SAAB 96

owner's manual

787811

SVENSKA AEROPLAN AKTIEBOLAGET
TROLLHÄTTAN
SWEDEN

Preface

Dear Saab Owner.

It is a great pleasure to present you with this manual for your Saab 96.

The Saab 96 is a high quality automobile, manufactured to fulfill the greatest demands regarding quality and performance.

However, no car will give proper satisfaction if not correctly maintained, no matter how well it is designed and manufactured. Faulty driving technique and neglected maintenance will spoil the good qualities of the car and shorten its life. Particularly while the car is new, it needs regular inspection and service by trained experts. By reading this book and keeping it conveniently accessible, you will become familiar with your car and its qualities and you will also be able to ensure that it receives all the care it needs. The contents do not involve any obligations concerning the equipment of the car, which may be subjected to modifications during the series production.

The first section of the manual, "Technical Data", is a summary of specifications and performances. The second part, "Description", provides brief information about the construction of the car, its various systems and equipment. The third section, "Operation and Maintenance" — the most important part — includes instructions for running-in, general driving hints and directions regarding the care and maintenance of the car. Since some of the maintenance operations described are very important, it is recommended that they be carried out preferably by an approved service garage.

We are convinced that the contents of this booklet, will be of benefit for your car, and that your Saab 96 will give you the profit and pleasure expected from it.

Trollhättan in November 1960.

SVENSKA AEROPLAN AKTIEBOLAGET

Introducing the SAAB AIRCRAFT COMPANY

Formed originally in 1937 to manufacture airplanes, the SAAB Aircraft Company has since World War II also become a major producer of automobiles.

SAAB began automobile production in 1949—50 with a four-passenger two-cylinder car — the Saab 92 — which rapidly gained popularity for its rugged design, excellent economy and outstanding driving characteristics. In 1956 the Saab 92 was replaced in production by a new model, the threecylinder Saab 93, which quickly became a real best-seller, not only in the highly competitive Swedish market, but also in the export markets. Its outstanding qualities have been proved by overall victories in several international car rallies, including the 4th Annual Great American Mountain Rallye in 1956. The Saab 93 also won the European Rally Championship in 1957

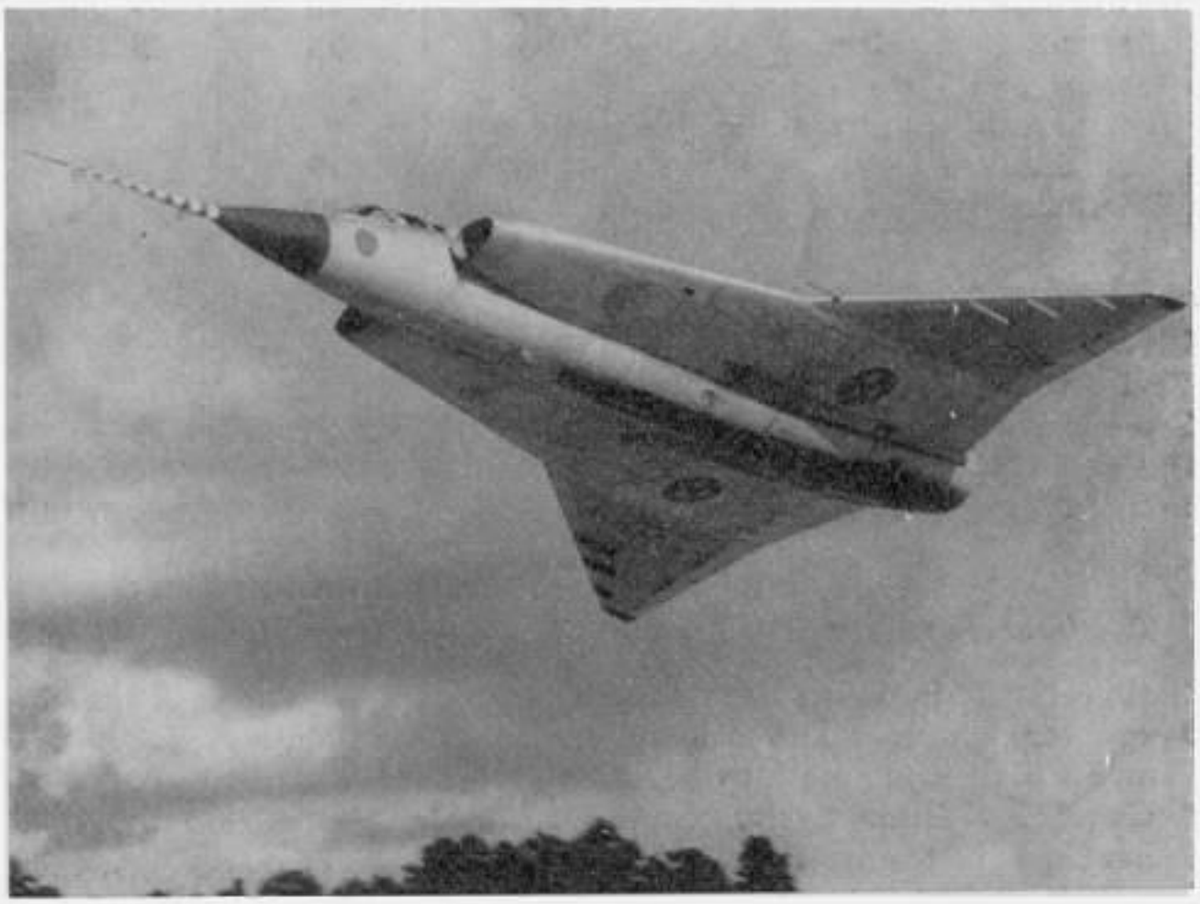
In 1959 a station wagon, the Saab 95, appeared on the market and in the spring of 1960 a new standard model the Saab 96 was introduced. Featuring numerous improvements the Saab 96 represents the greatest change that the Saab car has undergone since the 93 model was introduced. The most noticeable change is the completely new rear end with the much larger rear window.

The SAAB Aircraft Company is today the largest privately-owned airplane manufacturer on the European continent, employing in its own factories more than 9,000 people. It supplies most of the aircrafts used by the Swedish Air Force, and is well known in international aviation circles for the modernity of its airplanes. In 1951, SAAB started delivering the Saab 29, the first swept-wing jet fighter in service in Western Europe. The company has also supplied the Swedish Air Force with large quantities of the Saab 32 "Lansen", a two-seat radar-equipped allweather attack, fighter and reconnaissance airplane, which can attain supersonic diving speed. Another well-known aircraft is the Saab 91 Safir, which is being used in many countries for military and commercial pilot training.

Late in 1955 another SAAB combat airplane made its first flight, the spectacular Saab 35 "Draken", single-seat, allweather fighter. Featuring a special type of delta wing called the "double delta", developed exclusively in Sweden, the Saab 35 has a top speed of

more than twice the speed of sound and a phenomenal rate of climb. This highly advanced fighter has now gone into service with the Swedish Air Force .

SAAB today operates four major plants in addition to a number of smaller factories. The main plant and the center of airplane development and production is at Linköping. The three other major plants are situated at Trollhättan (motorcars and jet engine parts), Gothenburg (motorcar power units etc.) and Jönköping (airplane and missile equipment etc.) A helicopter division is situated at Norrköping.



The Saab 35 Draken is one of the world's most modern interceptor fighters. Top speed exceeds 1,200 mph.

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The following operations are described:

* This operation must be carried out very carefully and should preferably be done by an approved service garage.

SAAB 96

Technical Data

General

Overall length, including bumpers	approx. 4015 mm (13 ft. 2 in.)
Overall width	1570 mm (5 ft. 2 in.)
Overall height, empty	approx. 1475 mm (4 ft. 10 in.)
Road clearance (2 passengers)	approx. 190 mm (7.5 in.)
Track, front and rear	1220 mm (4 ft.)
Wheelbase	2488 mm (8 ft. 2 in.)
Turning radius	approx. 5.5 m (18 ft.)
Hill climbing performance	
1st speed	37 %
2nd speed	17 %
3rd speed	9 %
Reverse	42 %
Empty weight, excl. fuel and water	approx 777 kg (1710 lbs)
Empty weight, incl. fuel, water, tools and spare wheel	approx. 815 kg (1800 lbs.)
Weight distribution	
Empty	front 58 %
Fully loaded, incl. 5 pass. and 75 kg (165 lbs) luggage = 1245 kg (2700 lbs)	front 48 %

Engine

Type	two-stroke, three cylinders in line
Power	
SAE at 5000 rpm	42 bhp
DIN at 4250 rpm	38 bhp
Max. torque at 3000 rpm	8.2 kpm (59 ft.-lbs)
Cylinder volume, total	841 cc (51.9 cu.in.)
Bore of cylinders	70 mm (2.76 in.)
Stroke	73 mm (2.87 in.)
Compression ratio, nominal	7.3:1

Fuel System

Fuel tank capacity	approx. 40 liters (10,5 US gal)
Carburetor, down-draft type	Solex, type 40 AI
Fuel pump, electric	SU, type AUA 79

Cooling System

Capacity, incl. heater	approx. 7.5 liters (2 US gal.)
Temperature, normal	approx. 90° C (195° F)
Thermostat, opens at	approx. 85° C (185° F)

Transmission

Oil capacity, gearbox with differential	approx. 2 liters (2 US qts.)
Clutch	single dry plate with cushioning device
Plate diameter, outer	180 mm (7 in.)
Gear ratios, total	
1st speed	17.2:1
2nd speed	8.5:1
3rd speed	5.3:1
Reverse	21.0:1
Differential gear ratio	5.43:1

Road speed at 1000 rpm engine speed.		
1st speed	6.6 km/h	(4.1 mph)
2nd speed	13.4 km/h	(8.4 mph)
3rd speed	21.8 km/h	(13.6 mph)
Reverse	5.4 km/h	(3.4 mph)

Suspension

Maximum spring movement:	
Front wheels	140 mm (5.5 in.)
Rear wheels	170 mm (6.7 in.)
Shock absorbers, front	hydraulic-telescopic
Maximum stroke, front wheels	82 mm (3.2 in.)
rear wheels	106 mm (4.4 in.)

Brake System

Foot brake, four-wheel	Lockheed, hydraulic
Parking brake, rear wheels	mechanical
Brake lining sizes:	
Front	9″×1¾″
Rear	8″×1½″
Total area	675 cm² (105 sq.in.)

Steering Mechanism

Steering gear ratio, steering wheel/road wheels	average 14: 1
Number of turns, lock to lock	2¼

Wheels and Tires

Type	wide base, disc wheels
Rim dimensions	4J×15″
Tire dimensions	500/5.20×15″
Tire pressure: kp/cm² Front	1.7—1.8
Rear	1.4—1.7
(lbs/sq.in.) Front	24—26
Rear	20—24

FRONT WHEEL ALIGNMENT

Toe-in, measured on rim	2 mm ± 1 (.08 in ± .04)
Camber	¾°
Caster	2°
"King pin" inclination	7°

Electrical System

Voltage	12 volts
Battery, capacity	33 amp/h
Starter	0.5 hp
Generator	160 watts
Spark plugs:	
Thread	M 18
Thread length	12 mm (0.5 in.)
Electrode gap	0.7 mm (.028 in.)
Heat range:	
Ordinary driving and running-in	Champion UK 10, Bosch M 175 T1
(Hot plug.)	or equivalent
Fast driving (*exceptionally*)	Bosch M 225 T1
(Cold plug.)	or equivalent
Ignition timing at 3000 rpm	20° before T.D.C.
Timing, advance weights retracted	10° before T.D.C.
Breaker point gap, distributor	0.3-0.4 mm (.012-.016 in.)
Firing sequence (No. 1 is the rear cyl.)	1—2—3

BULBS and FUSES	Philips No.	Watts
Sealed Beam (U.S.A.)	—	50/40
Headlights (R.H.D.)	12620	45/40
Turn and parking lights, front, 2	1034	20/5
Turn and stop lights, rear, 2	1073	18
Parking lights, rear, 2	12821	5
License plate lights, 2	12844	5
Courtesy light	12913	2
Instrument light and control lights, 5	12844	5
10 + 2 fuses, 25 mm (1 in.)		8 amp

Tools

Jack and ratchet wrench in bag
Tool bag, containing:

1 Spark plug/wheel bolt wrench (socket and pin)
1 Adjustable wrench
2 Fixed wrenches
1 Combination pliers
2 Screwdrivers
1 Square key for transmission filler, drain and inspection plugs

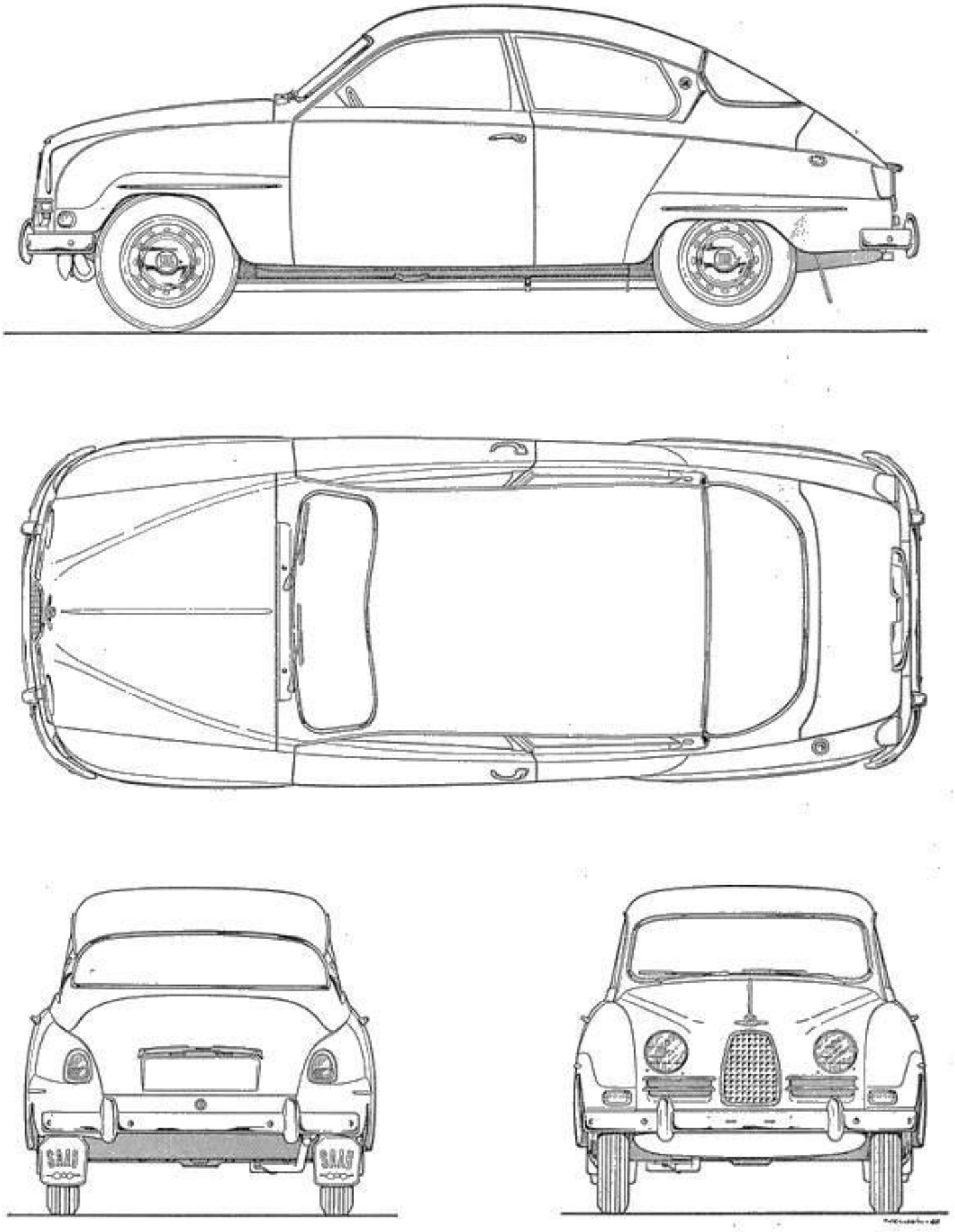

Fig. 1. Four-view drawing

SAAB 96

Description

General

The front wheel driven Saab 96 is a five-seater, two-door sedan with an all-welded, self-supporting steel body. The aerodynamic design with a windshield of pronounced slope and a smooth floor minimizes the air resistance of the car.

The low air resistance in combination with the relatively low weight contribute to a high top speed, remarkable acceleration and low fuel consumption.

Serial and Engine Numbers

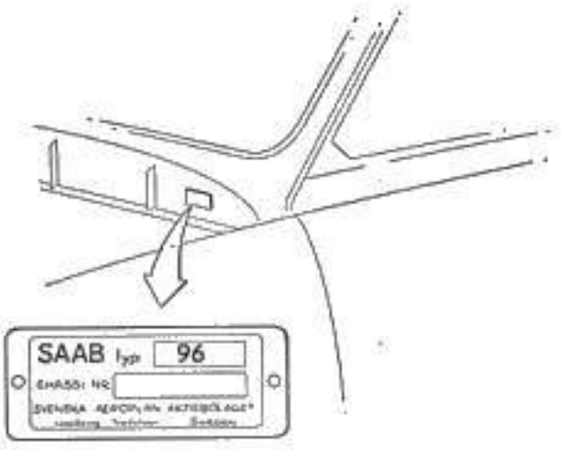

Fig. 2. Serial number

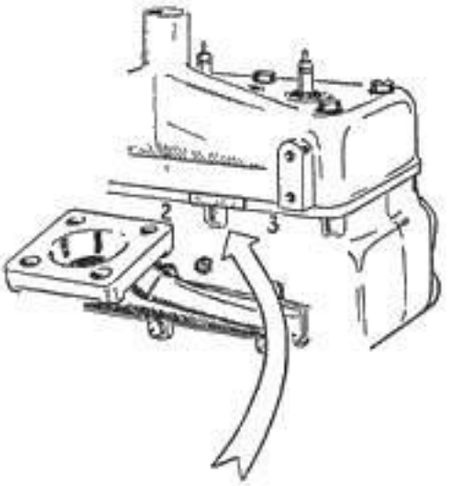

Fig. 3. Engine number

Engine

The engine is a three-cylinder, liquid-cooled, two-stroke engine employing the Schnürle-principle of charging through the crankcase.

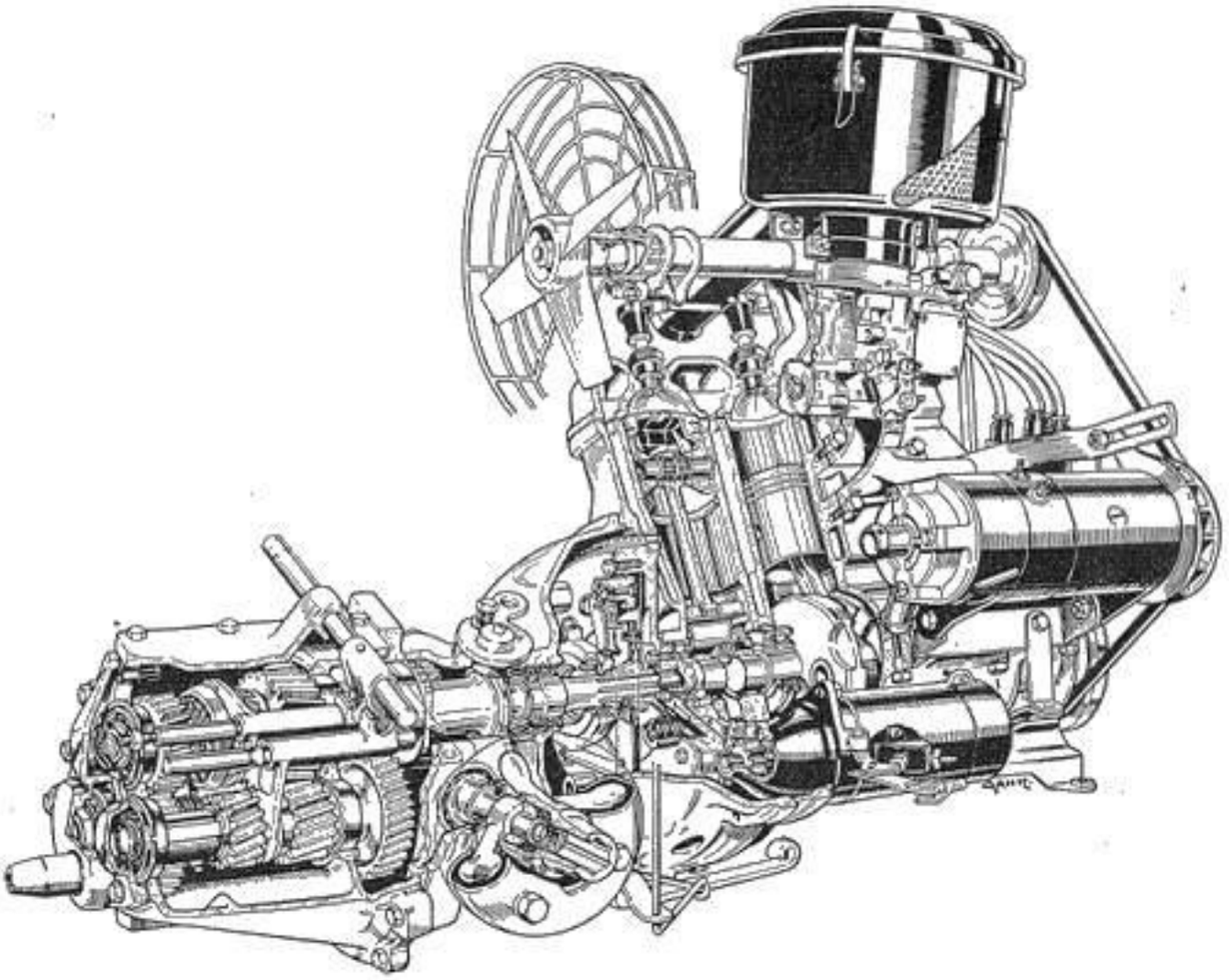

Fig. 4. Engine, sectioned

Lubrication is obtained by adding oil to the gasoline, when refueling. The cylinder block is integral with the upper part of the crankcase and is machined in pair with the lower crankcase half. These two parts are iron castings while cylinder head and pistons are of aluminum alloy.

The crankshaft is supported in the crankcase by four single-row ball bearings, and the big-end bearings of the piston rods are double-row roller bearings. Since the crankshaft is built-up of disks, interconnected by main and big-end bearing pins with very close tolerances requiring special precision tools, it should be reconditioned only by the manufacturer.

The engine and the transmission are bolted together and constitute the power unit, which is supported on three rubber cushions. The engine can be lifted out very easily either separately or together with the transmission.

Cooling System

The capacity of the cooling system, including the heater element, is approx. 7.5 liters (2 US gal.). The main parts of the system are radiator, thermostat and pump. Before the engine has reached its proper operating temperature, the radiator inlet hose is closed by the thermostat. The coolant flows through a by-pass until it has reached a temperature of approx. 85° C (185° F), when the thermostat opens. The fan is driven by a V-belt and the coolant pump impeller is attached to the generator shaft extension.

Fuel System

The fuel tank with built-in mixer is located under the luggage compartment floor panel and has approx. 40 lit. (10,5 US gal.) capacity. From the tank the fuel runs in a pipe via the electric fuel pump and through a flexible up to the carburetor. There are two fuel filters, one inside the banjo fitting at the carburetor, fig. 17, and one in the pump, fig. 18.

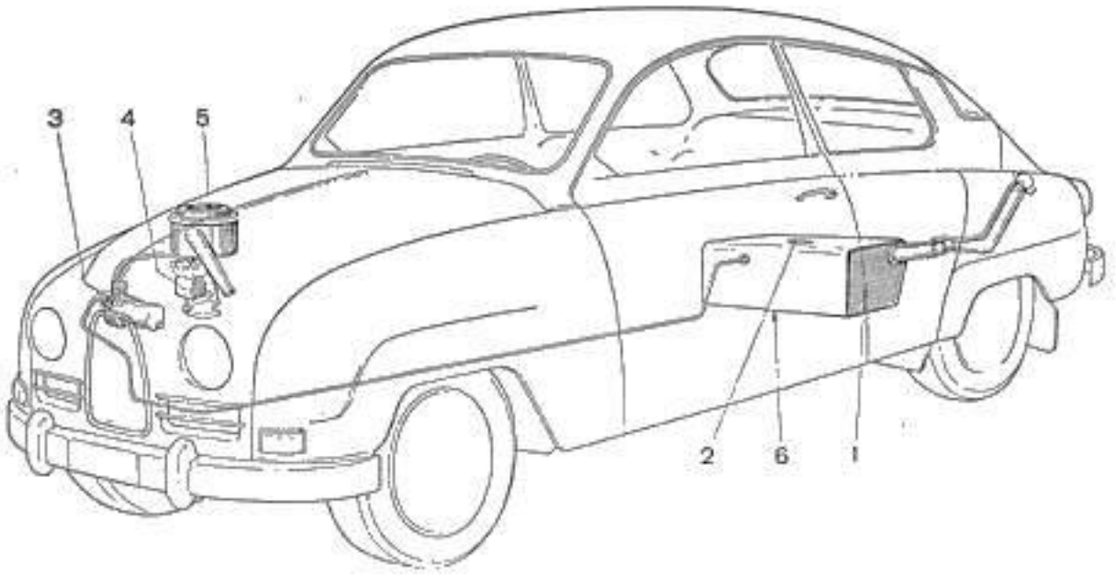

Fig. 5. Fuel System

1. Fuel tank with mixer
2. Fuel gauge, tank unit
3. Fuel pump
4. Carburetor, Solex 40 AI
5. Suction silencer with filter
6. Drain plug (under the car)

Air Filter

The suction silencer containing the air filter element is secured on top of the carburetor by a clamp screw and to the fan shaft stand by a bracket. The air intake pipe may be extended for collecting heated air at the exhaust manifold, see fig. 16.

Carburetor

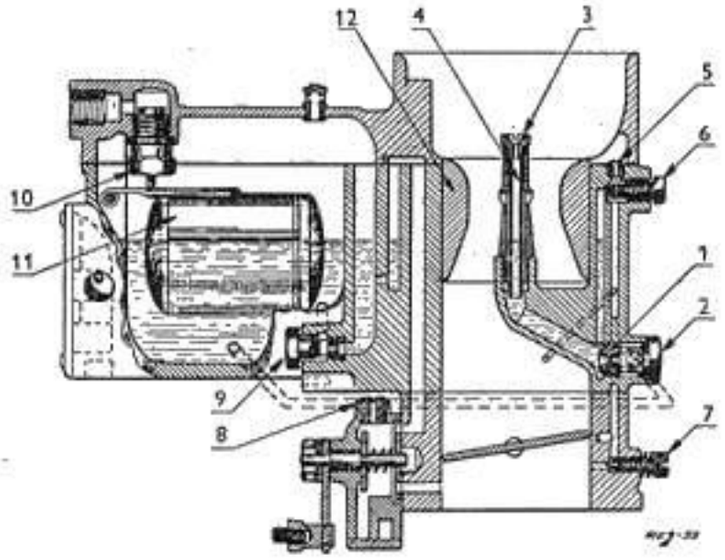

Fig. 6. Carburetor, Solex 40 AI

1. Main jet
2. Main jet carrier
3. Emulsion jet
4. Emulsion pipe
5. Idling air jet
6. Idling jet
7. Idling air adjustment screw
8. Starting air jet
9. Starting jet
10. Needle valve
11. Float
12. Air throat

Adjustments of the down-draft Solex 40 AI carburetor should be carried out only by experienced mechanics. The following figures give the nominal choke and jet sizes and numbers refer to fig. 6:

Air throat, 12	28 mm (1.1 in.)
Main system:	
Main jet, 1	135
Emulsion jet, 3	250
Emulsion pipe, 4	1
Idling system:	
Air jet, 5	100
Fuel jet, 6	40
Cold start system:	
Air jet, 8	3.5
Fuel jet, 9	190

Transmission

The transmission housing has three compartments, the rear one containing shafts, gears, shift forks, etc. constituting the gearbox. The center part contains free wheel device and pinion/ring gear with differential, to which the drive shafts are connected. The front part of the housing is limited by the engine and covers the release bearing and the clutch.

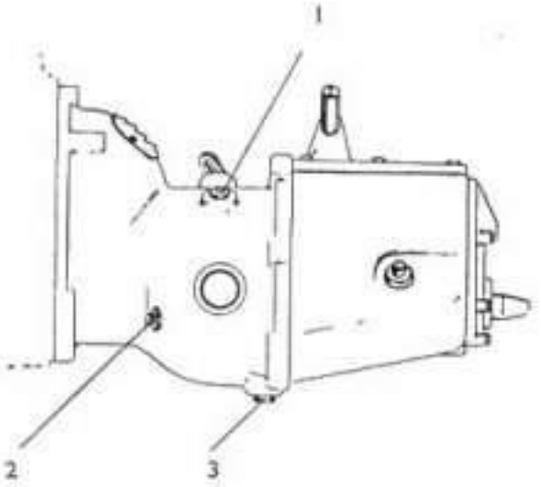

Fig. 7. Transmission plugs

1. Filler plug
2. Level plug
3. Drain plug

The gearbox has three forward speeds with helical gears in constant mesh, which are locked to their shafts by coupling sleeves. The coupling sleeve for the first gear is integral with the sliding reverse gear pinion and 2nd and 3rd gears are synchronized. The free wheel device between clutch shaft and gearbox is operated from the driver's seat.

For gear shifting and free wheel operation instructions, see page 26.

Suspension

The Saab 96 has coil spring suspension at the front as well as at the rear. Rubber bushings are used extensively to minimize road noise and reduce the number of lubrication points. The suspension, fig. 8, consists of two separate front axle units and one rigid rear axle.

The front wheels are independently suspended and each front axle is mounted by ball joints to one upper and one lower transverse spring arm. Each one of these wishbone spring arms is attached to the body brackets by rubber bushings. A coil spring is installed between a seat on the upper spring arm and a similar one in the body. The spring arm deflections are limited by rubber bumpers.

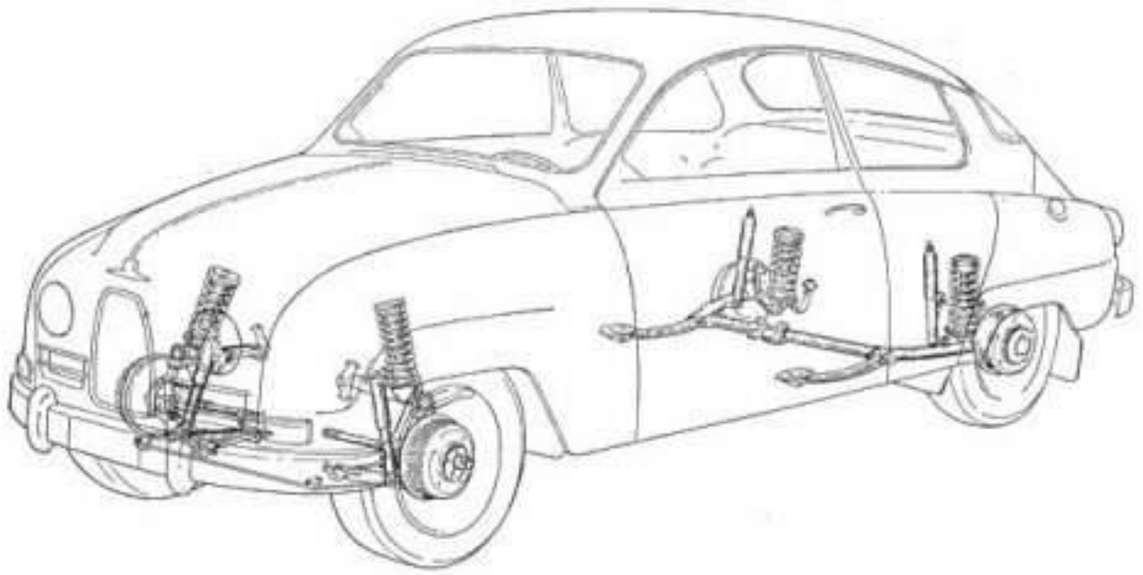

Fig. 8. Axles and Suspension

The rear wheels are carried on spindles fitted in the swept-back ends of the rigid, U-shaped axle, which is mounted in a recess under the body by a central rubber bushing and braced by two longitudinal side links. The coil springs are installed between seats in the body and on the inner extensions of the wheel spindles.

Rubber bumpers and straps limit the upward and downward deflections respectively.

Shock absorbers

The double-acting, hydraulic-telescopic shock absorbers are rubber mounted to the front lower spring arms and the swept-back ends of the rear axle respectively. Front and rear shocks are different and must not be interchanged.

Brake System

The hydraulic foot brake acts on all four wheels. A rear wheel has one double-acting wheel cylinder and a front wheel has two single-acting ones. The brake fluid container is located in the engine compartment to the left of the radiator, and to the wheel housing panel below the container the stop light switch is fitted to the wheel housing panel.

The parking brake is mechanical and works on the rear wheels only. The brake lever is placed between the front seats and is connected to the rear wheel cylinders by two Bowden cables.

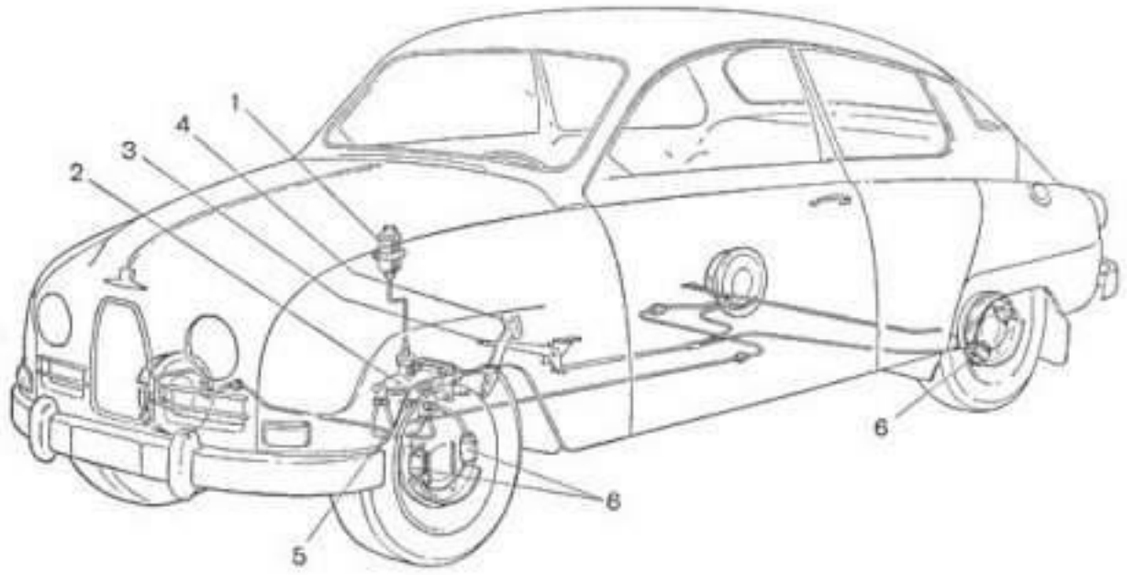

Fig. 9. Brake System

1. Brake fluid reservoir
2. Master cylinder
3. Hand brake lever
4. Brake pedal
5. Stop light switch
6. Wheel cylinders

Steering Mechanism

The steering movement is transmitted from a pinion at the end of the steering tube to a transverse rack, the ends of which are connected to the steering arms by adjustable drag rods of equal length. The drag rods are attached to rack and steering arms by adjustable ball joints and drag rod ends respectively.

NOTE. All adjustments of the steering gear should be carried out by an authorized Saab service shop.

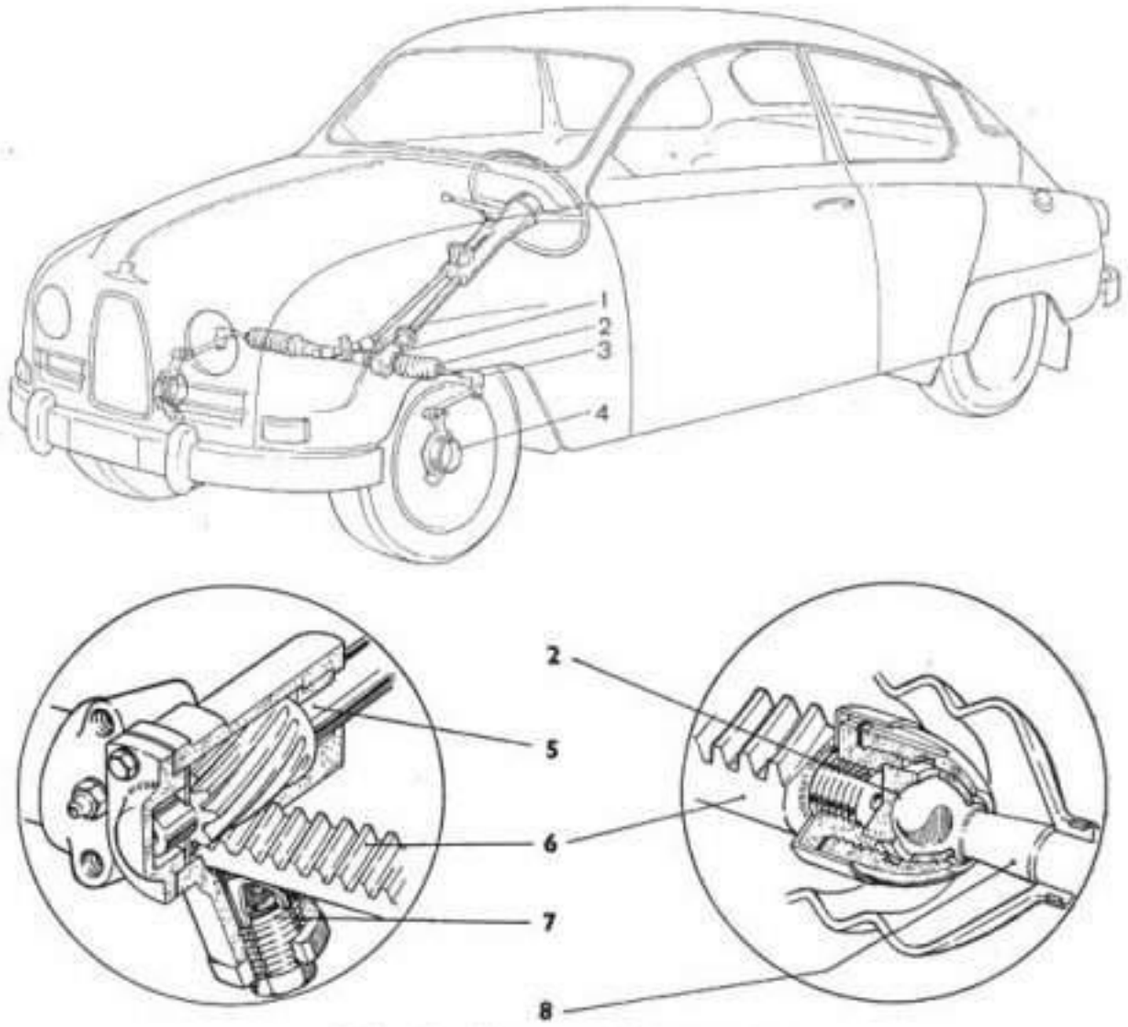

Fig. 10. Steering Mechanism

1. Steering gear
2. Inner ball joint
3. Outer ball joint
4. Spindle housing
5. Steering tube pinion
6. Rack
7. Rack damper, spring and plunger
8. Drag rod

Instruments, Controls and Equipment

1. Cold start control. For operation see page 27.
2. Air temperature and defroster controls, see fig. 33.
3. Fan motor switch, see fig. 33.
4. Instrument light intensity control, when the lights are on.
5. Light switch. On pulling out the knob to first position the parking lamps will be lighted, in the second position the headlights.
6. Instrument unit, see fig. 12.
7. Hood lock lever.
8. Ignition and starter switch (theft-proof). — Integral with ignition coil.

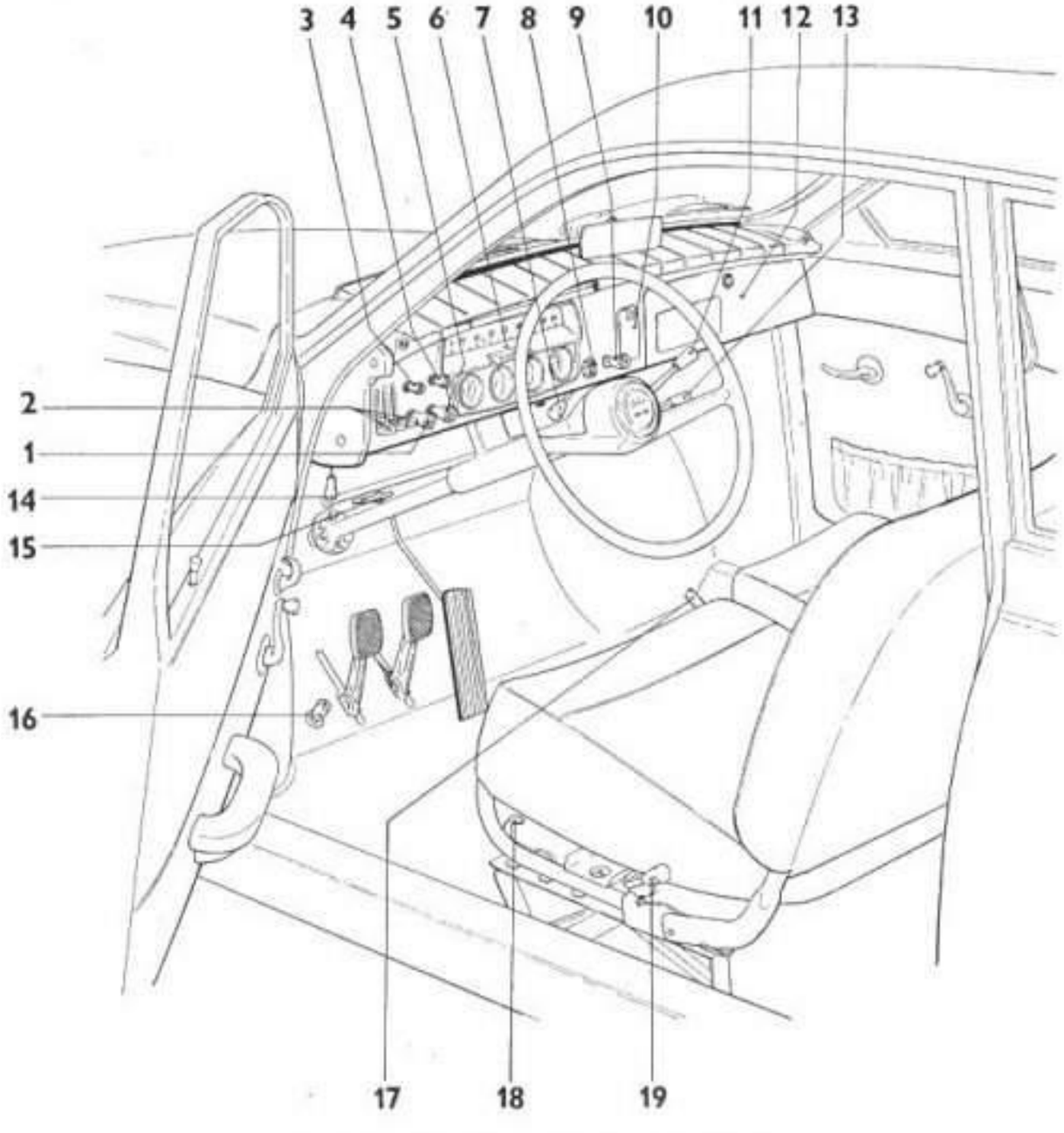

Fig. 11. Instruments and Controls

9. Windshield wiper switch and pump for windshield washer. The wipers are started by turning the knob. On pulling out the knob the pump will start working.
10. Ashtray. A second one is provided for the rear seat.
11. Gear shift lever. Regarding gear shift positions, see fig. 15.
12. Glove compartment with lid. Radio installation is possible by removing the detachable panel in the lid.

13. Turn indicator switch.
14. Grill screen control.
15. Free wheel control. The free wheel is locked by pulling out the handle entirely, see page 26.
16. Headlight dip switch, main and low beam.
17. Brake lever.
18. Seat adjustment mechanism. When the lever is depressed, the seats are unlocked for longitudinal adjustment.
19. Mechanism for adjusting the seat back inclination.
    The ventilator lever, which is not visible on the fig., is located under the instrument panel behind the ash tray.

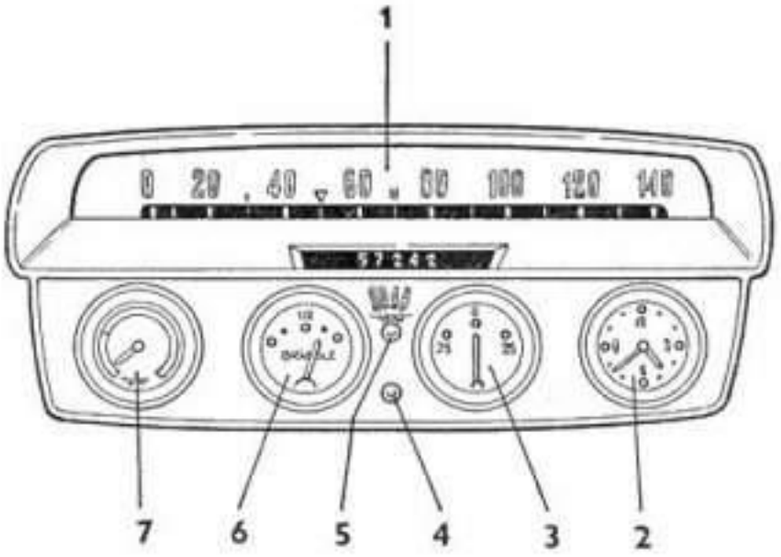

Fig. 12. Instrument Unit

The instruments are placed in a panel in front of the driver and are easily visible through the duo-spoked steering wheel.

1. Speedometer and mileage recorder. The speedometer, graduated from 0 to 140 km/h (90 mph), is actuated via a flexible shaft by a worm gear on the pinion shaft of the gearbox.
   The mileage recorder is driven from the same shaft as the speedometer. The mileage is registered in full kilometers (miles).
2. Clock.
3. The ammeter shows charging or discharging current of battery.
4. Control lamp for turn indicators flashing a green light when the indicators are operating.

5. Headlight control lamp showing a red light when the main beam is on.
6. The fuel gauge indicates the fuel level in the tank when the ignition is switched on. A warning light comes on when about 7 litres (2 U.S. gal.) of fuel remain.
7. The thermometer indicates the coolant temperature in C° (F°). Under normal driving conditions the temperature should be about 90°C (195° F), i.e. rather high on the green part of the scale.

Electrical System

The cables of the 12 volt electrical system, fig. 13, have different insulation colors, in order to facilitate identification.

Black: 1, 7, 18, 19, 23a, 24a, 32, 37, 45, 46, 47, 48, 49, 71, 77, 78, 79, 80.
Red: 2, 5, 8, 9, 10, 11, 14, 15, 20, 21, 27, 28, 33, 34, 39, 63, 65, 67, 68, 72.
Green: 16, 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61.
Grey: 4, 12, 25b, 26b 29, 35, 36, 38, 44a 64, 69, 70, 74, 75, 76.
White: 23b, 24b, 40, 41, 42b.
Yellow: 17, 25a, 26a, 30, 43, 44b, 66, 73, 81, 84.
Blue: 42a, 62.

Explanations to the encircled numbers of Fig. 13.

1. Turn indicators and parking lamps
2. Headlights
3. Horns
4. Distributor
5. Sparks plugs
6. Generator
7. Fuel pump
8. Starter
9. Battery
10. Relay
11. Fuse box
12. Ignition coil
13. Heater fan motor
14. Wiper motor
15. Stop light switch
16. Instrument unit
17. Beam switch
18. Courtesy light switch
19. Headlight switch
20. Heater fan switch
21. Instrument light control
22. Flasher
23. Wiper switch
24. Ignition and starter switch (theft-proof)
25. Cigarette-lighter
26. Turn indicator switch
27. Horn push
28. Tank unit, fuel gauge
29. Courtesy light with switch
30. Turn indicators and tail lamps
31. License plate lights

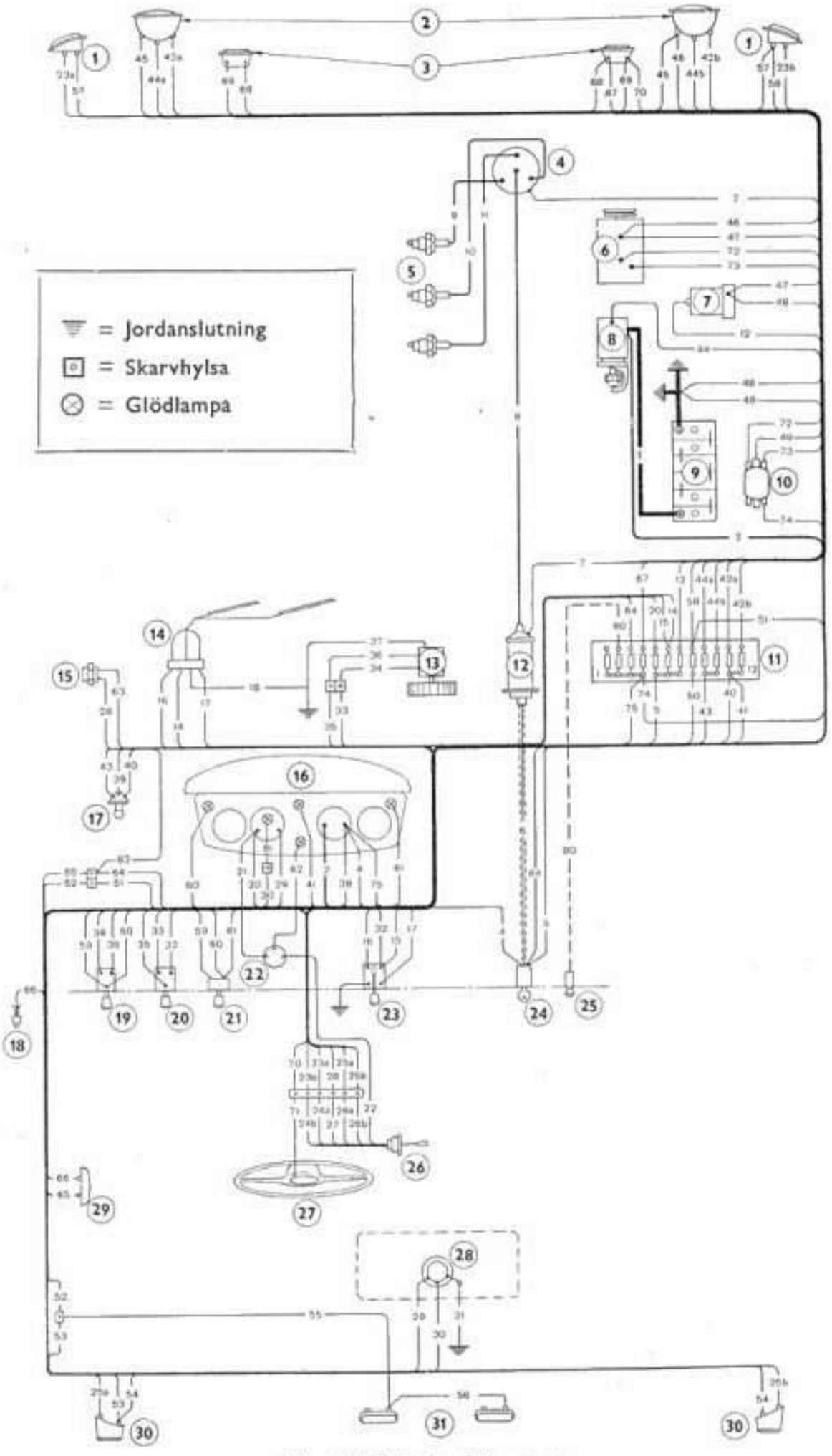

Fig. 13. Wiring Diagram.

The cable numbers refer to the color diagram and the encircled numbers are explained on the opposite page.

Rear Seat Adjustment Device

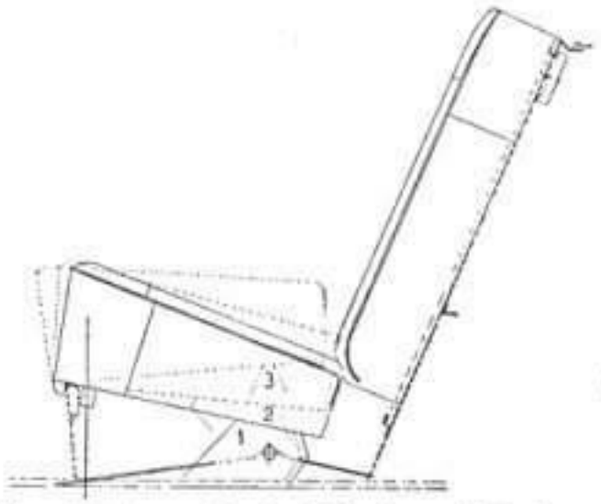

Fig. 14. Rear Seat Adjustment Device

A device under the rear seat cushion enables the selection of three different heights. Lift the rear seat cushion upwards—forwards after which the device can be put into the desired position.

SAAB 96

Operation and Maintenance

Driving Instructions

Qualities of the car

General

Each type of car has its own characteristics and even cars of the same type and make can differ considerably depending on the condition of the car. Wheel alignment, steering mechanism, brakes, tires, shock absorbers etc. should therefore be kept well adjusted and in good condition for maintaining the features designed into the car. There are, however, other important things to consider which affect the performance, e.g. how the car is loaded, road condition and driver. The following statements are thus composed exclusively with respect to the construction of the car.

Steering Qualities

The Saab 96 is under-steered which means that, when cornering with a certain steering deflection, the car straightens out the turning circle as the speed increases. This feature tends to eliminate tail skidding and provides directional stability. If, however, owing to a brusque manoeuvre, tail skidding should occur, it is easily checked. The under-steering is partly due to the weight distribution of the car, which is also one of the reasons for the front wheel drive, as it gives the maximum traction and thus better advancing possibilities on poor roads and steep grades. Another reason for the front wheel drive is that the car will maintain directional stability on slippery roads even if the pedals are used carelessly.

Free Wheel

The free wheel device between clutch and main shaft can be engaged or disengaged by means of a control, located above the brake pedal. When the control is pulled out, the free wheel is disengaged, i.e. locked. The car should preferably be stopped before pulling out the free wheel control entirely. To engage the free wheel device, push in the control.

Generally the free wheel should be engaged, thus enabling the car to coast with idling engine, when the accelerator is released. This gives more miles per gallon of fuel and reduces engine wear. Gear-shifting is also carried out more smoothly and the driving becomes more comfortable. Take advantage of the free wheel, not only down-hill, but also on level roads. The only occasions when the free wheel should be locked are when the motion of the car is required for starting the engine, and when descending long, steep grades in order to use the engine for braking the car, which reduces the brake lining wear. Further information is found under "Brakes" on the following page.

3-speed

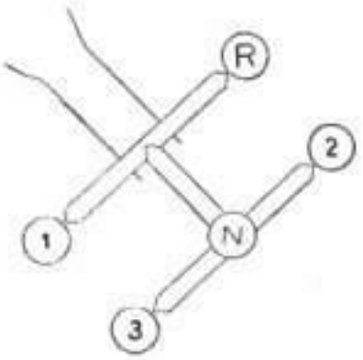

Fig. 15. Gear shift positions

Gearshifting

The gearbox is provided with synchro-mesh for 2nd and 3rd speeds, which means that the spur pinions of the second or third gear cannot engage with the shaft before the rotation speed of the gear is the same as that of the shaft. The first gear is engaged to its shaft by means of a toothed coupling, integral with the reverse pinion.

The synchronizer and the toothed couplings facilitate gear shifting,

and for shifting to a lower gear, the clutch pedal need not be used provided that the free wheel is engaged. All gearshifts, however, should be carried out with easy and firm movements and with a slight, scarcely noticeable stop in the neutral position.

When shifting, the clutch pedal should be released smoothly and carefully. Make it a habit always to remove your foot from the clutch pedal when not in use. To drive with a slipping clutch or with your foot resting on the pedal is bad practice since this will soon wear down release bearing and clutch linings. At standstill, the gear shift lever should be put in neutral and the clutch pedal released.

Brakes

The car is delivered with a thoroughly tested type of brake linings with very good heat resistant qualities, which will stand high temperatures without their proper function being impaired. Be certain, therefore, that original Saab linings, or linings recommended by SAAB, are fitted when relining the brakes.

There is, however, a limit of the temperature resistance for every type of brake lining. When driving downhill on mountain roads, with considerable altitude differences, the free wheel should be locked in order to use the engine for braking. In top gear the retarding effect is rather small and the second gear should therefore be engaged, or on extremely steep grades, the first gear. The speed must under these circumstances not exceed 60 km/h (40 mph) in second gear and 30 km/h (20 mph) in first gear.

Cold Start Device

For easy starting at low temperatures, the carburetor is provided with a cold start device, the control of which is placed to the left on the instrument panel. By pulling out the control knob, a special jet combination in the carburetor provides a richer fuel-air mixture than normally.

The cold start control has two positions. When starting a cold engine, the knob should be pulled out to the intermediate position, or under very cold conditions, to the outer position. While warming up the engine, the knob may be left in the intermediate position, but it should be pushed in completely as soon as possible. *The engine should be warmed up by driving, not by idling at the curb.*

Preheater

The engine is provided with a device for heating the carburetor air to prevent icing in the carburetor, which may occur at temperatures

between —50° and +15°C (20—60°F) if the relative humidity of the air is over 55%. The icing causes excessive fuel consumption and decreased engine power. It is therefore recommended that the preheater always be connected except during the warm season. When the preheater is not being used, the connection pipe should be secured to the bracket on the radiator frame, and the lower clamps fastened to the end of the pipe as shown in fig. 16.

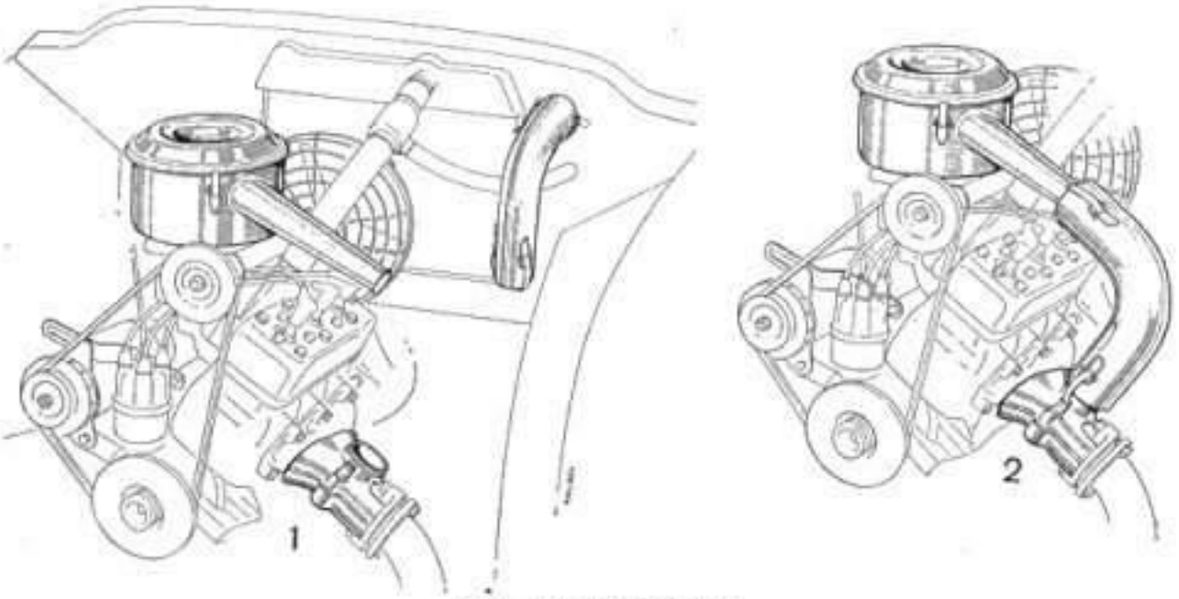

Fig. 16. Preheater

1. Cold (summer driving) 2. Warm (winter driving)

Starting the Engine

Warm Engine

1. Gear lever in neutral.
2. Switch on ignition and starter.
3. Release starter switch when engine starts.

If the engine fails to start, it may have received too much fuel. In this case, keep the accelerator depressed 5—10 mm (¼—½ in.), while the starter is running.

Never use the cold start device when the engine is warm.

Cold Engine

1. Gear lever in neutral.
2. Depress clutch pedal.
3. Cold start knob out. — At very low temperature, keep the control pulled out entirely.

4. Switch on ignition and starter.
5. Release starter switch and push in cold start knob to intermediate position when engine starts.
6. Release clutch pedal.
7. Push in the cold start knob completely as sooon as the engine becomes warm enough to operate on normal mixture.

NOTE

When the cold start is operated, never depress the accelerator as this will obstruct the function of the cold start device.

Push in the cold start control entirely as soon as possible.

Cold Engine at very Low Temperature

When stopping the engine and leaving the car outdoors in cold weather, proceed as follows to faciliate the subsequent cold start:

1. Depress accelerator slightly.
2. Pull out cold start knob.
3. Turn off ignition and release accelerator.

For subsequent starting, follow starting instructions for "Cold Engine".

A few operation hints

General

The Saab 95 has an excellent roadability. However, even a skilful driver needs a certain time to get acquainted with a new car and its characteristics. It is therefore recommended to exercise care in the beginning to become gradually familiar with the car. Also the car needs a running-in period of approx. 3,000 km (2,000 miles) during which rough driving should be avoided.

Running-in

Every new car requires a certain running-in period during which it should be driven with care. Pistons, cylinder bores and bearings need to be in operation for some time to produce smooth and resistive surfaces. Straining a new engine impedes this gradual bedding down and will probably shorten the life of the engine.

During the running-in period which covers the first 3,000 km (2,000 miles), avoid driving at too high engine speeds. This, however, does not mean that the engine, e.g. when driving uphill, should pull hard before shifting down. Select the gear to keep the engine speed sufficiently high at low road speed so that the engine is running without strain.

The following running-in speeds may serve as a general guide.

1st speed	0—20 km/h (0—15 mph)
2nd speed	10—50 km/h (5—30 mph)
3rd speed	25—75 km/h (15—45 mph)

Avoid giving full throttle during the first 3,000 km (2,000 miles) and remember that the fuel should contain 4 % of oil during this running-in period.

Driving Economy

To achieve the best economy with regard to fuel consumption as well as wear, the Saab 96, as every other car, needs careful and even driving. Avoid excessive acceleration and high engine speeds espescially in low gears. As previously described, the car has a free wheel device which enabels further reduction of the fuel consumption. The car is also equipped with a device for heating the carburetor air, see fig. 16, thus preventing icing in the carburetor which may occur under cold and damp weather conditions and is noticeable only by increased fuel consumption and poor idling.

Driving on Slippery Roads

When driving on slippery roads it is more important than ever that the characteristics of the car be maintained. Especially tires and brakes must be in proper condition to ensure even braking power. A driver who prefers to make use of the engine braking power can lock the free wheel. There is no general recommendation for driving with locked free wheel and each driver may choose the alternative which suits him best.

Regardless of whether the free wheel is locked or not when driving on slippery roads, the most important thing is to be able to use the wheel brakes. Even under the most slippery road conditions, engine braking cannot stop the car in shorter distance than proper braking with the wheel brakes, provided that the car is two-wheel driven and has four-wheel brakes.

In case of a tail skid, the general rule is to give gas and to steer in the same direction as the tail skids. If the front wheels skid, let up on the accelerator to regain steering and traction ability and then gradually open the throttle again.

All pedal operations should be carried out more smoothly and carefully when driving on slippery roads. As soon as the winter season begins, take the opportunity to practice turning and braking in some open area which is free from traffic. In a situation when a skid occurs, this practice may prove quite useful, since you will know instinctively how to regain control over the car.

Learn the technique of winter driving and it will become a pleasure.

Maintenance

Useful hints

1. Be sure that the ignition is switched off when the engine is not running, otherwise the crankcase may be flooded with fuel if the carburetor needle valve should be leaking. It is also possible that ignition coil and breaker points may be damaged.
2. Learn the quickest way to start the engine. If the engine is cranked too long without starting, it will become flooded and more difficult to start.
3. Drive in top gear whenever possible without straining the engine at low engine speeds. Avoid fast driving in 1st and 2nd gear.
4. Make use of the free wheel as much as possible. Release the accelerator entirely when the car is maintaining speed without throttle. When driving on motor roads and similar highways allowing high speeds, the accelerator should be released entirely now and then in order to make use of the free wheel, and to allow the car to coast for a while with idling engine. This driving technique affects the average speed very little but is beneficial to the engine and gives more miles per gallon.
5. Do not change carburetor jets. Adjustments, if required, should be carried out by qualified Saab mechanics.
6. Keep the brakes adjusted so that they do not drag.
7. Keep the battery well charged. A poorly charged battery cannot start the engine quickly. It may also freeze at low temperatures.
8. During the cold season the door locks should be prepared to prevent ice formation in the lock cylinders. There are several means available at the service shops for this purpose. Should,

however, the lock cylinder have stuck, be careful not to destroy the key. Try to warm up the lock in some way until the ice melts and the key can be turned. To prevent new ice formation the lock cylinder may be greased sparingly with ethylene glycol or Silicone spray.
NOTE. Be careful to protect the finish from glycol.

9. When refueling at temperatures below 0° C (32° F), the oil should be diluted with an equal amount of gasoline before being poured into the tank. Use preferably Saab oil or other two-stroke oils but avoid the so-called outboard oil. Instead an ordinary four-stroke oil Premium or H.D. oil (ML, MM and MS) may be used if it corresponds with the new API-system.
The special Saab-oil does not need pre-mixing.
10. Do not change to using cold spark plugs as long as the hot ones function satisfactorily. Consult your approved service shop before any change.

Engine

The most favorable operating temperature of the engine is approx. 90° C (195° F) i.e. rather high on the thermometer scale range. Keep the coolant temperature too high rather than too low. Do not forget to close the wheel housing openings behind the radiator when the cold season begins.

The engine should always be kept in a good operating condition. For normal driving it should be decarbonized after every 30,000 km (20,000 miles). Carbon deposits in combustion chambers, ducts and exhaust system increase the exhaust resistance and impair the efficiency and economy of the engine. Carbonization can be reduced by avoiding slow driving in top gear and by using oil and gasoline of good quality.

Decarbonizing and other major maintenance operations should be carried out by an approved Saab service shop.

Fuel System

Air Filter

The air filter in the suction silencer should be replaced every 30,000 km (20,000 miles) or at least every second year.

The filter element should be protected against moisture and must therefore not be washed or oiled. It may be necessary, however, to clean the interior of the filter housing (the suction silencer), especially when changing the filter element. This should be carried out carefully in order to avoid impurities falling down into the carburetor.

Carburetor

It is essential that the carburetor be kept free from impurities. For this reason a filter, 10, is provided in the carburetor feed pipe connection. This filter should be inspected regularly and cleaned whenever necessary as should also the jets. The design of the Solex carburetor allows the removal of all jets, except the idling air jet, without dismantling. Positions and designations of the jets are shown in figs. 6 and 17. It is important that carburetor adjustments are carried out in accordance with the manufacturer's recommendations, otherwise the proper function of the carburetor and thereby the engine operation may be impaired. Wrong carburetor adjustment may cause abnormal fuel consumption and rapid wear of the engine.

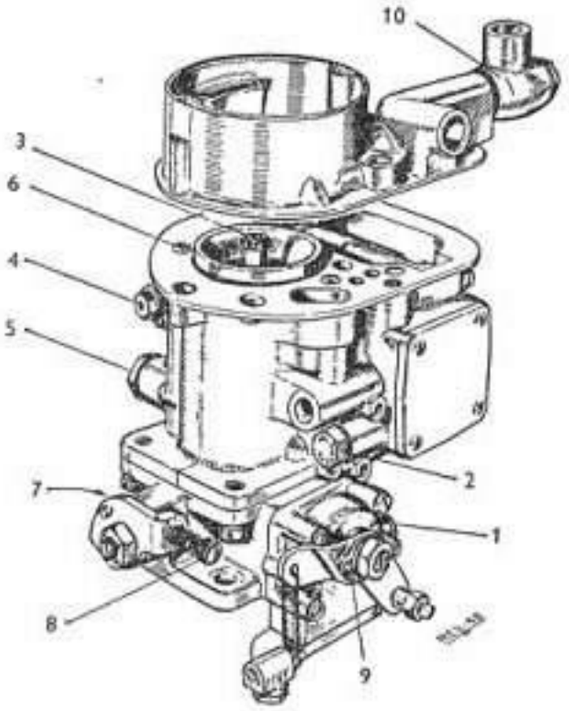

Fig. 17. Carburetor, Solex 40 AI

1. Starting air jet
2. Starting jet
3. Emulsion jet
4. Idling jet
5. Main jet
6. Idling air jet
7. Idling mixture, adjustment screw (see fig. 6.)
8. Idling speed, adjustment screw
9. Cold start lever
10. Fuel feed pipe connection with filter

Idling Adjustment

Idling adjustment should always be carried out when the engine is warm. The procedure is as follows and the numbers refer to fig. 17.

1. Set the idling speed rather high with the adjusting screw 8.

2. Adjust the engine to run uniformly with the adjusting screw 7, which is achieved when the screw is opened about 2 turns.
3. Adjust the engine speed with the screw 8 until the proper idling speed, 700—800 rpm, is attained.

Fuel Pump

In the fuel pump there is a filter 16, which can be removed by screwing out the plug 17. This filter should be cleaned every 12,000 km (8,000 miles) or whenever impurities in the fuel are suspected. If the fiber washer 15, fitted between the plug and the pump housing, comes loose, be sure to replace it when inserting the plug. The contact points in the breaker mechanism should also be checked and if necessary adjusted every 12,000 km (8,000 miles). In case the owner himself wants to carry out this operation, the procedure is as follows:

1. Check that the ignition is switched off so that the cable to the fuel pump is dead.
2. Remove the terminal nut 21, which holds the electric cable.
3. Remove the cable and the nut 22 after which the cover 9 can be removed.
   When carrying out the following operations, the greatest cleanliness should be exercised to prevent grease or impurities from entering the breaker mechanism.
4. The contacts 6 and 7 can now be cleaned by pulling a strip of stiff paper or very fine emery cloth between their faces. Should

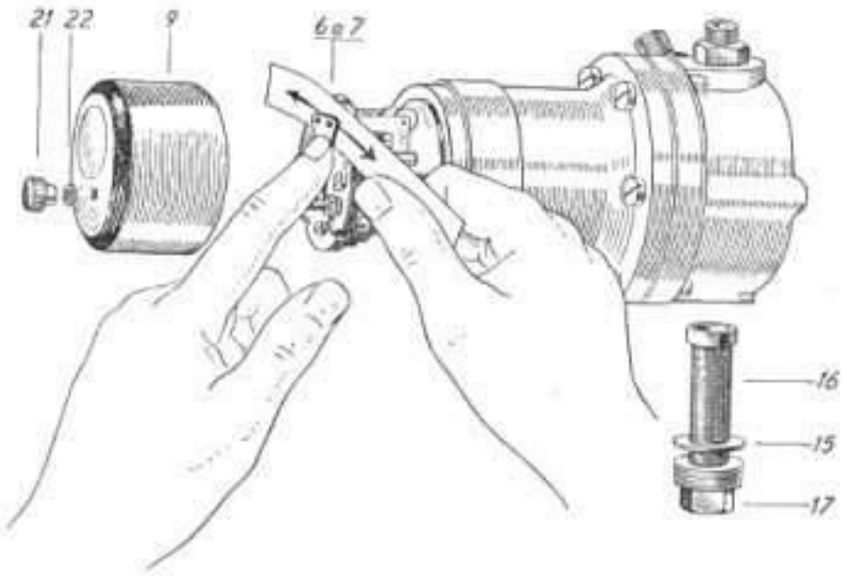

Fig. 18. Fuel Pump
The numbers refer to the text.

the points be burnt, or otherwise be in poor condition, the pump should be checked by a service garage.

5. Assemble cover 9, nut 22 cable, and nut 21 to their original positions. Tighten the terminal nut 21 firmly to assure satisfactory contact.

Cooling System

General

When topping up or draining the cooling system, the heater control 4, fig. 33. should be in the "Hot" position. Note that the filler cap must be loosened when draining. Topping up of the radiator must be done in two steps, so that the heater element will also be filled with coolant. When the radiator is full, more coolant may be added, if the engine is raced moderately for a few seconds. Use only clean coolants, preferably pure rain water, which eliminates the formation of deposits in the system. Never top up with a considerable amount of cold water if the engine is hot, as this may crack the cylinder block.

Greatest care should be exercised when removing the filler cap in case the coolant is boiling. Unscrew the cap carefully to let out the steam before removing the cap.

Cleaning the Cooling System

The coolant should be changed twice a year, spring and autumn, and in connection with this the system should be cleaned by flushing. The flushing is carried out in opposite direction to the normal flow of the coolant. Thus the block should be flushed through the upper neck and downward and the radiator through the lower pipe and upward. Cracked hoses and defective clamps should be replaced.

If the flushing proves to be insufficient for removing deposits, the system should be cleaned by a service shop with special equipment for cleaning cooling systems. In order to prevent further formation of deposits some rust inhibitor or glycol may be used.

Remember

1. That the heat control should be in the "Hot" position when draining and filling the cooling system.
2. That filling of coolant should be carried out in two steps, so that the heater element becomes completely filled up.
3. That the filler cap should be loosened when draining.

Radiator Repairs

A leaky radiator core should be repaired by soldering. Patent solutions added to the coolant in order to seal the radiator should be used only in case of emergency as they may clog the cooling jackets and pipes.

Anti-freeze Solutions

During the cold season when the temperature often falls below the freezing point it is necessary to fill the cooling system with a freeze-proof mixture instead of water, which may freeze and damage the radiator core or the cylinder block. Methylated spirit or ethylene glycol may be used as antifreeze solutions. Methylated spirit, however, is not very suitable because of its low boiling point, especially when driving with high coolant temperature, which is desirable during the cold season to make effective use of the heater. See page 58.

Glycol, on the other hand, has a boiling point above that of water and therefore only water need be added when replenishing. The dis-

Ethylene glycol volume %	Freezing point °C	Freezing point °F	Boiling point °C	Boiling point °F	Spec. grav.
10	— 4	25	101	214	1.012
20	—10	14	102	216	1.027
30	—17	2	103	217	1.041
40	—26	—15	104	219	1.055
50	—39	—38	106	223	1.068
60	—56	—68	109	228	1.076

Ethylene glycol (U.S. gal.)	Volume %	Freezing point °C	Freezing point °F	Boiling point °C	Boiling point °F	Spec. grav.
1 quart	13	— 6	21	101	214	1.012
2 quarts	25	—14	7	103	217	1.041
3 quarts	38	—24	—11	104	219	1.055
4 quarts	50	—39	—38	106	223	1.068

advantage with glycol is that it is rather expensive, and like methylated spirit, it must be handled with care as it can spoil the finish of the car. It also reduces the thermal conductivity of the water and thus it should not constitute too great a percentage of the coolant.

Transmission

Check the oil level in the transmission every 3,000 km (2,000 miles) by unscrewing the level opening plug 2, fig. 7. The oil level should not be more than 5 mm (1/4 in.) under the opening. Add oil when required and be sure not to mix different lubricants.

The transmission oil should be changed the first time after the running-in, i.e. 2,500—3,000 km (1,500—2,000 miles) after which the oil is to be changed every 12,000 km (8,000 miles) or every spring and autumn. Drain the transmission after the car has been driven 15 to 20 minutes and rinse with flushing oil. The transmission should then be filled with approx. 2 liters (2 U.S. qts.) of oil until it comes out through the level opening. See Lubrication Chart.

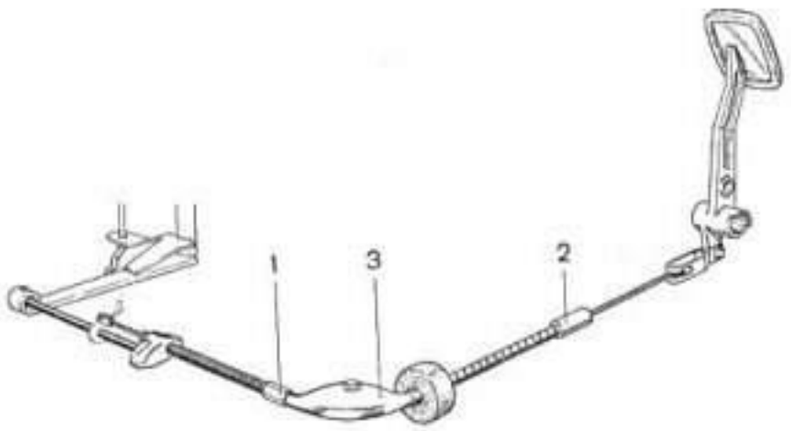

Fig. 19. Clutch Cable with Adjusting Nut

1. Adjusting nut
2. Bracket at firewall
3. Pulley segment

Clutch

The clutch pedal should have a play of about 25 mm (1 in.) which is adjusted with the nut 1, fig. 19. Screw out the nut to reduce the play. To avoid excessive wear of the clutch linings and the release bearing, the play should be checked regularly.

Jack and Spare Wheel

When jacking up the car for wheel change, brake adjustment etc. the jack should be fitted in the bracket located under the floor member, see fig. 20.

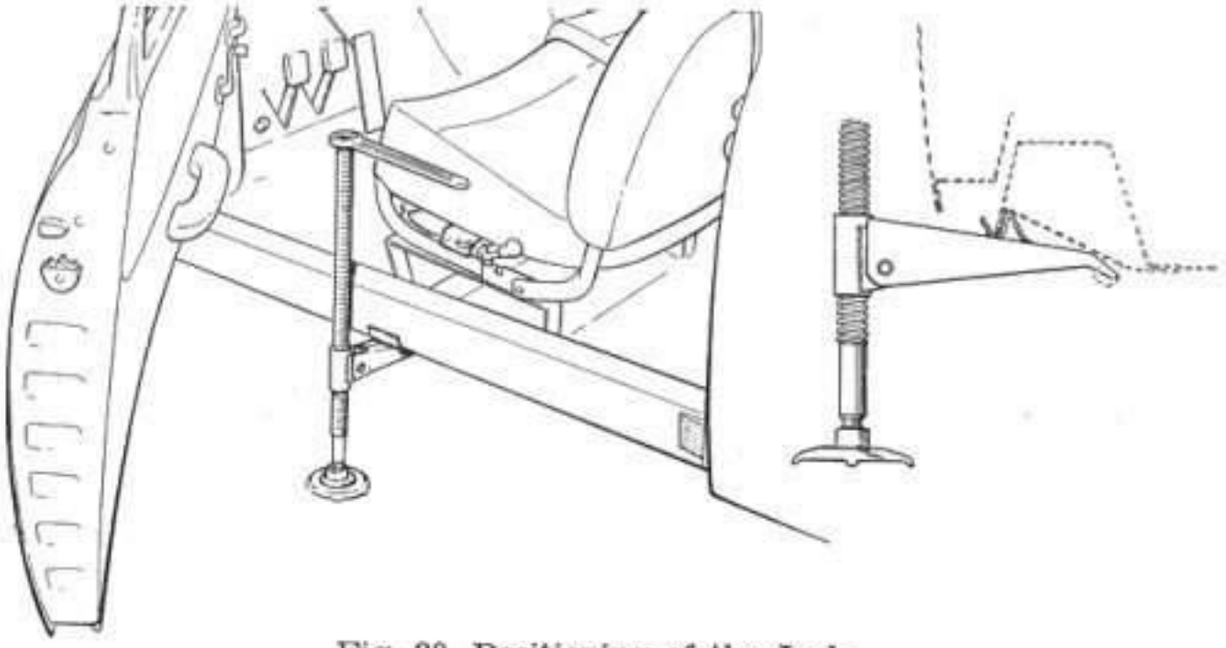

Fig. 20. Positioning of the Jack

When using a garage jack make certain that it does not damage the underside of the body. Strongpoints for the jack are provided. The front strongpoint is a bent plate behind the muffler and the rear one is located on the body center line, just in front of the rear axle tunnel. Place a piece of wood on the lifting head when lifting the rear end of the car.

The spare wheel, the jack and the tool kit are placed under the luggage compartment floor, the rear part of which forms a lid.

Suspension

Front and rear axle suspensions require no particular service since rubber attachments are employed throughout. If suspension troubles are suspected, the car should be checked by an authorized service shop.

Brake System

Replenishing Brake Fluid

Inspect the brake fluid level every 3,000 km (2,000 miles) and check that the holes in the lid are not clogged. Never use inferior brake fluids, which may ruin the rubber parts and thus impair the functioning of the hydraulic system.

* Bleeding of Brake System

A resilient brake pedal or braking power that is obtained after two or more pedal depressions signifies air in the hydraulic system which should then be bled as follows:

1. Check that the container is well filled and make sure that the vent holes in the cover are not clogged.
2. Connect a suitable hose to the bleeder screw 1, fig. 21, inside the left rear wheel.
3. Immerse the free hose end in a glass jar filled with clean brake fluid.
4. Open the bleeder screw ½—1 turn.
5. Have the pedal pumped with long even strokes until the discharged fluid is free from air bubbles. The end of the hose should be kept immersed during the bleeding.
6. Tighten the bleeder screw during a pedal depression.
7. Bleed also at the front wheels in the order right and left. Check that the fluid level in the container does not get too low.
8. Check that all bleeder screws are tightened and top up with brake fluid. Never use the fluid collected in the jar.

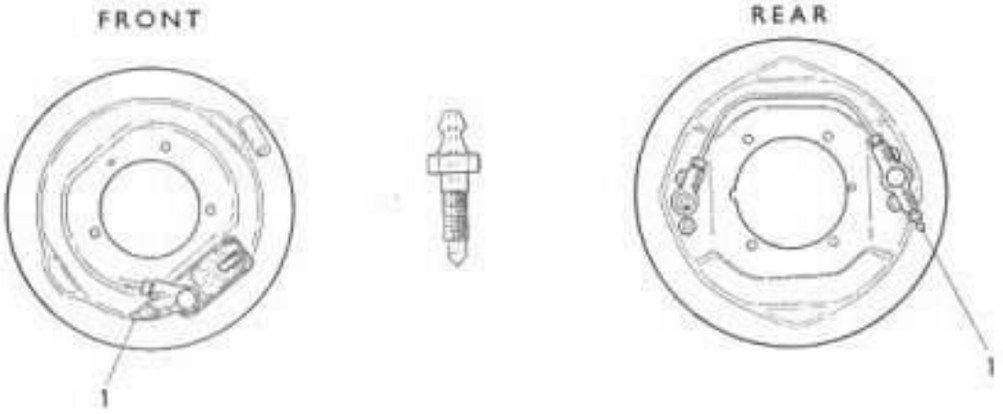

Fig. 21. Location and Design of Bleeder Screws

* Brake Adjustments

If the stroke of the brake pedal has increased gradually during an extended period of driving, it is likely that the brake linings are worn. Never let the fully pressed down pedal come closer to the floor than two inches.

The brakes are adjusted in the following manner:

* See page 6.

Foot Brake

1. Jack up the car until two wheels are free from the ground.
2. If there is no separate opening for adjustment, remove one wheelbolt and turn the wheel until the hole faces one of the adjusting screws (two at each front wheel, one at each rear wheel).
3. Turn the adjusting screw with a screwdriver until the wheel is locked. Then unscrew one or more notches until the wheel is freed.
4. When all four wheels have been adjusted, check that the brake pedal play is 5—10 mm (¼—½ in.) otherwise the brakes will drag when the pedal is released.

If a wheel cannot be locked with the adjusting screw, the brake linings are badly worn and should be replaced without delay. To ensure uniform brake power, reline both front wheels or both rear wheels and *never* on one side only. When relining, use only Saab original linings, or linings recommended by SAAB.

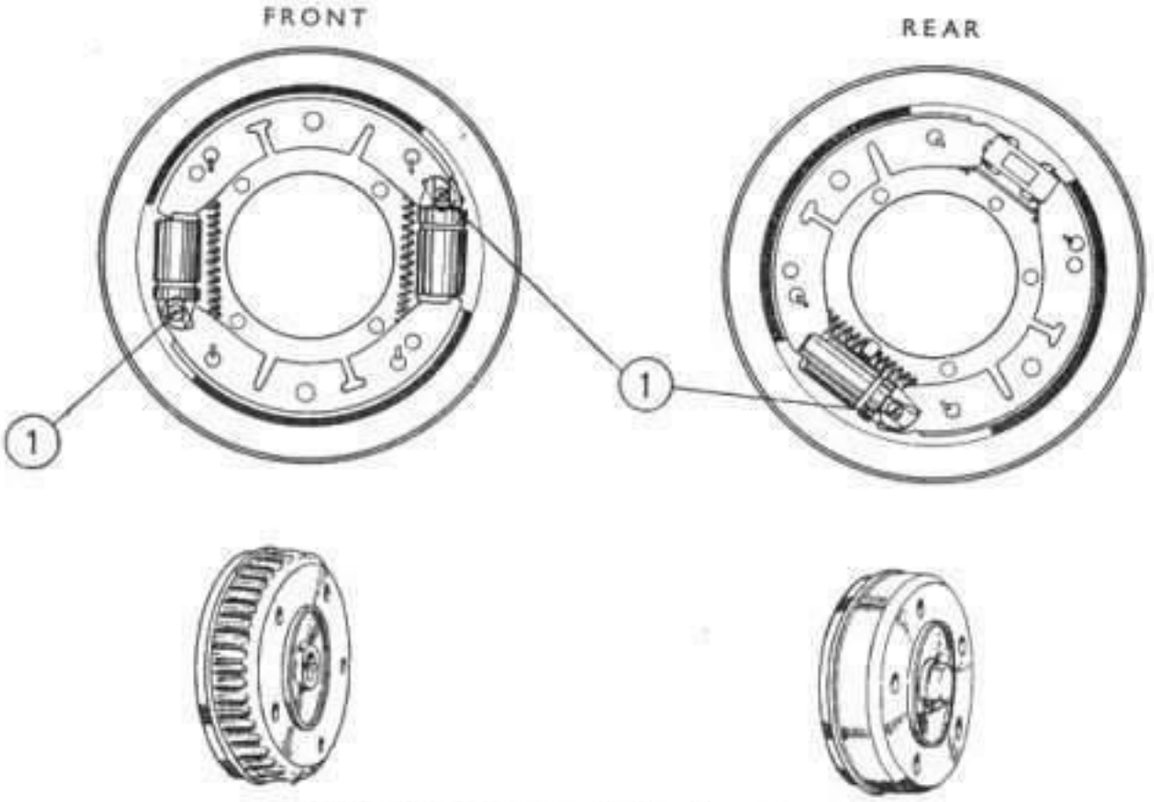

Fig. 22. Foot Brake Adjusting Screws

Parking Brake

The brake lever movement is transmitted to the rear brake shoes by Bowden cables. The brake lever play is adjusted by the nuts 1, fig. 23, accessible from the driver's seat. It should be possible to pull the brake lever two notches before the brakes drag. This adjustment must not be carried out unless the foot brake has first been adjusted as previously described.

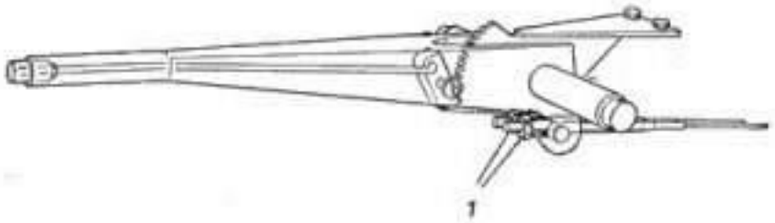

Fig. 23. Brake Lever with Adjusting Nuts

Wheels and Tires

In case of puncture the air leaks out very slowly from a tubeless tire since the hole in the synthetic rubber layer is squeezed almost tight by the tire pressure. If the penetrating object remains in the tire, pressure may be retained long enough for braking safely, or even proceeding to a service station, before the tire is deflated. Furthermore, the repair of a tubeless tire is so simple that in most cases removal of the wheel is not required.

Fitting and repair of tubeless tires should preferably be carried out by a tire repair shop. The following directions are intended for those who wish to carry out minor repairs themselves or for those occasions when no service is available.

Fitting Tires

When fitting a tire to the rim, be sure that the surfaces of the tire beads are clean and even. The tire bead and the inside of the rim edge should be thoroughly cleaned and any rust should be removed with a wire brush and steel wool. Particular attention should be paid to the area around the valve hole. If the corrosion is so severe that the surface has become rough, the affected areas and the tire bead should be coated with a thick layer of rubber cement. The tire should then be fitted before the cement has dried. Welding seams on the rim should be filed off if there is reason to believe they may cause air leakage.

After the valve has been attached to the wheel rim, the tire is fitted. This operation should be carried out very carefully to ensure

that the tire bead is not damaged by sharp edges on the tools. Check that the tire beads are properly seated in the rim. A most simple way of doing this is to place the wheel at a 45° angle against a wall and push in the rim with your foot. Turn the wheel and repeat the procedure with the other side.

The initial inflation should be done with the valve needle removed, so that the tire is properly seated on the rim by the suddenly increased air pressure. Insert the needle, inflate to 2.5—3 kp/cm² (35—40 lbs./sq.in.) and then bleed the tire until the proper pressure is obtained.

Repair of Leaks

If a tire does not keep its pressure, it is possible to locate the fault by merely inspecting the tire and after the puncturing object, if any, has been removed, the tire can often be repaired without removing the wheel. To locate minor leaks it may be necessary to remove the wheel and immerse it in water.

Tires

A puncture can be repaired without difficulty by inserting a rubber plug in the hole after the plug and the hole have been coated with rubber cement. A special needle is required for this operation. Repair kits containing a needle, plugs of various sizes, and rubber cement, i.e. everything required for repairing tire punctures, are available in the market. Directions for use are also enclosed.

Wheel Rim

Air leaks due to minor deformation of the rim may be remedied by straightening the edge using hammer and anvil. Small holes etc. are repaired by hot riveting and if an existing rivet is leaking, its head may be hammered out. A rim leak must never be tightened by brazing or welding. For safety reasons a cracked rim should be replaced instead of being repaired.

Valve

Air leaks around the valve can often be stopped by cleaning the rubber washers and valve and then coating with rubber cement. If the valve has a hexagon nut, this can be tightened. If the valve is integral or if the remedies mentioned above fail to stop the leak, the valve must be replaced. Before fitting a new valve, inspect and clean its contact surface on the rim.

Tire Pressure

Check the tire pressure once a week with a reliable pressure gauge and follow carefully the directions on page 9.

A tire with correct pressure makes road contact with its entire tread. Uniform wear and effective traction is thus achieved.

Tires with too high pressure cause a bumpy ride and wear excessively in the middle of the tread, where cracks may occur in the bottom of the pattern grooves.

Tires with too low pressure are worn most on the outer edge of the tread. They impair the roadholding by causing the car to sway when cornering, and cracks may occur on the tire sides.

Fig. 24. Tightening Wheel Bolts

Interchanging Wheels and Tires

The front tires are subjected to heavier wear than the rear ones, and after a certain period of driving it is therefore advisable to shift the wheels, so that the least worn tires are placed in front. Note that some tires may have a certain rotation direction, which must be maintained. By shifting the wheels the life will be approximately the same for all the tires.

Fig. 24 shows the tightening sequence of the wheel bolts.

Front Wheel Alignment

It is essential that the alignment of the front wheels be correct. Wrong alignment impairs the road characteristics and it may be tiring and difficult for the driver to manoeuvre the car. The abnormal wear on tires and steering mechanism will result in increased tire and repair expenses.

To avoid incorrect front wheel alignment, the car should be taken

to an authorized service garage for inspection and possible adjustment every 6,000 km (4,000 miles) or whenever there is reason to believe that the alignment is faulty.

The various alignment angles are shown in the figure below. Note, that the dimensions A and B are measured between the wheel rims.

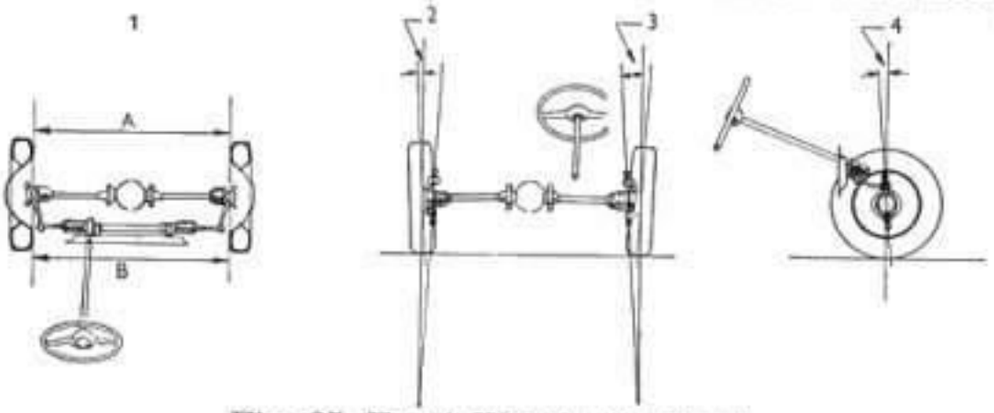

Fig. 25. Front Wheel Alignment

1. Toe-in B—A = 2 mm ± 1 (.08 in ± .04)
2. Camber = ¾°
3. "King pin" inclination* = 7°
4. Caster = 2°

Electrical System

Battery

The battery is one of the most important parts of the car and should be checked and serviced carefully.

Check the electrolyte level at least once a month in the winter and every second week in the summer. It should be 6—8 mm (approx. 1/4 in.) above the cell plates. Use only distilled water when topping up. The charge of the battery is measured with a hydrometer which shows the specific gravity of the electrolyte. The specific gravity values from fully charged to discharged are listed in the table below.

In order to prevent corrosion of the terminals, they should be coated liberally with Vaseline. All grease, dirt, etc. should be removed before coating. Check also that the battery is firmly secured and that the terminal nuts and the ground connections are tightened.

Battery condition	Specific gravity
Fully charged	1.28
¾ charged	1.24
½ charged	1.21
¼ charged	1.16
Discharged	1.12

* Since this car has ball joint suspension of the wheels, the term king pin refers to an imaginary line through the centers of the ball joints. See fig. 25.

Avoid long and heavy discharges of the battery because they shorten its life considerably. In case of repeated attempts to start the engine, the battery should be allowed to recover for a short while between attempts.

Generator

The generator is located to the right of the engine and is driven by a V-belt from the crankshaft pulley. To tighten the belt, loosen the bolts 1 and 2, fig. 26, and pull the generator outwards. The correct tension is attained when the belt can be pressed inwards about 6—8 mm (1/4 in.) on the longest run. See fig. 26. Do not overtighten the belt, since this will cause excessive load on the generator bearings and heavy belt wear. When the tension has been correctly adjusted, tighten the bolts 1 and 2.

Should the generator or relay be defective, take the car to an approved service garage without delay. The generator should be lubricated when overhauled.

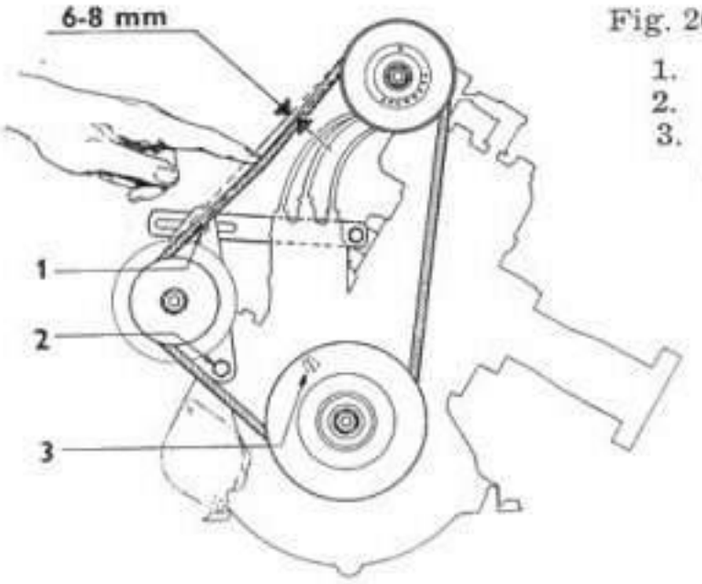

Fig. 26. Adjustment of Belt Tension

1. Adjusting bolt
2. Fastening bolts
3. Index for ignition timing (piston in cyl. 2 at T.D.C.)

Ignition Distributor

The ignition distributor is mounted to the right on the engine. The rotor is driven by the crankshaft via a worm gear and a pinion. It rotates clockwise and as shown in fig. 28, the firing sequence is 1—2—3 (No. 1 cyl. being the rear one).

It is essential that the distributor gear be lubricated regularly every 3,000 km (2,000 miles) and that the contact gap be checked every 12,000 km (8,000 miles). The distributor shaft and the lubricating felts should also be oiled at this time. See Lubrication Chart.

* Checking Contact Points

The contact points and point gap should be checked every 12,000 km (8,000 miles). Remove the distributor cap and rotor. Make sure that the contact surfaces of the points are clean and not burnt to the extent that they must be replaced.

Do not forget to lubricate the breaker arm pivot with the same lubricant as used on the lubricating felts for the breaker cam and rotor shaft. Note. All lubrication in the distributor should be moderate.

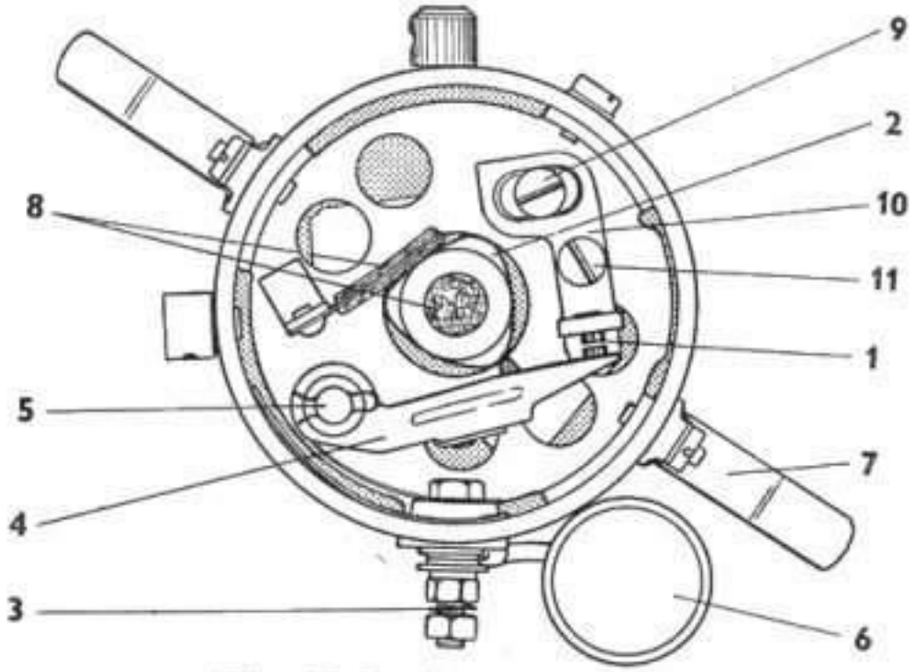

Fig. 27. Ignition Distributor

1. Contact points
2. Breaker cam
3. Primary cable terminal
4. Breaker arm
5. Breaker arm pivot
6. Condenser
7. Clamp spring
8. Grease felts
9. Adjusting screw
10. Fixed breaker point
11. Lock screw

After checking the contact points, the point gap should always be adjusted. The correct gap is 0.3—0.4 mm (.012—.016 in.) measured when the breaker arm peg is on the highest point of a cam. Use a feeler gauge when checking. The gap is adjusted by loosening the lock screw 11, fig. 27, of the stationary point. Then turn the eccentric adjusting screw 9 until the correct gap is obtained and tighten the lock screw. Check the gap again and, if correct, fit the rotor.

Note. When fitting the rotor, the lock washer for its lock screw must be replaced by a new one. After adjustment of the point gap, always check the ignition timing.

* See page 6.

* Ignition Timing

Since the timing of the three cylinders in relation to each other is fixed by the shape of the cam, it is sufficient to check the timing of one cylinder only. Engine and distributor are indexed with cylinder 2 as determinant for the timing, which is carried out as follows:

1. With the distributor cap removed and the breaker points adjusted, turn the crankshaft until the index on the crankshaft pulley coincides with the crankcase index underneath the distributor, as shown in fig. 26. The piston in cylinder 2 is now at its top dead centre.

2. The index of the rotor should now coincide with the index of the distributor body. This index is located on the rear side of the body and to the left of the guide lug which also serves as a support for one of the clamp springs. See fig. 28.

3. Switch on ignition and by using a test lamp for indication, turn the crankshaft until the breaker points close. Make sure that the advance regulator weights are retracted by turning the rotor anticlockwise. When the setting is correct the

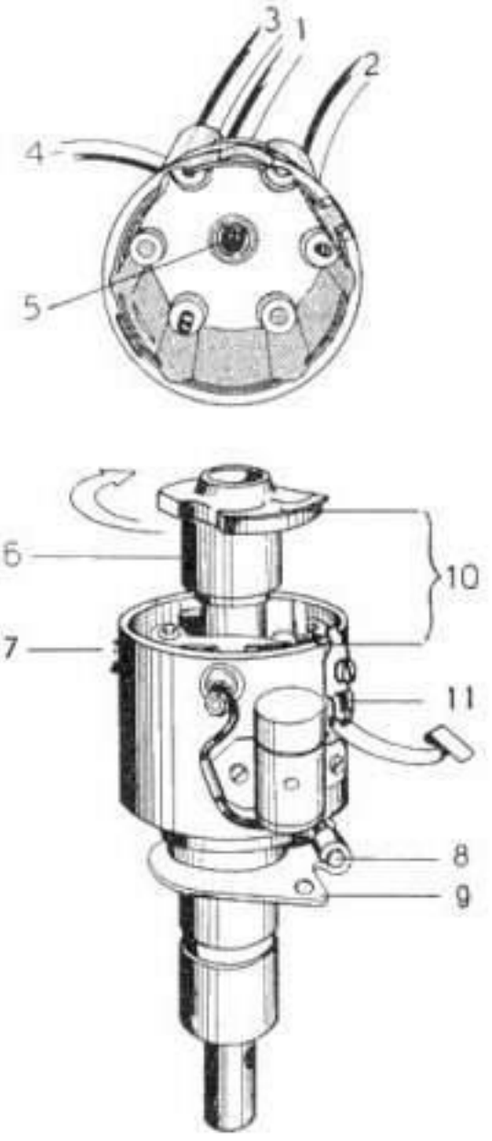

Fig. 28. Ignition Distributor

1. Ignition cable, cylinder 1
2. Ignition cable, cylinder 2
3. Ignition cable, cylinder 3
4. Cable to ignition coil
5. Center carbon terminal
6. Rotor
7. Vent hole
8. Distributor lock screw
9. Lock plate
10. Indexes for ignition timing
11. Clamp spring support with guide lug.

* See page 6.

points begin to open at 10°, or if a dial gauge is used, 0.7 mm (.028 in.) before T.D.C. If a dial gauge is not available, the distance between the pulley index and the crankcase index, fig. 26, may be measured. The distance measured on the pulley periphery corresponding to 10° is 12—13 mm (½ in.).

If adjustment of the timing is required, proceed as follows:

a. Turn the crankshaft until the piston of cylinder 2 is 10° before T.D.C. (See item 3 above). Note, that the indexes on the rotor and distributor body should coincide, see fig. 28.
b. Loosen screw 8, fig. 28, and turn the distributor until the breaker points open. Make certain that the advance regulator weights are retracted.
c. When the correct setting is obtained, tighten the distributor lock screw.
d. Check the correctness of the timing by turning the crankshaft a few full turns.

4. Clean the distributor cap, inside as well as outside, with a dry and clean cloth, and check that all contact faces are clean and undamaged. Also check that the center carbon terminal 5 slides freely in its holder. Clamp on distributor cap so that the lug on the spring attachment fits in the corresponding notch. Check that the ignition cables are correctly inserted and make good contact. If required, the distributor shaft should be lubricated through the nipple at the front of the distributor body and at the felt in the shaft under the rotor, which must be removed.

> **Important**
>
> All high tension insulators must be kept clean and dry. The following parts should be cleaned every 6,000 km (4,000 miles): ignition coil bakelite cap, distributor cap (inside and outside), ignition cables and spark plug insulators.

Spark Plugs

The spark plugs should be cleaned after approx. 6,000 km (4,000 miles) driving. At the same time, check with a feeler gauge that the spark gap is 0.7 mm (.028 in.) If adjustment is required it must be done with the side electrode since the insulator may crack if the

center electrode is subjected to bending. After 10,000—15,000 km (6,000—10,000 miles) the spark plugs should be replaced.

The type of spark plugs to be used is determined to a great extent by how the car is being driven. Hot spark plugs should be used for running in, city driving and when the car is used ordinarily. Long distance, high speed driving requires cold spark plugs in exceptional cases, see page 10.

Use cold spark plugs only if the hot ones have proved to burn down. The Bosch M 175 T1, Champion UK 10 or equivalent are generally the most suitable plugs for ordinary use of the car.

*** Aiming Headlights**

The headlights are mounted in the hood by three attachments, one of which is pivoted and the other two serving as adjusting screws. See fig. 29.

The upper screw, 1, is used for horizontal adjustment and by screwing the lower one, 2, in or out, the beam is raised or lowered respectively.

Before aiming, check that tire pressures are correct and place the car on a level floor and square with the target. The car should be unloaded except for the driver.

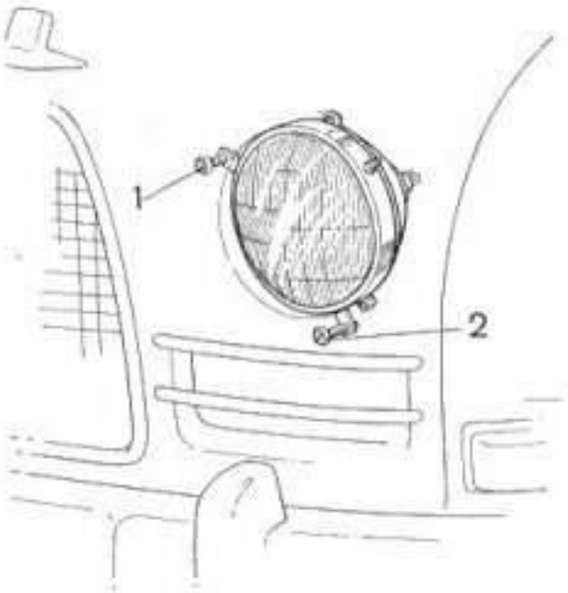

Fig. 29. Screws for adjusting Headlights
1. Horizontal adjustment
2. Vertical adjustment

It is very important that the headlights be correctly adjusted in order to ensure the best possible illumination of the road and at the same time to avoid dazzling on-coming traffic.

* See page 6.

Sealed Beam Headlights

A = 50 mm (2 in.)
B = 150 mm (6 in.)
C = 480 mm (19 in.)

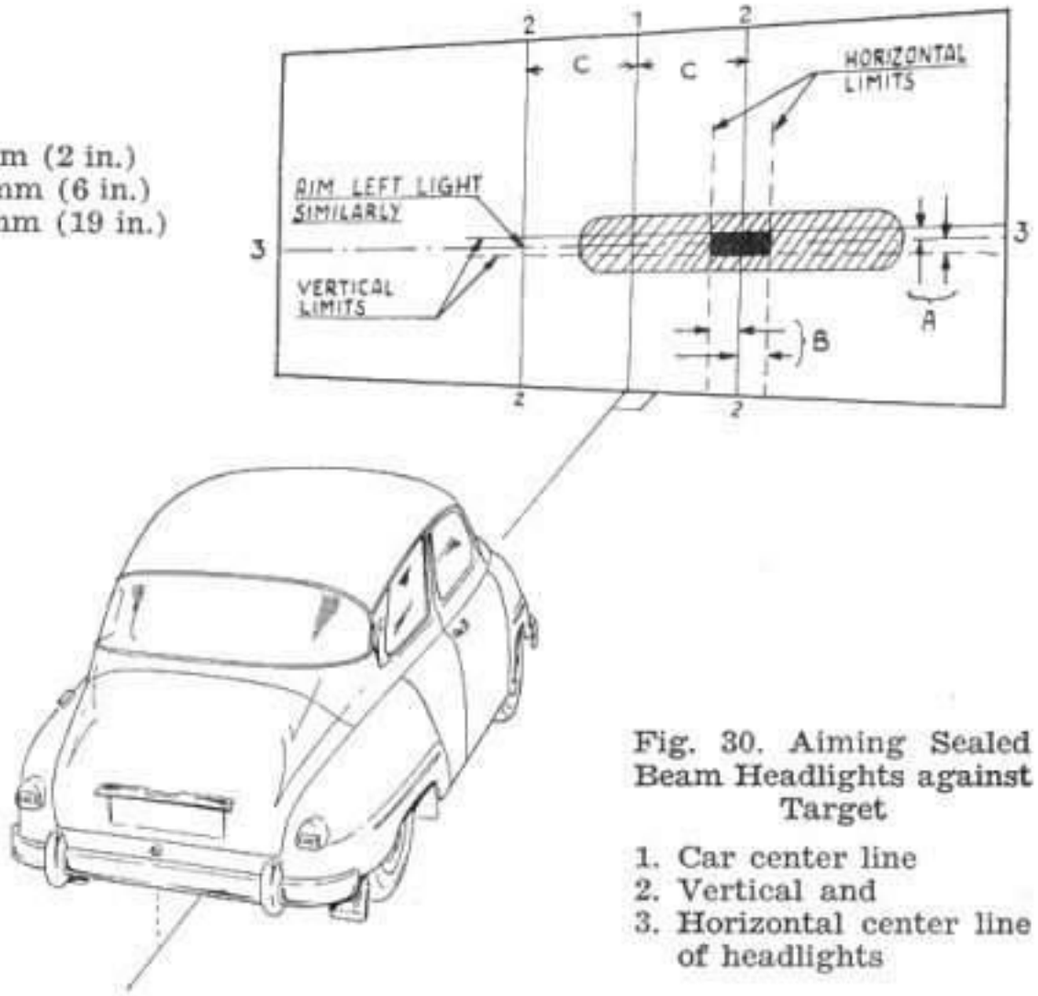

Fig. 30. Aiming Sealed Beam Headlights against Target

1. Car center line
2. Vertical and
3. Horizontal center line of headlights

The aiming of Sealed Beam asymmetric headlights should be carried out against a target, as shown in fig. 30, or with special equipment giving equivalent results. The various lines of the target are the car center line, 1, the two vertical headlight center lines 2-2 and the horizontal headlight center line, 3-3.
Measure the distance between headlight and target, 7.5 meter (25 ft.) and adjust the line 3-3 to be horizontal at the height of the headlight centers. Switch on the main beams and aim one at a time, with the other one masked. The centers of the high intensity zones should be adjusted against the intersection points of the lines 2-2 and the line 3-3. However, there are certain limits within which the beam centers should be kept. Thus they must not be to the left of or more than 150 mm (6 in.) to the right of straight ahead, neither above or

more than 100 mm (4 in.) lower than the line 3-3. This horizontally and vertically limited area is shown as a black field on the target in fig. 30. If the headlights are aimed according to this description, no separate adjustment will be required for the low beams.

Asymmetric Headlights (R.H.D.)

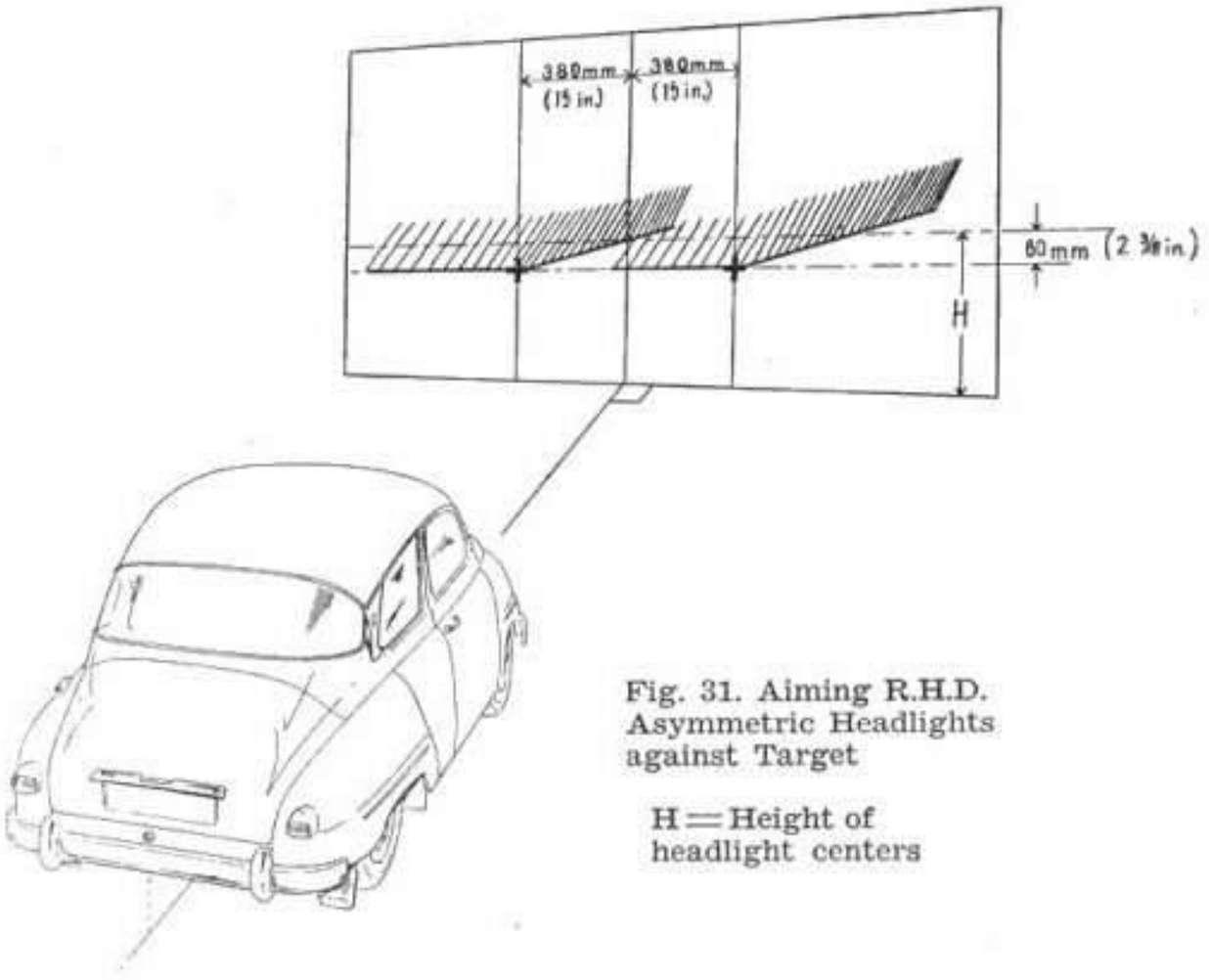

Fig. 31. Aiming R.H.D. Asymmetric Headlights against Target

H = Height of headlight centers

The target for aiming the asymmetric headlights is shown in fig. 31. Place the car at a distance of 5 meters (17 ft.) from the target, switch on the low beams and mask one lamp. Check, and if necessary, adjust the beam until the horizontal part of its light-darkness limit falls exactly 6 cm (2⅜ in.) below and entirely to the left of the headlight center (+). The inclined part of the light-darkness limit must be entirely to the right of this mark and should thus intersect the horizontal limit under the headlight center.