SERVICE MANUAL

CARS AND VANS

PV 444, 544

Part 12

LUBRICATION

Export Service Department

AKTIEBOLAGET

VOLVO

GÖTEBORG . SWEDEN

CONTENTS

INSTRUCTIONS FOR OIL CHANGES

Engine

During the summer and on cars that are mainly used for long-distance driving, the engine oil should be changed after 5000 km (3000 miles). An exception to this rule consists of cars without oil filters (PV 444 chassis Nos 1—12005) in which case the oil should be changed after every 2500 km (1500 miles), especially on cars mainly used for short-distance running. On new cars the oil should also be changed after the first 1000 km (600 miles).

The oil should be drained off immediately after the engine has been run and while it is still warm. The oil drain plug is shown in Fig. 1. When all the oil has run out check the washer and then screw the plug tightly back into position. Remove the filler cap on the rocker arm cover and add the new oil through the hole.

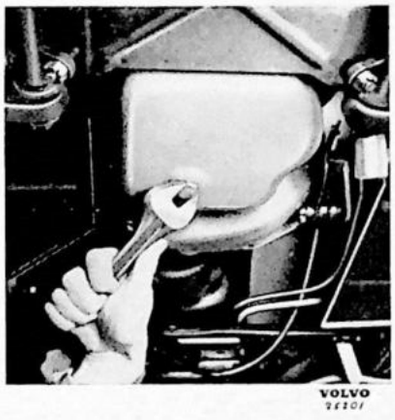

Fig. 1. Draining the engine oil.

The engine lubricating oil used should be of a grade corresponding to the conditions laid down in "For Service MM" or "MS". Oil of the "For Service MS" type is used under difficult conditions of operation, for example, driving of a mainly short-distance character with excessively low working temperatures, driving for long periods at high speed or other conditions where a high degree of loading on the engine results in a high working temperature. Otherwise oil of the "For Service MM" type should be used. Only oil of the "For Service MS" type should be used on cars fitted with sports engines. The viscosity of the oil used is as follows:

below 0° C (32° F) SAE 10 W
between 0° C (32° F) and 30° C (90° F) SAE 20
over 30° C (90° F) SAE 30

The oil capacity of PV 444 cars up to chassis No. 131917 is 3.25 litres (6 Imp. pints=7 US pints). For PV 444 cars from chassis No. 131918 onwards and PV 544 cars, the capacity is 2.75 litres (4 ¾ Imp. pints=5 ¾ US pints). The corresponding capacities including the oil filter are 3.75 litres (6 ¾ Imp. pints=8 US pints) and 3.5 litres (6 ¼ Imp. pints=7 ½ US pints).

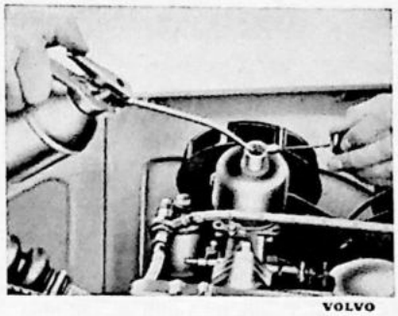

Fig. 2. Topping up the carburetter damping cylinders.

Each time the oil is changed the twin carburetters on B 14 A and B 16 B engines should have their damping cylinders topped up with light engine oil (SAE 10 W). The cap nut and the damping plunger (Fig. 2) should be removed on each carburetter and the damping cylinders should be filled with oil. Do not fill the part above the cylinder.

Gearbox

The oil should be changed after every 20000 km (12000 miles). With a new or reconditioned gearbox, the oil should be changed and the gearbox should be flushed after the first 5000 km (3000 miles).

The oil should be drained off immediately after the car has been run while the oil is still warm. To drain off the oil remove plugs 1 and 2 as shown in Fig. 3. It is recommended that now and then, for example, in connection with every other oil change, flushing oil should be used. This flushing oil is added through the filler hole (2, Fig. 3) after which the drain plugs should be screwed back into position.

Fig. 3. Gearbox.
1. Drain plug 2. Filler plug

The engine should then be allowed to run for a minute or so with one of the gears engaged and one of the rear wheels jacked up. The engine should then be stopped, the rear wheel lowered and the flushing oil drained off.

The new oil should be added after the drain plug has been screwed tightly back into position. The level of oil should be up to the filler hole (2). Then screw the filler plug tightly back into position.

Use SAE 30 gearbox oil all the year round. When changing the oil, the capacity of the three-speed gearbox is 0.5 litres (⅞ Imp. pint= 1 US pint) and for the four-speed box 0.9 litres (1 ¾ Imp. pints=1 US quart).

Rear axle

The oil should be changed after every 20000 km (12000 miles). In the case of a new or reconditioned rear axle, the oil should be changed and the rear axle should be flushed after the first 5000 km (3000 miles).

Fig. 4. Rear axle.
1. Filler plug 2. Drain plug

The oil should be drained off immediately after the car has been driven and while the oil is still warm. To drain off the oil, remove plugs 1 and 2 as shown in Fig. 4.

As in the case of the gearbox, it is recommended that now and then, for example in connection with every other oil change, flushing oil is used. This oil is added through the filler hole (1) after the drain plug has been screwed back into position. The engine should be allowed to run for a minute or so with one of the gears engaged and one of the rear wheels jacked up after which the engine is stopped, the rear wheel lowered and the flushing oil drained off.

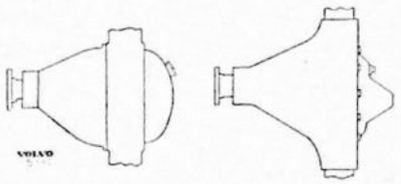

Fig. 5. Rear axle.

Add the new oil after the drain plug has been screwed tightly back into position. The level of oil should be up to the filler hole (1). Screw the filler plug tightly back into position.

Use SAE 80 hypoid oil all the year round. On PV 444 cars from chassis No. 131918 onward and for PV 544 cars the oil capacity when changing oil is 1.3 litres (2 ¼ Imp. pints=2 ¾ US pints). For PV 444 cars up to chassis No. 131917 the oil capacity when changing oil is 0.9 litres (1 ¾ Imp. pints=2 ¼ US pints) for model I and 1.3 litres (2 ¼ Imp. pints=2 ¾ US pints) for model II. Model I and model II can be recognized by their design, see Fig. 5.

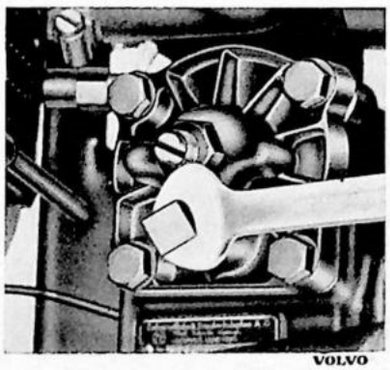

Fig. 6. Removing the steering gear filler plug.

Steering gear

The oil in the steering gear does not usually require changing except in the case of reconditioning. If, however, the oil must be changed for some reason when the steering system is fitted in the car, the old oil must be sucked out with some suitable device, for example, a grease gun which is inserted through the filling hole.

Oil is then added through the filling hole after the plug has been removed, Fig. 6. The level of oil should be up to the filler hole. Screw the plug tightly back into position.

For the steering gear on PV 544 cars SAE 80 gear oil should be used all the year round and on PV 444 cars one of the following special oils: Caltex Special Oil 250, Castrol B Special Gear Oil, Esso Gear Oil 250 Special, Kendall 400, Kopra Gear Oil Special, Mobilube Special Steering Gear Oil or Shell Dentax Oil 250. The capacity of the steering gear for an early production PV 444 when all the old oil has been removed is 0.3 litres (3/8 Imp. pint= 1/2 US pint), for late production PV 444 0.13 litres (1/4 Imp. pint=3/8 US pint) and for PV 544 0.25 litres (1/2 Imp. pint=5/8 US pint).

INSTRUCTIONS FOR ALL-ROUND LUBRICATION

Points to be lubricated:

After every 1250 km (750 miles)

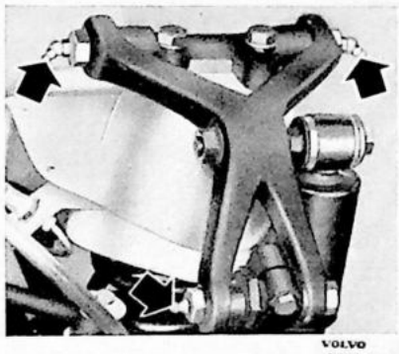

Fig. 7. Upper control arm.

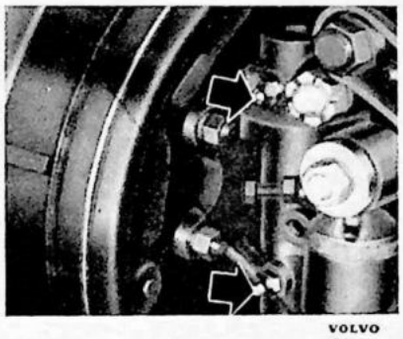

Fig. 8. King pin.

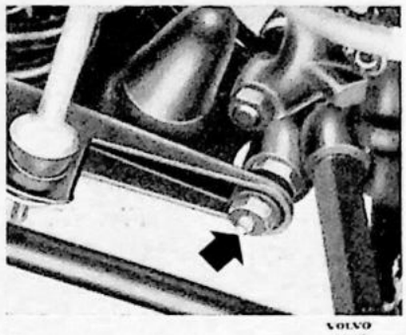

Fig. 9. Lower control arm.

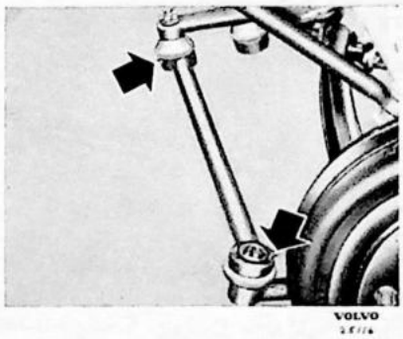

Fig. 10. Steering linkage.

See page 6 concerning ball joints without lubricating nipples.

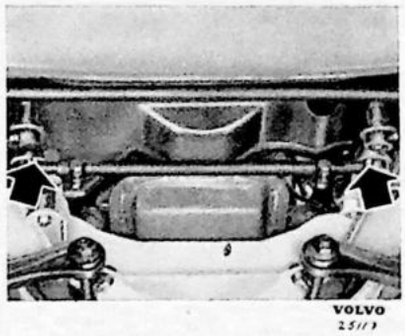

Fig. 11. Tie rod.

See page 6 concerning ball joints without lubricating nipples.

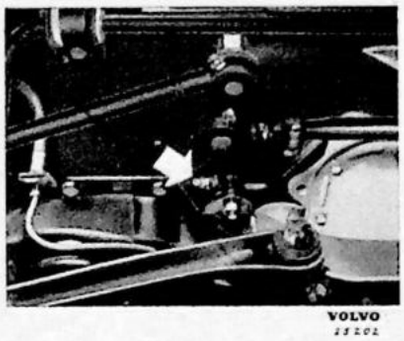

Fig. 12. Steering idler arm.

After every 5000 km (3000 miles)

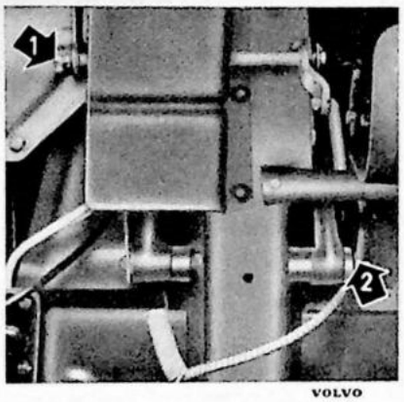

Fig. 13.
1. Clutch shaft 2. Pedal shaft

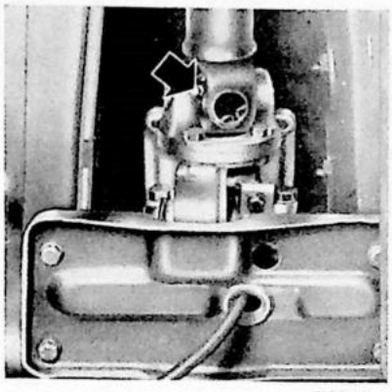

Fig. 14. Forward universal joint.

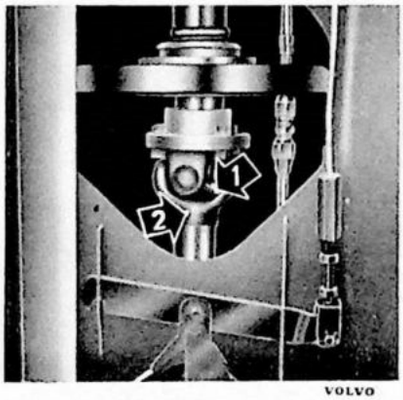

Fig. 15.
1. Centre universal joint 2. Slip joint

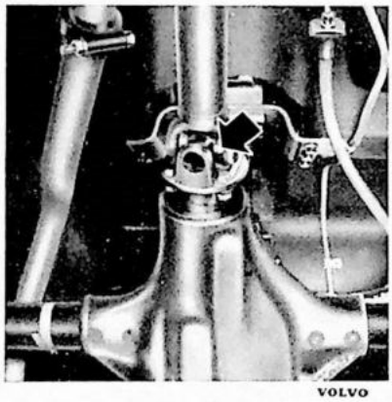

Fig. 16. Rear universal joint.

After every 10,000 km (6000 miles)

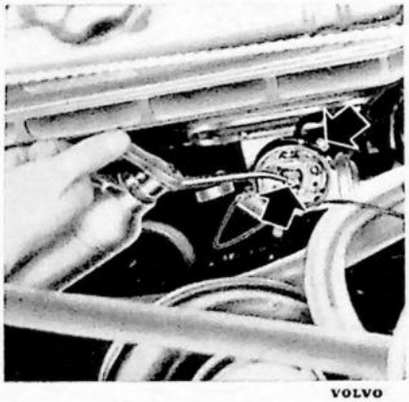

Fig. 17. Distributor.

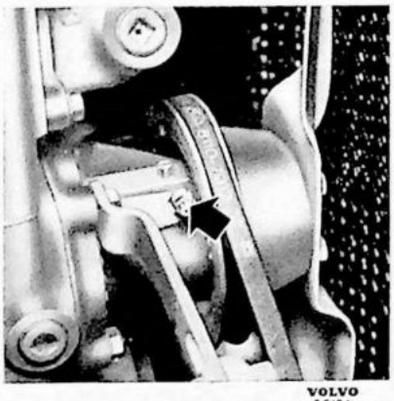

Fig. 18. Cooling water pump.

Lubricate sparingly.

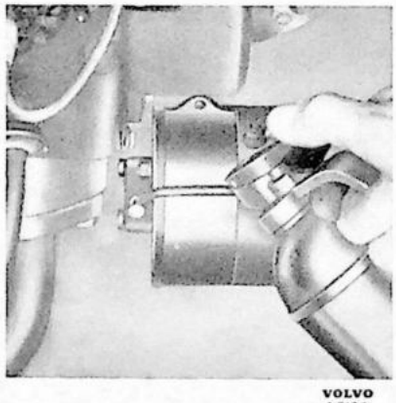

Fig. 19. Dynamo.

(PV 444 cars up to chassis No. 131917 and PV 544 cars, late production).

OTHER INSTRUCTIONS

Replacing the oil filter element

The oil filter element fitted may be of the by-pass type (PV 444 cars up to chassis No. 131917) or of the full-flow type (PV 444 cars from chassis No. 131918 onwards and PV 544 cars). The oil filter element should normally be changed after every 10,000 km (6000 miles). When a full-flow type filter is fitted the element should also be replaced after 5000 km (3000 miles) in the case of a new or reconditioned engine. Use only Volvo original elements.

The oil filter element is replaced as follows.

By-pass type oil filter

1. Clean the cover and loosen the centre bolt. See Fig. 20. Lift up the cover and the element.
2. Fit the new element. Check the cover gasket and replace if damaged. Fit the cover and tighten the bolt.
3. Check the oil filter for leakage after the engine has been started.

Fig. 20. Removing the cover.

Full-flow type oil filter

1. Clean the oil filter housing and the adjacent parts of the engine to prevent dirt from getting into the lubricating system while the replacement work is going on.
2. Loosen the centre bolt. see Fig. 21. Allow the oil running out to collect in a suitable vessel.
3. Remove the oil filter and take out the old element. Clean the housing in white spirit.
4. On late production units check that the intermediate plate is fitted with the mark "UP" at the top.

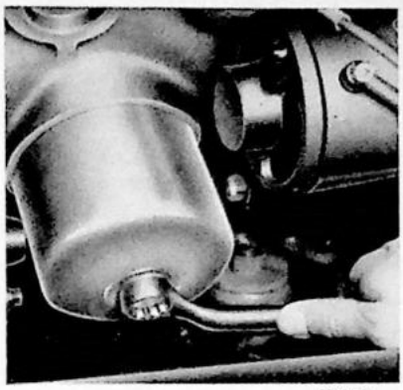

Fig. 21. Removing the oil filter.

Fit a new gasket in the cylinder block and a new filter element. Fit the oil filter and make sure that it comes correctly into the groove. Tighten the centre bolt to a torque of 2 kgm (15 lb.ft.).

5. If the element is replaced and the engine oil is not changed at the same time, top up with 0.75 litres (1 1/4 Imp. pints=1 1/2 US pints) of oil. Check the oil filter for leakage after the engine has been started.

Lubricating wheel bearings

The front wheel bearings should be disassembled for cleaning and greasing after every 20,000 km (12,000 miles) or at least once a year and the rear wheel bearings should be disassembled for cleaning and greasing after every 40,000 km (25,000 miles) or at least once every other year. Disassembly is carried out in accordance with the instructions given in the Service Manual Part 6 and Part 5.

The hub and grease cap should be carefully cleaned after the bearing and seal ring have been removed. Make sure that all old grease is removed from inside the hub. First clean the bearings by using compressed air and then wash the bearing components in white spirit and allow them to dry. Drying should not be carried out with compressed air since the compressed air often contains water and particles of dust. The parts of the bearing that are accessible should be dried off with linen or cotton cloth (not cotton waste). A new bearing that is delivered in a sealed package should not be cleaned.

Inspect all the components after cleaning. If any signs of damage, rust or blueing are noticed on the bearing races or rollers, the bearings should be replaced. If the outer or inner races are loose, test with a new ring. If this looseness still persists, the hub or the axle shaft in question should be replaced. Replace the seal rings if they are worn or damaged.

Use only high quality wheel bearing grease to lubricate the wheel bearings. Do not mix different makes of grease. A special greasing apparatus should be used to pack the wheel bearings effectively. Follow the instructions supplied by the manufacturer. If an apparatus of this type is not available, the bearings can be packed by hand with as much grease as there is place for between the roller bearing cage and the inner race. The insides of the rollers and the cage should also be greased. The space in the front wheel hub between the outer and inner bearings should be filled with grease as shown in Fig. 22.

Carry out assembling in accordance with the instructions given in Part 6 and Part 5.

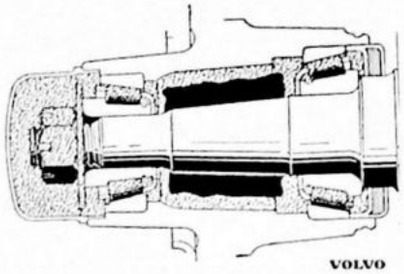

Fig. 22. Greasing a hub.

Lubricating plastic-lined ball joints

If there are no lubricating nipples on the tie rod and steering linkage this means that they are fitted with plastic-lined ball joints. The rubber seals on these should be turned back once a year and filled with chassis grease, see Fig. 23.

Lubricating handbrake cable

The handbrake cable with its sleeve (late production) should be lubricated about twice a year. The front and rear attachments for the sleeve should be loosened and moved backwards and forwards while graphite grease is smeared on the cable, see Fig. 24.

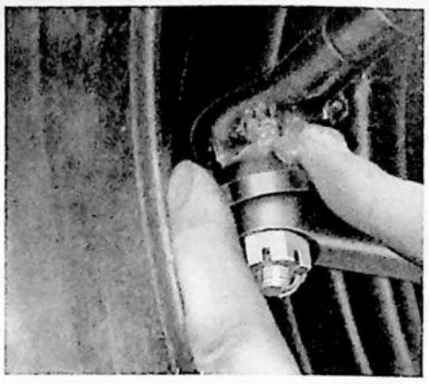

Fig. 23. Lubricating a ball joint.

Fig. 24. Lubricating the handbrake cable.

Cleaning the oil filler cap

In order to ensure that crankcase ventilation is satisfactory, the filter in the oil filler cap should be removed and cleaned after every 10.000 km (6000 miles). The filler cap should be removed, the three screws (Fig. 25) taken out and the top lifted off. The filters should be cleaned in petrol, dried and then oiled in with light oil. Before refitting the cap, check the gasket and replace if necessary.

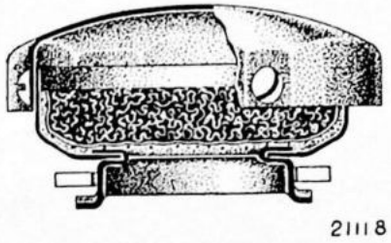

Fig. 25. Oil filler cap.

Cleaning the air cleaner

The air cleaner filter should be cleaned after every 5000 km (3000 miles). An exception to

this is the air cleaner of the oil-bath type (extra equipment) which only needs cleaning after every 10,000 km (6000 miles).

Cleaning is carried out in the following way.

Air cleaners on B 14 A and B 16 B engines (earlier production)

Two air cleaners are fitted on B 14 A and B 16 B engines and the appearance of these is shown in Fig. 26. Since it is not possible to disassemble them, they should be removed as a unit and washed in petrol. After this cleaning the filter should be oiled in with engine oil and this should be allowed to run off before the air cleaners are refitted on the engine. Make sure that the air cleaner and gasket come in the correct position when fitting. The ventilation holes (see illustration) must index with the corresponding holes on the carburetters if they are to function properly.

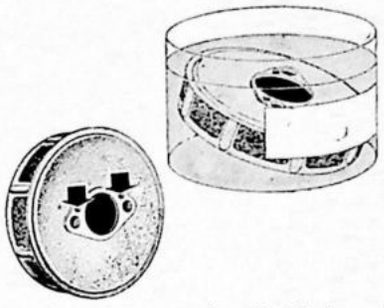

Fig. 26. Air cleaners for B 14 A and B 16 B engines.

Air cleaner with paper element, B 16 B engine (late production)

The elements in the air cleaners are made of specially-treated paper.

The air cleaners must not be washed in liquid or be oiled in.

If they should become moist in any way they must be replaced since the flow through them will then be greatly reduced.

If the car in question is run under relatively dust-free conditions then the only servicing operation necessary is to replace the air cleaners with new units after each 12,000 miles (20,000 km) and the old cleaners should be thrown away since the air cleaner and element are manufactured in one unit.

When the car is being run on dusty roads or the air cleaners become clogged more rapidly than usual, it is recommended that, in addition to the replacement mentioned above, they should be blown clean with compressed air after every 5,000 km (3,000 miles). The air cleaners should be removed and blown *from the inside outwards* with dry, clean compressed air. Hold the compressed air nozzle in the hole and not close to the cleaner element since this can damage it.

Remember to turn the gasket between the air cleaner and the carburetter the right way round when re-fitting the air cleaner.

Oil bath-type air cleaner

This air cleaner can be encountered on PV 444 cars from chassis No. 131918 onwards and on PV 544 cars.

Remove the complete air cleaner unit and then disassemble it, Fig. 27. Empty out the old oil and then clean the housing and the filter element in petrol before blowing it dry with compressed air. Fill the air cleaner up to the level mark with engine oil of the same type as used in the engine. Then reassemble the cleaner and refit it on the engine.

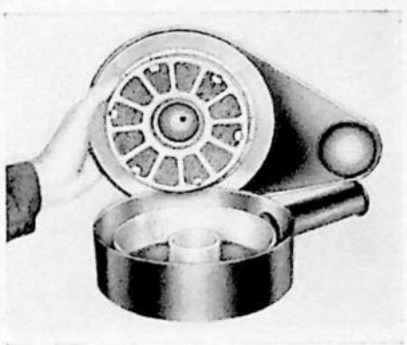

Fig. 27. Disassembling the air cleaner.

Other air cleaners

These do not need to be disassembled for cleaning. The nut on the cover is removed and

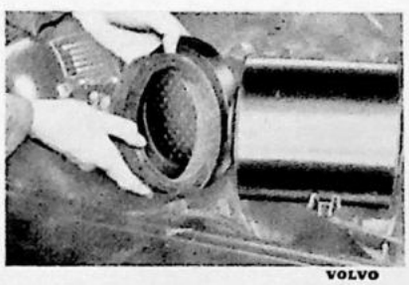

Fig. 28. Removing the filter element.

the cover is taken off. The air cleaner element is then removed (see Fig. 28 which shows an early production unit) and cleaned in petrol. After the element has dried it should be oiled in with engine oil and this should be allowed to run off before the element is replaced in the container.

Checking the brake fluid level

After every 5000 km (3000 miles) the level of brake fluid should be checked. Remove the plug from the master cylinder which is located under the steering column after it has been cleaned to prevent dirt from getting into the fluid container. To remove the plug on PV 444 cars up to chassis No. 20004 a special wrench SVO 1457 is used and for other models a box spanner (1 1/8″) and an extension as shown in Fig. 29.

The master cylinder should be almost full and should, if necessary, be topped up with high quality brake fluid, i. e. fluid satisfying the conditions laid down in SAE 70 R 1 (HD grade).

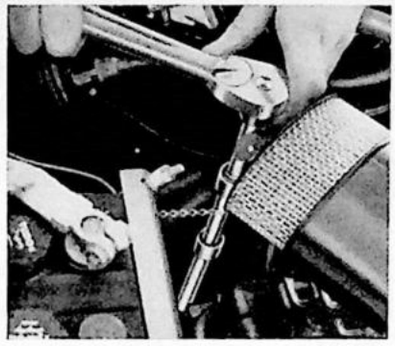

Fig. 29. Removing the master cylinder filler plug.

Body lubrication

In order to avoid squeaks and unnecessary wear the body should be lubricated at the points shown in Fig. 30. Unless otherwise stated, a few drops of light engine oil should be added after every 10,000 km (6000 miles).

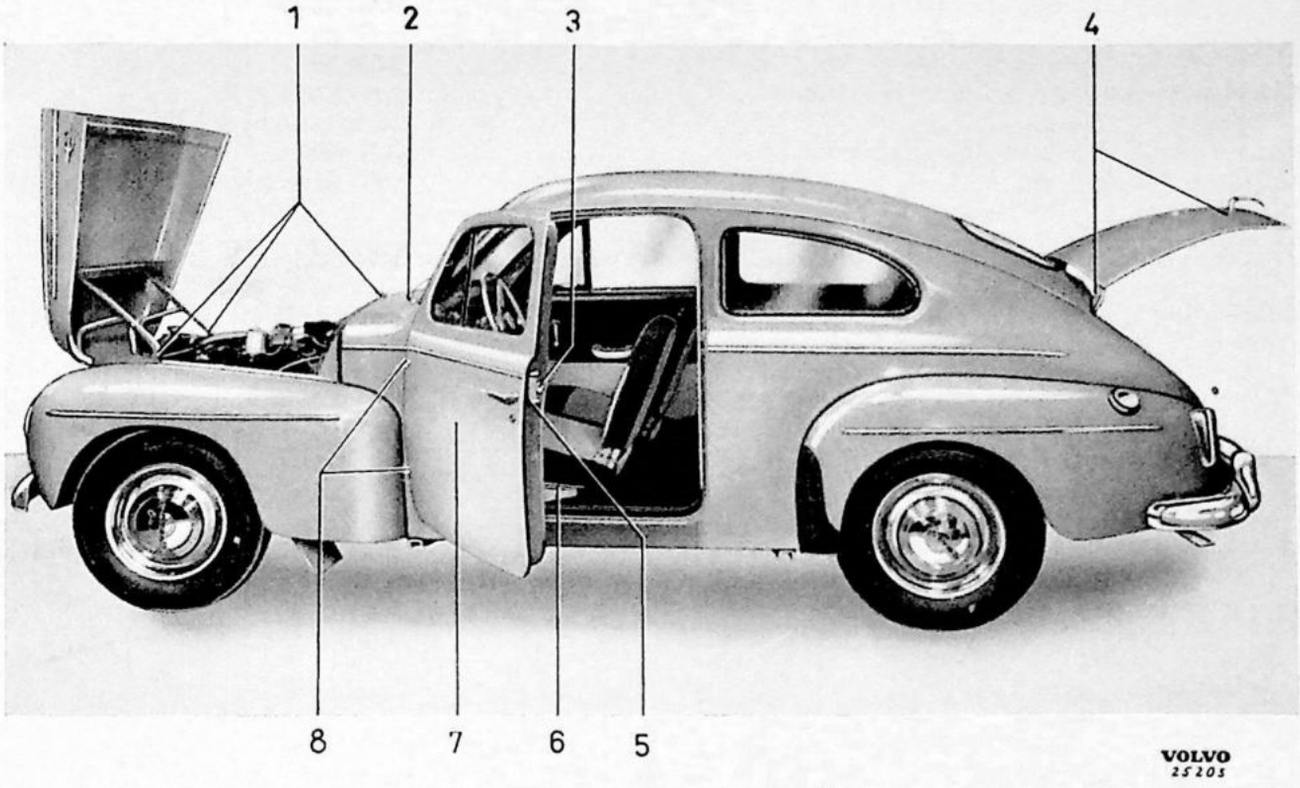

Fig. 30. Lubricating points on body.

1. Bonnet lock and hinges.
2. Windscreen wiper anchorages and spindles.
3. Door lock cylinders.
4. Rear compartment lock and hinges. The lock is lubricated by blowing a little powdered graphite into the keyhole. The key is then dipped in graphite, inserted in the lock and turned a few times.
5. Lock cylinders, dovetails and striker plates. Lubricate with paraffin wax.
6. Front seat slide rails and catches.
7. Lock mechanism with linkage, remote control system, window regulators with rollers and adjusters. These are accessible by removing the door inner panel. Lubrication is only necessary after every 20,000 km (12,000 miles) or once a year. The cable and chain should be lubricated with grease. See point 4 concerning the lubrication of the lock.
8. Door hinges.

SPECIFICATIONS

B 4 B Engine (PV 444 up to chassis No. 131917)

Lubricating oil, type	Engine oil
quality	Service MM or MS
viscosity: Below 0° C (32° F)	SAE 10 W
0° C—30° C (32° F—90° F)	SAE 20
Above 30° C (90° F)	SAE 30
Oil change quantity, without oil cleaner	3.25 litres (6 Imp. pints = 7 US pints)
with oil cleaner	3.75 litres (6 1/2 Imp. pints = 7 3/4 US pints)

B 16 A Engine (PV 444 from chassis No. 131918 onwards, PV 544)

Lubricating oil, type	Engine oil
quality	Service MM or MS
viscosity: Below 0° C (32° F)	SAE 10 W
0° C—30° C (32° F—90° F)	SAE 20
Above 30° C (90° F)	SAE 30
Oil change quantity, without oil cleaner	2.75 litres (4 3/4 Imp. pints = 5 3/4 US pints)
with oil cleaner	3.5 litres (6 1/4 Imp. pints = 7 1/2 US pints)

B 16 B Engine

Lubricating oil, type	Engine oil
quality	Service MS
viscosity: Below 0° C (32° F)	SAE 10 W
0° C—30° C (32° F—90° F)	SAE 20
Above 30° C (90° F)	SAE 30
Oil change quantity, without oil cleaner	2.75 litres (4 3/4 Imp. pints = 5 3/4 US pints)
with oil cleaner	3.5 litres (6 1/4 Imp. pints = 7 1/2 US pints)

Gearbox

Lubricating oil, type	Gear oil
viscosity, all year round	SAE 80
Oil change quantity, 3-speed	0.5 litre (1 Imp. pint = 1 1/4 US pints)
4-speed	0.9 litre (1 1/2 Imp. pints = 2 US pints)

Rear axle

Lubricating oil, type	Hypoid oil
viscosity, all year round	SAE 80
Oil change quantity, PV 444 up to chassis No. 131917,	
rear axle type I (see page 2)	0.9 litre (1 1/2 Imp. pints = 2 US pints)
rear axle type II (see page 2)	1.3 litres (2 1/4 Imp. pints = 2 3/4 US pints)
PV 444 from chassis No. 131918 onwards and PV 544	1.3 litres (2 1/4 Imp. pints = 2 3/4 US pints)

Steering gear, PV 444

Lubricating oil	Caltex Special Oil 250, Castrol SB Special Gear Oil, Esso Gear Oil 250 Special, Kendall 400, Kopra Gear Oil Special, Mobilube Special Steering Gear Oil, Nynäs Steering Gear Oil, OK Special Steering Gear Oil or Shell Dentax 250
Oil capacity, early production (Ross)	0.3 litre (1/2 Imp. pint=3/4 US pint)
late production (Gemmer)	0.13 litre (1/4 Imp. pint=3/8 US pint)

Steering gear, PV 544

Lubricating oil, type	Gear oil
viscosity	SAE 80
Oil capacity	0.25 litre (3/8 Imp. pint=1/2 US pint)

Directions for Lubricating Chart

Symbols

Engine oil:
B 16 B engine "For Service MS"
Others "For Service MM" or "MS"

Viscosity, below 0° C (32° F) SAE 10 W
0° C—30° C
(32° F—90° F) SAE 20
above 30° C (90° F) SAE 30

Gearbox oil, all year round: SAE 80

Rear axle oil, all year round: Hypoid oil SAE 80

Chassis lubricant

Lubricant, see respective note

Light engine oil

Brake fluid

Oil Change Quantities

See "Specifications" or "Instructions for Oil Changes".

Other Lubricating Points

In addition to the points shown in the lubricating chart, the chassis should also be lubricated once or twice a year at all joints for the throttle control, handbrake, pedal joints etc.

Notes

Note 1. On a small series of PV 444 between chassis Nos. 68956 and 98000 and 131918 onwards, the rods have ball joints without grease nipples. These should be lubricated once a year, see page 6.

Note 2. Check the oil level, see further page 3.

Note 3. The front wheel bearings should be removed every 20,000 km (12,000 miles), see page 5.

Note 4. Change the oil every 5,000 km (3,000 miles) and at spring and autumn, see page 1. At every other oil change the lubricating oil cleaner element should be changed, see page 5.

Note 5. Check the oil level and top up as necessary with good quality brake fluid, se page 8.

Note 6. Lubricate felt wick under the rotor with a few drops of light engine oil, see fig. 17. Also lubricate the periphery of the cam disc if necessary with a very thin coating of vaselin. On distributors with a lubricating oil cup, add a few drops of light engine oil, and on distributors with grease lubricating cup, turn this one turn and if necessary fill up with heat-resisting grease.

Note 7. Check the oil level every 1,250 km (750 miles) and change the oil every 20,000 km (12,000 miles) see page 1. Do not use hypoid oil.

Note 8. On PV 444 the intermediate lever joints should be lubricated every 5,000 km (3,000 miles). On PV 544 the joints between the lever and pull rod should be lubricated every 10,000 km (6,000 miles).

Note 9. The rear wheel bearings should be removed every 40,000 km (25,000 miles), see page 5.

Note 10. Check the oil level every 1,250 km (750 miles) and change the oil every 20,000 km (12,000 miles), see page 2.

Note 11. On cars with lubricating oil cup on the dynamo (PV 444 up to chassis No. 131917 and PV 544, late production), add a few drops of light engine oil, see fig. 19.

Note 12. Lubricate sparingly with heat-resisting grease, see fig. 18.

Note 13. Cables with outer casing should be lubricated twice a year, see page 6. Cables without outer casing but with guide brackets (PV 444 chassis No. 131918 onwards) should be lubricated every 5,000 km (3,000 miles).

Lubricating chart