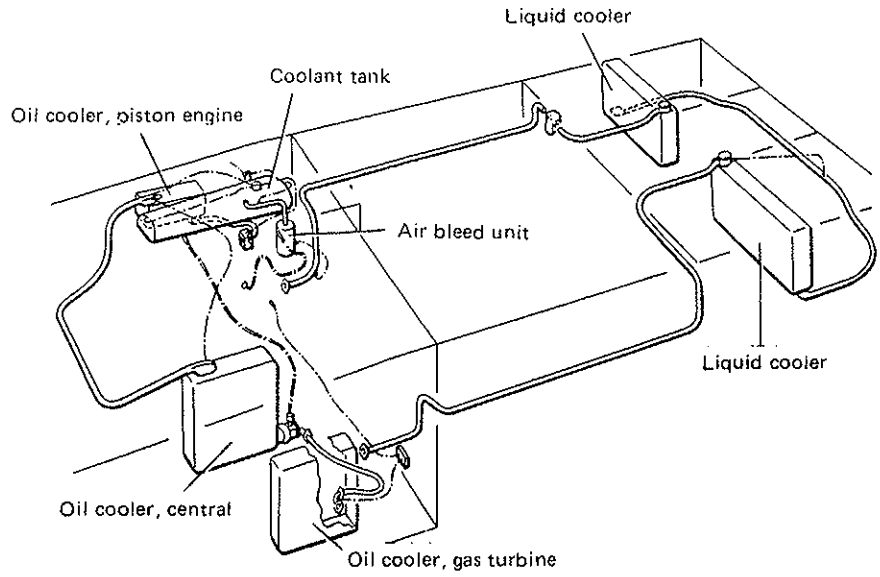


Fig. 70. Cooling System

The servo oil is heated up at numerous points in the vehicle. Cooling is accomplished by a certain quantity of oil being steadily pumped from the oil tank through the coolers and back to the tank.

The coolant and the servo oil is cooled by two hydraulically driven thermostat-controlled blowers with intake and outlet through grids on the top side of the vehicle providing air exchange through the coolers. How this is accomplished is described below under Blower Drive.

Blower Drive

The mechanism for driving and regulating the blower is shown in Fig. 71. There is a hydraulic pump driven by the piston engine for driving the hydraulic engine blowers. The pressure regulator senses the temperature of the coolant and of the servo oil and regulates percolation. The excess pressure valve assures that pressure does not become too high. The oil in the system is air cooled by means of coolers of the fin type.

When the piston engine is operated, the hydraulic pumps pump oil from the hydraulic tank to the three-way branching and further to the pressure regulator and the hydraulic engines. As long as the coolant and the servo oil are relatively cool, the pressure regulator permits oil to flow without noteworthy resistance. From the three-way branching, the oil flows mainly through the pressure regulator and the coolers, back to the hydraulic tank.

Power Transmission

The steering clutches, the brakes and the final drives are situated in the front of the engine compartment. They are divided into a right and left half and accessible for checking, adjustment and oil filling through the engine apertures.

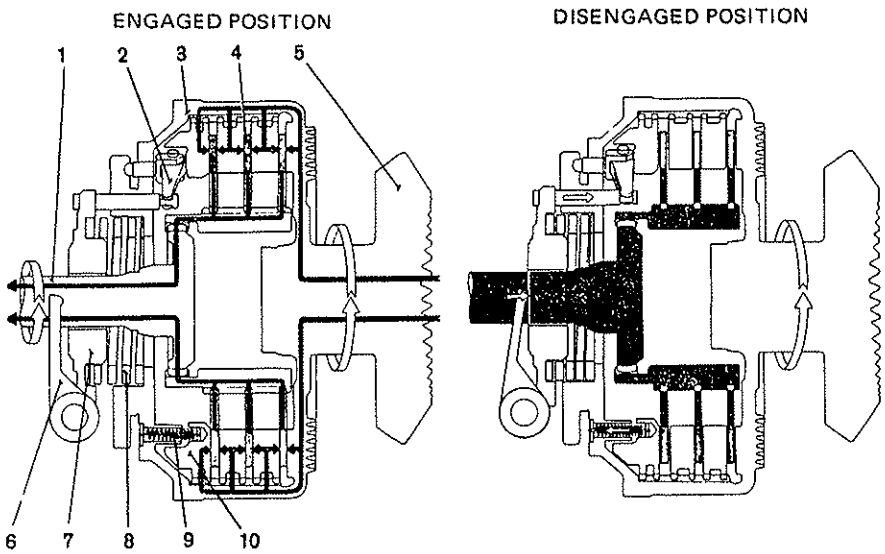
The angle gear transmits the drive force of the engine aggregate by means of the steering clutches and the drive axles to the final drives and the drive sprockets.

STEERING CLUTCHES

The two steering clutches are similar and both are mounted in the same manner on the output axle of the angle gear.

Disconnect is achieved with the maneuvering lever arm. (6, Fig. 73)

The steering clutch is a spring-loaded, air-cooled dry friction clutch with three disks. The disks can be moved on the hub of the steering clutch and have impressed rubber blocks of kerabrons (unknown). The output drive axle of the steering clutch is inserted in an arc-toothed coupling which sits within the steering clutch hub.



1. Drive axle
2. Lever arm
3. Coupling housing
4. Disk
5. Output axle, angle gear
6. Maneuvering lever arm
7. Thrust collar
8. Compression spring
9. Return spring
10. Pressure disk

Fig. 73. Steering Clutch

Function

In engaged position, disk 4 is pressed by compression spring 8 between the clutch housing 3 and the disks connected with the housing by means of the inside cogs. In this position the force is transmitted from the output axle 5 of the angle gear to drive axle 1. In this engaged position there should be a clearance between the maneuvering lever arm 6 and the thrust collar, 7.

Self-Adjusting Mechanism

The brakes are maneuvered with two separate systems; one hydraulic for driving and one mechanical for parking and stick control. After repeated brakings, friction segments are worn in the steering brake.

Maneuvering is achieved in both systems by means of a braking arm which automatically adjusts the brakes when wear occurs so that the stroke does not change.

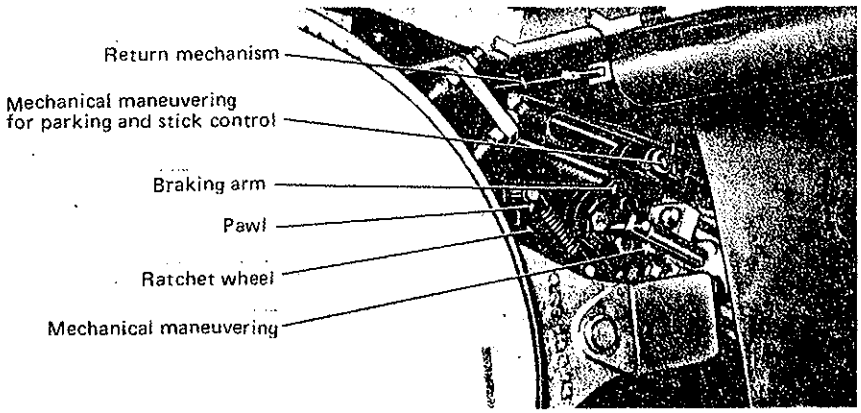


Fig. 75. Self Adjusting Mechanism

Return Mechanism

The return mechansim actuates the steering brake by holding the disks apart, as well as the plates, so that no braking effect occurs. This is brought about by a strong compression spring on each steering brake. By means of a steel cable, the compression spring actuates the ratchet wheel in the self-adjusting mechanism so that by means of its gear wheel it holds the disks and the plates apart so that no braking is actuated.

FINAL DRIVES

A final drive is situated on each side of the front end of the vehicle. The function of the final drive is to reduce the rotational speed of the drive sprocket and to provide the drive sprocket with different speeds if required for taking a curve or for traversing.

Lubrication System

Each gear is lubricated by a pressurized oil system. Certain parts of the gear are lubricated directly with oil, heavily loaded gear wheels by oil streams, and the rest by splash lubrication. Each final drive has an oil filler plug with a dipstick and two drain plugs.

Driving straight ahead: Sun gear in the steering planetary gear does not move.

Superimposed Steering: Steering axle 9 causes the sun gear in the steering planetary gear to rotate. The direction of rotation is always different in the right and in the left final drive. In the one gear, the sun gear makes the same rotation as ring wheel 7, then the speed of the planetary retainer and thus of the drive sprocket is increased. In the other final drive, the sun wheel and the ring gear perform the opposite direction of rotation which means that the speed of the drive sprocket is reduced.

Coupling brake steering: Drive axle 12 is disconnected from the angle gear with the steering clutch and locked with the steering brake.

Fig. 78. 79 and 80. Not actual for this case.

Track

A new track consists of 86 track links. Each track link has a guide tab. The links are held together by track bolts which are locked by a lock washer.

Suspension Wheel and Suspension Wheel Mounting

The suspension wheel is mounted on one end of a crank-shaped axle. The other end of the axle is mounted in a housing. On the axle there is a worm segment which is in engagement with a worm screw. In the outer end of the worm screw there is a grip for the track tightening wrench. When the worm screw is turned, this changes track tightness. A casing protects the worm screw against foreign objects and locks it in adjusted position.

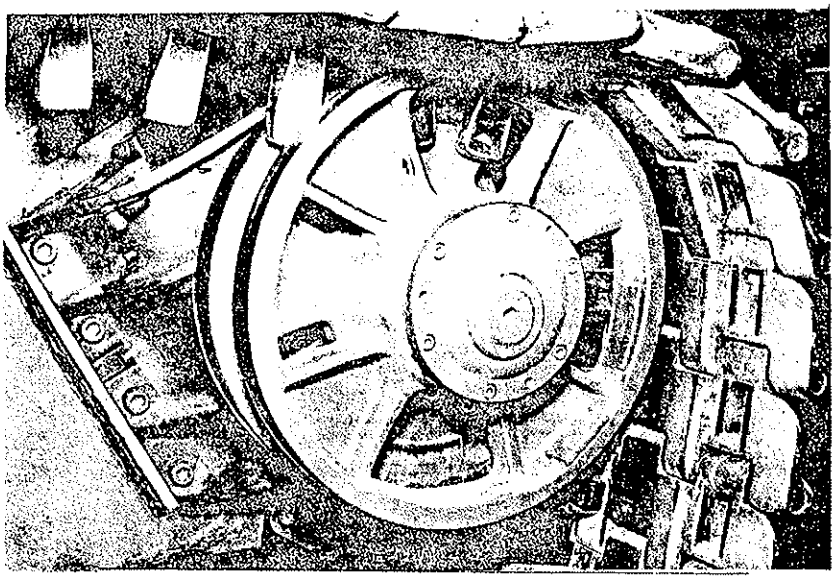


Fig. 83. Suspension Wheel and Suspension Wheel Mounting

Backing Rollers

The upper part of the track is supported on two rubber-coated backing rollers. They are seated on brackets which are firmly bolted to the vehicle walls.

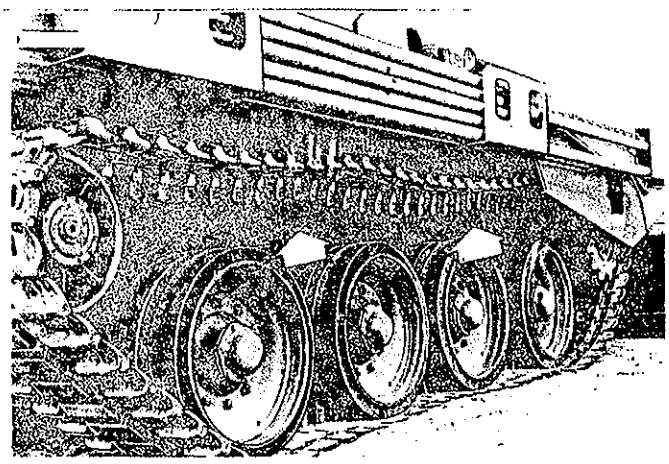


Fig. 84. Backing Roller

Under spring action, the volume of the nitrogen gas varies. The character of the spring action (hard or soft) depends on the volume of the nitrogen gas in idle position, or in other words on the damping pressure of the nitrogen gas.

In relation to spring action, the pressurized oil constitutes only a medium which transmits movement to and from the nitrogen gas. But the quantity of oil which is enclosed within the piston is a determining factor in vehicle ground clearance. When the quantity of oil is reduced in the spring mechanism, ground clearance is decreased; increase the quantity of oil and ground clearance is increased.

The end road wheel is designed for more extreme spring movement than the center road wheel. The spring mechanism for it is therefore equipped with a damping valve, which is situated between the hydraulic cylinder and the pressure accumulator. The valves damp the flow which occurs with spring action. The spring mechanism for center road wheels have a fixed quantity of oil, depending on the primary loading pressure of the nitrogen gas.

Buffers

The stroke of the rocker arm during the spring action is limited by stop lugs and buffers. At maximum stroke the rocker arm strikes against a stop lug on the vehicle wall. With movement in the other direction, the other end of the rocker arm strikes a buffer which damps and limits the stroke.

The eight buffers are firmly bolted to the vehicle walls. They are filled with pressurized oil 058 and function as hydraulic shock absorbers.

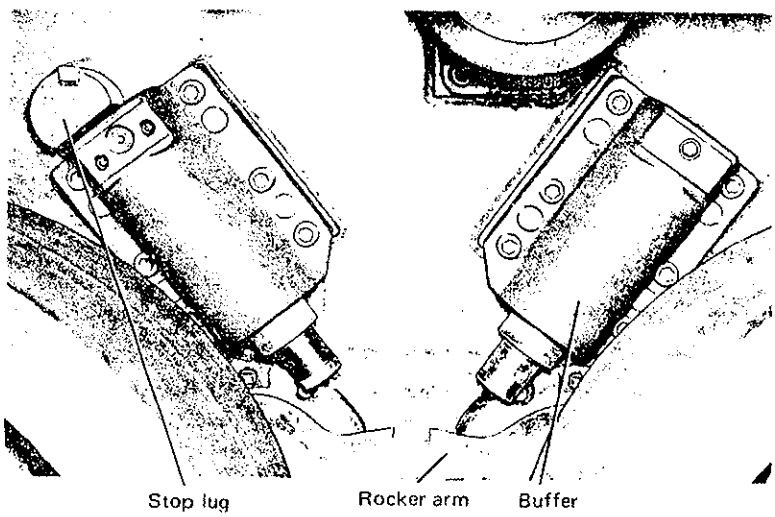


Fig. 86. Rocker Arm, Stop Lug and Buffers

Control units for the servo oil system:

- On backwards driver`s panel	Lamp and press buttons for checking servo oil level
	Warning lamp for empty tank
	" " for oil pressure, servo oil
	" " for oil temperature, servo oil
	" " for oil pressure, injection oil
- Control Unit	Warning lamp for transmission
- Tap Panel	Oil pressure guage

Four oil pumps on the transmission gear deliver oil to the different systems (see fig. 83). It is driven by a universal drive shaft from a power take off on the piston engine.

The main parts in the oil delivery system:

- servo oil tank, measuring 57 litres, placed in the crew compartment	
- oil pump 90 kp/cm^2	oil for the engine compartment ventilation system
- oil pump 65 kp/cm^2	oil for the spring- and traversing systems and for the weapon system
- oil pump 15 kp/cm^2	oil for the injection oil system
- oil pump 320 kp/cm^2	for the laying system with variable capacity

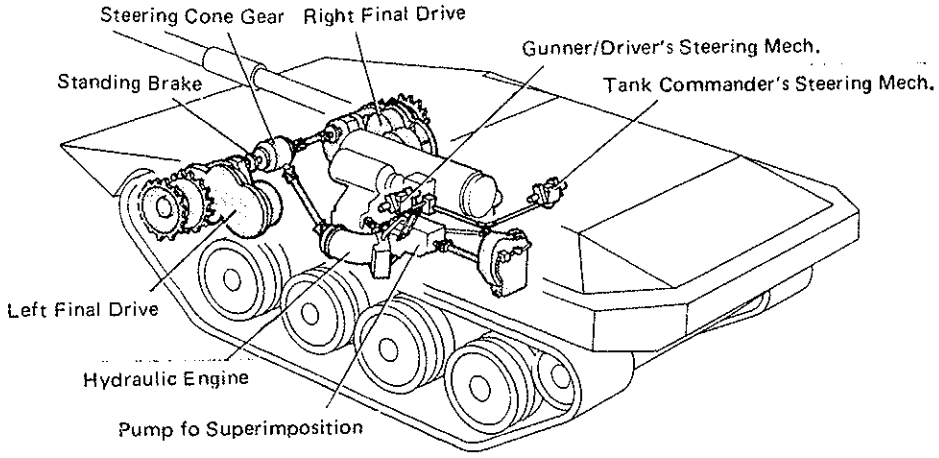


Fig 91. Principle of superposition system

The pump for the superposition system which is driven by the transmission gear is connected to the hydraulic engine by means of two large pipes. In a certain space in the pump and engine there are pipes filled with oil which form a separate, enclosed oil system. When the pump admits oil to be circulated in this system, the hydraulic engine is driven. The movement of the hydraulic engine is transmitted by means of a universal drive shaft to the steering cone gear. The output axle of the steering cone gear is connected with the final drives. The steering cone gear is designed in such a way that the output axle is always moving in the same rotational direction.

A control mechanism is located in the pump which is mechanically coupled with the steering mechanism in the combat compartment.

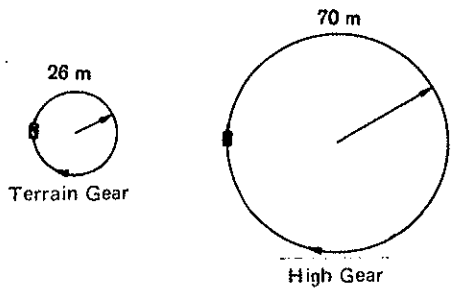


Fig. 92. Superposition steering

The oil flow in the enclosed system between the pump and the hydraulic engine is regulated by turning the steering mechanism. In part the direction of the oil flow can be varied; in part the amount of oil furnished by the pump can be varied in an infinitely variable manner. The work of the hydraulic engine is completely dependent on the oil from the pump. For this reason the rotational direction and the speed of the hydraulic engine's output axle is always under regulation and thus the turning radius of the vehicle.

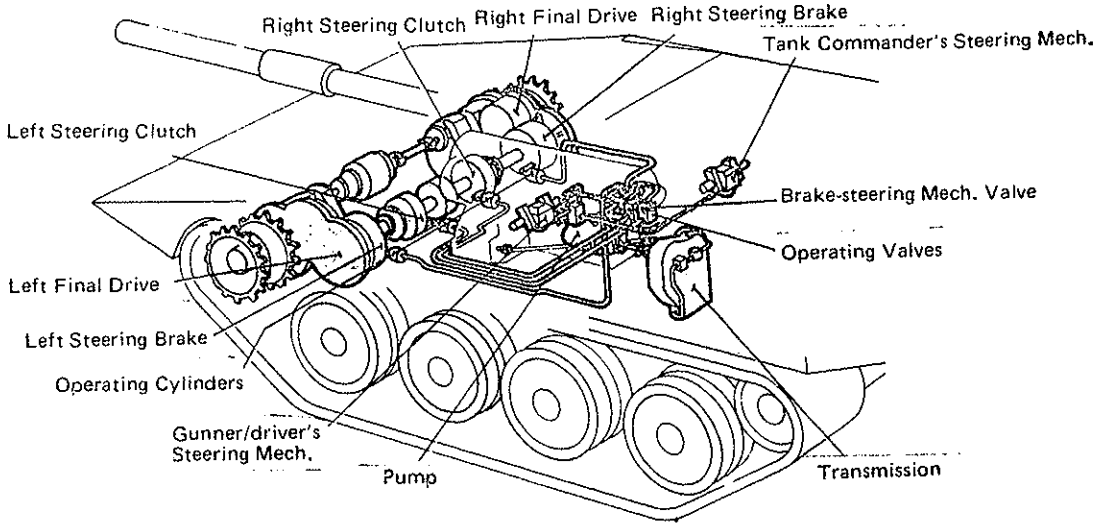


Fig. 93. Principle of Clutch Brake System

The clutch-brake system provides very rapid changes of direction and thus must not be used at high speeds. The steering method should be used primarily for terrain driving in case the superposition system provides too large a turning radius. Thus the steering mechanism actuates no valves in the clutch-brake system before the superposition system has been fully utilized (the steering mechanism is turned about 20 degrees). As soon as the steering mechanism is turned further, disconnect and braking occur. Before the clutch-brake system begins to function, an increased resistance to turn is experienced.

Maximum steering with the superposition system is going on even when the clutch-braking system is being used.

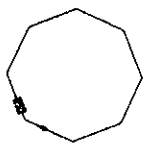


Fig. 94. Coupling-Brake-Steering

Elevating

Elevating means that the entire position of the vehicle body is changed with relation to the ground surface. This operation utilizes the possibilities of the spring system for raising and lowering the vehicle body.

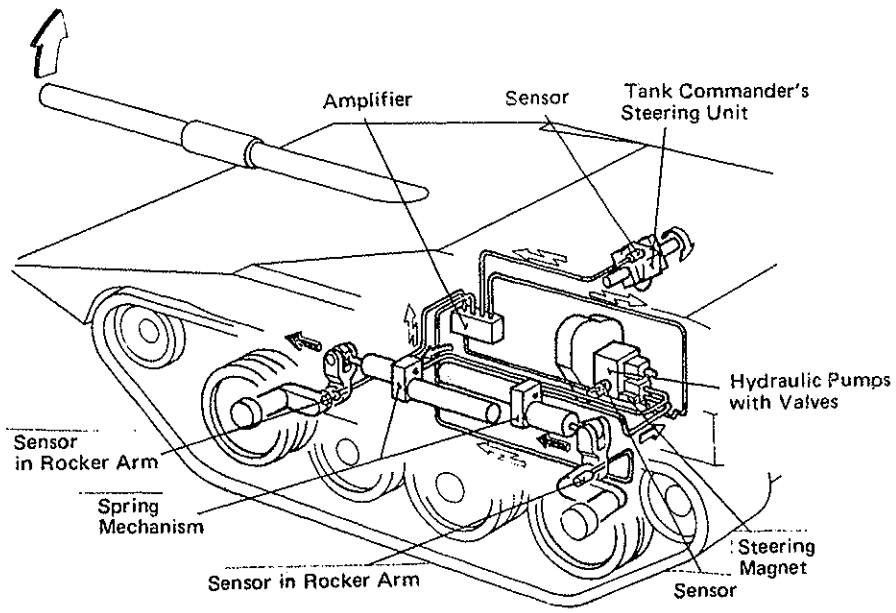


Fig. 96a. Principle of the Elevating System
(as viewed from the left side)

Oil transport is accomplished by turning of the rocker arms on the end road wheel which actuates the mechanisms on the four rocker arms. The control signals which thus go out to the amplifiers are of such a nature that they counteract the control signals from the sensors in the steering control mechanism. In a certain position, the control signals cancel each other out completely and thus the amplifier stops sending control signals to the steering magnets. The pumps stop transporting oil and the vehicle body is in the new elevation position.

A certain angle of turn on the steering control handle corresponds to a certain elevation angle of the vehicle body.

The mechanisms on the axial piston pumps have the function of stabilizing the system (e.g. soft and precise braking when the new angle of elevation is achieved).

Observe the following difference between traversing and elevating: Elevating takes place continuously for the entire time the steering control mechanism is turned from its neutral position. During elevating the vehicle body stands at an angle which corresponds to the angle of turn of the steering mechanism handle.

Ventilation System

The engine compartment is ventilated by a hydraulically driven blower. A pump on the transmission gear draws oil from the servo tank and moves oil under pressure to a hydraulic motor on the blower aggregate. The blower always moves at a speed dependent on the speed of the piston engine.

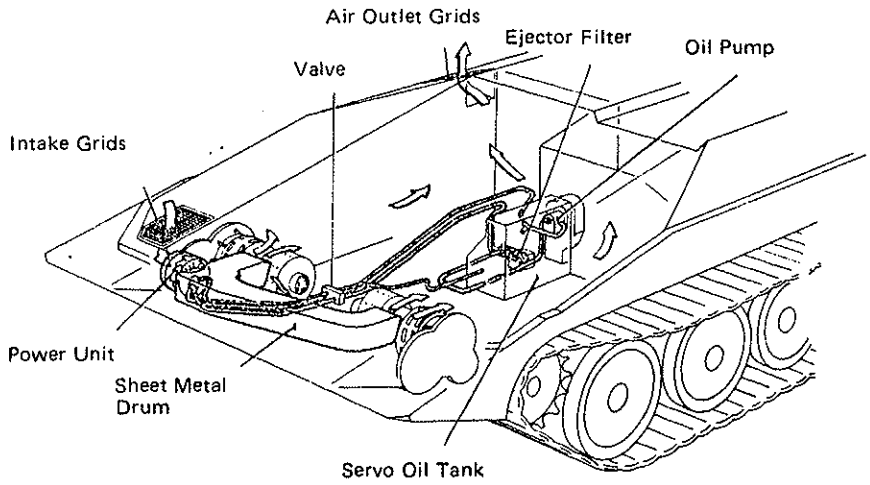


Fig 96d. Ventilation of the Engine Compartment

The blower draws in air through a grid in the right front part of the track housing. The air is distributed by a sheet metal drum so that the steering and the driving brakes, as well as the steering clutches, are cooled first hand by the air flow. Simultaneously, air is spread throughout the engine compartment to achieve ventilation. The heated up air blows out through a grid directly in front of the sound damping cover.

When the gas turbine is operating, a certain exchange of air is caused by the ejector effect of the exhaust gases.

Reserve Steering

The reserve steering mechanism consists of two control sticks which, by means of linkage and switch mechanisms, are connected with the steering clutches and the steering brakes. The control sticks are situated in front of the gunner/driver (Fig. 29). The right control stick is connected to the clutch and the brake on the right track. When the lever is pulled back, first the steering clutch is disconnected and then braking occurs in the steering brake. Thus the vehicle turns to the right. When the left control stick is applied, the vehicle turns to the left in the same manner. Note. The two levers cannot be applied simultaneously.

The reserve steering mechanism is used when the oil pressure drops in the servo system, e.g. when the vehicle is driven with only the gas turbine. Since the oil pumps in the servo system are driven by the piston engine, oil pressure drops constantly when the piston engine is not operating.

When oil pressure drops below a certain value, both axles which unite the steering cone gear with the final drives are braked automatically. Braking occurs in two parking brakes, the left one of which is connected to the steering cone gear (Fig. 40). Thanks to the parking brakes, the reserve steering mechanism can be used at the moment the ordinary steering system fails due to too low oil pressure in the servo system.

OPERATION

Vehicle body

ENGINE HATCHES

Opening:

Equipment:

1. Lifting gear
2. Lifting block
3. Gripper sleeve 30 mm (2 pc)
4. Extension rod 250 mm
5. Hinge handle
6. Ratched wrench

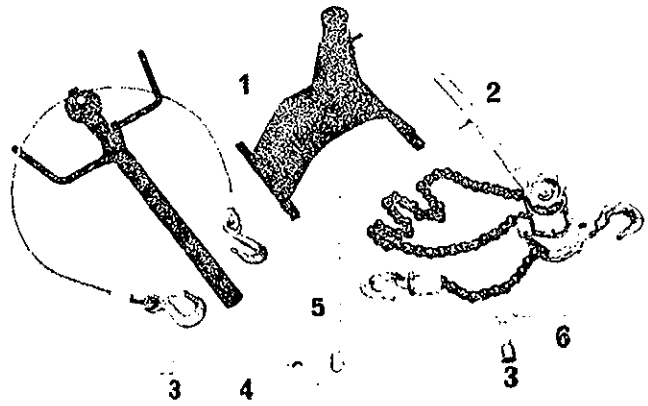


Fig. 110. Equipment for opening

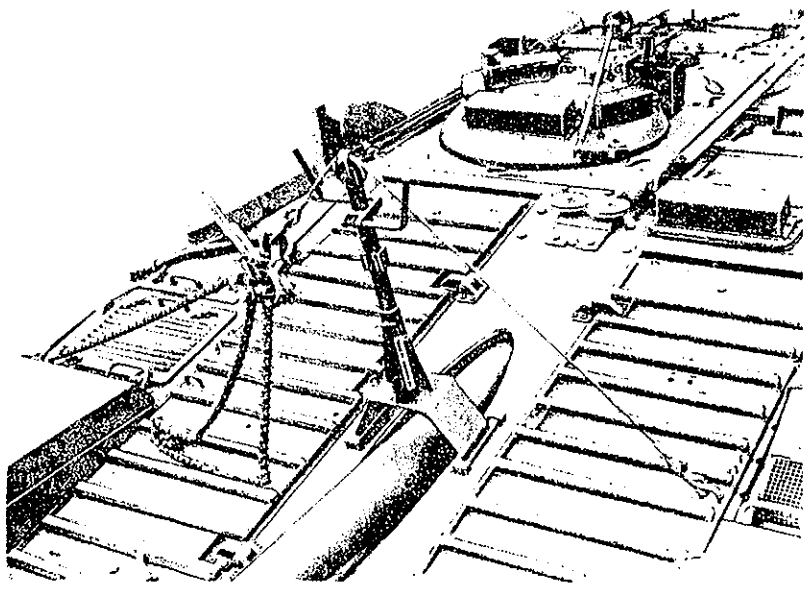


Fig. 111. Equipment mounted for the left engine hatch

1. Remove the lock for the hatch which will be closed.
2. Check that the lifting block-wire is connected through treading on the wire and keep it stretch.
3. Remove the hatch to closed position. Keep during that moment the foot on the hatch to prevent that snatch arise.
4. Lift down the hatch.
5. Assemble the moldings.
6. Screw on moldings and diverge plate. Tightening moment 25-30 kpm.
7. Set the extinguisher knob in ordered position.

Engine hatches on education vehicles are only fastened with seven screws in each hatch: three screws in the long molding and two screws in each of the short moldings. Remaining holes are covered with plastic plugs in the moldings.
Remaining screws are stored in a bag in box 6.

The tank commander´s hatch

Opening:
1. Turn the locking handle down and to the left.
2. Push the hatch up and back.

NOTE. The hatch is locked automatically in fully open position. Therefore you can fast in an emergency situation throw up the hatch without it is fasten in observation position.

Observation position

1. Open the hatch fully.
2. Pull the locking handle forward.
3. Pull the hatch forward and release the locking handle. The hatch is automatically locked in observation position.
   NOTE. Don´t touch the locking handle during the opening.

Closing

1. Pull the locking handle forward.
2. Pull the hatch forward and down.
3. Release the locking handle and lock the hatch by guiding the locking handle to the right and upward.

Opening from outside

The hatch locked:
Turn the locking axle square bult clockwise with a drift until the locking pin release from the locking lip.

The hatch unlocked:
Lift up the hatch and carry the hatch to fully open position.

NOTE. Don´t use the rubber rim on the hatch as handle.

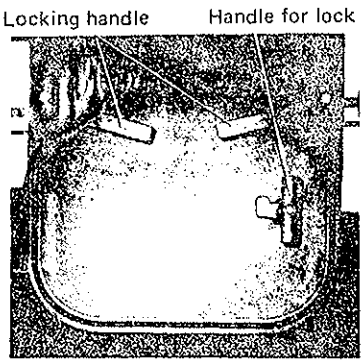


Fig. 114. Hatch for gunner/driver and backwards driver as viewed below

Hatches over breech and wedge

Equipment: Hinge handle
Extension rod 250 mm
Gripper sleeve 30 mm
Wege closing tool

Opening

1. Remove the platform for fording equipment.
2. Remove the screws.
3. Check that the hatch over the wedge is covered and locked.
4. Check that gunner/driver's hatch is not fully opened.
5. Lift up the hatch and drop it back.

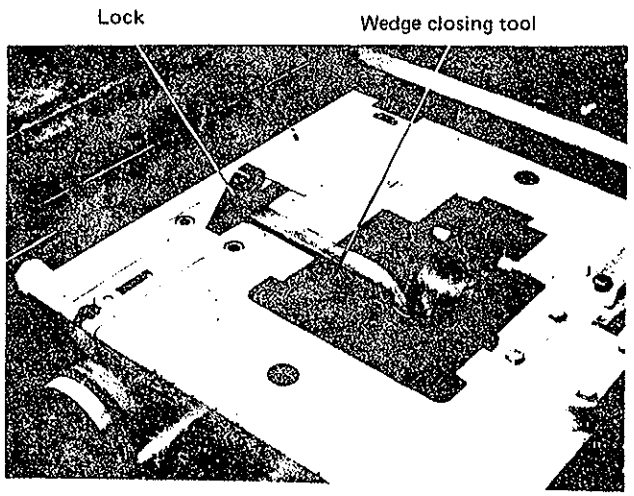


Fig. 115. Closing the Hatch over the Breech

Fuel measurement

1. Open the cover over the fuel filling cup.
2. Remove the strainer and put it on a rag or a paper.
3. Measure the fuel quantity with the shaft of the plunder fool (fig. 117).
   - o The tank is filled up over the battle plate: read the fuel quantity on the scale HELA.
   - o Fuel level under the battle plate upper edge: read the fuel quanti-ty on the scale FRAM, read the fuel quantity on the scale BAK. Sum up.
4. Check that the strainer is clean and put it back in position.
5. Close the cover.
6. Repeat the measurement in the other fuel tank. Total fuel quantity is 110 litres plus reading quantities.

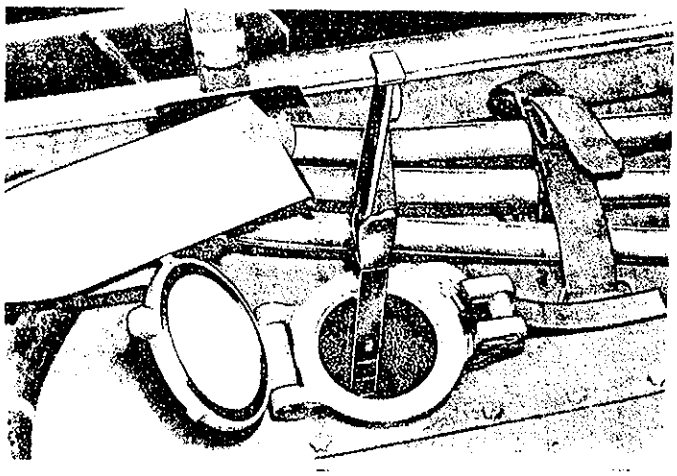


Fig. 117. Fuel measurement

Fuel draining

Side fuel tanks

Equipment: Gripper sleeve 19 mm
Ratched wrench
Wrench for fuel draining tap
Container

1. Remove the bars for the fording equipment.
2. Remove the plugs in the track covers.
3. Open the drain taps in combat compartment and let fuel drain through the holes for the draining plugs.
4. The fuel flow can be closed by the draining taps.
5. Replace the plugs and close the draining taps when the fuel tanks are emty.
6. Replace the bars for fording equipment.

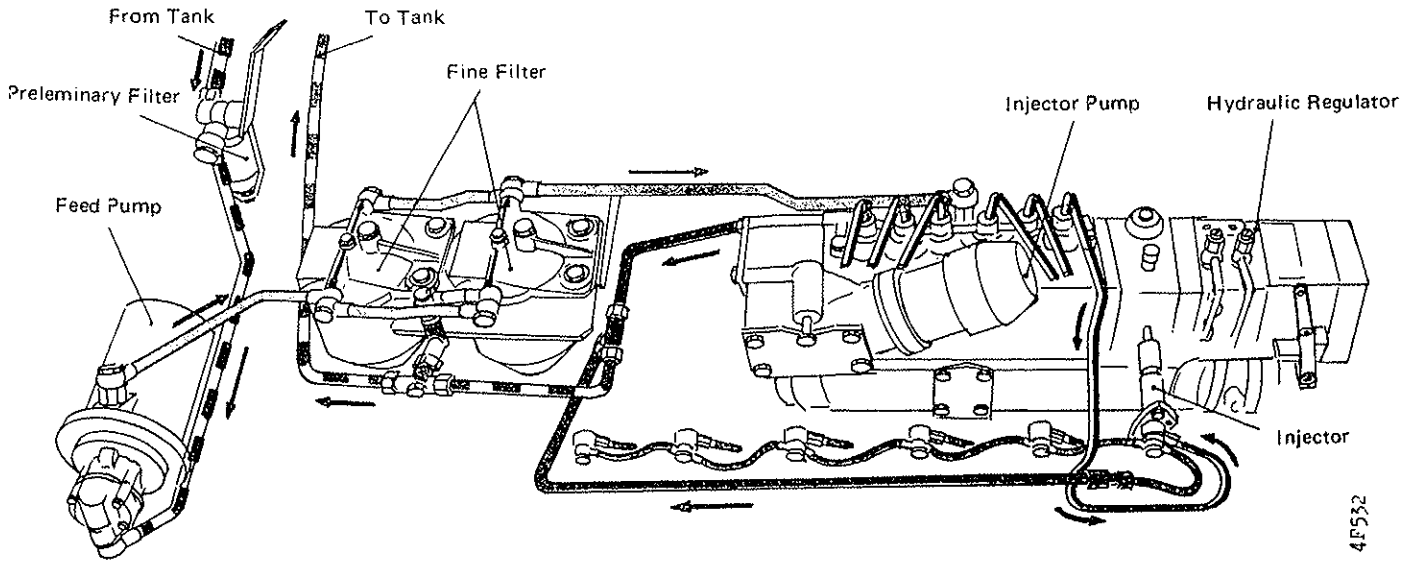


Fig. 119. Piston engine fuel system

Air bleeding of piston engine fuel system

Equipment: Wrench

1. Lift up the engine hatch over the piston engine.
2. Put on the starting switch for the piston engine, so that the fuel pump start.
3. Release the screw between the two fine filters. Put drying papers around the filters.
4. Close the screw when air bubbles not are coming and only fuel spray out.

   NOTE! Collect the fuel in a container.
5. Remove the drying papers and clean.

COMBAT COMPARTMENT

Ventilation Control Mechanism

The combat compartment can be ventilated by opening a hatch to the left radiator compartment and a valve located in front of the gunner/driver:
When the hatch is open air is drawn from combat compartment by the blowers.

1. When firing with the cannon should the valve in the front of gunner/driver and the ventilation hatch be open.
2. Every pause in shooting should make use o for ventilation of combat compartment through the ventilation hatch.

Chairs

NOTE! The Crew Chairs are not like in construktion. Don´t confuse the backwards driver´s chair with the other chairs.

Removing

1. Put the chair in down position.
2. Lock the chairs with the securiting clamp.
3. Put the locking wheel in such position that the handle is accessibly.
4. Release the locking nut with a wrench and unscrew the handle.
5. Release the locking wheel further and remove the whole locking device through putting it forward.
6. Remove the chair seat through putting it forward.

Replacing

1. Replace the chair with the lip on the support in the groove of the seat.
2. Replace the locking device and fasten it by hand.
3. Replace the handle in the hole of locking wheel so that the chair is locked with the handle displaced.
4. Tighten the locking nut on the handle with a wrench.

RAISING AND LOWERING (Commander´s and gunner/driver´s seat)

1. Unload the seat and lift the lever for height locking.
2. Allow the seat to go up or press it down to the desired position and release the lever.

Starting of engines

See separate STARTING CHART.

Don't shift with the vehicle driving or with higher speed than 1100 rpm on engine. If the idling exceed 1100 rpm, traverse until the speed drop.

Observe that right shifting position is recived. Wait until pressure in Forward-Back-Terr-gearbox is recived.

NOTE! In the selection between terrain and direct shifts, should terrain be selected to avoid the risk for warm going.

Note. For separate driving with the gas turbine, the instruments and the warning lights must be watched closer than usual because the cooling blowers are not operating. It the oil temperature is too high the driving had to be stopped.

WARNING. Drop the antennas when the combat vehicle must pass under wires which hang lower than 10 m above the ground. Failure to do so may mean MORTAL DANGER.

Checking While Driving

See Material Maintenance Scheme I.

High power GT

Light for GT on steering unit may be lighting when GT is idling and at high power (see below). In the remaining case, when yellow light comes on, should GT be stopped.

At driving with high power on GT and yellow light on steering unit comes on following procedure should be done:

1. Backwards driver hold the switch ÖVERVAKNING in position FRÅN (yellow light goes out) in one minute and careful supervise gauges and warning lights for GT oil temperature and oil pressure.
2. Driving under these conditions must not exceed one minute.
3. Release the accelerator pedal until the exhaust temperature is normal again.

If any warning light comes on should the driving be braked.

High power must not be used at temperatures below 0° C.

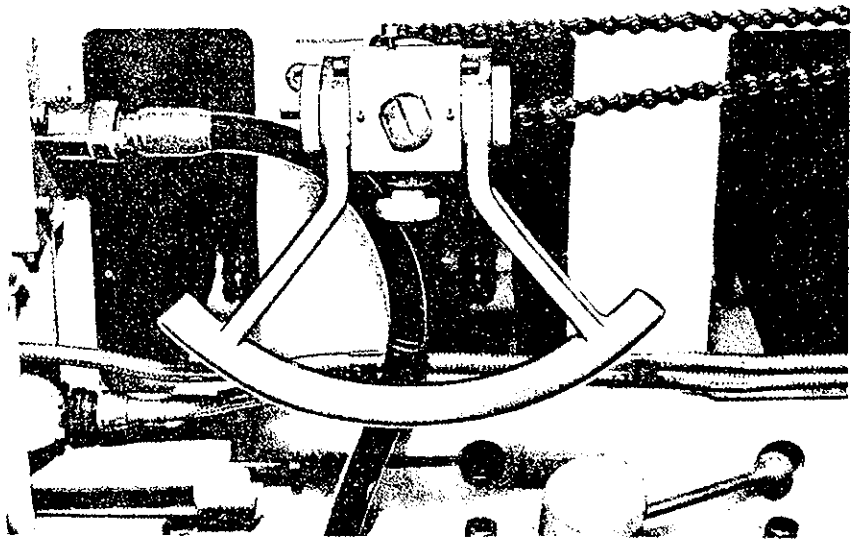


Fig. 123. Backwards driver's wheel

The steering mechanism is coupled to the general system in such a way that steering motion remains natural (smooth driving) for the tank commander and for the gunner/driver when driving forward and for the backwards driver when driving backwards. The vehicle turns in whatever direction the steering mechanism is turned. If, on the other hand, the tank commander or the gunner/driver drives the vehicle backwards or if the backwards driver drives forward, they must execute "unnatural" steering motions, i.e. the vehicle turns in the opposite direction to that which the steering mechanism is turned.

NORMAL STEERING

When the steering mechanism is turned between 0 and 20 degrees (when increased resistance to additional turning is detected), steering is performed according to the superposition method. With additional turning, the clutch-brake method is connected.

In the case of the superposition method, the track is furnished with a different speed; speed differences are increased the more the steering mechanism is turned. The vehicle goes smoothly around curves. At full deflection (about 20 degrees) and maximum speed, the turning radius is 26 m in the terrain gear and 70 m in high gear. Turning radii decrease at lower speeds in the respective gear.

Note. Keep speed as high as possible on the piston engine when the vehicle is to be steered.

BRAKING

Braking is performed as follows:

1. Release the gas pedal.
2. Depress the foot brake. Observe that braking takes place with the aid of a hydraulic servo system. Good braking effect is obtained even with moderate pedal pressure.

If the servo oil pressure fails (e.g. during separate driving with the gas turbine) brake with the hand brake.

Stopping the Vehicle

The vehicle and the engines are stopped as follows:

1. Let up on the gas pedal and brake the vehicle.
2. Apply the hand brake and set the gear shift in neutral.
3. Allow the gas turbine to idle about 3 minutes if it is in operation. Then stop it by placing the GAS TURBINE toggle switch in OFF position.
4. Care should be taken that the steering mechanism is in neutral position and that the steering control handle is locked.
5. Stop the piston engine by placing the PISTON ENGINE toggle switch on the starter panel at OFF position.
6. Switch OFF the main current switch.

Driving Under Special Conditions

ELEVATING WHILE DRIVING

When driving on terrain and under combat conditions it is necessary to be able to elevate the vehicle. The lock knob on the steering control mechanism should be set in the position marked FREE. After this the steering mechanism handle can be turned, which elevates the vehicle.

LOW GROUND CLEARANCE

When the GROUND CLEARANCE toggle switch on the backwards driver's control panel is moved to LOW position, the ground clearance of the vehicle decreases about 12 cm. The switch must be held in this position while the vehicle assumes the low ground clearance. When the toggle switch is released, it returns automatically back to NORMAL position and the vehicle returns to normal ground clearance.

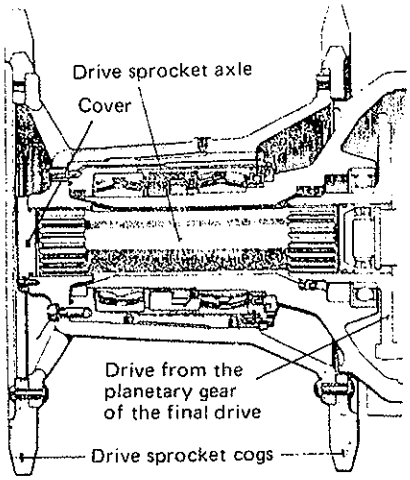


Fig. 155. Drive Sprocket

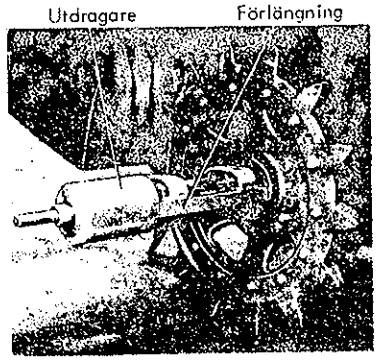


Fig. 156. Removing Drive Sprocket Axle

Fastening the sprocket wheel axles when the tracks are mounted, the replacing of the axles facilitates by swinging with a iron bar on the sprocket and simultaneous replacing the axles.

TROUBLE SHOOTING

Engine Aggregate

The steps listed below can be taken by the crew. If the trouble cannot be corrected, file a report (mechanical measure).

Voltmeter Gives No Reading:

1. Check that the main current switch is on.
2. Check the fuse D88.
3. Check junctions to the battery.

Temperature Gauge Gives No Reading:

1. Check that the respective switch in ON.
2. Check the fuses.

Warning Light Do Not Come On Before Start:

1. Check that the switch in ON. (TILL)
2. Check the fuses.
3. Replace the bulb (28V, 0.04A GE 327).

Starter Motor Operates Sluggishly:

1. If the battery voltmeter indicates below 24 V, check the battery junctions.
2. Connect the auxiliary battery if necessary.
3. Exchange batteries.

Piston Engine Does Not Start:

1. Check that the shift gear is in neutral.
2. Check that the starting switch automatic fuse not is released (the switch in position FRÅN).
3. If the battery voltmeter indicates below 24 V, check the battery junctions.
4. Check that fuel magnets comes on and the fuel pump is running.
5. Check that there is enough fuel in the tank.
6. Aerate the fuel system if the engine has sat for an extended time. To be done by a mechanic.

2. Drive the engine in idling speed until the coolant temperature has dropped below 95°. Then check the coolant level. If the temperature not goes down during idling stop the engine.

   NOTE! The filler cover must not be screwed down until the temperature level has dropped below 95°. Unscrew the right cooler cover first. Bleed the F-tank.

   Fresh coolant should not be filled before possible leaks have been plugged. The engine should not be started before the trouble is corrected.

Oil Pressure Too Low:

1. Stop the engine and check the respective oil level. If it is too low, possible leaks should be plugged before oil is filled. The engine should not be operated before the trouble is corrected.

Warning Light for Oil Temperature Lights up While Driving:

1. Stop the engine.
2. Check the oil level.
3. Report the trouble.

Power Transmission

Vehicle Turns to One Side:

1. Check track tension on the track aggregate.
2. Check and adjust the steering clutches
3. Check and plug possible leaks. The oil can penetrate into the steering clutch disks. The oil on the friction surfaces disappears after a short period of driving.
4. Check the steering clutch compression springs. Report if a spring is broken.
5. Check the clearance in the brakes.
6. Check the drive sprocket axles. Report if an axle is broken.
7. Check if the vehicle turns to one side when the control unit is on zero.

The Vehicle Does Not Steer During Clutch-Brake-Steering

1. Check the steering brake return mechanisms according to the directions in the chapter entitled Maintenance. Report if the disks need to be replaced.

Servo System

Traversing mechanism does not functioning:

1. Check the oil pressure gauges for injection and servo oil. If the needles during driving don't reach the green field, check the level in the servo oil tank.
2. If Warning light for injection oil pressure comes on, the vehicle must not be driven with the piston engine. Use separate driving with gas turbine.

The vehicle is traversing when the steering unit is on zero:

1. Adjust with steering unit if the vehicle had to be used before the trouble is cared.
2. Report the trouble.

The vehicle elevate when the steering unit handle are in zero and locked:

1. Set change over knob on junction box in position HÖJDR FRÅN if the vehicle had to be driven before the trouble is cared.
2. Report the trouble.

The possibilities of vehicle elevation are restricted:

1. Check that the change over knob ÄNDBÄRHJUL is in position HÖJDR TILL.
2. Check the position of the knob in relation to the scale.
3. Check primary pressure of the pressure accumulators.
4. Report.

Control light 115 V, 400 Hz don't comes on when the piston engine is running:

1. Put the change over switch ÄNDBÄRHJUL in position FRÅN. Risk can exist for uncontrolled elevation.
2. Check fuse R30 and light 115 V, 400 Hz.

   If the trouble is remaining:

   - o stop the piston engine
   - o put main switch in position FRÅN during min 5 seconds
   - o start the piston engine. If the control light exceed lights, push down the automatic fuse P27

3. If the trouble is remaining, put the changeover switch ÄNDBÄRHJUL in position HÖJDR FRÅN if the vehicle must be driven before the trouble is cured.
4. Report.

Electrical system

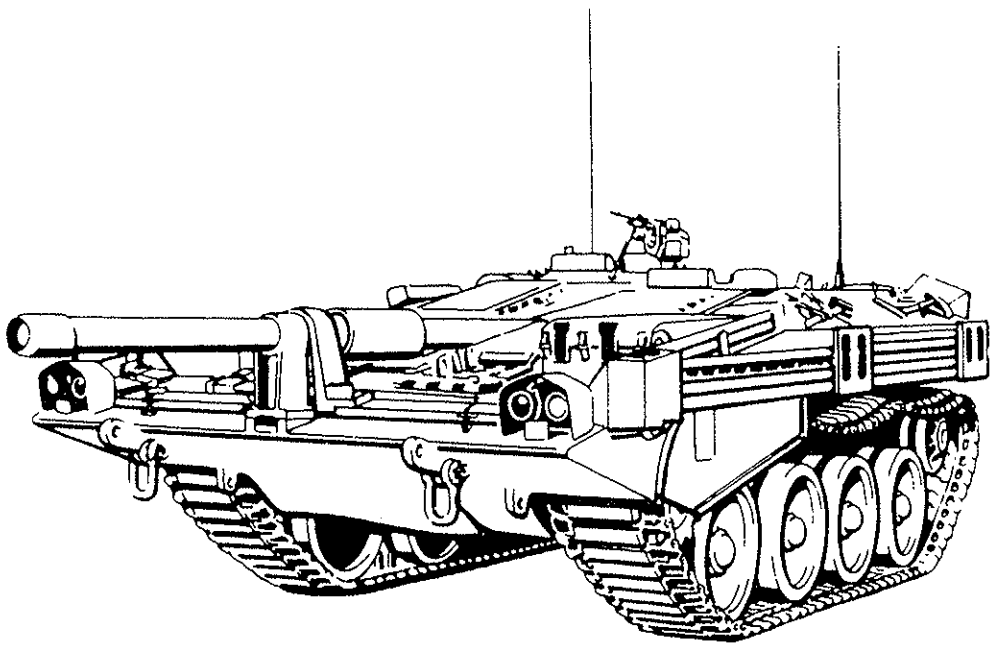
Illuminating lights (outer and inner):

1. Check the main switch position.
2. Stop the engines.
3. Put the main switch in position TILL.
4. Start the piston engine.
5. Report remaining troubles.

Tank 103B

Description Part 1

4. COMMUNICATIONS EQUIPMENT



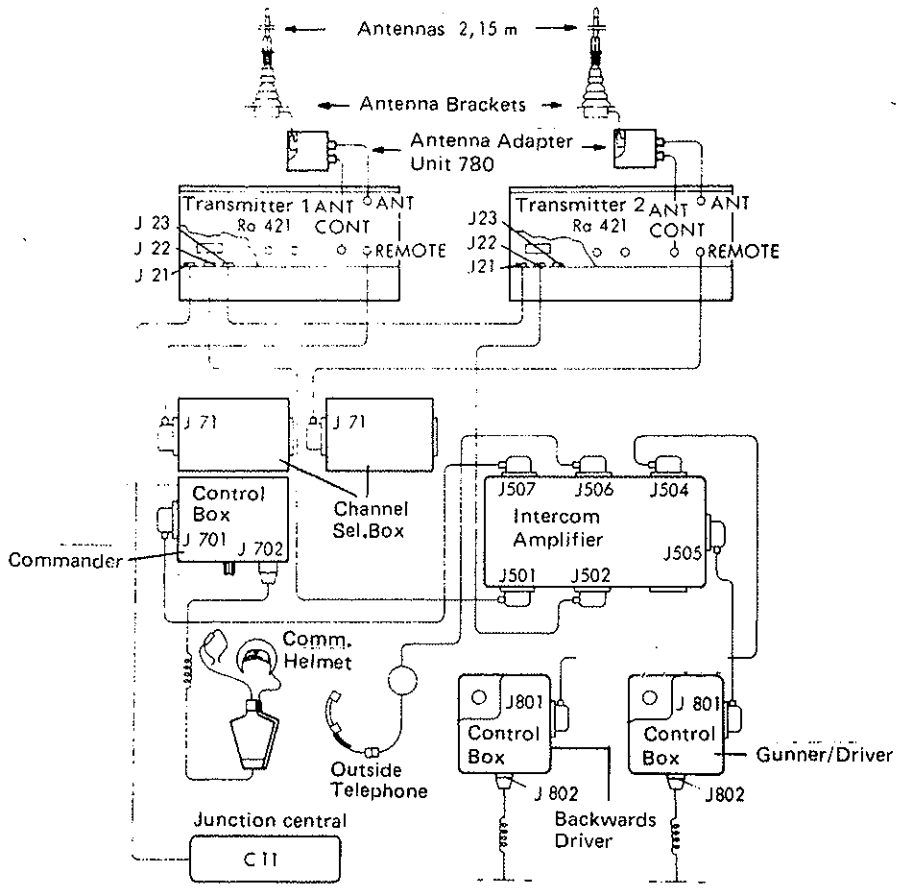
The Defense Materiel Administration of Sweden

May 1975

GENERAL

The communications equipment consists of two RA 421 transmitters with antenna system, control system and intercom system; telephone communications helmets with accessories and the following additional equipment:

Outside telephone junctions,
Remote control equipment (moveable accessories).



P 23 Autom Fuse 25 A for Com. equipment

P 34 Fine Fuse 6 A for Engine, Outside Telephone

Fig. 1. Communications Equipment, Connections Equipment

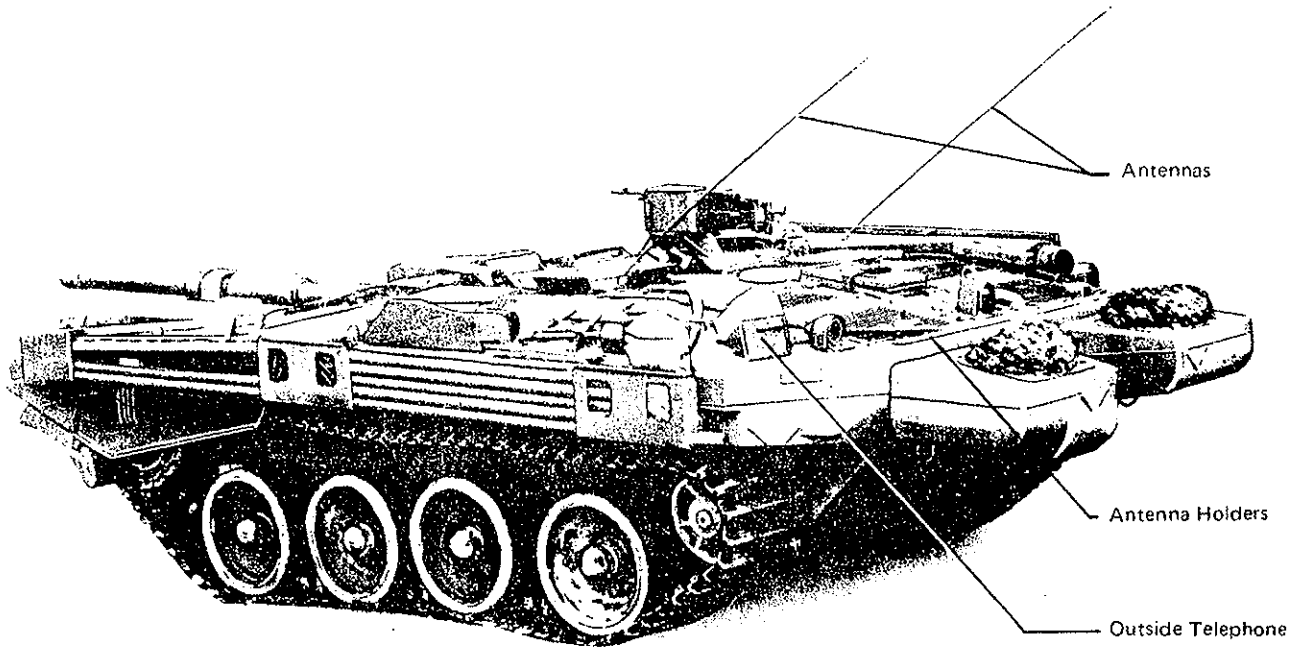


Fig. 4. Outside Communications Equipment

Radio Transmitter 421

Ra 421 is an ultra-short wave radio intended for a combat vehicle. It can be utilized for telephone communications up to a distance of 30 km. When the antennas are put up, the range is increased.

Transmitters

The transmitters consist of a sender and a receiver. It is a single unit contained in a water-tight equipment box which is mounted on a frame in the vehicle. The frame is connected to the vehicle electrical system and to a maneuvering and an intercom system.

All transmitter control mechanisms are on the front panel.

On the rear of the transmitter there is an adapter which fits the corresponding mechanism on the frame's radio junction box. In addition, there are two apertures for the frame guide pins.

For cooling of the transmitter output stage and transformer, the transmitter is provided with a blower. The air intake is situated on the rear. Air is blown out through the right rear side.

The following table shows the identification marking and function of the control mechanisms:

Marking	Function
CALL	Signal light which comes on with an incoming signal when the squelch is on (if the LIGHT switch for the dial illumination is on).
LIGHT	Switch for dial illumination and signal light.
LAMP	Dial illumination light.
BAND	Frequency range changeover switch Positions: AUTO = remote control A 30 - 52 MHz B 53 - 75 MHz
ANT	Junction for antenna cable from the antenna adapter unit.
TUNE MC	Knob for frequency adjustment in stages around 1 MHz
TUNE KC	Knob for frequency adjustment in stages around 50 KHz
POWER	Four-position switch for turning the transmitters on and off, selection of low and high power, as well as remote control of the transmitters. Positions: REMOTE = remote control of switch functions. HIGH = receiver on and sending possible with high power from transmitter. LOW = receiver on and sending possible with low power from transmitter. OFF = off.
① - ⑩	Ten pushbuttons for setting of preselected channels.

Attachment Frame

The frame and the plate are provided with two copper bands to assure good current connections for the transmitter.

On the front corner of the frame there are two clamps with wing nuts which hold the transmitter in place. On the back, the frame has two guide pins for holding the transmitter adapter and the transmitter in place.

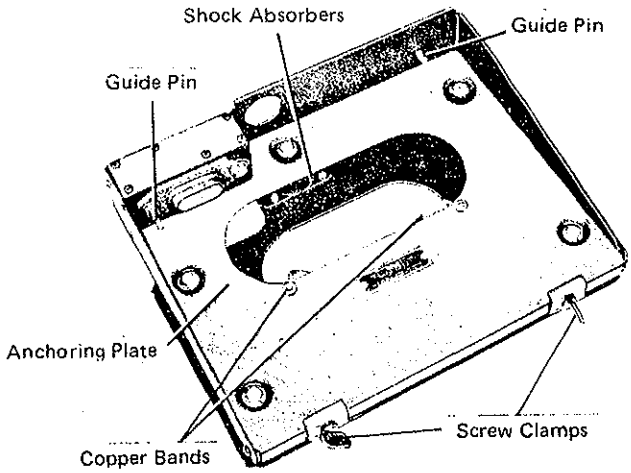


Fig. 6. Attachment Frame

ANTENNA SYSTEM

The antenna system consists of one antenna 2,15 m which is tightly screwed to an springing antenna holder. The holder can be inclined in 45° position or in horizontal position. The holder is assembled with an antenna adapter unit which is situated directly under the antenna holder itself. Between the antenna adapter unit and the transmitter there are two connected cables, one of which is an antenna cable and the other a current supply cable. During all radio transmission, the antenna should be fully extended if possible. When the antenna rods are not being used, they are kept in holders outside the vehicle.

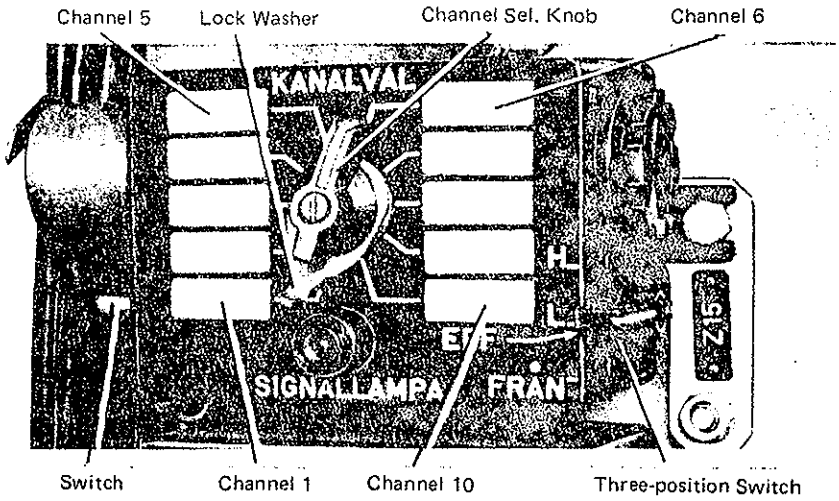


Fig. 8.

Channel Selector Box

contain all the control mechanisms needed for remote control of the two transmitters:

Turning on and off,
Selection between high and low power,
Selection between 10 preadjusted channels.

Marking	Function
SW	Switch on the left gable for connecting the channel selector box to the transmitter, to be used only when two channel selector boxes are series-connected to the same transmitter.
CHANNEL SEL	Channel selector knob for selection among ten pre-adjusted channels; the knob can be stopped at the desired channel with the aid of a lock washer.
SIGNAL LAMP	Signal light which comes on when the PWR toggle switch is on; the lamp can be dimmed.
PWR	Three-position switch for turning on and off of the transmitters and the intercom amplifier and for selection between high and low power when the power changeover switch POWER on the transmitter is in the position marked REMOTE. The switch has the following positions: OFF = transmitter and intercom amplifier off x). L = transmitter on in position low power and reception, along with intercom amplifier x). H = transmitter on in position high power and reception, along with intercom amplifier x).

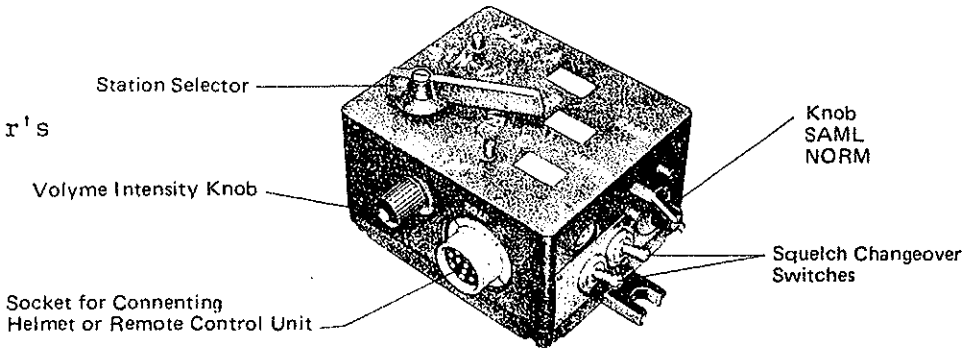
x) Intercom amplifier is on as soon as one of the channel selector boxes are connected.

Tank Commander's Control Box

With the aid of the control box, the tank commander can make communications on both transmitters inside the vehicle and between himself and the gunner/driver and the backwards driver and he can also turn squelch on and off.

Fig. 10.

Tank Commander's Control Box



Marking	Function
STN SELECTOR	Knob for selection of transmitters between the tank commander and the rest of the crew. The knob has the following positions: ALL: The tank commander listens on both transmitters but cannot send. Backwards driver uses transmitter 2. A: Tank commander uses transmitter 2. Backwards driver uses transmitter 1. B: Tank commander uses transmitter 1. Backwards driver uses transmitter 2. C: Backwards driver uses transmitter 2. Gunner/driver uses transmitter 1.
SAML-NORM	Knob with two positions: SAML Crew listens on the same transmitter as the tank commander. NORM The crew uses the transmitters according to the position of the station selector.
VOLUME	Knob for regulating sound intensity.
SQUELCH	Changeover switch for turning on and off the squelch on the transmitters: the lower switch is used for transmitter 1, the upper one for transmitter 2.
J702	Adapter for connecting the junction cable to the communications helmet.

The helmet has a headset which by means of cable from a junction box on the right side of the helmet is connected to the Radio/Intercom-changeover switch with a tripolar sleeve.

The helmet comes in two sizes: size II to No. 57-58, size III to No. 59-60.

The helmet size can be adjusted with the aid of an adjustment strap and by inserting and removing foam plastic in the front part of the helmet.

The helmet is intended to protect the crew against bumps and jolts which occur for example when a mine is driven over or explodes in the immediate vicinity of the vehicle.

The Radio/Intercom-changeover switch with junction cable consists of a changeover box and spiral vulcanized cable with adapter.

On the Radio/Intercom-changeover box there is a pushbutton marked R for radio and marked L for the intercom system. Button L can be locked in depressed position by giving it a 1/4 turn.

On the top of the Radio/Intercom-changeover switch there is a tripolar sleeve for connecting the helmet and a dipolar one for connecting the throat microphone.

On the underside of the Radio/Intercom-changeover switch there is a so-called breaker contact so that when the tank is evacuated rapidly it is possible to disconnect the equipment from the vehicle control box.

The spiral vulcanized cable is connected to the control box by means of a ten-pole adapter.

The throat microphone consists of a bent clamp with a microphone jacket and a junction cable to the Radio/Intercom-changeover switch.

Outside Telephone Hookup

The outside telephone connection is primarily provided to connect the member of the crew directing fire to the rest of the vehicle crew. It is situated on the back of the vehicle on the left side and consists of a box containing a hand microphone and a drum with 15 m of cable which can be rolled back up on the drum with the aid of a motor. The cable is terminated by a junction box which has an adapter for the hand microtelephone and a control button to the motor for rolling up the cable.

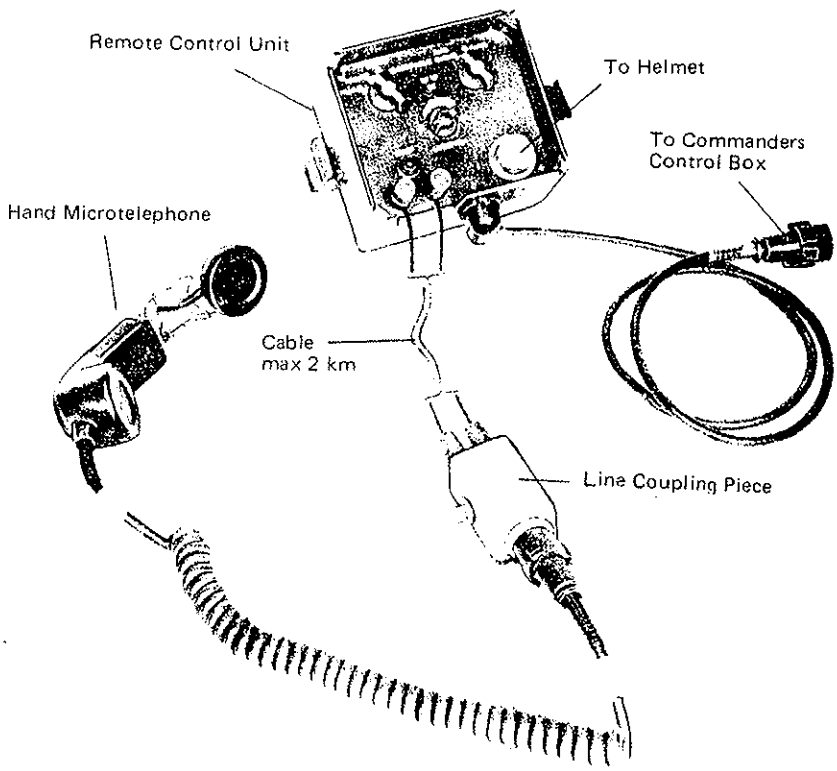


Fig. 14. Remote Control Equipment

9. If while preadjusting the channels a red field becomes visible in the window of the frequency scale, proceed as directed under item 11.

10. Close the cover when the desired channel is adjusted and tighten the locking screws.

11. Set the POWER switch in REMOTE position.

Note. If a red field comes into view in the window of the frequency scale, which can occur when preadjusting channels which lie in the vicinity of the upper or lower limit of A or B, this can be corrected as follows:

a. Turn the red field away with the aid of the MC or KC knob.

b. Turn the frequency adjustment screw a few times to the right (left) if it is adjusted in the vicinity of or to the left final position (right final position).

c. Depress the TUNE button and check that the red field is not visible in the window. If the red field does not appear, the desired channel is to be adjusted according to items 4-8.

d. If the red field again comes into view, repeat steps a-c but turn the frequency adjustment screw an additional time.

e. If the red field does not go away, the trouble should be reported or adjustment performed manually with the MC or KC knobs.

Putting the Communications Equipment into Operation

1. Connect the communications helmets to the control boxes.

2. Check that the intercom amplifier switch is ON.

3. Check that the knob marked SENDING on the intercom amplifier is in the position marked COMMANDER + OTHERS, if not otherwise recommended.

4. Check that the SQUELCH button on the transmitter is at ordered position.

5. Adjust the LIGHT switch for dial illumination to desired position.

6. Check that the frequency range BAND switch on the transmitter is at AUTO position.

7. Check that the POWER switches on the transmitters are in REMOTE position.

8. Check that the VOLUME control on the transmitters are turned clockwise as far as possible (maximum volume).

Shutting Down

The communications equipment is shut down by moving the PWR switch on the channel selector box to OFF position.

Communications Helmet 2

The communications helmet is easiest to put on by drawing out hearing protection with the straps on both sides of the helmet. Fix the shaps on outside of the helmet. Grasp with both hands thumbs inside the helmet, bending out the sides and putting on the helmet directly from the front. Care must be taken that the ears fit into the compartments provided and do not bend over. Release the straps and the Hearing protection tighten against the ears. The Hearing protection has an lever wich in forward and in backward position lock out outside sounds. Then the throat microphone is connected to the Radio/Intercom-change-over switch by means of a dipolar sleeve.

It is important that the throat microphone be adjusted so that it lies correctly against the throat.

The Radio/Intercom-changeover switch spiral cable is connected to the proper control box. The Radio/Intercom-changeover switch can be uncoupled from the spiral cable by means of a breaker contact. Check that the position markings on the changeover switch and the breaker contact coincide at connection.

When sending on the radio, the radio button R on the Radio/Intercom-changeover switch is depressed and for conversation on the intercom system, local button L on the Radio/Intercom-changeover switch. The local button can be locked in depressed position.

Sending Possibilities with the RA 421

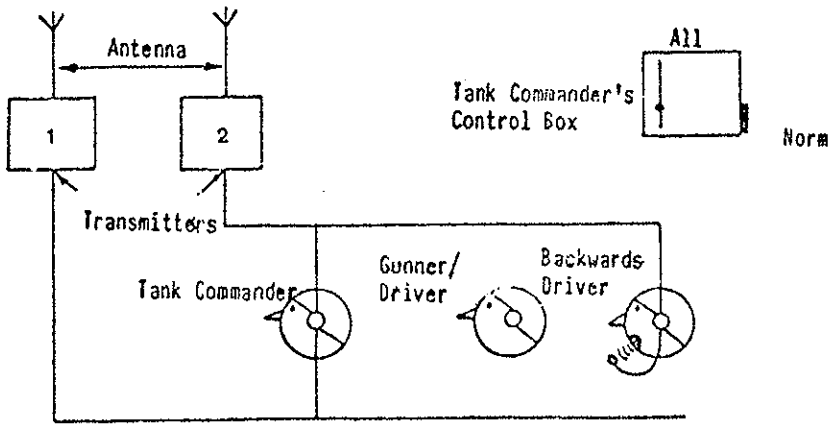


Fig. 16. Tank Commander listens on both Transmitters but cannot transmit. Backwards Driver utilizes Transmitter 2.

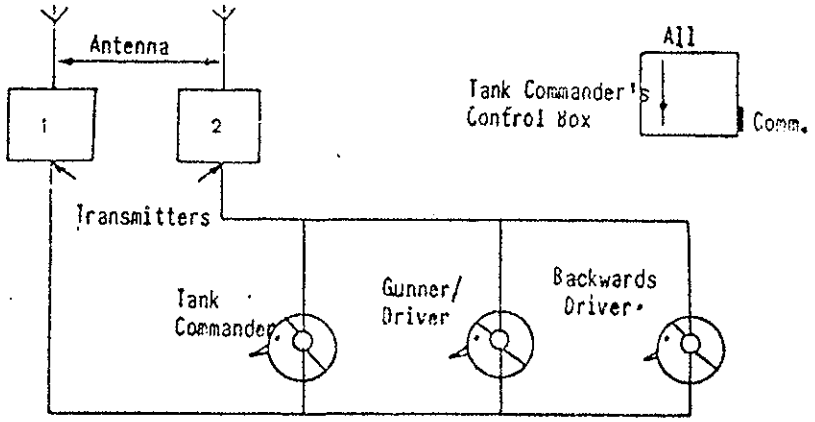


Fig. 20. The Entire Crew listens on Transmitters 1 and 2.

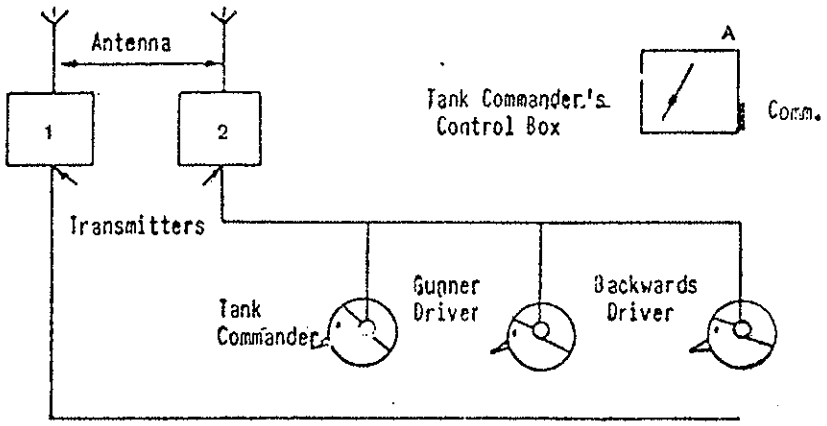


Fig. 21. The Entire Crew listens on Transmitter 2.

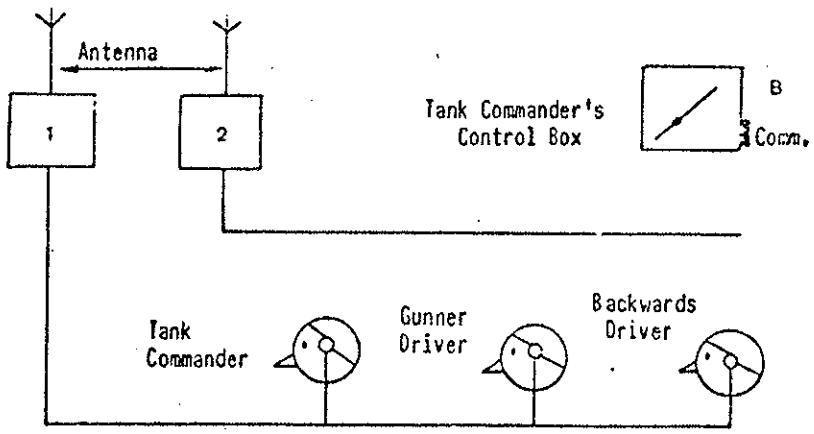


Fig. 22. The Entire Crew listens on Transmitter 1.

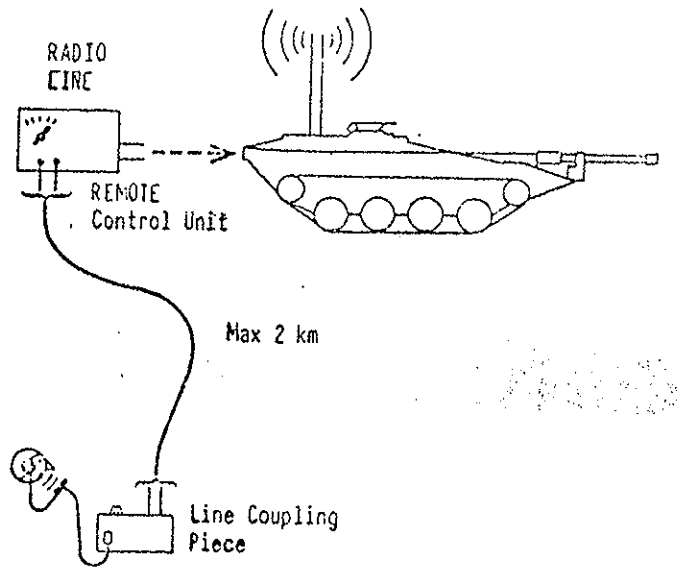


Fig. 24. Communication on Ra 421 by means of Remote Control Unit

Outside Telephone Hookup

1. Open the hatches.
2. Take out the hand microtelephone. Pull out the cable to an appropriate length by grasping the cable at the box.
3. Depress the key on the hand microtelephone and talk.
4. At the conclusion of the conversation:
   If the cable is pulled out, depress the control button so that the cable is wound up on the drum.
5. Put the hand microtelephone in the compartment and close the hatches.

TROUBLE SHOOTING

If the communications equipment does not function satisfactorily, proceed as follows:

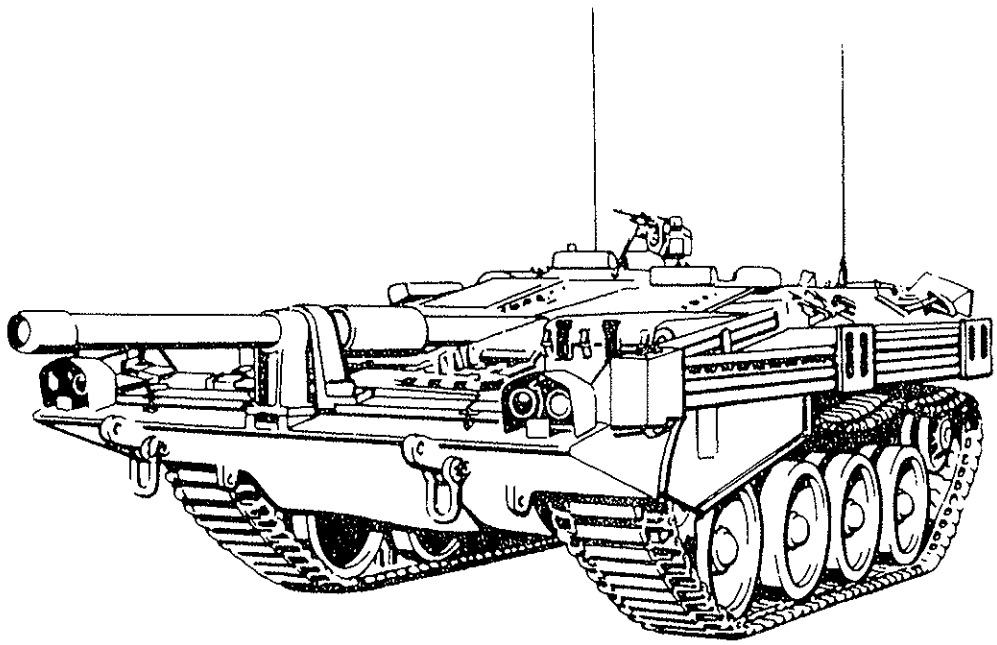
1. Check that switches and other control mechanisms are correctly adjusted.
2. Check for broken cables and proper connections (loose contact).
3. Check that the antenna is correctly attached.
4. Check that the transmitters are correctly attached in the frame. If trouble persists, it is to be reported.

NOTE! Make no checks with the power turned on.

Tank 103B

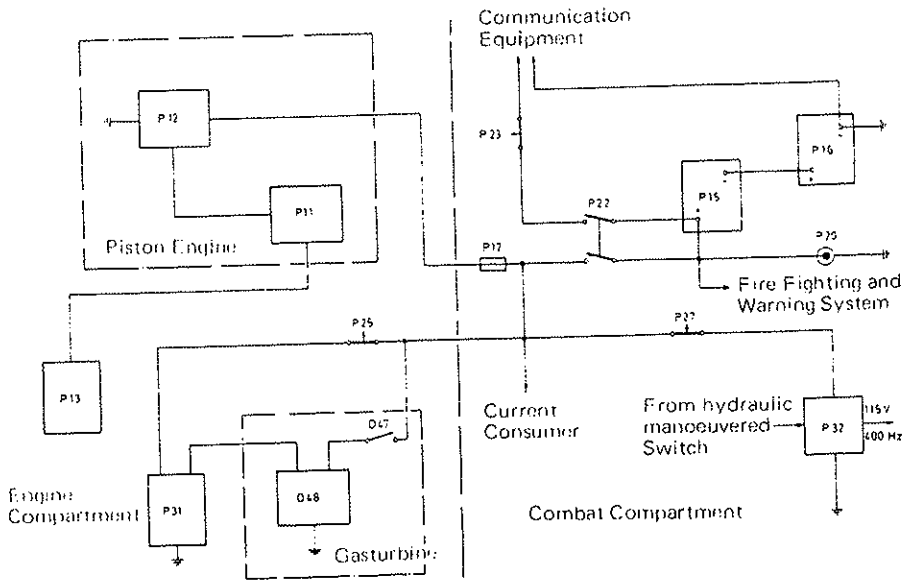
Description Part 1

5. ELECTRICAL SYSTEM



The Defense Materiel Administration of Sweden

May 1975



D47	Starting Relay
D48	Start Generator
P11	Charging Generator
P12	Rectifier
P13	Charging Regulator
P15	Battery
P16	Battery
P17	Diode Fuse 250 A
P20	Connection for compensating charge
P22	Main Switch
P23	Automatic Fuse
P25	Automatic Fuse
P27	Automatic Fuse
P31	Charging Regulator
P32	Transformer

Fig. 1. Power suppley system, principal cirquit

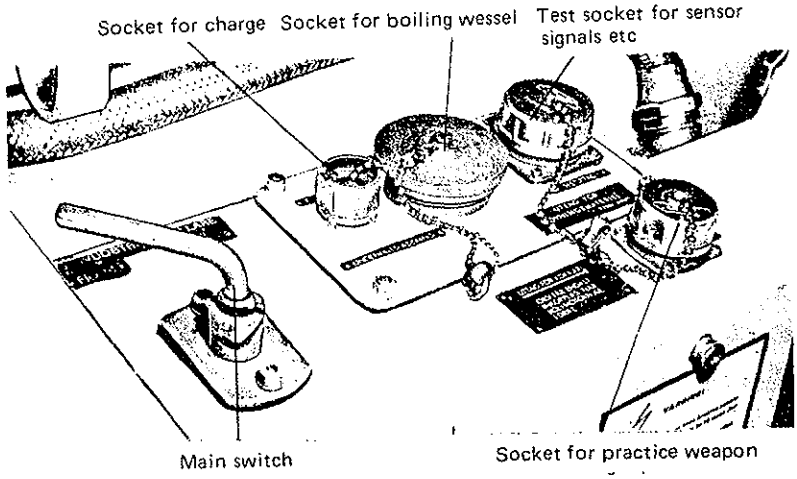


Fig. 3. Main switch and connections

Jumper Cable Junction

On the left wall of the combat compartment, above the main switch, there is a jumper cable junction. When necessary, a jumper cable is connected there from the jumper cable junction of another vehicle.

Before connecting the cable, check that the other vehicle has a 24 V electrical system.

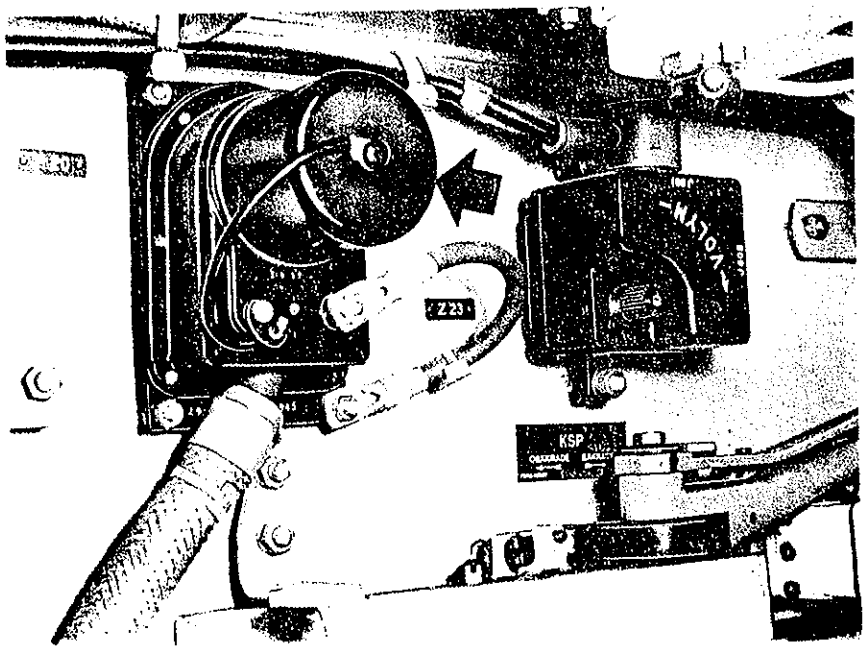


Fig. 4. Jumper cable junction

Generator

The piston engine is driven by an alternating current generator. The alternating current is rectified in a diode box. A charging regulator regulates generator load and limits it to 100 A. A control light on the backwards driver´s panel comes on when the main switch is in position ON and will not light when the generator is charging.

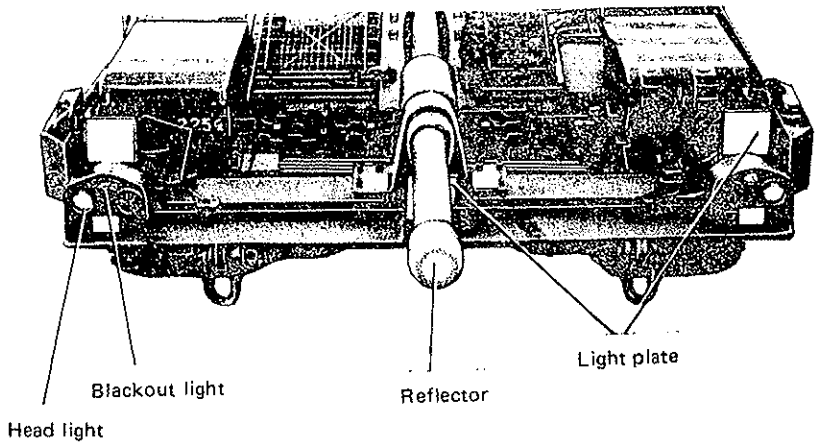


Fig. 7. Illumination forward

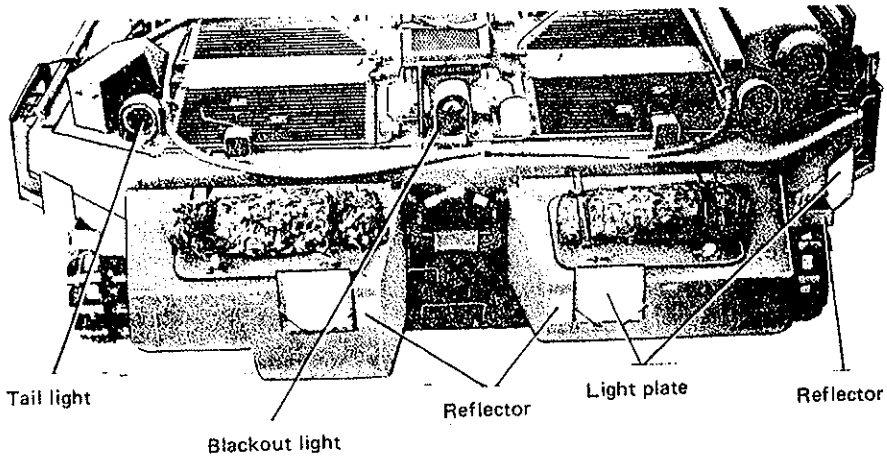


Fig. 8. Illumination backwards

The headlights can be adjusted for full and partial illumination using a switch on the gunner/driver's instrument panel. There are two incandescent bulbs in either tail light. The strongest light is obtained with the headlights and the weakest with the blackout lights.

Reflectors and Light Plate Retainers

In the front the vehicle has two white lights and four red reflectors are in the rear. In addition, there is a white reflector on the muzzle guard.

On the front side of the vehicle there are three light plate retainers and on the rear there are four retainers. The light plates are kept in an accessories box when not in use.

Two potentiomers are located on the gunner/driver´s panel. The left regulates illumination on gunner/driver´s panel, starter panel and elevation- and side waterlevel. The right regulates illumination on gratitude in gunner/driver´s sight. One potentiometer is on the backwards driver´s panel and actuates its illumination.

The observation cupola's traversing scale is illuminated by a lamp. It is always illuminated when the main switch is ON.

On observation cupola control panel there is one potentiometer which regulates the illumination in commander´s sight.

List of Incandecent Bulbs

Used in	Number	Designation	Data
Vehicle			
Tail lights			
ordinary	2	OSRAM-7244	20/7 W
blackout	2	OSRAM-6444	3 W
Fire warning	3	OSRAM-5626	5 W
Glowlamp, Transformer	1	GEUS-NE-2J	115 V
Control lights the rest	4	GEUS-327	0,04 A
Blackout Lights	3	OSRAM-6453	15 W
Panel lights	8	GEUS-327	0,04 A
Inspection light	1	OSRAM-7429	15 W
Headlights	2	GEUS-4811	110/55 W
Ceiling lights			
ordinary	2	OSRAM-7529	15 W
blackout	2	OSRAM-5627	5 W
Warning lights	20	GEUS-327	0,04 A
Weapons			
Firing tester	1	OSRAM-3797	3 W
Light for traversing scale	1	GEUS-327	0,04 A
Signal light, charging	4	GEUS-327	0,04 A
Light for graduatet dial	2	OSRAM-3797	3 W
Light for water level	3	OSRAM-6444	3 W

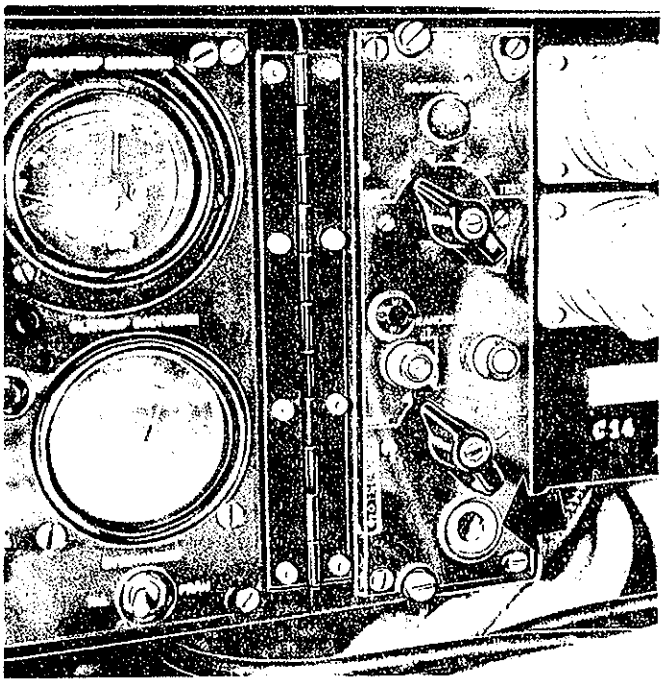


Fig. 11. Power outlet on backwards driver´s panel

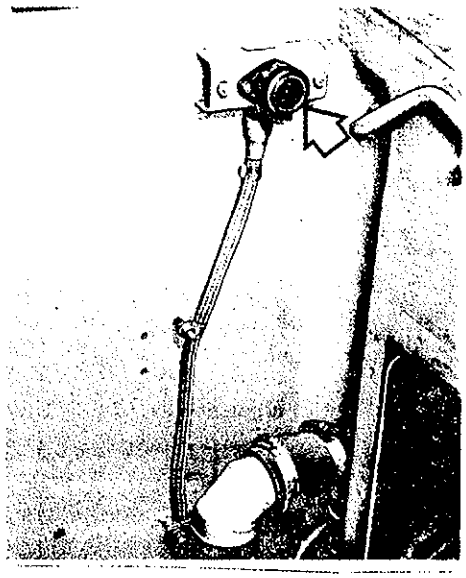


Fig. 12. Power outlet in engine compartment

Bilge Pumps

The vehicle has two electrically driven bilge pumps for draining water and can be assembled on the vehicle floor. One pump is situated in the combat compartment and the other in the engine compartment. The bilge pump is operated with a switch on the backwards driver's panel.

Transformers

Some electro-hydraulic servo system includes components which require alternating current. For this purpose there is a static transformer which transforms the electrical systems 24 V direct current to 115 V, 400 Hz (Hz = periods per second). The transformers are situated on the left wall of the combat compartment in back of the backwards drivers panel. It starts automatically when the piston engine starts and servo oil approaches a certain pressure. On the backwards drivers instrument panel there is a white control light which comes on when indirect current is present.

Amplifier

To amplify electric signals in the electro-hydraulic servo system there is an amplifier and an adapter unit. They are situated in the electrical junction box in the combat compartment.

The gyro is a so-called miniature speed gyro. Its rotors, which rotate at high speed, are suspended in a rotatable frame. When the vehicle turns (or when its angle of elevation is changed) the frame turns and actuates a signal transmitter. An electric signal goes out from the transmitter and actuates the servo system gyro.

Fuses

The fuses are situated under a cover on the junction box in the combat compartment. On the underside of the cover there is a holder with spare fuses as well as directions with the names of the fuses, their area of application and maximum load.

There are two types of fuses: regular and automatic fuses. A regular fuse which goes out of order must be replaced. An automatic fuse which goes out can be re-actuated by depressing a fuse. An automatic fuse which goes out must cool off at least 10 seconds before it is re-actuated.

All fine fuses (6 A) are situated in a screw holder. A fuse (P 17) which bears 250 A, is screwed directly on the current-conducting bolts. The other fuses are automatic fuses.

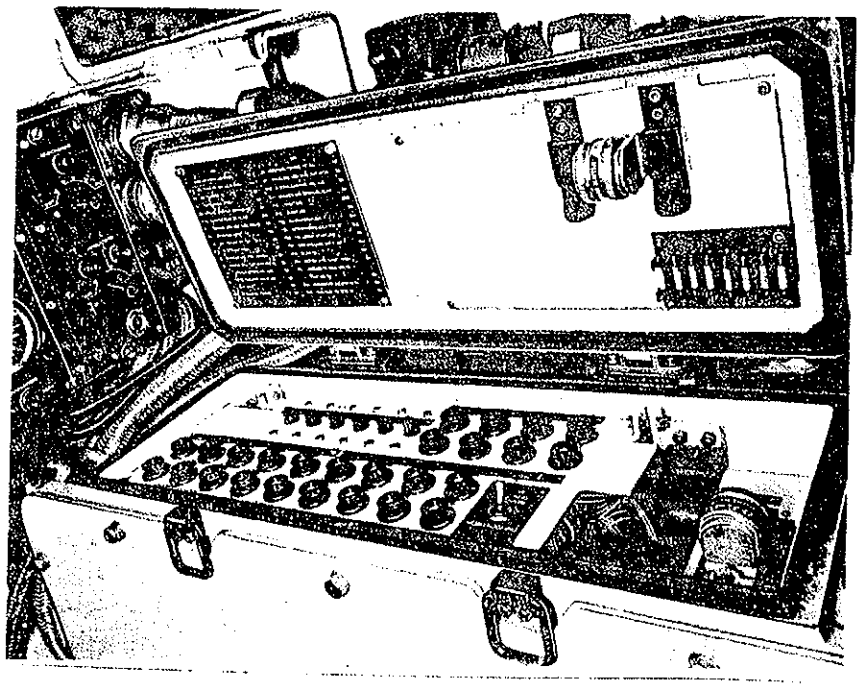


Fig. 13. Fuses in junction box C 11

In addition to the aforementioned fuses, automatic fuses are installed in the following switches:

- piston engine switch
- gas turbine switch
- bilge pump switch

Turn OFF the switch before touching these fuses.

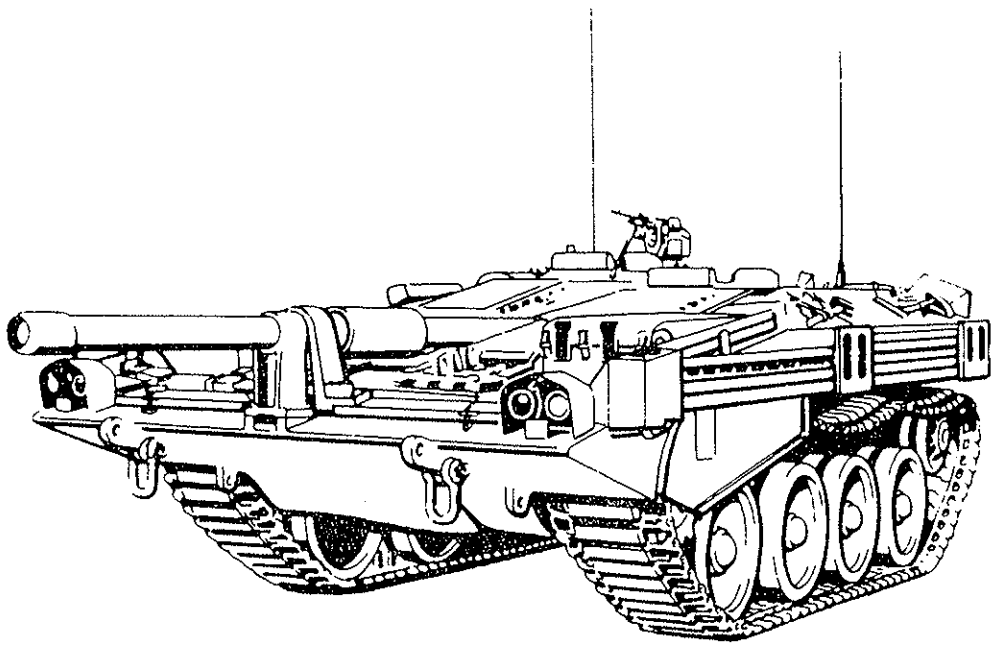
List of Fuses

Fuse	Current Consumer	Resistance	Note
N11	Fire warning and extinguisher	6 A	
P17	Rectifier	250 A	Diode fuse
P19	Rectifier	6 A	
P23	Communications equipment	25 A	Automatic fuse
P25	Voltage regulator GT	35 A	Automatic fuse
P26	Field winding, start generator	6 A	
P27	Transformer 24 V-115 V, 400 Hz	15 A	Automatic fuse
P30	Boiler	35 A	Automatic fuse
P34	Engine for cable winding	6 A	
R11	Maneuvering circuits, elevation	6 A	
	Switches with automatic fuses		
D11	Switch for piston engine	15 A	
D41	Switch for gas turbine	15 A	
V11	Switch for bilge pump in combat compartment	25 A	
V13	Switch for bilge pump in engine compartment	25 A	
	115 V 400 Hz		
R30	Sensor circuits, elevation	6 A	
R69	Sighting circuits, observation cupola	6 A	

Tank 103B

Description Part 1

8. FIRE EXTINGUISHING



The Defense Materiel Administration of Sweden

May 1975

General

The vehicle fire extinguishing system consists of:

a fire warning system,
a permanent fire extinguishing system,
two powder extinguishers (hand fire extinguishers).

Fire warning system

Fire warning system consists of three indicators (IR-eyes) in engine comparmen In combat compartment there is a control unit in junction box (C11) and a warning light (red) located at the commander and gunner/driver. On backwards driver´s panel there is a warning lamp and a knob for checking the fire warning system. There is also a knob for changing over to manual or automatical operation and control lamps for extinguisher 1 and 2.

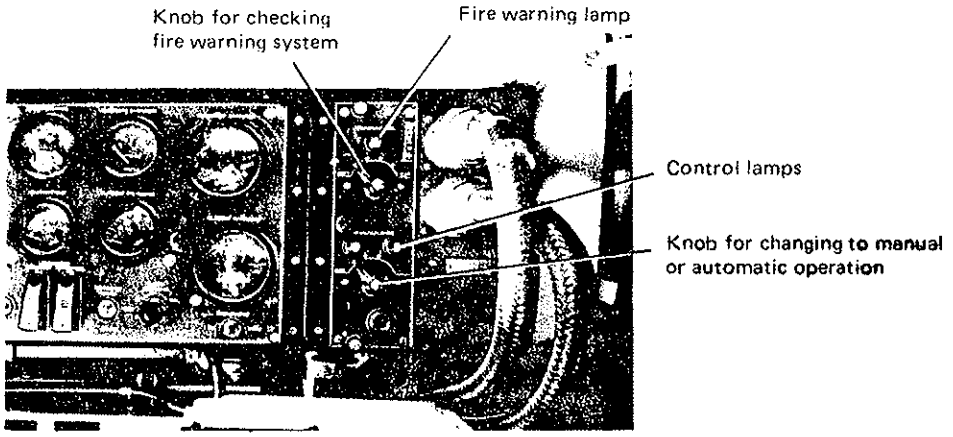


Fig. 1. Backwards drivers panel, right part

When fire appears in engine compartment the warning lamps in combat compartment will lit. The warning system will operate even if the main switch is in position OFF:

Operating control

The main switch in position ON. Check the system by putting the knob on the backwards driver´s panel in position TESTLÄGE 1. The warning lamps should lit. Repeat the check for position TESTLÄGE 2 and TESTLÄGE 3.

After the check the knob must be positioned to DRIFT and the knob for manual or automatic operation in ordered position.

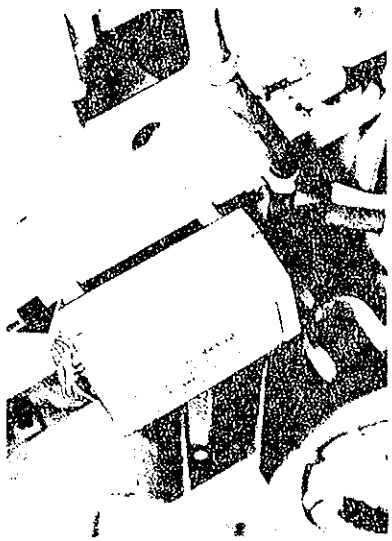


Fig. 3.
Release mechanism in the Combat Compartment

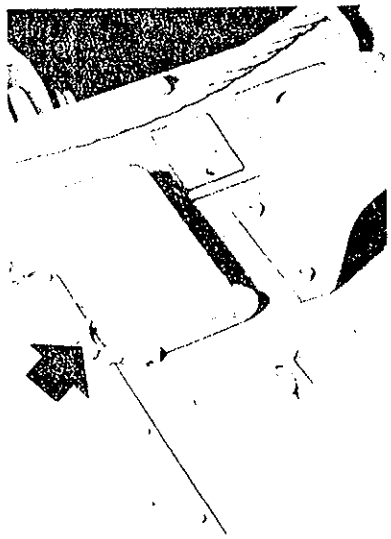


Fig. 4.
Outside Release Mechanism

Manual operating

When the release mechanisms are depressed, the air flask is punctured. In this manner, pressurized air flows out to the reversing valve which conducts air to the safety valve, where the pressure is reduced to 15 kp/cm^2, and thereafter to the valve which is closed. Simultaneously, pressurized air is conducted to the maneuvering cylinder in the carbonic acid flasks which actuates a picker stick, a breaker clamp and the breaker arm, which causes the carbonic acid flask to open and carbonic acid to flow out through the nozzles into the engine compartment.

Sealing

The release mechanism protective cover is provided with safety pins which are sealed so that they do not protrude unless the sealing wire gives out.

The carbonic acid flasks are each provided with two seals. One wire is wound around the valve housing and through an aperture in the breaker arm. The other wire is wound round the breaker clamp and the upper part of the valve housing in such a way that the breaker clamp is held in upright position. As sealing wire use Sandvikens rust-free 12 R 10 wire (diameter 0.30 mm). NOTE. The wire must not be wound double.

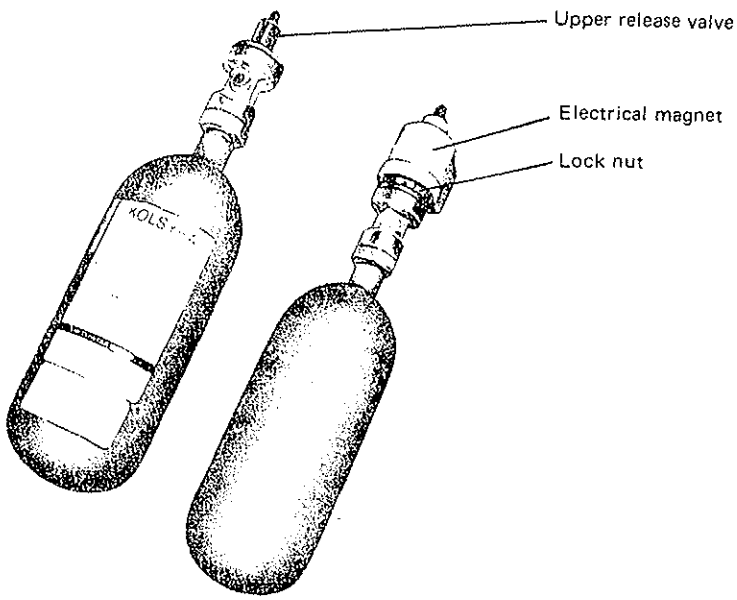


Fig. 6. Carbonic flasks with and without electrical magnet

WARNING! Check that the new flask has a safety nut.

- Pull the white lever button on the electrical magnet. See fig 7.
- Place the electrical magnet on the flask and tighten it hard.
- Place locknut and tighten it.

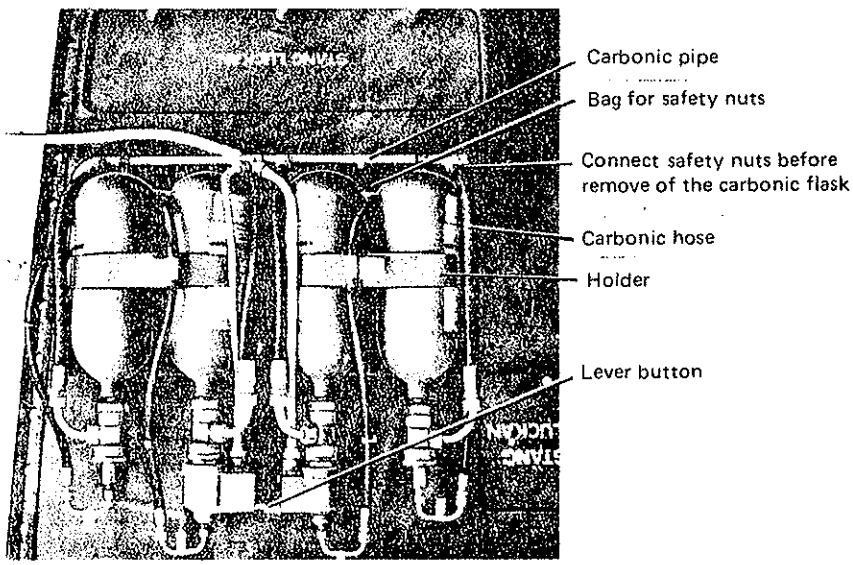


Fig. 7. Carbonic flasks connected

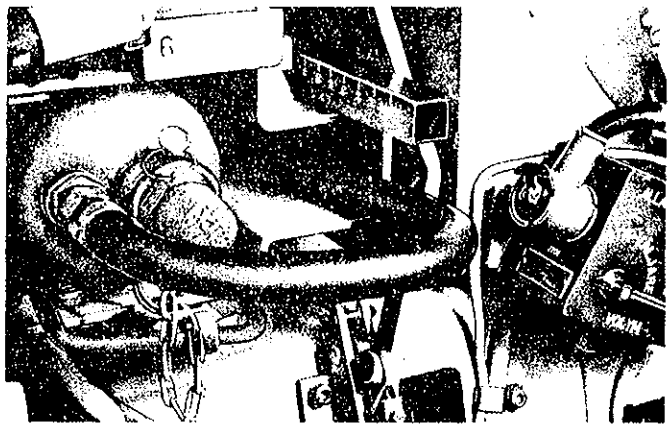


Fig. 10. Powder Extinguishers
in the Combat Compartment

When the powder extinguishers are being used, a smoke powder spurts out which becomes gaseous as it heats up.

The powder extinguishers are reloaded at a special service station.

Refer to the instructions which are on every powder extinguisher.

What To Do In Case of Fire

Fire in the Engine Compartment

Automatic release - the knob in automatic position. When the fire warning lamp is lit, if possible stop the engine. Nevertheless, the system is designed for use with the engines in operation. If the fire is for use with the engines in operation. If the fire is not extinguished by use of extinguisher 1, positioned the knob on backwards driver's panel in position 2.

Manual release - the knob in manual position.

If possible, the engines must be stopped before the fire extinguishing system is used. Nevertheless, the system is designed for use with the engines in operation. It is released with the nearest release mechanism (combat compartment or outside) in the following manner:

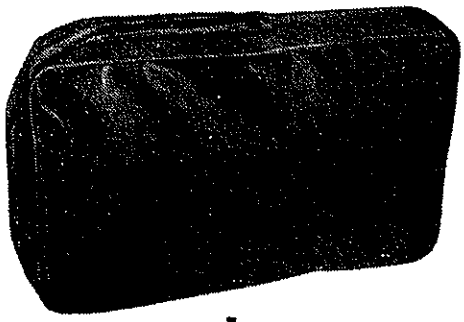
1. Pull out the safety pin.
2. Open the protective cover.
3. Depress a releaser with a quick movement.

If the fire is not extinguished, the engines must be stopped and the other release mechanisms depressed.

Tank 103B
Strv 103B

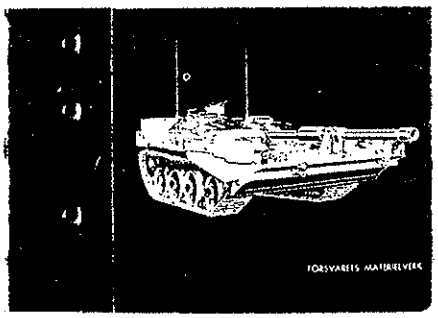
TOOLS AND EQUIPMENT
TILLBEHÖR

FÖRSVARETS MATERIELVERK 1973



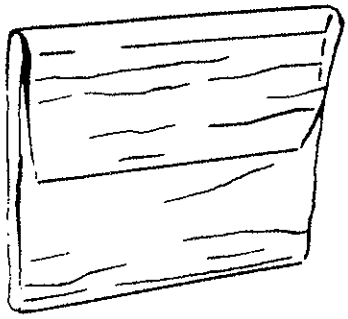
1

Strv 103B
Beskrivning del 1

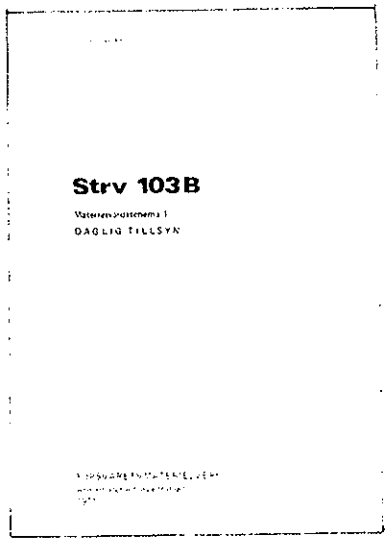


2

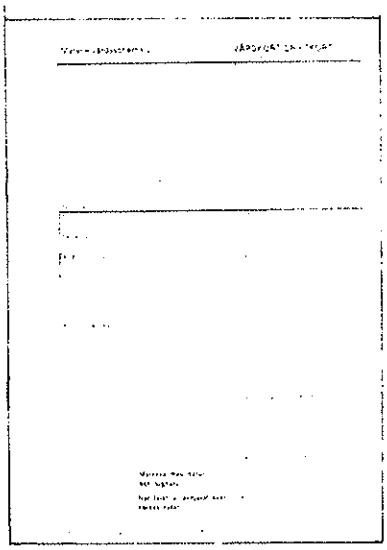
3



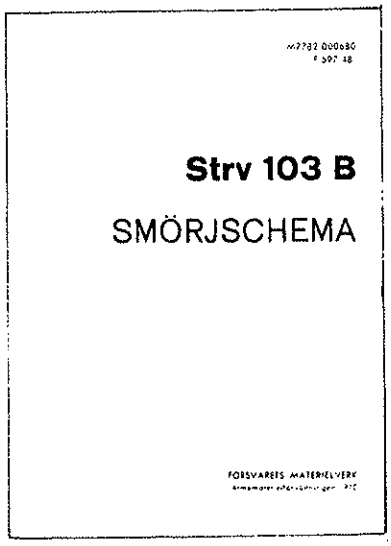
3.1 - 3.3



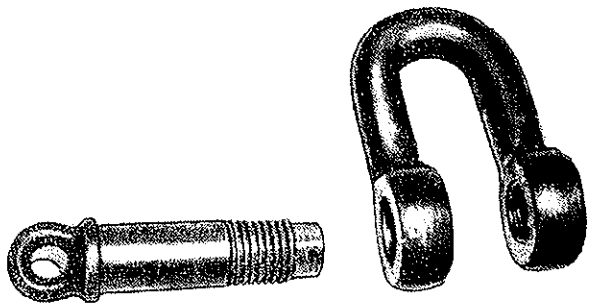
4



5

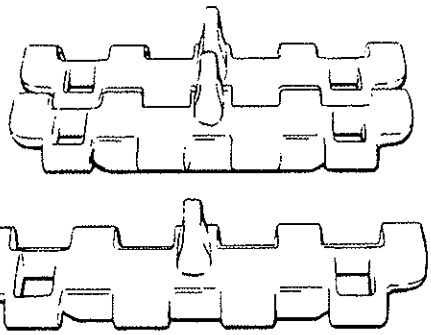


6

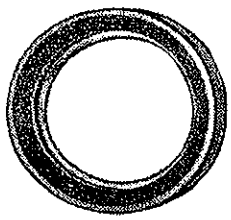


1

6

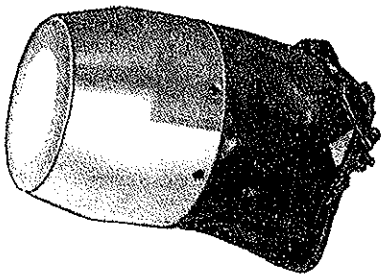


7

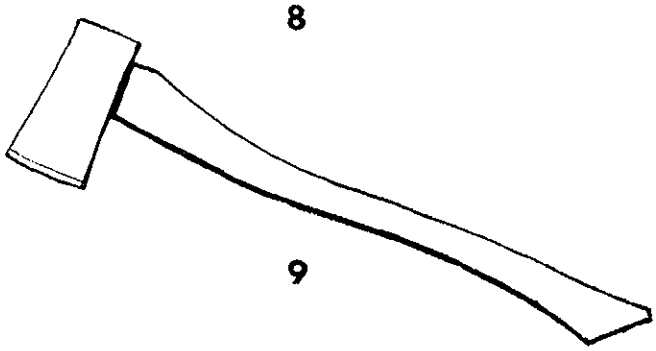


2

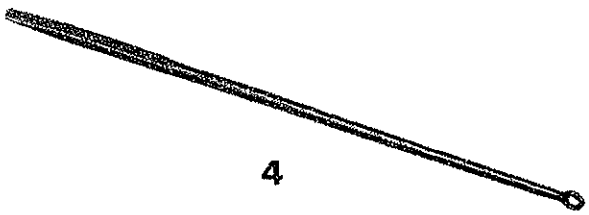
8



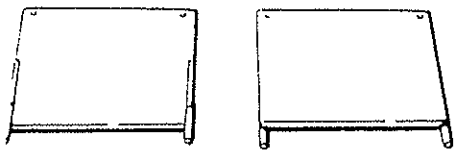
3



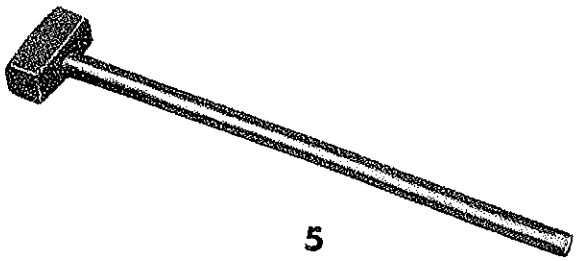
9



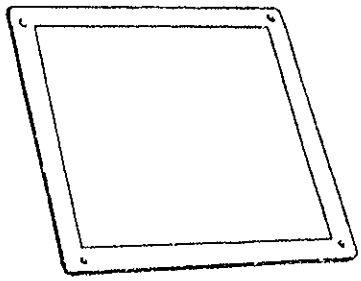
4



10

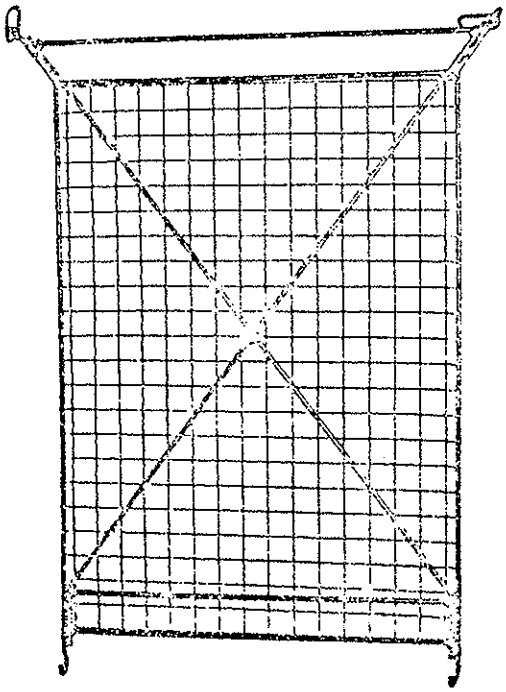


5

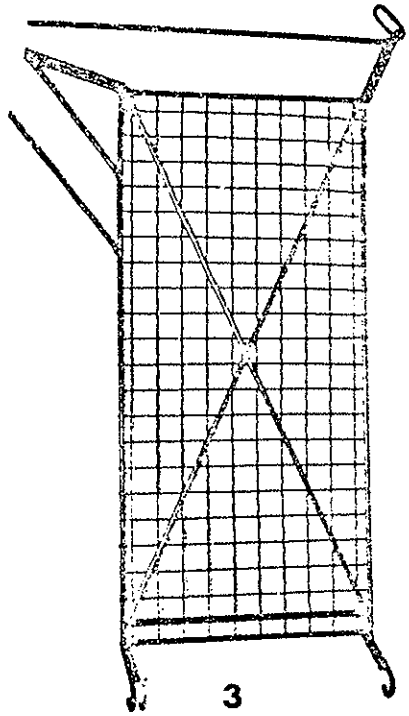


11

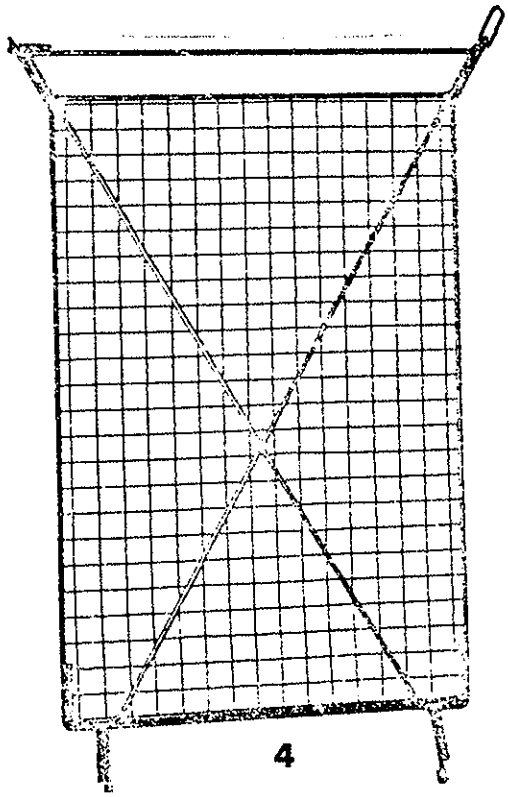
1



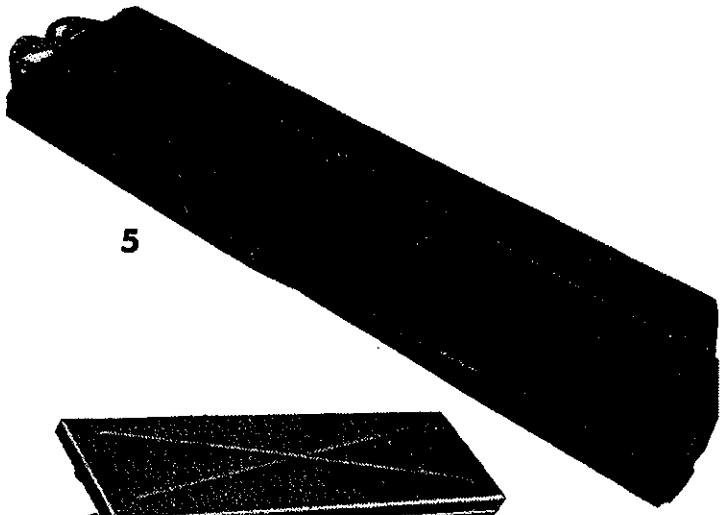
2



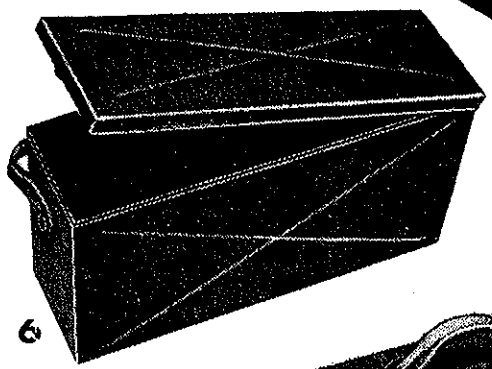
3



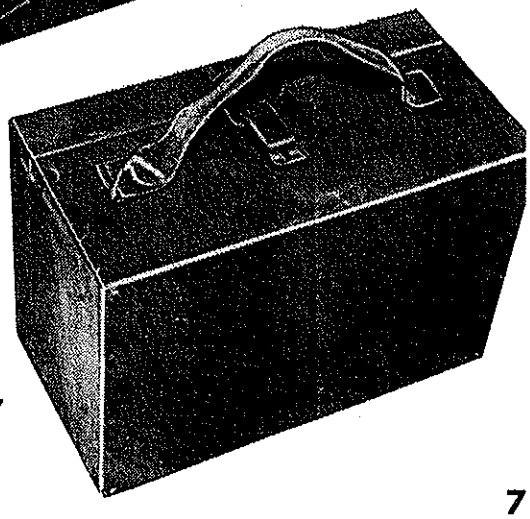
4



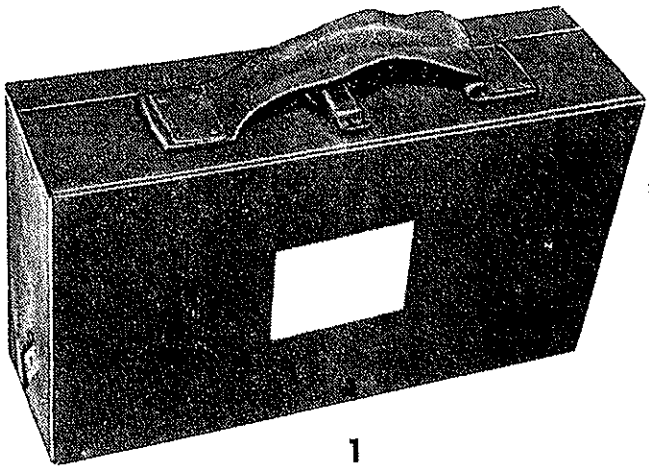
5



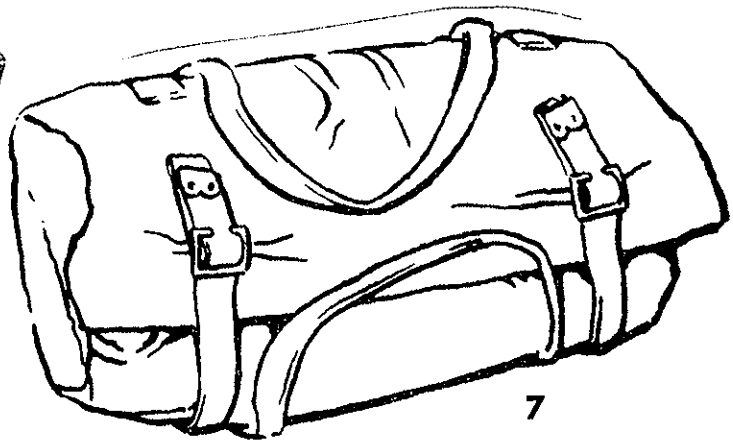
6



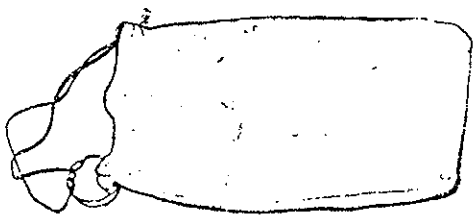
7



1

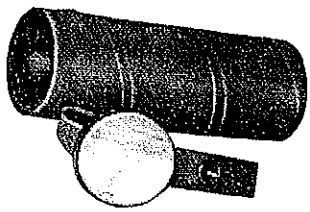


7

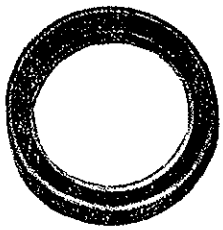


2

8



9



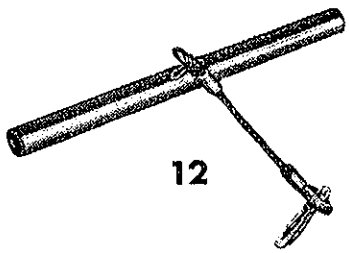
3

10

4

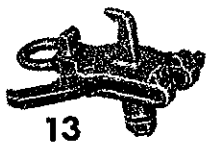
11

5



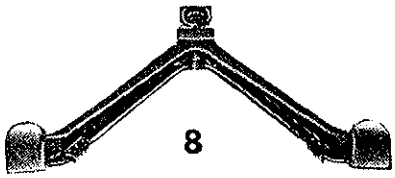
12

6



13

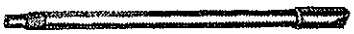
1



8

2

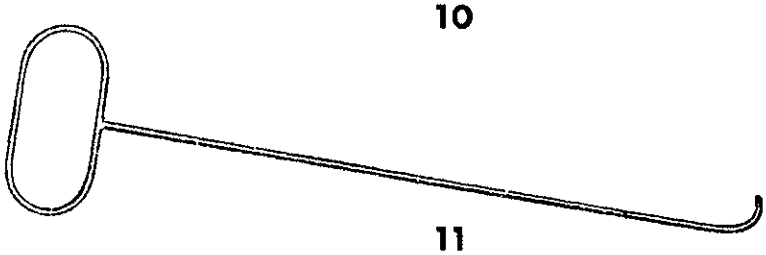
9



3

10

4

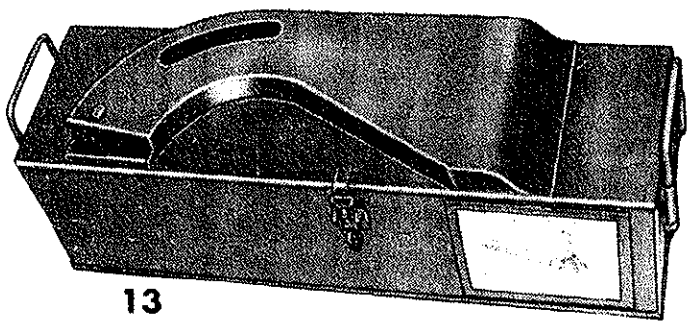


11

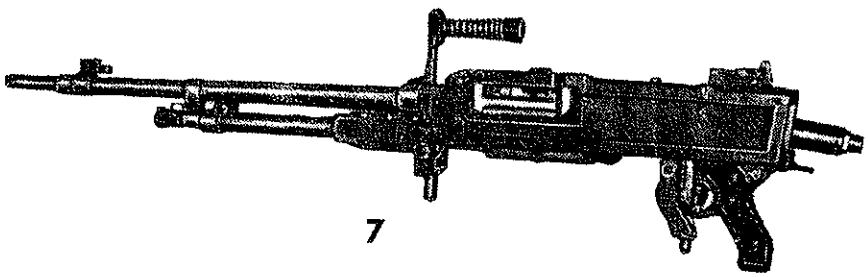
5

12

6

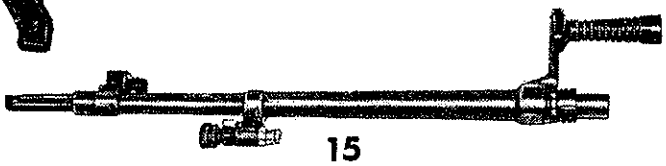


13



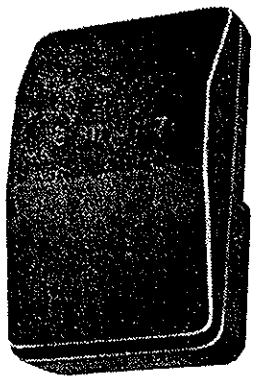
7

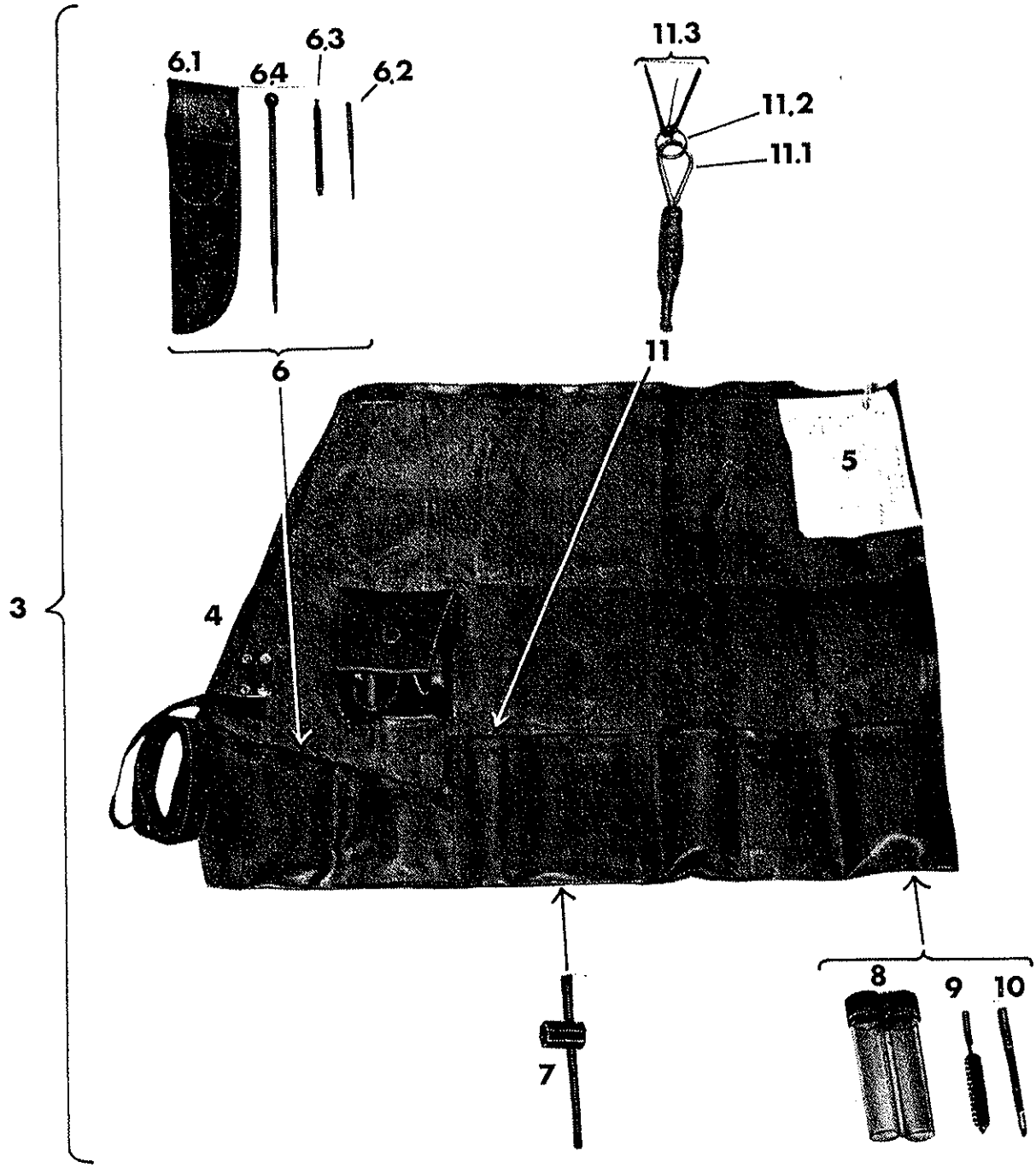
14

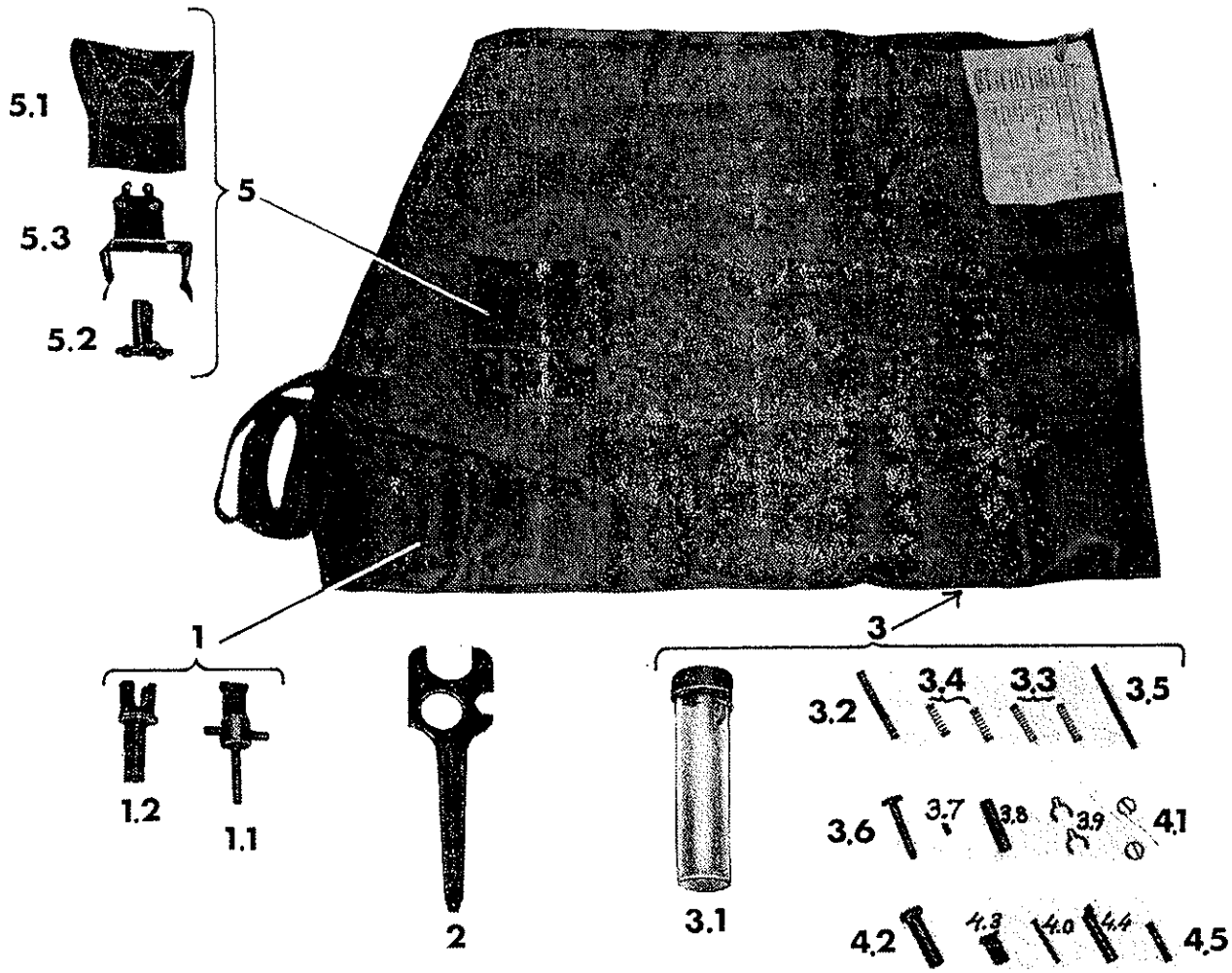


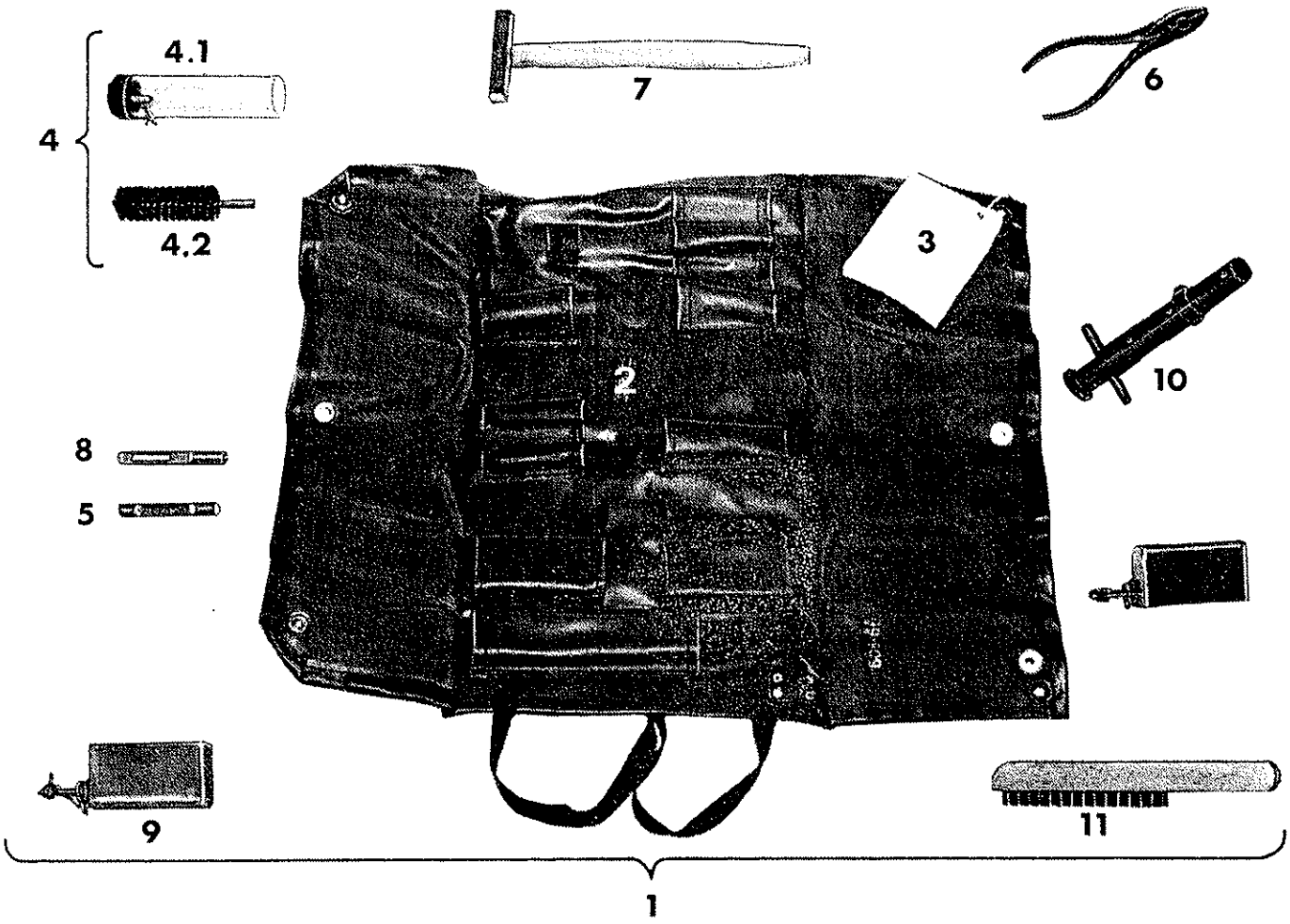
15

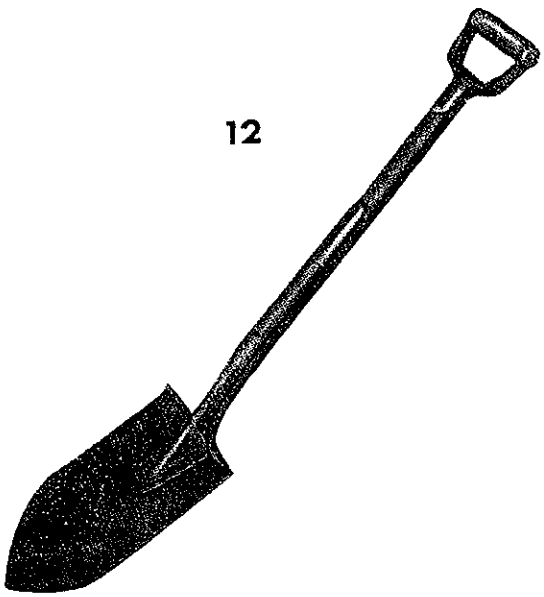

1

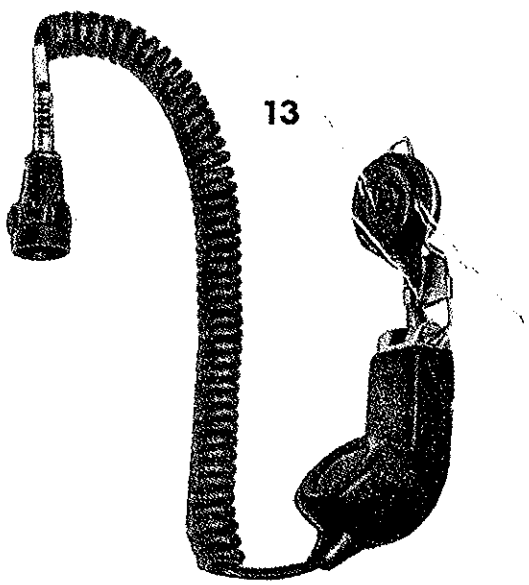

2

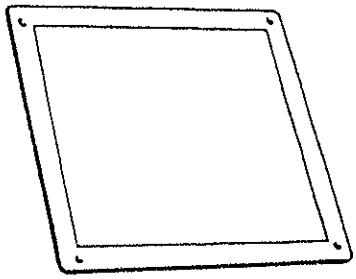

6.1
6.4
6.3
6.2
6
11.3
11.2
11.1
11
5
4
3
7
8
9
10


5.1
5.3
5.2
5
1
1.2
1.1
2
3
3.1
3.2
3.4
3.3
3.5
3.6
3.7
3.8
3.9
4.1
4.2
4.3
4.0
4.4
4.5

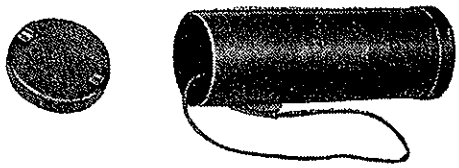

4.1
4
4.2
7
6
3
2
10
8
5
9
11
1


12

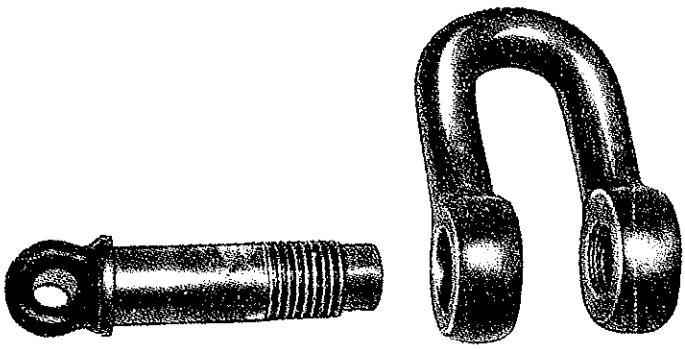

13



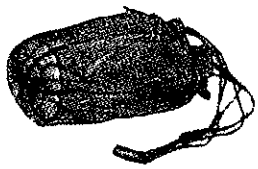
1.3



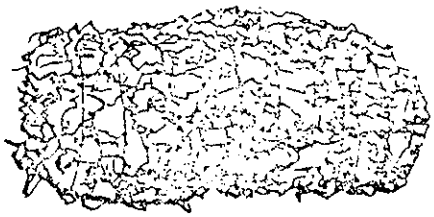
7



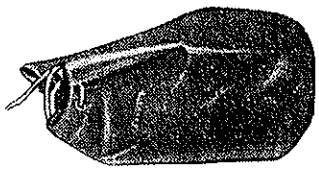
2



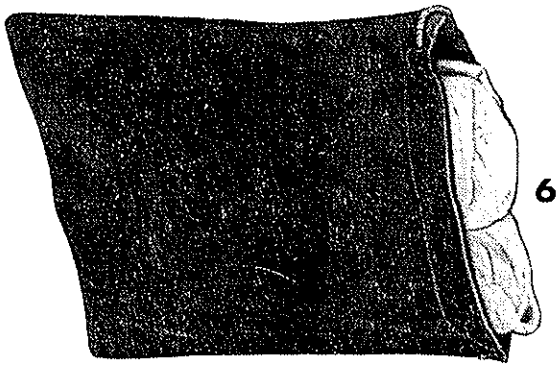
8



4

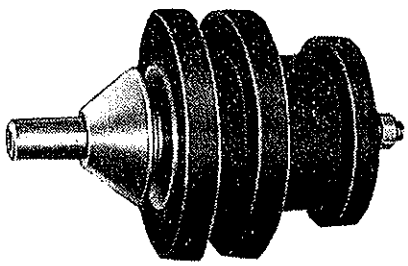


9

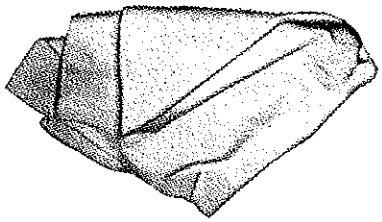


6

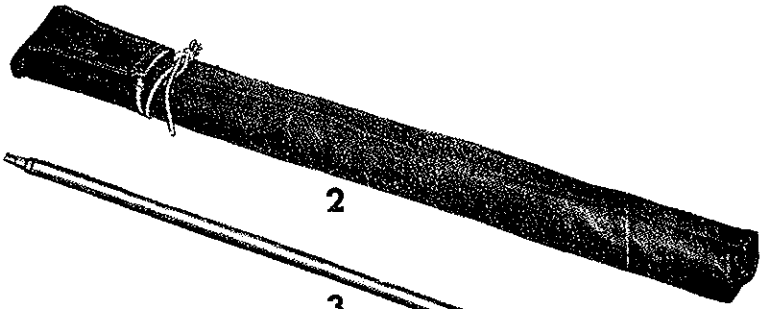
5



10



1



2

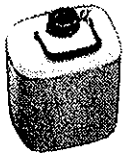
3

4

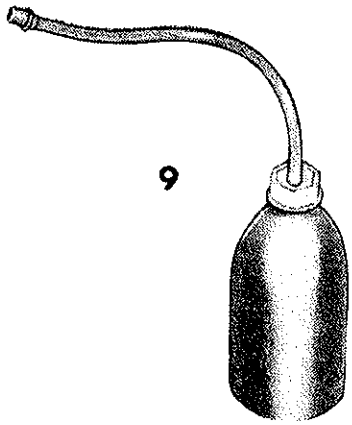
5

6

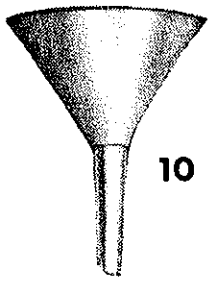
7



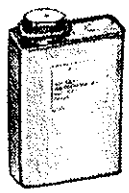
8



9



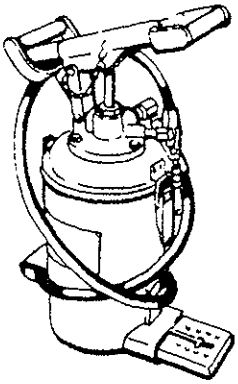
10



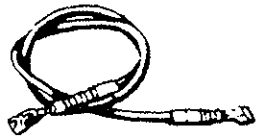
11

12

13



1.1

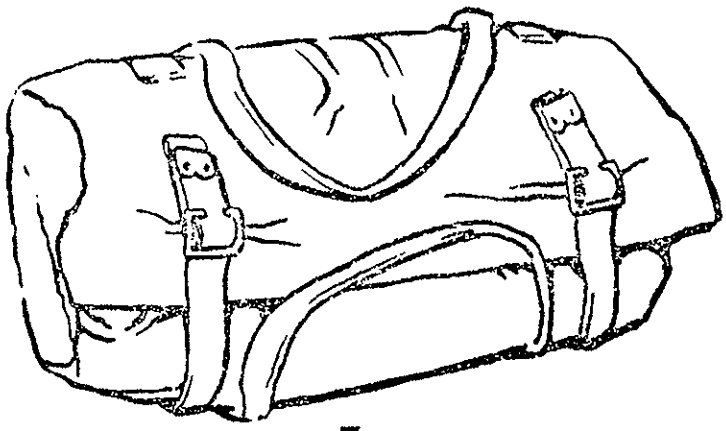


1.2

1.3

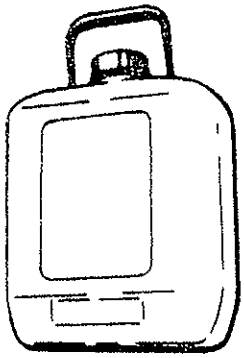
1.4

1



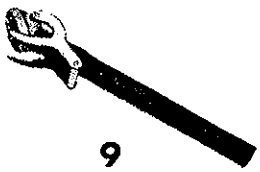
7

2

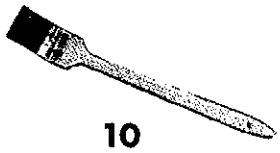


3

8

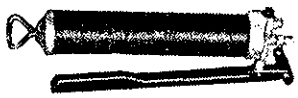


9

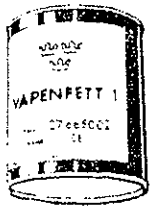


10

4



11



5

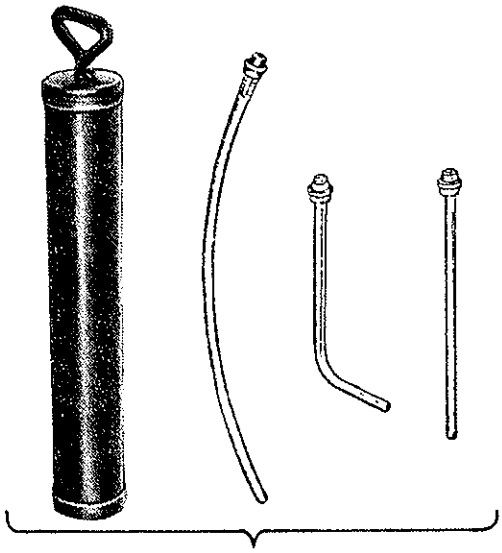
6

12

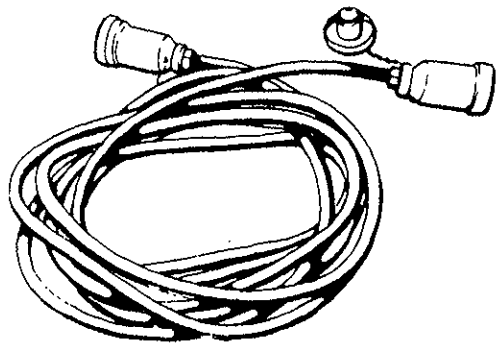
1

2

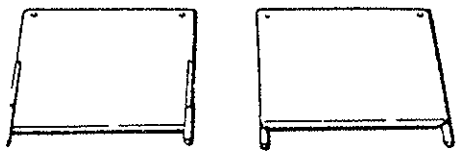
14



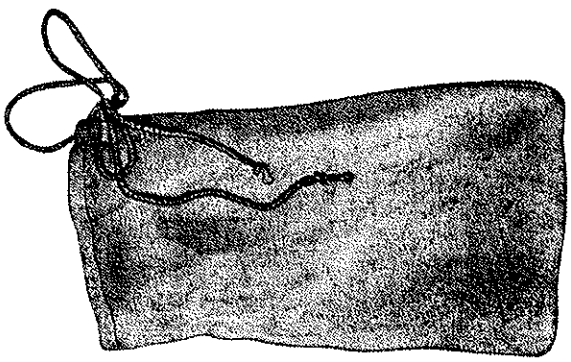
3



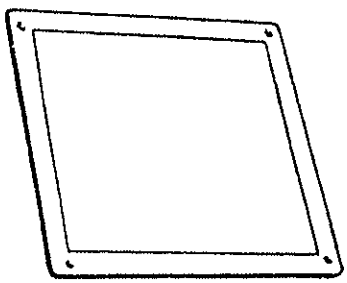
15



16

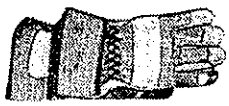


4



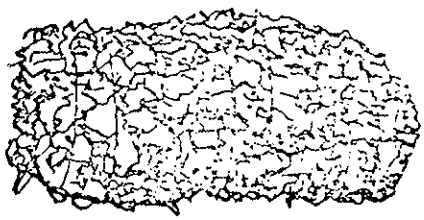
17

5 6 7 8 9 10 11

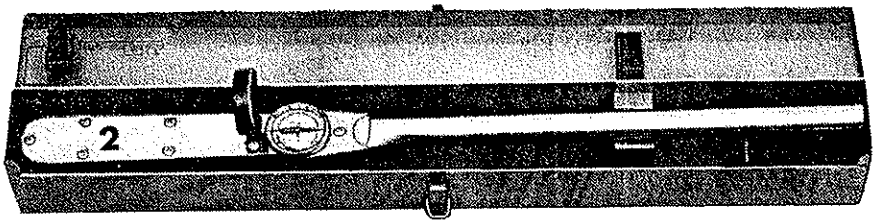


12

13



18

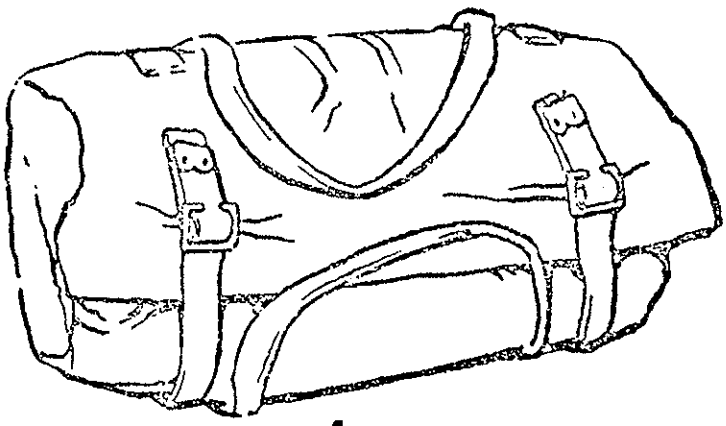


1

7

3

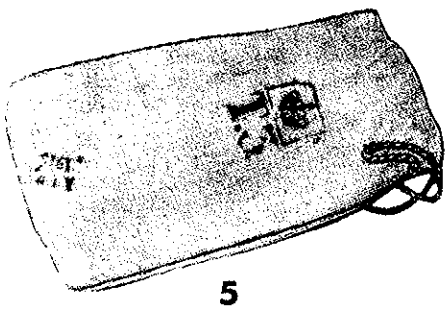
8



4

9

10



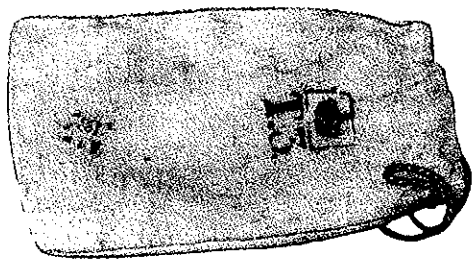
5

11

6

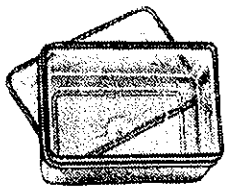
12

1 – 4

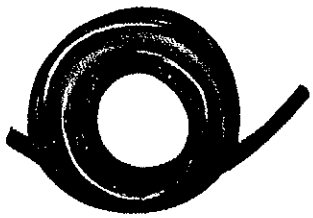


19

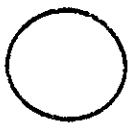
5 – 8



9

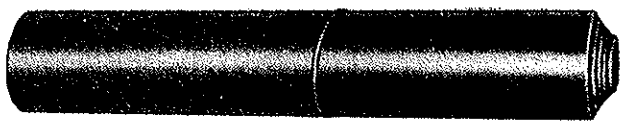


20



10 – 13

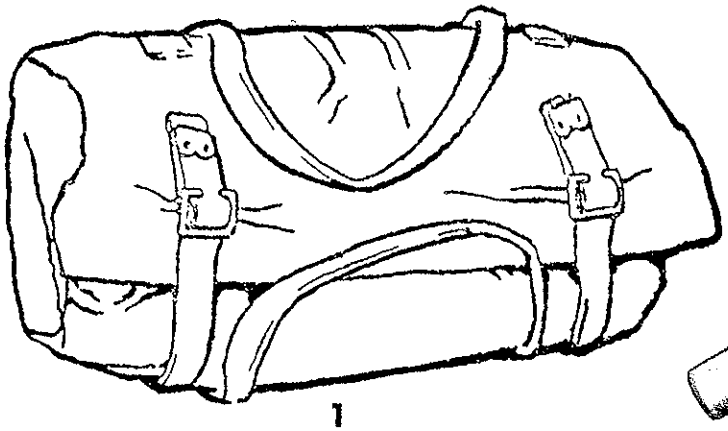
14, 15



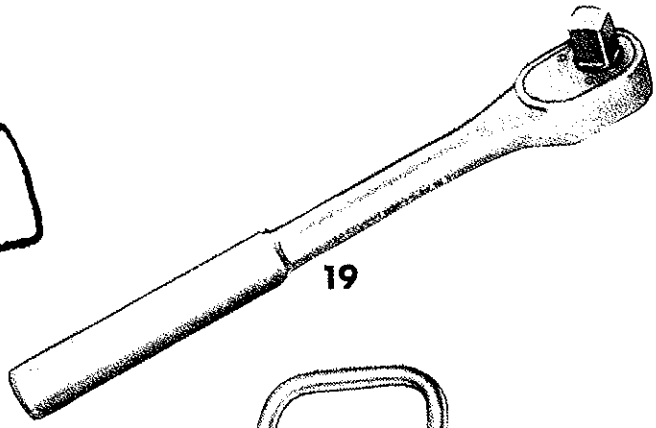
21

16 – 18

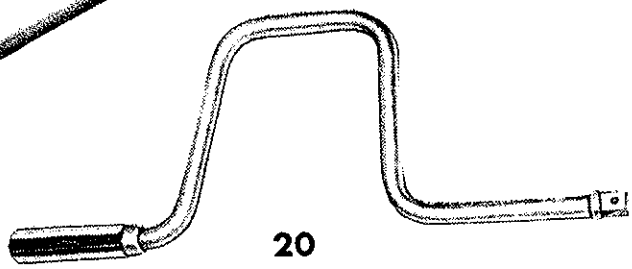
22



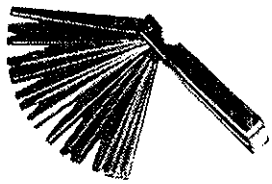
1



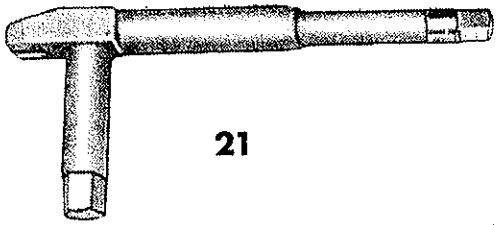
19



20



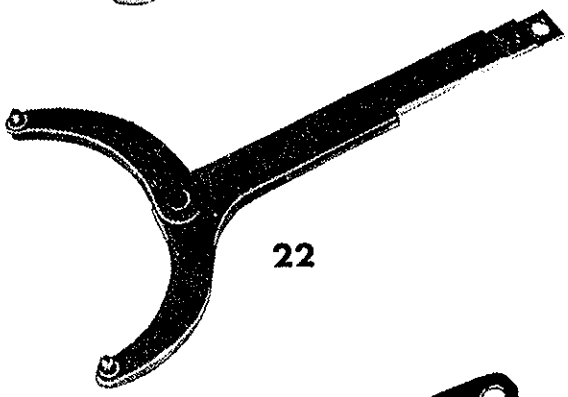
2



21

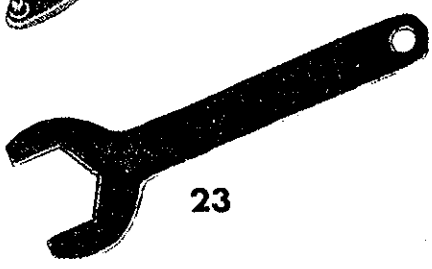
3

4–9



22

10



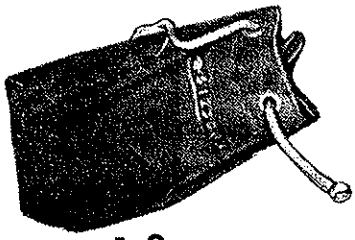
23

11

12–17

24

18

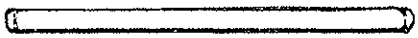


1, 3

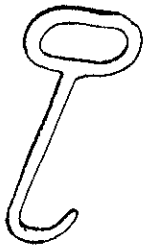
2

4

5

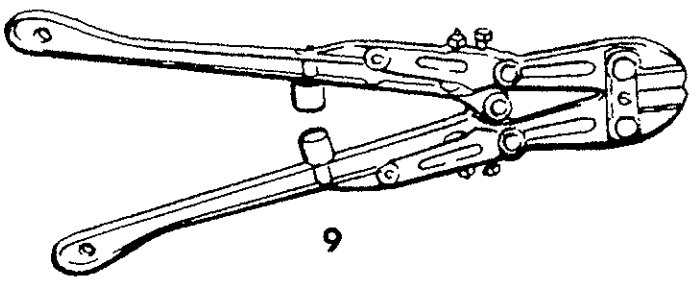


6

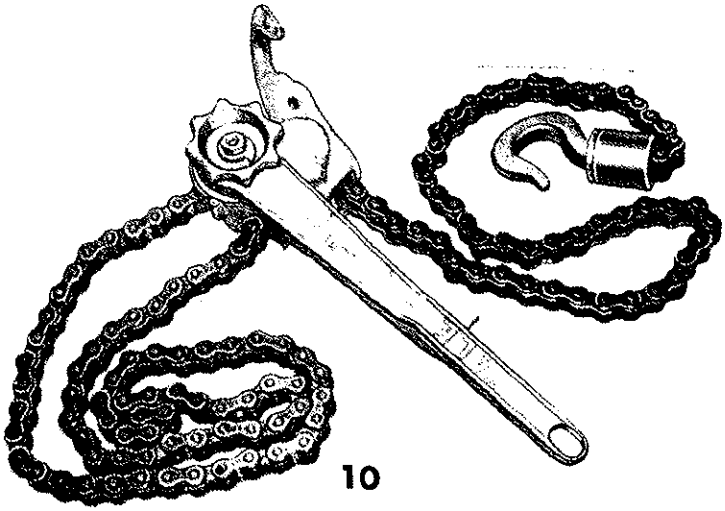


7

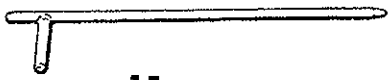
8



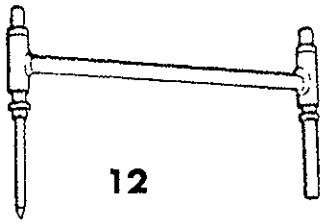
9



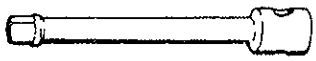
10



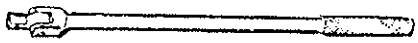
11



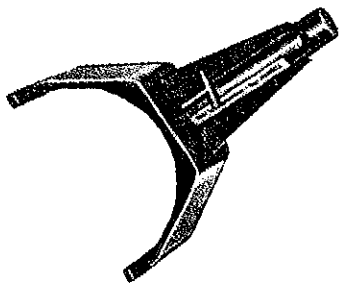
12

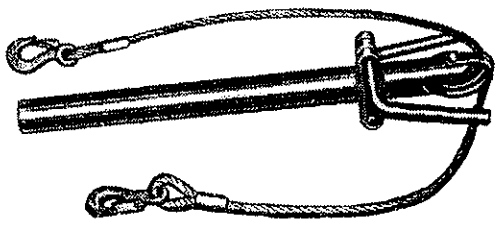


13

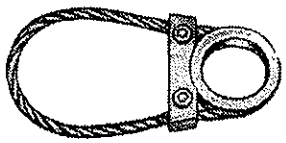


14

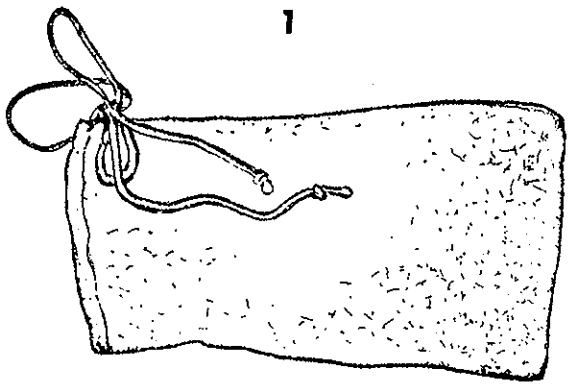




15



1



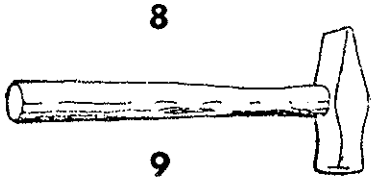
2

3 - 5

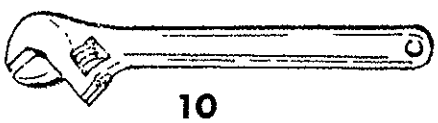
6

7

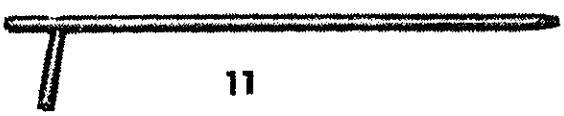
8



9



10

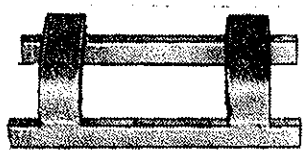


11

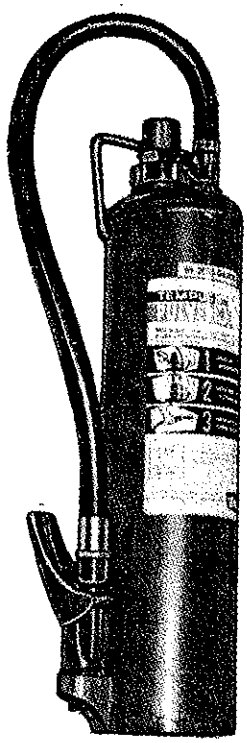
12

13

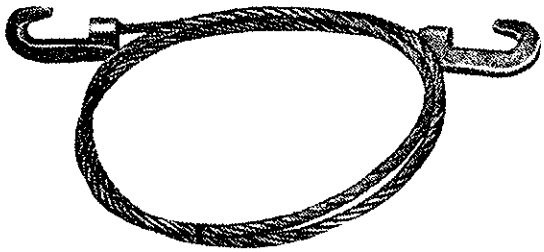
14



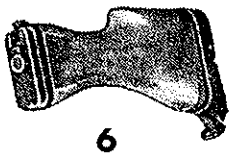
15



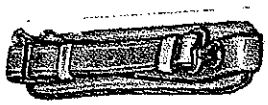
16



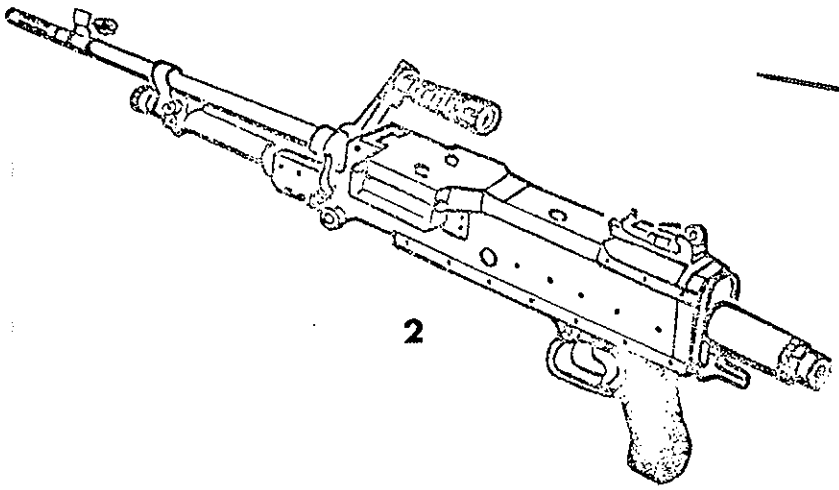
1



6



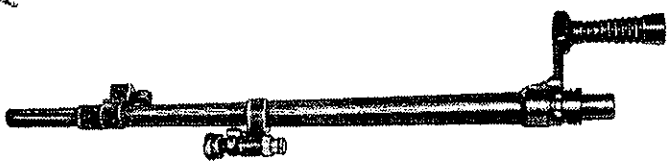
7



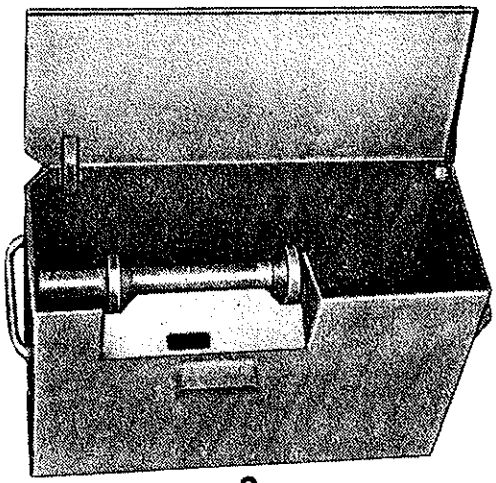
2

8

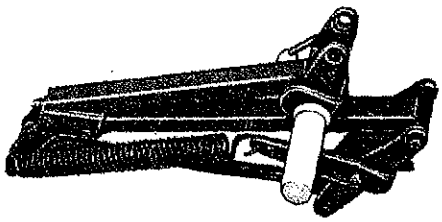
10



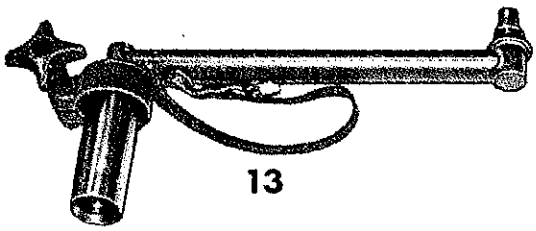
11



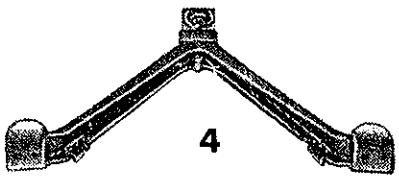
3



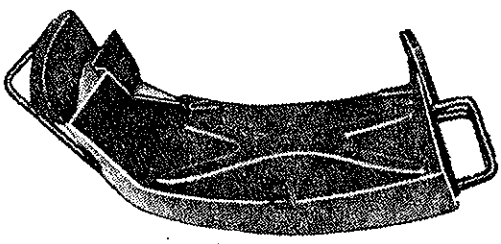
12



13



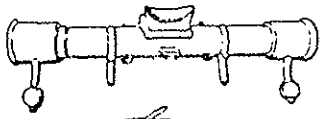
4



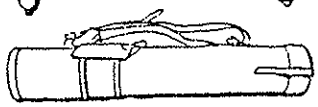
5

14

1.1

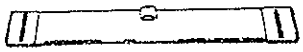


1.2

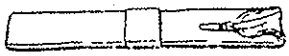


1.3

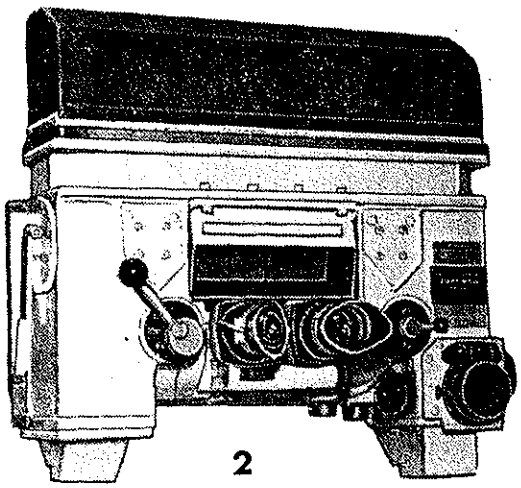
1.4



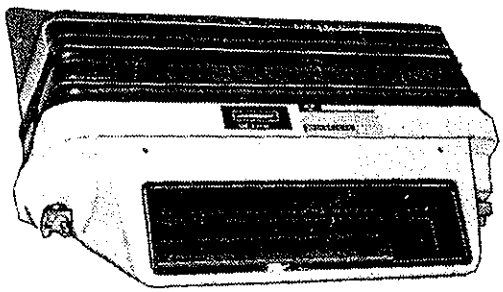
1.5



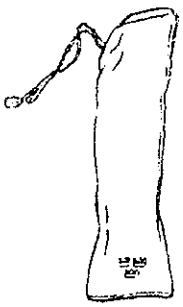
1.6



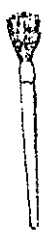
2



3



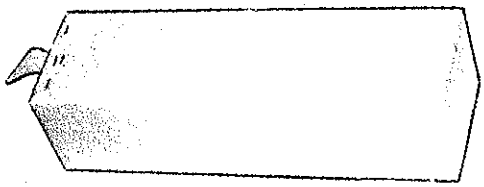
4

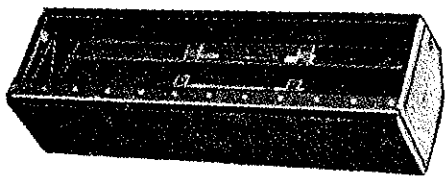


5

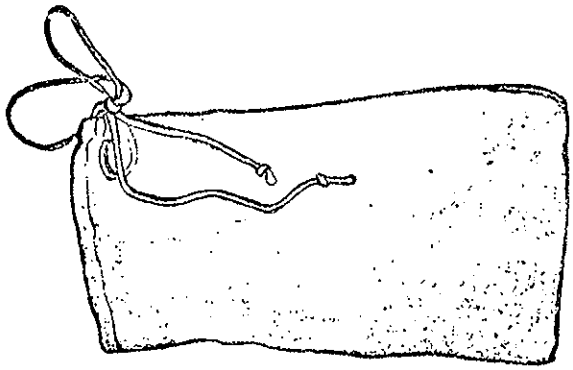
6

7

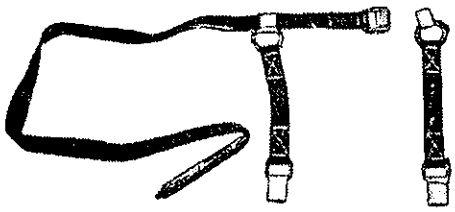




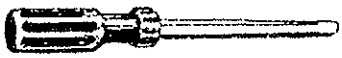
8



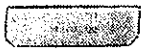
9



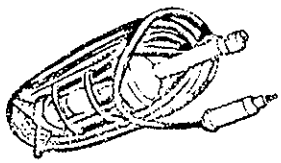
1



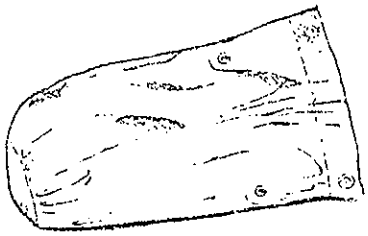
2



3



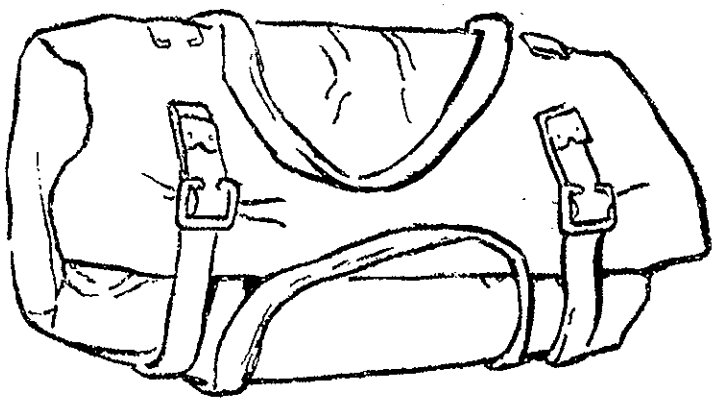
4



5

6

7



8

9

10

11,12

13

14

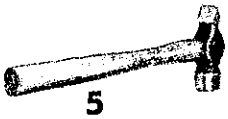
15

1

2

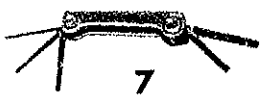
3

4



5

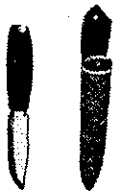
6



7

8

9 10



11

12

13

14

15

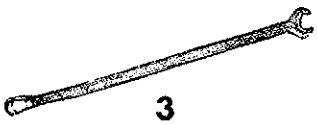
16

17

18

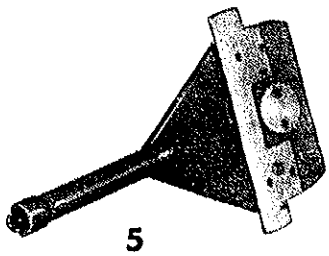
1

2

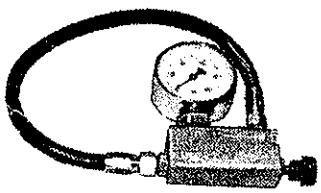


3

4

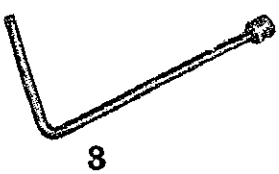


5

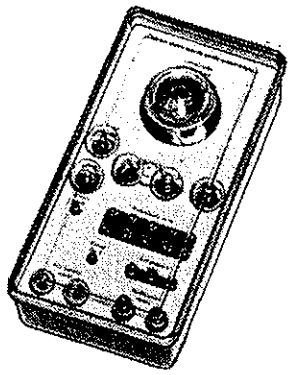


6

7

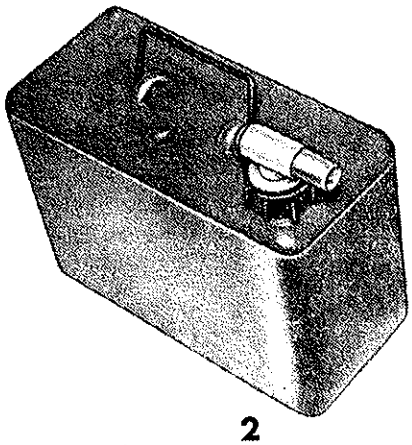


8

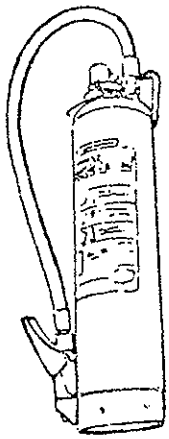


9

1

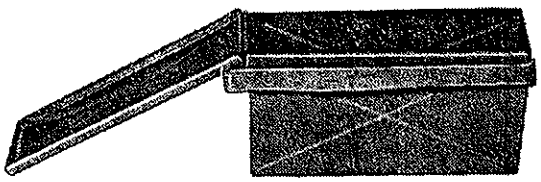


2



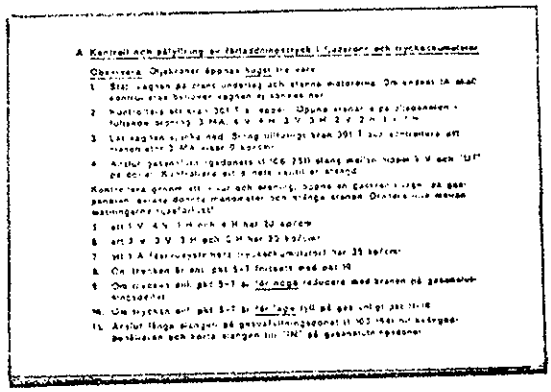
3

4

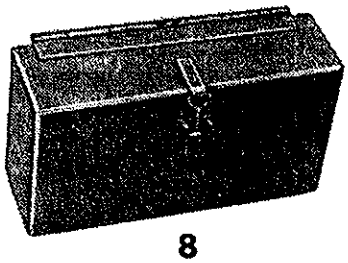


5

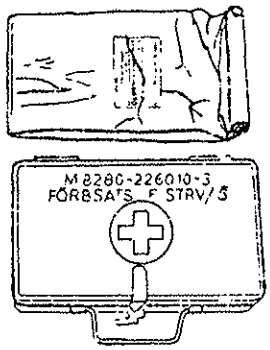
6



7

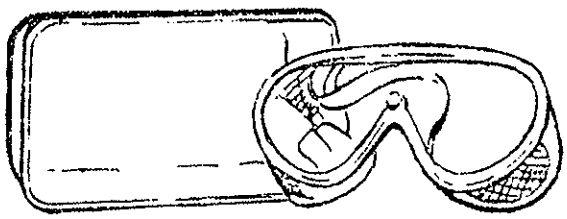


8

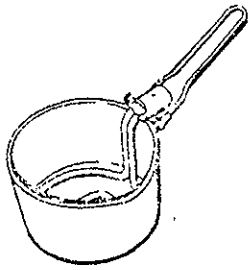


9

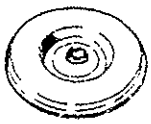
10



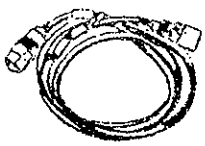
12 11



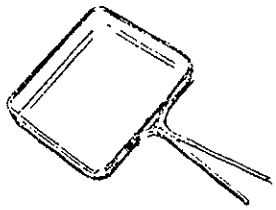
1



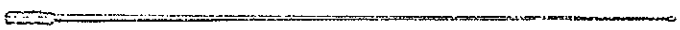
1.1



1.2

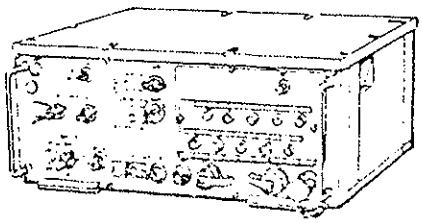


1.3

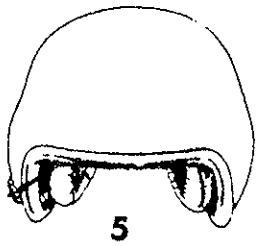


2

3

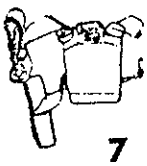


4

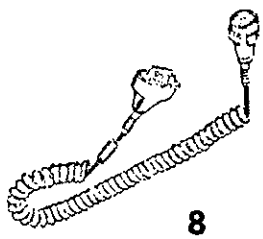


5

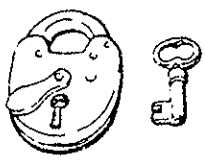
6



7



8



9