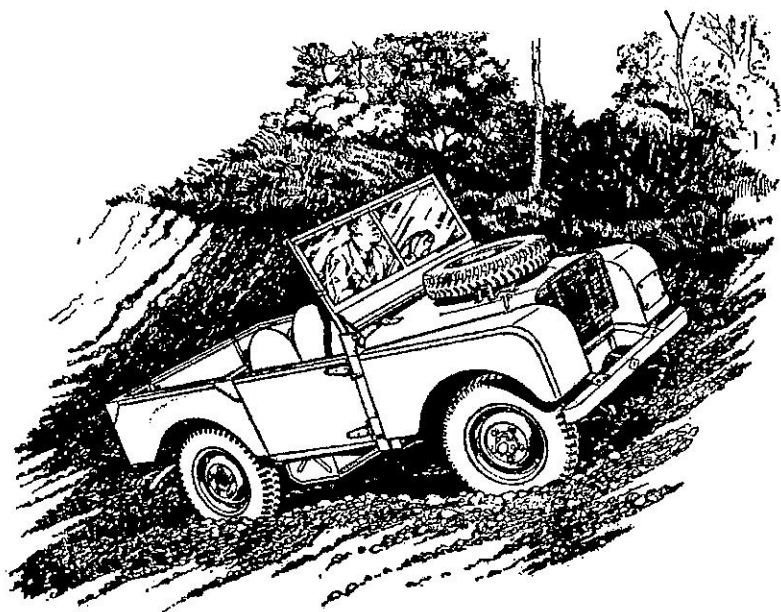


LAND- ROVER



LAND ROVER

IMPORTANT

NOMENCLATURE. As this manual covers both Right and Left-hand Drive models, reference is made throughout the text to the "left-hand" and "right-hand" sides of the vehicle, rather than to the "near-side" and "off-side." The "left-hand side" is that to the left hand when the vehicle is viewed from the rear; similarly "left-hand drive" models are those having the driving controls on the left-hand side, again when the vehicle is viewed from the rear.

CAPACITIES. All capacities are quoted in Imperial and Metric measure; to ascertain the U.S. equivalent, multiply the Imperial figure by 1.2

Example from Page 26:—

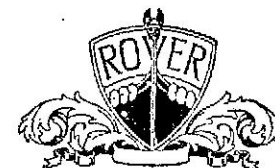
The engine oil capacity is 10 pints (5.5 litres). Therefore the capacity in U.S. measure is 12 pints.

GUARANTEE. In order to obtain the Certificate of Guarantee operative with your vehicle, it is essential that you should, with the minimum of delay, either fill in and post the guarantee form supplied or ask your supplier to do it for you. Failure to do so may seriously jeopardise any claim you may have on the Company under the terms of the standard guarantee.

GEAR RATIOS. The Land-Rover is equipped with a transfer box giving a secondary series of low gear ratios for heavy work. You are advised to consult Page 17 for full details of the operation of this transfer box.

LOCKING. To protect your Land-Rover against theft, always remove the ignition key when parking. As an additional precaution the distributor rotor arm may also be removed or the petrol tap on the sediment bowl turned "OFF" (Page 46).

MAINTENANCE. In order to obtain maximum service and dependability from your Land-Rover, the maintenance items listed on Pages 33—35 should receive regular attention. They are few in number and quite straightforward and will amply repay the small amount of time which needs to be devoted to them.



OPERATION MANUAL

— for the —

LAND- -ROVER

Vehicles numbered:

R860001 onwards Right-hand Drive.
L860001 onwards Left-Hand Drive.

THE ROVER CO. LTD.,
SOLIHULL, BIRMINGHAM, ENGLAND.

Telephone: Sheldon 2461.

Telegrams: Rover, Solihull.

SERVICE DEPT.,
SOLIHULL.

Telephone: Sheldon 2461.

Telegrams: Roverrepair, Solihull.

London Service Station
SEAGRAVE ROAD,
FULHAM, LONDON S.W.6.

Telephone: Fulham 1221.

Telegrams: Roverrepair, Phone, London.

A copy of this operation manual is sent out with each vehicle. Additional copies are obtainable from either of the addresses opposite.

PRICE - 5/-

ROVER PHONES:

Solihull (Head Office)	Sheldon	2461
Solihull Service Dept.	Sheldon	2461
London Service Station	Fulham	1221

OCTOBER, 1948.

Publication No. TP/108/B

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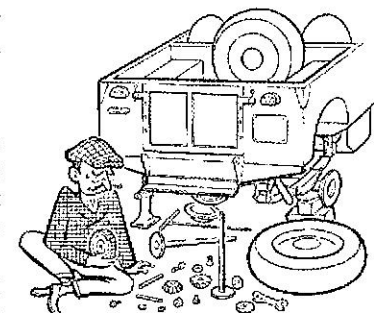
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INTRODUCTION

In the design of the Land-Rover every effort has been made to simplify as far as possible the amount of attention which the owner must devote to upkeep. For this manual we have endeavoured, by the use of illustrations, to make the instructions for items of routine maintenance as simple and as clear as possible. At the same time we realise that there may be occasions when the owner finds himself in some difficulty; such cases are dealt with by our Service Department and the information given on Page 117 will help you.

In the event of spare parts being required, they may be obtained through the nearest Rover agent or in cases where difficulty is experienced, directly from us. A list of Rover distributors (both Home and Overseas) is given at the back of this book.



"Occasions when the owner finds himself in some difficulty."

It will be realised that from time to time, alterations in design and in the make of various accessories occur and this operation manual, while being kept up-to-date as far as possible, is not to be taken as a standard specification of the Land-Rover.

We reserve the right to alter the specification at any time and without incurring any obligation to incorporate such alteration in vehicles already delivered.

The purchaser is earnestly requested to fill in the Guarantee form supplied with the vehicle, upon receipt of which we will place his name on our list of owners and return the completed Guarantee form.

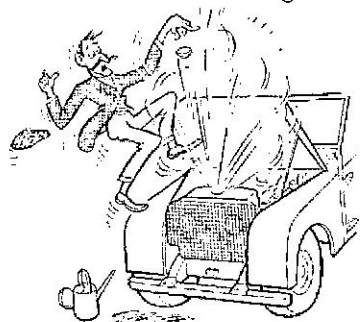
THE ROVER CO. LTD.,
SOLIHULL, BIRMINGHAM,
ENGLAND.

OCTOBER, 1948.

SPECIAL NOTES

GUARANTEE. In order to obtain the Certificate of Guarantee operative with your vehicle, it is essential that you should, with the minimum of delay, either fill in and post the guarantee form supplied or ask your supplier to do it for you. Failure to do so may seriously jeopardise any claim you may have on the Company under the terms of the standard guarantee.

COOLING SYSTEM. The cooling system is pressurised and great care must be taken when removing the radiator filler cap, especially when the engine is hot, to avoid steam which may be blown out with considerable force. The system is fully described on Page 40.



"Avoid steam which may be blown out with considerable force."

THE RUNNING-IN PERIOD. The years of good service expected from your vehicle will depend to a large extent upon the treatment it receives in the early stages. It is most important that your Land-Rover be properly "run-in," that is, it should be given an initial period of service during which it must be driven carefully at moderate speeds so that no component is subjected to extreme loads.

We recommend a running in period of 500 miles (750 Km.) during which 35-40 m.p.h. (55-65 k.p.h.) in high transfer ratio should not be exceeded, but even after that the vehicle should not be driven at prolonged high speeds until it has done 1,000 miles (1,500 Km.); good use should be made of the gearbox and a change-down to a lower gear made if the engine is subjected to hard pulling in a high gear. **Never race the engine when cold at any time during the life of the vehicle.**

The instructions pasted on the windscreen are only general and to get the most lasting benefit the owner will not only obey these, but also see that he does not, on prolonged stretches, do even 40 m.p.h. (65 k.p.h.) if it means using full throttle during the first 500 miles (750 Km.).

It may well be that you desire to use the Land-Rover for other purposes besides road-work, even when it is new; it may be required for driving stationary equipment or for cross-country work necessitating low transfer ratio. In the latter case 15 m.p.h. (25 k.p.h.) should not be exceeded in top gear whilst running-in, with correspondingly lower speeds in the intermediate gears. For stationary work an engine speed of 2,000 r.p.m. should be regarded as the maximum during the first five hours and this figure can be raised to 3,000 r.p.m. for the next ten hours. As an engine revolution indicator is not fitted to the Land-Rover, reference should be made to the table below to ascertain the road-speed corresponding to these figures and the hand-throttle marked to give these settings during a trial run on the road.

ENGINE R.P.M.	ROAD SPEED	
	Top gear (high transfer).	Top gear (low transfer).
2,000	30 m.p.h. (50 k.p.h.).	12 m.p.h. (20 k.p.h.).
3,000	45 m.p.h. (70 k.p.h.).	17 m.p.h. (27 k.p.h.).

Your dealer will carry out a complete check-over on the vehicle after 750 miles (1,000 Km.) if used exclusively for road-work or after 30 hours when mainly used in low transfer ratio for farming purposes. The inspection will conform to the Free Service Card supplied with the vehicle and includes changing the oil in the engine, gearbox, transfer box and axles. A second check-over will be given after 1,500 miles (2,500 Km.) or 60 hours.

UPPER CYLINDER LUBRICATION. During the early life of the vehicle we recommend the use of an upper cylinder lubricant. It should be used in the proportion of one fluid ounce to four gallons of petrol (three centilitres to twenty litres) and added to the tank before filling with petrol to ensure thorough mixing.

We have tested and exclusively recommend the following lubricants:—

Wakefield's Castrollo.
Mobil Upperlube.
Shell Donax U.
or Motorine U.C.L.

The addition of upper cylinder lubricant is not considered so essential after the engine has been "run-in," but it can be continued without any detrimental effect.

FUSE. The single 25 amp. fuse fitted in the electrical system protects the horn, windscreen wiper, petrol tank gauge unit and rear stop lights. It is situated under a bakelite cover on the engine side of the scuttle panel on the right-hand side; a spare fuse is carried under the same cover. In the event of a failure occurring on any of the components detailed, first examine the fuse to make sure that it has not "blown."



"First examine the fuse."

VEHICLE SERIAL NUMBERS. The vehicle serial number will be found on a plate fixed to the scuttle panel. Owners are requested to quote this number in all correspondence; the registration number of the vehicle is of no use whatever to us.

Certain units also carry serial numbers as detailed below, but they should not be quoted unless specially asked for, as we can identify them from our records, providing the vehicle number is given.

Chassis number is stamped on the top of the left-hand front engine bearer bracket.

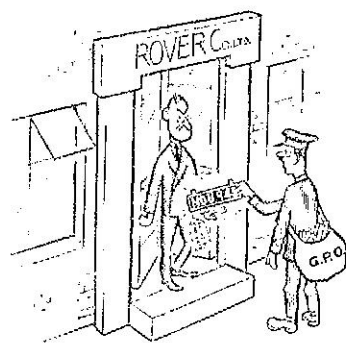
Engine number is stamped at the top front of the cylinder block on the left-hand side, adjacent to the water pump.

Main gearbox number is stamped on the right-hand side of the casing at the rear.

Transfer box number is stamped on top of the casing.

Rear axle number is stamped on top of the axle casing on the left-hand side.

Front axle number is stamped on top of the axle casing on the left-hand side.



"The registration number ... is of no use whatever to us."

GENERAL DATA AND DIMENSIONS

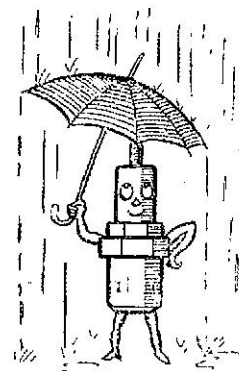
ENGINE. Four cylinders cast en bloc with detachable cylinder head. Flexibly mounted on rubber at four points. Three crankshaft bearings; four camshaft bearings. Vibration damper on crankshaft integral with fan driving pulley. Overhead inlet valves operated by followers and push rods; side exhaust valves by direct rockers from camshaft; camshaft is driven by duplex chain automatically adjusted by hydraulic tensioner. Lubrication is full pressure from gear-type oil pump to all bearings and valve gear. External A.C. by-pass pressure filter and a gauze pump intake filter in the sump.

Bore	...	69.5 mm. (2.736 in.).
Stroke	...	105 mm. (4.102 in.).
Cylinder capacity	...	1,595 c.c. (97.34 cu. in.).
Compression ratio	...	6.8—1.
B.H.P.	...	50-55 at 4,000 R.P.M.
R.A.C. Rating	...	11.98 H.P.
Max. torque	...	80 lbs./ft. (11 Kgm.) at 2,000 R.P.M.
Firing order	...	1, 3, 4, 2.
Sump capacity	...	10 pints (5.5 litres).

COOLING. Impellor type water pump and fan driven from crankshaft. Temperature controlled by thermostat. Pressurised system to decrease loss of coolant under hard working conditions. Total capacity 17 pints (9.75 litres).

IGNITION SYSTEM. Battery and coil. Distributor has both centrifugal and vacuum advance and retard. Waterproof covers on sparking plugs.

FUEL SYSTEM. Petrol from tank under seat-box on right-hand side is delivered to the Solex 32 P.B.I.2 down-draught carburettor by electric S.U. pump. A.C. sediment filter between tank and pump. A.C. oil-bath air cleaner. Fuel capacity 10 Imperial gallons (45 litres).



"Waterproof covers on sparking plugs."

CLUTCH. Single dry plate 9 in. (230 mm.) diameter.

MAIN GEARBOX. Single helical constant-mesh gears, with synchro-mesh on top and third speeds.

TRANSFER BOX. Two-speed reduction gears on main gearbox output. Incorporates Rover free-wheel in front axle drive.

TRANSMISSION. Hardy-Spicer open propeller shafts to front and rear axles.

REAR AXLE. Spiral bevel pattern. Semi-floating axle shafts. Ratio 4.7—1. (4.88—1 for axle numbers up to 861371).

FRONT AXLE. Spiral bevel differential. Drive transmitted through enclosed constant velocity universal joints. Ratio 4.7—1. (4.88—1 for axle numbers up to 861371).

OVERALL GEAR RATIOS. The table below gives the overall gear ratios, i.e., total reduction obtained through main gearbox, transfer box and axles. (Axles numbered 861372 onwards).

MAIN GEARBOX.	TRANSFER BOX.	
	High ratio.	Low ratio.
Top gear	5.396	13.578
Third	8.039	20.229
Second	11.023	27.738
First	16.165	40.676
Reverse	13.743	34.581

SUSPENSION. Semi-elliptic leaf springs with rubber bushes controlled by Monroe hydraulic dampers.

BRAKES. Girling Hydrastatic brakes on all wheels. Handbrake applies Girling Mechanical brake on transfer box output shaft for parking purposes only.

WHEELS. 16" detachable rim or 16" well-base pattern.

TYRES. 16 × 6.00 Avon "6-ply Traction," or 16 × 7.00 Avon "Super-Traction."

ELECTRICAL SYSTEM. Lucas 12-volt starting and lighting set. Battery 51 A.H. mounted at right of engine well clear of ground.

STEERING. Burman worm and nut pattern.

VEHICLE DIMENSIONS.

Overall length 132 in. (3.35 m.).
 Overall width 61 in. (1.55 m.).
 Overall height—hood up 70½ in. (1.79 m.).
 —hood down, screen up ... 65½ in. (1.66 m.).
 —hood down, screen down ... 53 in. (1.35 m.).
 Wheelbase 80 in. (2.03 m.).
 Track 50 in. (1.27 m.).
 Ground clearance 8½ in. (216 mm.).
 Turning circle (6.00/16 tyres) 35 ft. (10.5 m.).
 (7.00/16 tyres) 40 ft. (12 m.).
 Weight—running (with water, oil and fuel) 2,594 lb. (1.170 Kg.).
 —maximum approved gross loaded 3,714 lb. (1.675 Kg.).
 Maximum approved payload 1,000 lb. (450 Kg.).
 Maximum draw bar pull 1,200-2,000 lb. (550 to 900 Kg.).
 (according to surface conditions).

DESCRIPTION

The main characteristics of the Land-Rover are brought out in Figs. 1 and 2; there are, however, a few small points which may not be too clear from the illustrations and which require explanation to ensure your obtaining the maximum utility from the vehicle.

The front bumper (A) is retained by bolts and hence readily detachable to facilitate straightening should it become damaged in service.

When towing a trailer, connections for the trailer tail and stop lamps are provided by the three-pin socket (B) fitted in the right-hand side of the rear chassis cross-member. (See Page 97 for explanation of connections).

The tailboard (C) can be lowered to its horizontal position by withdrawing the keys (D). To remove the tailboard from the vehicle, unhook the two chains (E), lower it as far as possible and slide off the hinges to the left.

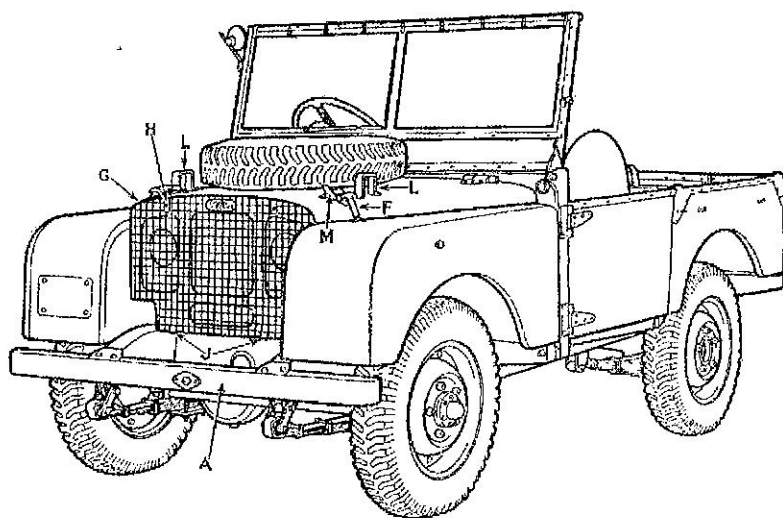


Fig. 1. (Three-quarter front view).

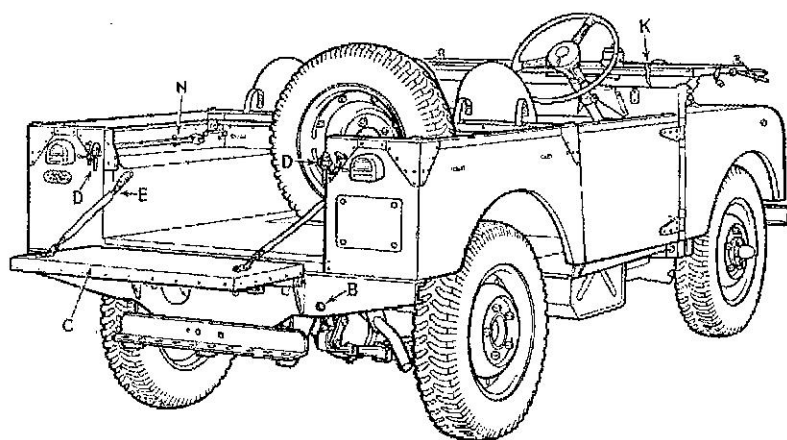


Fig. 2. (Three-quarter rear view).

- | | |
|----------------------------|------------------------|
| A—Detachable front bumper. | H—Grille clamp. |
| B—3-pin socket. | J—Grille bracket. |
| C—Tailboard. | K—Windscreen clamp. |
| D—Tailboard key. | L—Windscreen support |
| E—Tailboard chain. | M—Windscreen fastener. |
| F—Bonnet fastener. | N—Jack handle clips. |
| G—Radiator grille | |

Two spring fasteners (F) secure the bonnet top panel in the closed position; it can be held in the open position by means of the stay rod clipped under the panel on the left-hand side. The panel can be removed from the vehicle by raising it to a vertical position and sliding off its hinges to the left.

The headlamps and horn are protected by the radiator grille (G) which is readily removed by detaching the two bolts and clamps (H), and lifting out from the brackets (J).

Provision is made for folding the windscreen down on to the bonnet (Fig. 2). To do this, release the two clamps (K) from the dash panel and lower the windscreen on to the supports (L); secure in this position by means of the spring fasteners (M). To prevent rattles when not in use, these fasteners are normally clipped to the bonnet panel (Fig. 1).

The spare wheel is stowed in the depression in the body floor (Fig. 2) and retained by means of a clamp and wing-nut. When it is desired to utilise the entire body space for load-carrying the spare wheel can be carried in the alternative position on the bonnet top (Fig. 1). The mounting plate for this purpose is supplied as an extra component (see Page 95). With the spare wheel carried in this way, it is not possible to fold the windscreen into the horizontal position.

The hinged flap in the gearbox cover just to the rear of the main gear change lever affords access to the gearbox oil filler and dip-stick, whilst that in the centre of the seat-box covers the power take-off engagement lever. The locker lid on the right-hand side of the seat-box, beneath the driver's cushion, encloses the petrol tank and filler (see Fuel System).

TOOLS.

The small tools are carried in the locker under the seat-box on the left-hand side. Clips for the starting handle are fitted on the rear of the seat back-rest panel and those (N) for the jack handle on the inside of the left-hand side panel (Fig. 2). When certain items of special equipment are installed, the jack handle is stowed in clips along the dash above the instrument panel.

The standard tool-kit supplied with each vehicle comprises:

- | | |
|---|---|
| Wheel brace | *Adjustable spanner |
| Lifting jack | *Distributor screwdriver and feeler gauge |
| Tyre pump | *Spanner (3/8 in.) |
| Grease gun | *Sparking plug spanner |
| *Pliers | *Box spanner |
| *Screwdriver | *Tommy bar |
| *Open-ended spanner (3/16 in. x 1/4 in.) | *Tyre pressure gauge |
| *Open-ended spanner (5/16 in. x 7/16 in.) | |

Items marked * are contained in a leather tool roll.

CONTROLS AND INSTRUMENTS

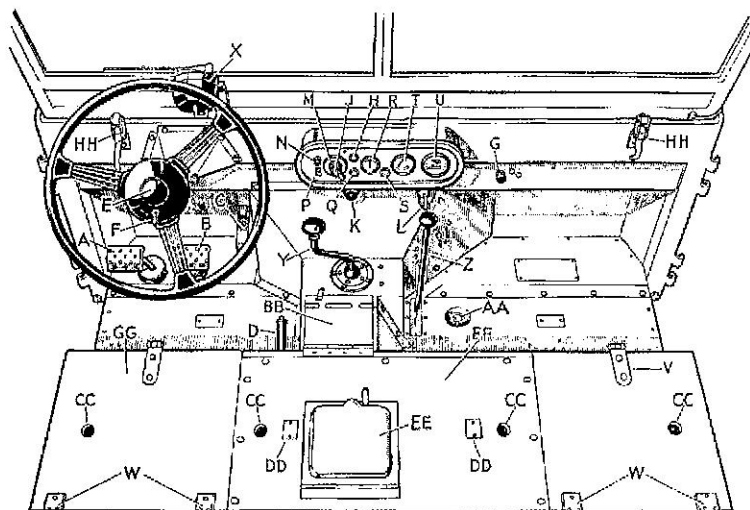


Fig. 8.

A—Clutch pedal.
B—Brake pedal.
C—Accelerator pedal.
D—Hand-brake.
E—Horn button.
F—Headlamp dipper switch.
G—Mixture control.
H—Mixture control warning light.
J—Ignition switch.
K—Starter switch.
L—Slow-running control.
M—Lamp switch.
N—Instrument panel light switch.
P—Lead lamp socket.
Q—Charging warning light.
R—Ammeter.
S—Oil pressure warning light.

T—Petrol level gauge.
U—Speedometer.
V—Access to petrol filler.
W—Locker lid hinges.
X—Windscreen wiper.
Y—Main gear-change lever.
Z—Transfer box change lever.
AA—Freewheel control.
BB—Access cover for gear-box filler.
CC—Location hole for seat.
DD—Cover plate for seat location hole.
EE—Access cover for power take-off control.
FF—Seat-box lid.
GG—Tool-box.
HH—Windscreen clamp.

The principal controls and instruments are illustrated on the opposite page, where it will be seen that the layout is very similar to that on a normal car, with the addition of gearbox transfer and freewheel controls.

Except for the positions of the steering column, foot-pedals and handbrake lever, the layout is the same for both left-hand and right-hand drive vehicles.

FOOT PEDALS. The three foot-pedals are normal in position and operation, i.e., the left-hand pedal controls the clutch, the centre pedal the foot brake and the right-hand pedal the accelerator.

HAND-BRAKE. The hand-brake lever protrudes through the front of the seat-box, to the driver's left hand on a R.H.D. vehicle, and to his right hand on a L.H.D. vehicle. In the "off" position it is parallel with the floor; to apply the brake pull the lever upwards; to release, pull up slightly, depress the small knob in the end of the lever and push downwards as far as possible.

STEERING COLUMN. This is positioned either to the right or left-hand side; in both cases, the horn push-button is fitted in the centre of the steering wheel, with the headlamp dipper switch on the wheel boss.

Operation of this switch replaces the primary filaments in both lamps by secondary "out-of-focus" filaments.

MIXTURE CONTROL. The mixture control is situated on the dash to the right, below the instrument panel. It is marked "COLD START" and its operation and also the action of the mixture control warning light are fully described on Page 14. This light is amber in colour and is located in the centre of the instrument panel at the top.

IGNITION SWITCH. This takes the form of a barrel lock controlled by a small yale-type key, situated in the centre of the main lamp switch on the instrument panel. When the ignition is switched off, the key can be withdrawn.

STARTER SWITCH. The switch operating the starter motor is located on the dash to the left below the instrument panel. To operate, press the knob and release as soon as the engine fires.

SLOW RUNNING CONTROL. Situated to the right of the starter switch is a slow-running control; by pulling out this control, the engine idling speed may

be increased when desired for stationary work. Prior to road usage, the idling speed should always be returned to normal to facilitate gear changing.

LAMP SWITCH. A rotary type lamp switch is located on the instrument panel; turn the handle until the pointer registers with the required position:—"OFF," "S" (side and tail) or "H" (side, tail and headlamps).

INSTRUMENT PANEL LIGHT SWITCH. The "push-pull" switch controlling the panel lights is situated at the top left-hand corner of the instrument panel. It is only operative when the ignition is "ON."

LEAD LAMP SOCKET. Below the panel light switch are a pair of sockets which can be used either for a lead lamp or a trickle battery charger. The electrical system being of the "positive earth" variety, the red socket is earthed.

CHARGING WARNING LIGHT. The red warning light at the bottom centre of the instrument panel glows when the dynamo fails to charge, or when the charging rate is lower than the voltage of the battery; in the latter case it will go out when the engine speed is increased above normal idling.

AMMETER. The ammeter is located to the right of the charging warning light.

OIL PRESSURE WARNING LIGHT. The oil pressure warning light to the right of the ammeter glows when, for any reason, the engine oil pressure falls below a safe figure. Should this light appear during normal operation, stop the vehicle at once and ascertain the cause—usually low oil level in the sump. Never operate the vehicle with low oil pressure as serious damage to the engine will result.

PETROL LEVEL GAUGE. The petrol level gauge will always show ZERO when the ignition is switched off. It must be stressed that, while the gauge will always give a reliable indication of the petrol level, it is not a precision instrument and therefore cannot be employed to derive accurate petrol consumption figures. Such tests should always be made with an auxiliary tank of known size.

PETROL FILLER. The petrol filler cap is located beneath the locker lid on the right-hand side of the seat-box; when the cap is removed, a telescopic tube may be drawn out of the tank neck to facilitate filling. The tank capacity is 10 Imperial gallons (45 litres).

WINDSCREEN WIPER.

A windscreen wiper is fitted on the driver's side only. To set the wiper in operation, pull out the horizontal lever a short way and turn it to clear the vertical lever; turn the latter to the right. To park the blade, reverse the operations.

MAIN GEARBOX CONTROL.

The main gear-change lever is situated in the centre of the gearbox cover; it has five positions—four forward speeds and reverse. For gear-changing instructions see Pages 15—17.

TRANSFER BOX CONTROL.

The transfer box which gives two ratios in the output from the main gearbox (i.e., making eight forward and two reverse speeds in all) is controlled by the lever to the right of the gearbox cover. Push the lever right forward for high ratio and pull right back for low ratio. The lever should be left in the neutral (central) position when using the power take-off pulley for stationary work. On no account must low ratio be selected unless the vehicle is stationary with the clutch depressed. Full instructions for the use of the transfer box are given on Pages 17—18.

4 WHEEL DRIVE. Four-wheel drive is fitted as standard equipment to the Land-Rover; no control is provided for disengaging the front axle drive, as the provision of a freewheel eliminates any undue tyre wear on the front wheels or excessive strain on the transmission when travelling on hard surfaces.

FREEWHEEL CONTROL.

A freewheel is fitted in the drive to the front axle, controlled by the ring on the right-hand side of the floor (Fig. 3). The freewheel is normally left in the "free" position to eliminate undue front tyre wear and the possibility of "wind-up" in the transmission when travelling on hard surfaces; its design is such that when reverse gear is employed, the drive to the front axle is disengaged. There may be occasions when four-wheel traction is necessary in reverse while operating on soft surfaces, and provision must therefore be made to "lock" the freewheel and so obtain four-wheel drive. The control is so arranged that the freewheel can only be locked by pulling the ring upwards, when the transfer lever is in LOW ratio; the unit is automatically returned to its normal free condition when the transfer lever is returned to the HIGH position after the soft ground has been negotiated.

The ring control should be used gently, its total upward travel being only about $\frac{1}{4}$ -in. (7 mm.) and it must only be operated when the vehicle is stationary.

STARTING PROCEDURE

Before attempting to start the engine, read the special notes which follow.

SPECIAL NOTE The mixture control has three positions and there is no graduation between them. The mixture is **NORMAL** when the control is right in as far as it will go. The

WARMING-UP position can be found by pulling out the control until a light click is felt; it is a little more than half-way out. The **RICH** or **STARTING** position is with the control right out. On no account leave the control in any position between those indicated above and do not forget to push the control right in as soon as the engine temperature will permit. The appearance of the **AMBER WARNING LIGHT** on the instrument panel will indicate that the control has been left out inadvertently and must be pushed right in.

SPECIAL NOTE The carburettor is fitted with an **ACCELERATOR** pump, the action of which is such that if the throttle is fully depressed, an extra rich mixture is provided to assist acceleration. As this is not wanted when starting the engine, except under abnormal starting conditions, **DO NOT TOUCH THE ACCELERATOR PEDAL** at all if the engine is **COLD**. It may assist starting a hot engine if the throttle is opened half-way and released as soon as the engine fires. **Never pump the accelerator pedal under any circumstances.**

Having read the special notes above, ensure that:—

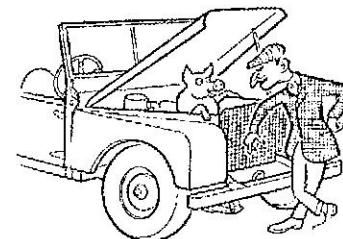
1. The **MAIN GEAR-CHANGE LEVER** is in the **NEUTRAL** position, that is to say, in the midway position between the gears. When in this position it can be moved sideways the full width of the "gate."
2. The **TRANSFER LEVER** is in the **HIGH** gear position, i.e., right forward.

Then set the **MIXTURE CONTROL** to suit:—

- (a) right out if the engine is cold.
- (b) in the mid-way position if the engine is warm.
- (c) right in if the engine is hot.

Finally switch on the **IGNITION**; press the **STARTER BUTTON** and the engine should start up after a turn or two.

FALSE START. If the engine makes a false start when operating the starter button, i.e., fires and does not continue to run, but throws the starter pinion out of mesh, it is imperative to wait until the pinion and flywheel come to rest before again pressing the starter button; failure to observe this precaution may jam and bend the teeth of the starter motor. Should the engine fail to start after two or three attempts, ascertain why it will not start, or the battery will be run down needlessly.



"Should the engine fail to start . . . ascertain why."

WHEN THE ENGINE STARTS. Except under conditions of extreme cold, the mixture control should be pushed in from the **RICH** (right out) position to the **WARM-UP** (mid-way) position within a few seconds of the engine starting. This period may have to be extended if conditions are severe, but should never exceed a minute or so.

Do not race the engine, but it is permissible to drive away at moderate speed, immediately after starting. This, or opening to about quarter-throttle by means of the slow-running control if the vehicle is to be used stationary, is definitely advised, as lubrication of the cylinder walls by oil-fling is thereby stimulated as the engine warms up. Continue with the mixture control in the mid-way position until the engine temperature has risen sufficiently to allow the knob to be pushed right in to the **NORMAL** position. The appearance of the **AMBER WARNING LIGHT** on the instrument panel will indicate that the control has been left out inadvertently and must be pushed right in at once.

SPECIAL NOTE Like all mechanical devices the mixture **WARNING LIGHT** control warning system is not completely fool-proof and the responsibility for pushing the mixture control to the normal position rests with the driver, especially as the warning light may never appear owing to bulb failure. As a guide the engine should always run satisfactorily in the normal position within $\frac{1}{2}$ mile (1 Km.) from starting away.

GEAR CHANGING INSTRUCTIONS

The positions of the main gear change lever are marked on the selector knob. It should be noted that the only reverse stop is a notch in the selector mechanism which tends to hold the lever in the reverse selector slot.

Throughout the instructions which follow, approximate speeds are quoted at which the various gear-changes should be made. These are given only to serve as a guide to owners who are unaccustomed to the Land-Rover; naturally they can be modified considerably as experience is gained under various operating conditions. At all times care should be taken against "racing" the engine and a "change-up" should be made well before the engine revolutions reach their peak.

Do not drive with the foot resting on the clutch pedal. To "ride" the clutch in this way causes excessive wear of the withdrawal mechanism.

GEAR CHANGING. (Transfer box in high gear).

CHANGING UP. Assuming that the engine is running, to start the vehicle from rest, proceed as follows:—

Depress the clutch pedal fully, pause for a moment to allow the clutch shaft to stop spinning and then move the gear lever into the first gear position. Release the handbrake by pulling the lever slightly upwards, release the catch by pressing down the knob on top of the brake lever and let the lever go downwards. Accelerate slightly and at the same time allow the clutch pedal to come back until you feel the clutch just gripping. Further gentle pressure of the accelerator will be necessary as the clutch takes up the drive and by this time the clutch should be right in.

After having set the vehicle in motion, continue on first gear, speeding up the engine until 5—8 m.p.h. (8—14 k.p.h.) is attained, when second gear should be selected as follows:—

- (i) Depress the clutch pedal fully, at the same time taking the foot off the accelerator pedal.
- (ii) Move the gear lever into neutral.
- (iii) Pause (count "one, two").
- (iv) Move the gear lever gently into the second gear position.
- (v) Release the clutch pedal, at the same time pressing the accelerator pedal gently down.

To change up from second to third speed, continue in second gear until about 15 m.p.h. (25 k.p.h.) is reached. Then depress the clutch pedal fully, at the same time releasing the accelerator, and move the gear lever towards third gear position. It will be found to dwell for a moment, due to the engagement of the synchro-mesh cones; do not force the lever, but maintain a light pressure on it, and at the correct moment it will slip into third gear, ensuring a silent and easy change. Release the clutch pedal and continue with the acceleration.

Repeat these operations for changing from third to top gear, at a speed of approximately 20—25 m.p.h. (35—40 k.p.h.).

CHANGING DOWN. To change down from top to third gear, depress the clutch pedal and ease the foot off the accelerator; move the gear lever gently but firmly towards third gear position, when the same "dwell" will be felt before third gear engages. Accelerate and let in the clutch.

When changing from third to second and from second to first gear, the double de-clutch method should be used, as the synchro-mesh mechanism does not operate on these two gears. Proceed as follows:—

- (i) Depress the clutch pedal and move the gear lever into neutral.
- (ii) Let in the clutch and accelerate until the engine speed is judged to correspond with the vehicle speed in the gear to be selected.
- (iii) Again de-clutch and move the gear lever into the required position.
- (iv) Let in the clutch.

Do not snatch or force the gear lever; if the engine speed has been judged correctly, the gear will engage quietly and smoothly.

TO REVERSE. To reverse the vehicle from a standstill, depress the clutch pedal fully, engage the reverse gear position and slowly release the clutch pedal, at the same time gently speeding up the engine by means of the accelerator pedal.

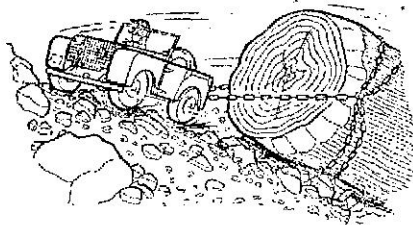
STARTING THE VEHICLE ON AN UPGRADE. When starting on an upgrade is necessary, hold the vehicle with the handbrake and select first gear; depress the accelerator in the normal way whilst simultaneously releasing the handbrake and letting in the clutch.

USE OF THE TRANSFER BOX.

The transfer box gives two ratios in the output from the main gearbox, termed "high" and "low," thus giving a total of eight forward and two reverse speeds in all. It is controlled by the lever to the right of the gearbox cover; this has three positions—left forward for high ratio, mid-way for neutral and right back for low ratio.

For normal usage and road work the lever should be in the high position and the foregoing instructions for gear changing apply to this condition.

Low ratio is used when the vehicle is to be operated on heavy ground and for heavy pulling. When low ratio is employed the same instructions for gear changing should be followed except that all the changes must be made at much lower vehicle speeds, i.e.,



"Low ratio is used . . . on heavy ground and for heavy pulling."

First to second—within two or three vehicle lengths of starting.

Second to third—6 m.p.h. (10 k.p.h.).

Third to top—10 m.p.h. (15 k.p.h.).

The neutral position mid-way between "high" and "low" is quite definite and is used with the power take-off pulley for stationary work; the vehicle cannot be driven with this lever in neutral.

TRANSFER Changing from HIGH to LOW transfer ratio should only be attempted when the vehicle is stationary. The engine may be left running, but the main gear lever must be in the neutral position. Depress the clutch pedal and pull the transfer change lever right back; release the clutch. Should there be any hesitation in the gear engaging, do not force the lever; either rock the vehicle backwards and forwards or, with the engine running, engage a gear in the main gearbox and let in the clutch momentarily; then return the main gear lever to neutral and try the transfer control again.

Changing from LOW to HIGH transfer ratio may be accomplished at any time, regardless of vehicle speed. Release the accelerator pedal, depress the clutch pedal and push the transfer box lever right forward, pausing slightly in the neutral position; let in the clutch.

FREEWHEEL. A freewheel unit is fitted in the front axle drive as an integral part of the transfer box. It is controlled by the ring on the floor to the right of the gearbox cover.

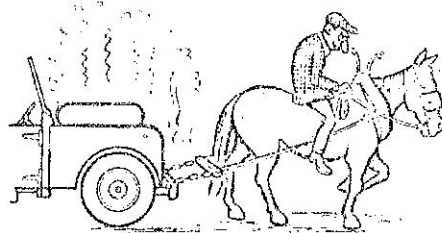
The freewheel is normally left in the "free" position to eliminate undue front tyre wear and the possibility of "wind-up" in the transmission when travelling on hard surfaces; its design is such that when reverse gear is employed, the drive to the front axle is disengaged. There may be occasions when four-wheel traction is necessary in reverse while operating on soft surfaces and provision must therefore be made to "lock" the freewheel and so obtain four-wheel drive as in the forward gears. The control is so arranged that the freewheel can only be locked by pulling the ring upwards when the transfer lever is in LOW ratio; the unit is automatically returned to its normal free condition when the transfer lever is returned to the HIGH position after the soft ground has been negotiated.

The ring control should be used gently, its total upward travel being only about $\frac{1}{4}$ -in. (7 mm.) and it must only be operated when the vehicle is stationary.

LUBRICATION

GENERAL INSTRUCTIONS.

One of the most important factors in the performance and durability of any vehicle is its lubrication. This is especially true of the Land-Rover because of the diverse conditions under which it may be called upon to perform. We are in your hands; not being able to stand over you and see that you put the right lubricant in the right place at the right time, we can only lay down instructions and hope that they will be carried out. You are earnestly advised, however, that the maximum amount of



"Trouble-free service will only be obtained if due attention is given to lubrication."

trouble-free service which you have a right to expect from your Land-Rover will only be obtained if due and regular attention is given to the vital subject of lubrication.

The lubricants recommended for use on the Land-Rover will be found on Page 32, as well as on a plate attached

to the scuttle panel. They have been selected only after an enormous amount of experimental work on our part in conjunction with the oil refiners; as a result of the careful checks and tests to which they have been subjected, we find that the oils listed are pre-eminently suitable for the Land-Rover and you are advised to use no other lubricant.

Apart from the general requirements of high quality and suitability, any oil used should be highly resistant to formation of sludge or any insoluble substance during operation and it should be and remain non-corrosive to the copper or bronze parts of the engine and transmission, this being especially true of the alloy main and connecting rod bearings.

In cold weather, starting the engine may prove to be a serious problem if oils heavier than those indicated are used and they would also affect fuel economy and engine life, so when ordering your oil be careful to state the GRADE as well as the MAKE.

We would advise you that we cannot hold ourselves responsible for damage arising from the use of any additive to our recommended lubricants. The high-grade oils we have selected are complete in themselves and afford every protection in use. A warning is necessary against the addition of any oils or other products, as these may materially impair the character of the lubricant in use by dilution and so reduce its viscosity to danger point.

The pages which follow give complete instructions regarding the grade and quantity of lubricant required for all parts of the

vehicle; it should be realised, however, that the intervals at which lubrication is carried out must depend largely on the conditions of service under which any individual vehicle is operated. The mileage intervals indicated should be adhered to when your Land-Rover is mainly used for road work, but it is difficult to quote accurate equivalent time intervals when the vehicle is employed on field work or as a mobile power plant, owing to the diversity of such applications. An attempt has been made to give average intervals in terms of operation hours and these should be followed as a general guide, but in many cases this will largely be a matter that must be left to the good judgment of the operator; obviously in dry dusty weather, certain operations must be carried out much more frequently than during rainy spells.

It should be constantly borne in mind that "over-lubrication," i.e., lubrication attention at comparatively short intervals, cannot do the slightest harm to the vehicle, whereas the converse certainly can (and very often will) seriously shorten its effective service life.

For convenience, the main lubrication points are shown on the plan views at Figs. 4 and 5 and the more important attention is repeated in the "summary of points requiring regular attention" on Pages 33—35.

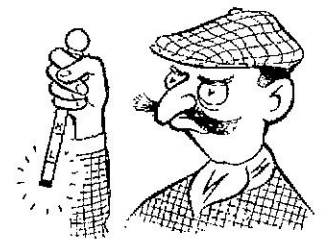
ENGINE LUBRICATION

OIL LEVEL.

It is necessary that the quantity of oil in the system be kept within specified limits. Since a certain amount of oil is used up in the proper operation of the engine, the supply must be replenished from time to time, this requirement being additional to the periodic changing of the oil. The amount of oil used will depend on many factors, amongst other things, on the speed at which the vehicle is driven.

A dip-stick is provided on the right-hand side of the engine to check the oil level. Access to it is gained by lifting the bonnet top panel (Fig. 6). The stick carries two marks, H (High) and L (Low) and the oil level should always be maintained up to the H mark as possible; on no account should it fall below the L mark, in fact it is desirable that the oil level is not even approached.

Before taking a reading of the oil level by means of the dip-stick, the engine should be stationary long enough to allow the oil to drain back into the sump from the cylinder walls, overhead rocker gear, etc., a process which normally takes about 10 minutes. Remove the dip-stick, wipe it straight upwards out



"On no account should it fall below the 'L' mark."

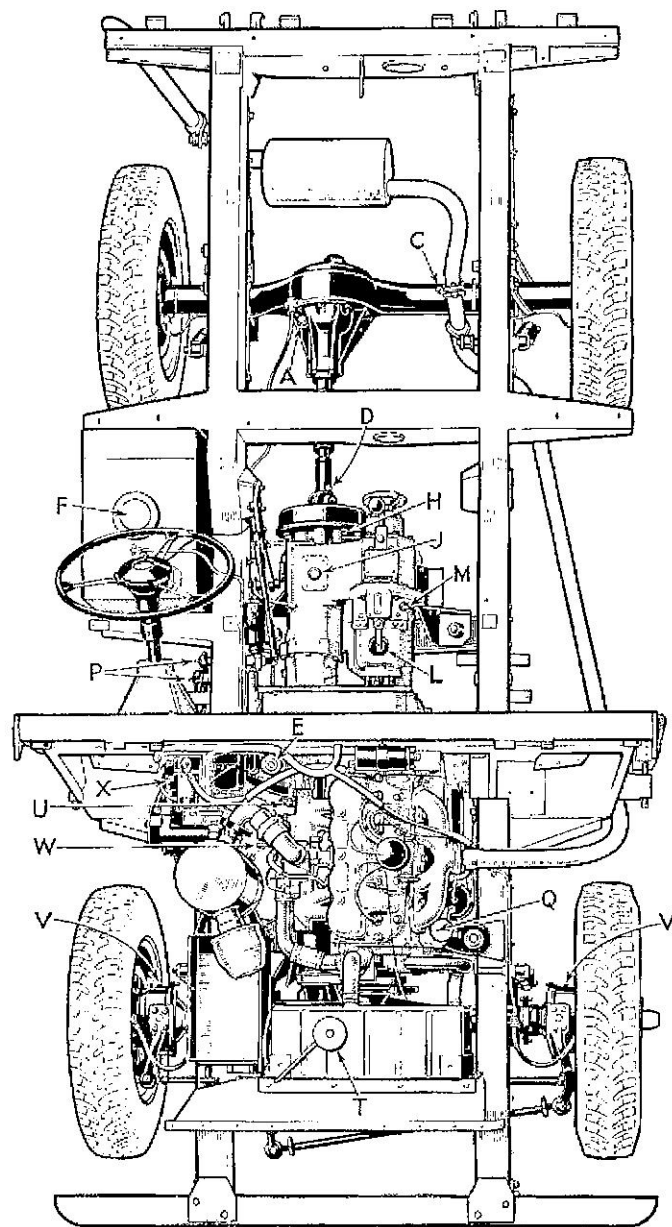


Fig. 4. Upper plan view.

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|-------------------------------|-------------------------------|
| A—Rear axle filler. | F—Petrol filler cap. |
| B—Rear axle drain plug. | G—Petrol tank drain plug. |
| C—Rear axle breather. | H—Transmission brake adjuster |
| D—Propeller shaft lubrication | J—Transfer box filler. |
| nipple. | K—Transfer box drain plug. |
| E—Brake fluid reservoir. | L—Main gearbox filler. |

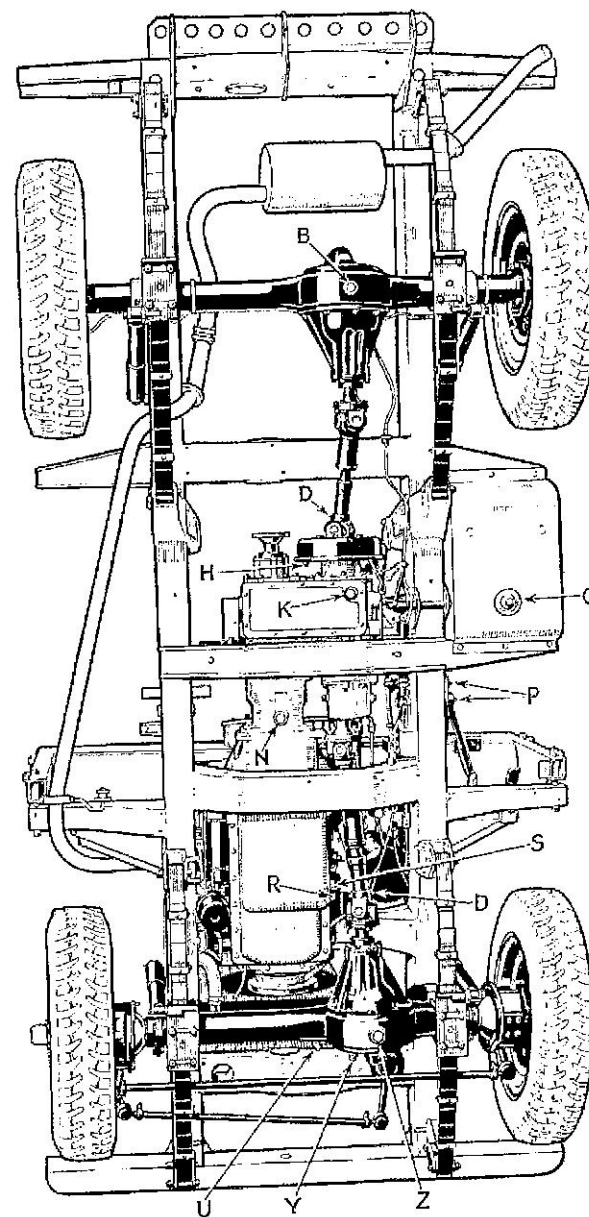
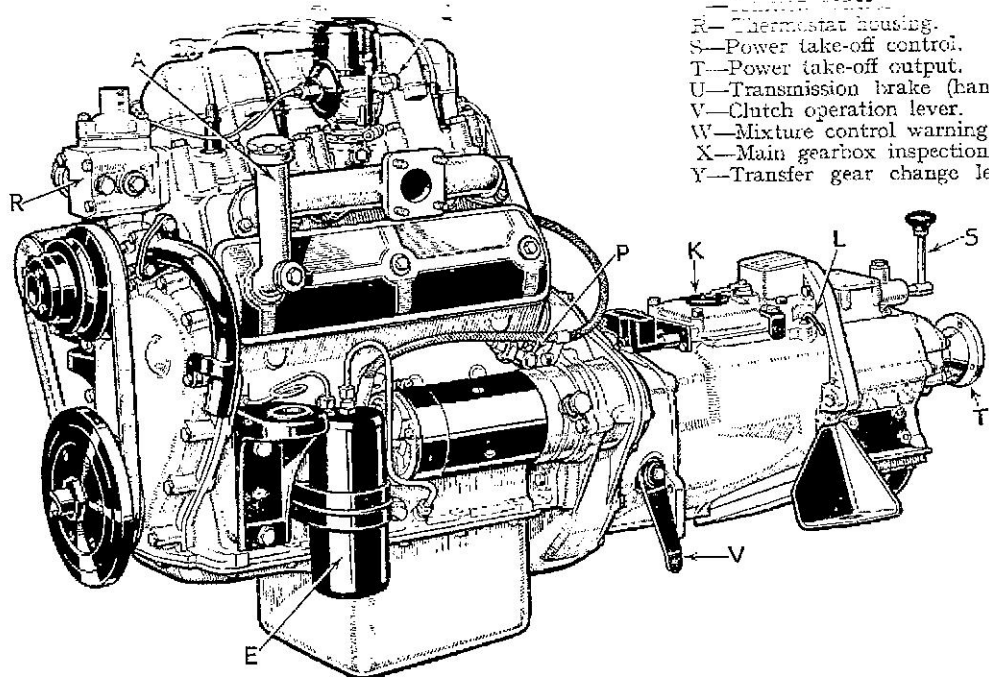
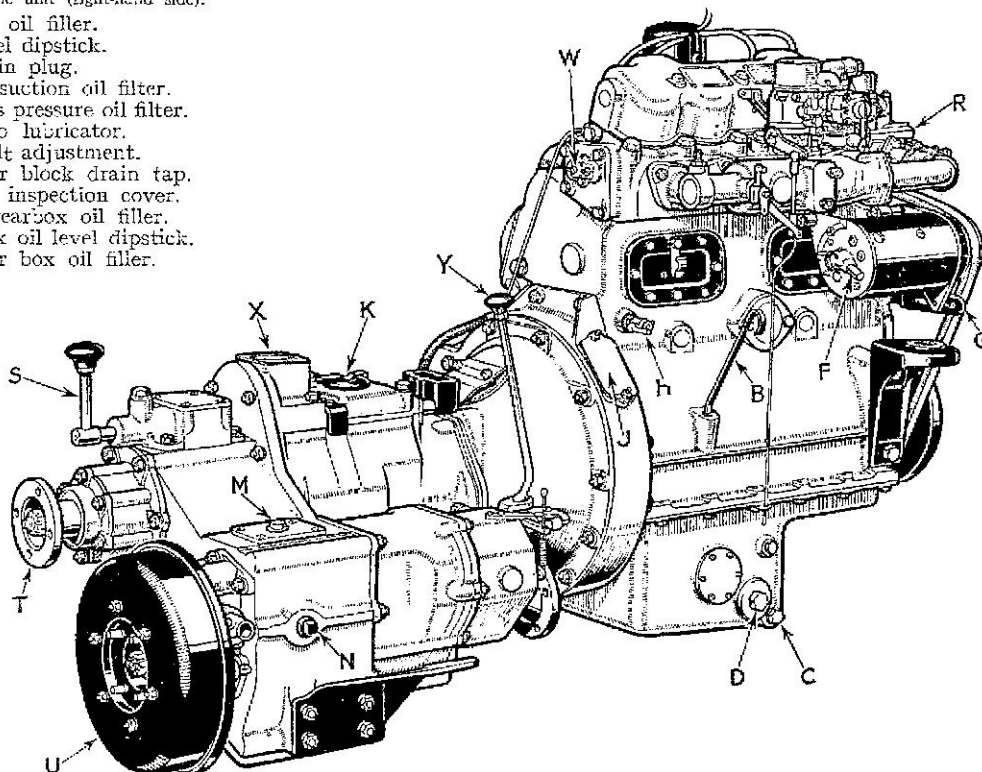


Fig. 5. Lower plan view.

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|------------------------------|---------------------------------|
| 1—Main gearbox dipstick. | U—Coolant drain tap. |
| 2—Main gearbox drain plug. | V—Tracta joint level and filler |
| 3—Pedal lubricating nipples. | plug. |
| 4—Engine oil filler. | W—Engine dipstick. |
| 5—Engine drain plug. | X—Steering box filler. |
| 6—Engine sump filter. | Y—Front axle filler. |
| 7—Radiator filler cap. | Z—Front axle drain plug. |

Fig 6. Engine unit (right-hand side).

- A—Engine oil filler.
- B—Oil level dipstick.
- C—Oil drain plug.
- D—Gauze suction oil filter.
- E—By-pass pressure oil filter.
- F—Dynamo lubricator.
- G—Fan belt adjustment.
- H—Cylinder block drain tap.
- J—Timing inspection cover.
- K—Main gearbox oil filler.
- L—Gearbox oil level dipstick.
- M—Transfer box oil filler.



- R—Thermostat housing.
- S—Power take-off control.
- T—Power take-off output.
- U—Transmission brake (hand-brake).
- V—Clutch operation lever.
- W—Mixture control warning light switch.
- X—Main gearbox inspection cover.
- Y—Transfer gear change lever.

of its socket, making sure that no dirt drops into the sump; wipe the rod clean, re-insert to its full depth and remove a second time to take the reading.

Do not fill beyond the H mark, otherwise you may experience trouble with sooted plugs and the engine may require more frequent decarbonisation than is really necessary.

The engine oil-level should be checked daily in this way and topped up as found necessary.

The oil pressure warning light on the instrument panel will glow when, for any reason, the oil pressure drops below 10 to 12 lbs. per sq. in. (0,7 to 0,8 Kg.). It will, therefore, light up when the engine is stationary and will go out when the engine has started and the oil pressure has built up to exceed this figure. Should the warning light appear at any time during normal vehicle operation, the engine must be stopped immediately and the cause ascertained; usually it will be due to low oil level in the sump.

ENGINE OIL CHANGES.

For the first 750 miles (1.000 Km.) or 25 hours, it is recommended that the oil placed in the crankcase by the manufacturer be used; at this stage the oil should be changed (see Page 31 for correct grade to use).

Thereafter, under good ROAD conditions, the engine oil need only be changed at intervals of 3,000 miles (5.000 Km.) provided that the EXTERNAL OIL FILTER is changed at every 10,000 miles (15.000 Km.).

When the vehicle is used primarily for industrial or dusty FIELD work, the oil should be changed at each 75 hours, provided that the EXTERNAL OIL FILTER is changed at every 300 hours.

It cannot be too strongly emphasised that, should the oil filter not be replaced at these intervals, the engine oil must be changed more frequently.

DRAINING THE SUMP.

The engine oil is drained by removing the plug in the bottom of the sump on the right-hand side. First run the engine to get the oil well warmed up, remove the plug and allow plenty of time for the dirty oil to drain completely away. Replace the plug and refill the engine by adding oil of the correct grade through the filler cap on the left-hand side. The sump capacity is 10 pints (5,5 litres).

At the same time it is advisable to inspect the gauze intake filter in the sump and if necessary, clean it by washing in petrol.

The filter can be detached without removing the sump by unscrewing the large brass plug on the right-hand side of the sump (Fig. 6).

EXTERNAL OIL FILTER.

In addition to the coarse gauze suction filter in the sump, the oil is cleaned by means of an A.C. type ZS1 pressure filter mounted externally on the engine. This filter continually cleans a proportion of the oil drawn from the front end of the bearing gallery pipe, the return being direct to the sump by external pipe-line (Fig. 7).

It should be renewed at intervals not exceeding 10,000 miles (15.000 Km.) if the vehicle is used primarily on the road and at every 300 hours if it is used mainly for field work.

WATER PUMP.

The water pump bearings are pre-packed with grease and require no further lubrication.

DYNAMO.

At about every 20,000 miles (30.000 Km.) or 500 hours, unscrew the lubricator at the end of the dynamo (Fig. 6), lift out the felt pad and spring and about half fill the lubricator with high melting-point grease. Replace the spring and felt pad.

DISTRIBUTOR.

Every 3,000 miles (5.000 Km.) or 100 hours, lubricate the distributor as follows (see Page 64):—

- (i) Lightly smear the cam with clean engine oil.
- (ii) Lift off the rotor and add a few drops of thin machine oil to lubricate the cam bearing and distributor shaft. Replace the rotor and push it on to the shaft as far as possible.
- (iii) Add a few drops of thin machine oil through the hole marked "OIL HERE" in the contact-breaker base plate to lubricate the automatic timing control.
- (iv) Place a small amount of clean engine oil on the contact breaker lever pivot. Do not allow oil to get on to the contacts.

CLUTCH LUBRICATION.

The clutch withdrawal mechanism is lubricated from the gear-box, hence no individual attention is required.

MAIN GEARBOX LUBRICATION.

Every 1,000 miles (1,500 Km.) or 30 hours, the main gearbox oil level should be checked and replenished as necessary. The dip-stick and filler cap on top of the gearbox are accessible through the cover plate on the gearbox cover in front of the seat-box; the level should be kept up to the "H" mark on the stick (Fig. 7).

The oil should be drained off after the first 750 miles (1,000 Km.) or 25 hours and thereafter at each 3,000 miles (5,000 Km.) or 100 hours, by removing the plug in the bottom of the gearbox casing (Fig. 5). Refill with the correct grade (see Page 32); the capacity is approximately 4 pints (2,25 litres).

It is advisable to drain off the oil after a run when the unit is warm, as draining will then be faster and more complete.

TRANSFER BOX LUBRICATION.

The transfer box, transfer case and freewheel are lubricated as one unit, through a filler plug situated on the top panel of the transfer box (Fig. 6).

Check the oil level every 1,000 miles (1,500 Km.) or 30 hours by removing the level plug on the right-hand side of the box; this should be done immediately after a run when the unit is warm; if any oil runs out of the plug hole, allow it to do so, but if the level is low, add oil of the correct grade (Page 32) through the filler hole until it reaches the bottom of the level hole. Replace both plugs securely.

The oil should be completely drained after the first 750 miles (1,000 Km.) or 25 hours and thereafter at every 3,000 miles (5,000 Km.) or 100 hours by removing the plug in the bottom of the transfer box housing (Fig. 5). Refill with new oil to the bottom of the level hole; the total capacity of the unit is 6 pints (3,5 litres).

FRONT AND REAR PROPELLER SHAFT LUBRICATION.

Grease nipples are provided on the sliding portions of the front and rear propeller shafts, i.e., at the axle end of the front shaft and the gearbox end of the rear one (Fig. 5). Every 1,000 miles (1,500 Km.) or 30 hours apply one of the recommended greases (Page 32) at these two points, using the grease gun provided in the tool kit.

FRONT AND REAR AXLE LUBRICATION.

While it is necessary to make sure that the axles receive sufficient lubrication, it is important to avoid an excess of oil. This

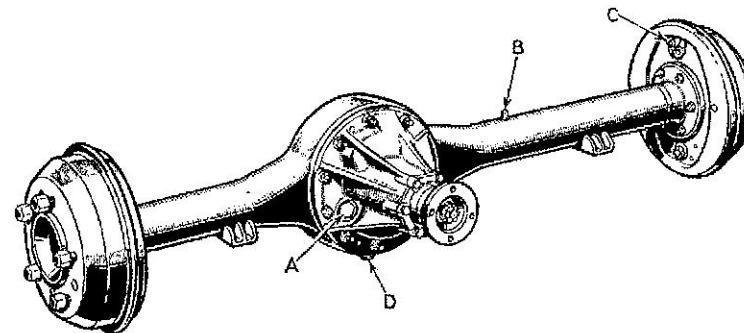


Fig. 8. Rear axle.

A—Oil filler/level plug.
B—Breather.

C—Brake bleed nipple.
D—Oil drain plug.

is especially so in the case of the rear axle, where the oil may reach the brake shoes and cause a serious loss in braking efficiency.

The oil levels should be checked at each 1,000 miles (1,500 Km.) or 30 hours, immediately after a run when the axles are warm. Remove the combined level and filler plug from the axle casing banjo (on the right-hand side on the rear axle and at the front on the front axle—Figs. 8 and 9); if any oil runs out, allow it to do so, but if the level is low, add oil of the correct grade (Page 32), using a syringe or suitable funnel, until it reaches the bottom of the filler hole. Replace the plug securely.

The oil should be completely drained after the first 750 miles (1,000 Km.) or 25 hours and thereafter at every 3,000 miles (5,000 Km.) or 100 hours by removing the plug in the bottom of the axle casing. Refill with new oil to the bottom of the filler hole; the total capacity of each unit is approximately 3 pints (1,75 litre).

NOTE:—A second oil filler/level plug is provided on the front axle at the rear of the differential casing; this is rather inaccessible on the vehicle, so that usually the front plug will always be used.

TRACTA JOINT, SWIVEL PIN AND FRONT HUB LUBRICATION.

The Tracta joints, swivel pins and front hubs receive their lubrication from common housings, the combined level and filler plugs being located at the rear of the joint housings on the centre-line of the axle. (Fig. 10).

Check the oil level in each joint at every 1,000 miles (1,500 Km.) or 30 hours by removing the plug immediately after a run when the unit is warm; if any oil runs out, allow it to do

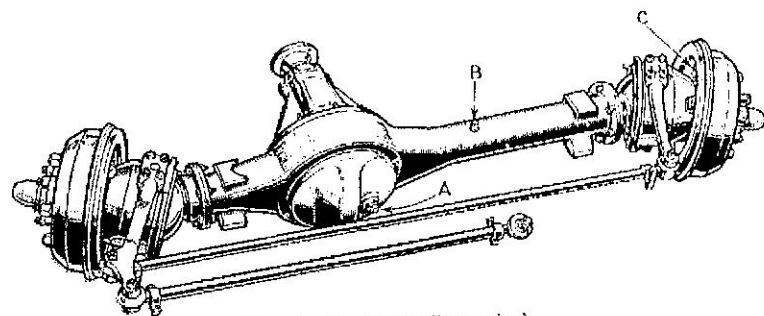


Fig. 9. Front axle (front view).

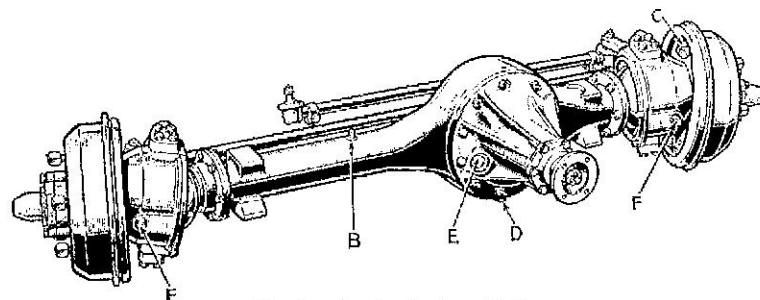


Fig. 10. Front axle (rear view).

- | | |
|---------------------------|-------------------------------------|
| A—Axle filler/level plug. | E—Axle secondary filler/level plug. |
| B—Breather. | F—Tracta joint filler/level plug. |
| C—Brake bleed nipple. | |
| D—Oil drain plug. | |

so, but if the level is low, add oil of the correct grade (Page 32), using a syringe or oil-gun, until it reaches the bottom of the filler hole. Replace the plug securely. The total capacity of each unit is approximately 1 pint (0,50 litre).

STEERING LUBRICATION.

The only component in the steering system requiring any lubrication attention is the steering box itself; the ball-joints and steering relay shaft are pre-packed with grease or oil and need no lubrication for the life of the vehicle except in cases of repair after accidental damage or when dismantled for any other reason.

An oil filler plug for the steering box will be found on top of the steering column just above the box (Fig. 20, Page 32). Every 1,000 miles (1,500 Km.) or 30 hours remove the filler plug and add oil of the correct grade (Page 32) as required to bring the level to the bottom of the filler neck. Replace the plug securely.

SUSPENSION LUBRICATION.

The road springs are mounted on rubber bushes which require no lubrication.

CHASSIS LUBRICATION.

The only points on the chassis requiring lubrication attention are the brake and clutch pedal shafts, which are provided with Tecalect grease nipples (Fig. 4). Every 3,000 miles (5,000 Km.) or 100 hours apply one of the recommended greases (Page 32) at these two points, using the grease gun provided in the tool kit.

RECOMMENDED LUBRICANTS

COMPONENT	WAKEFIELD		ESSOLUBE		PRICE'S		SHELL		VACUUM		S.A.E. EQUIV. ALENT
	Agricultural	Car	Agricultural	Car	Agricultural	Car	Agricultural	Car	Agricultural	Car	
ENGINE (22F and upwards) ..	AgriCastrol Medium	Castrol XL	Essolube 30	Essolube 30	Olympia M	Motorine M	Tractor Oil Medium SAE 30	Double Shell	Tractor Oil 650	Mobil Oil A	S.A.E. 20
ENGINE (22F, and downwards)	AgriCastrol Light	Castrolite	Essolube 20	Essolube 20	Olympia F	Motorine E	Tractor Oil Light SAE 20	Single Shell	Tractor Oil 620	Mobil Oil Arctic	S.A.E. 20
GEARBOX and TRANSFER BOX	AgriCastrol Heavy	Castrol XXL	Essolube 50	Essolube 50	Olympia O	Motorine B de Luxe	Tractor Oil Heavy SAE 50	Triple Shell	Tractor Oil 650	Mobil Oil D	S.A.E. 20
DIFFERENTIALS - FRONT AND REAR	AgriCastrol Gear Oil E.P.	Castrol Hypoc	Esso Espee Compound 90	Esso Espee Compound 90	Olympia E.P.	Motorine E.P. Light	Tractor Gear Oil 90 E.P.	Spixax E.P. 90	Tractor E.P. Gear Oil	Mobil E.P. Gear Oil	S.A.E. 20
STEERING BOX ..	AgriCastrol Gear Oil Medium	Castrol D	Esso Gear Oil 90 Medium	Esso Gear Oil 90 Medium	Olympia Gear DK	Motorine Amber A	Tractor Gear Oil 140	Spixax C	Tractor Gear Oil 140	Mobil Gear Oil	S.A.E. 20
TRACTA UNIVERSAL JOINTS	AgriCastrol Gear Oil EP	Castrol Hypress	Esso Espee Compound 140	Esso Espee Compound 140	Olympia E.P.	Motorine E.P. Light	Tractor Gear Oil 140 EP	Spixax E.P. 140	Tractor E.P. Gear Oil	Mobil E.P. Gear Oil	S.A.E. 20
STEERING BALL JOINTS AND GREASE NIPPLES ..	AgriCastrol Grease Heavy	Castrol-ease Heavy	Esso Grease	Esso Grease	Belmoline C	Belmoline C	Tractor Grease	Retinax R.B.	Tractor Grease	Mobil Grease	S.A.E. 20
STEERING RELAY LEVER (PRE-PACKED)	AgriCastrol Gear Oil Medium	Castrol D	Esso Gear Oil 90 Medium	Esso Gear Oil 90 Medium	Olympia Gear DK	Motorine Amber A	Tractor Gear Oil 140	Spixax C	Tractor Gear Oil 140	Mobil Gear Oil	S.A.E. 20
AIR CLEANER ..	..	..	..	..	..	..	..	..	..	..	..
ENGINE GOVERNOR ..	..	..	..	..	..	..	..	..	..	..	..
UPPER CYLINDER LUBRICANT	..	..	..	..	..	..	..	..	..	..	..
REAR POWER TAKE-OFF and PULLEY	..	..	..	..	..	..	..	..	..	..	..

Whenever possible the "Agricultural" grades of lubricant should be used; the corresponding "Car" grades are shown as alternatives when they are not obtainable. If neither of these grades are available, good quality oils corresponding to the S.A.E. numbers may be used.

SUMMARY OF POINTS REQUIRING REGULAR ATTENTION

Use only the recommended lubricants listed on the opposite page.

These maintenance items are listed for the main part on a mileage basis, but it will be appreciated that in many cases the necessity for attention is also related to running hours, especially where the vehicle is used largely for driving stationary equipment or slow-speed agricultural work.

Throughout the summary, page references are given on which the item concerned is dealt with at length and, where applicable, some indication of time interval is given. It is therefore most important that attention be transferred to these pages at appropriate points.

DAILY:

Before starting the engine, check:—

1. Level of oil in the engine sump. (Page 21).
2. Level of water in radiator. (Page 43).

WEEKLY:

1. TYRES. Check pressure and inflate if necessary (Page 57).
Examine tyres for cuts and damage and remove any embedded flints, etc.
2. WHEELS. Check wheel nuts for tightness.
3. BRAKES. Check the level of fluid in the hydraulic reservoir and replenish if necessary. (Page 54).

AT FIRST 750 MILES (1.000 Km.):

1. Your dealer will carry out the first service check-over as detailed on the Free Service Card supplied with the vehicle.

EVERY 1,000 MILES (1.500 Km.):

1. BATTERY. Check the acid level and replenish as necessary. (Page 63).
2. GEARBOX AND TRANSFER BOX. Inspect the oil levels and replenish as necessary. (Page 28).
3. FRONT AND REAR AXLES. Inspect the oil levels and replenish as necessary. (Page 28).
4. TRACTA JOINTS. Inspect the oil levels and replenish as necessary. (Page 29).

5. STEERING BOX. Remove the filler plug and top up with oil as required. (Page 30).
6. PROPELLER SHAFTS. Lubricate the grease-nipples on the sliding joints. (Page 28).
7. BRAKES. Adjust transmission brake as necessary. (Page 53).

AT FIRST 1,500 MILES (2,500 Km.):

1. Your dealer will carry out the second service check-over as detailed on the Free Service Card supplied with the vehicle.

EVERY 2,000 MILES (3,500 Km.):

1. DYNAMO AND FAN BELT. Check tension and adjust as required. (Page 42).
2. FRONT HUBS. Check that the lock-nuts and tab washers are secure.
3. WHEELS. Change round all wheels to give them equal spells of duty. (Page 57).
4. FRONT AND REAR AXLES. Check tightness of U-bolts securing the axles to the springs.

EVERY 3,000 MILES (5,000 Km.):

1. ENGINE. Drain the sump, clean the gauze intake filter and refill with fresh oil. (Page 26).
2. SPARKING PLUGS. Inspect and re-set gaps to .023—.026 in. (0.60—0.65 mm.) if necessary.
3. TAPPETS. Check tappet adjustment. (Page 38).
4. DISTRIBUTOR. Lubricate as described on Page 27.
5. CLUTCH. It is important to see that $\frac{3}{4}$ -in (20 mm.) free movement is maintained at the pedal pad. Adjust as required. (Page 39).
6. GEARBOX AND TRANSFER BOX. Drain off the oil and refill with fresh lubricant. (Page 28).
7. FRONT AND REAR AXLES. Drain off the oil and refill with fresh lubricant. (Page 28).
8. PEDALS. Lubricate the grease nipples on the pedal spindles. (Page 31).

EVERY 6,000 MILES (10,000 Km.):

1. PETROL. Clean petrol pump filter and sediment bowl. (Pages 45 and 46).
2. DISTRIBUTOR. Clean and check as described on Page 65.

EVERY 10,000 MILES (15,000 Km.):

1. ENGINE. Replace the A.C. external oil filter. (Page 27).
2. BRAKES. If the brakes have been harshly used, relining may be desirable.

EVERY 20,000 MILES (30,000 Km.):

1. DYNAMO. Lubricate as described on Page 27.

DECARBONISING. See below.

GENERAL. A few spots of oil should be applied to all exposed joints, such as throttle joints, brake joints, door locks and hinges, etc., as frequently as possible—at least once every month. At the same time it is a sound practice to look over such points as wiring (where this is exposed), brake pipes and control rods for signs of chafing which might cause "shorts" or leaks.

DECARBONISING

It is not possible to lay down any hard and fast rule concerning the mileage intervals at which the engine should be decarbonised and the valves ground in, for it is not actually necessary to carry out the operation until there is a "fall-off" in performance. As that condition is not always readily detected under varying conditions of service, your nearest Rover dealer will always be pleased to advise you on the matter. If you are in any doubt at all, it is far better to depend upon mileage as your guide and decarbonise and grind in the valves every 10,000 miles (15,000 Km.). In cases where the vehicle is used almost exclusively for stationary work, decarbonising should be carried out at intervals of 300-500 hours.

It will always be an advantage to carry out the first decarbonising operation at 2,000 to 4,000 miles (3,500 to 7,000 Km.), when the initial tightness in the engine has disappeared.

GENERAL INFORMATION

ENGINE TIMING

OCTANE SELECTOR.

The timing of the ignition is controlled automatically by mechanism in the distributor. In addition, an octane selector is fitted. This is a vernier adjustment attached to the distributor (Fig. 7) fitted with a sliding portion controlled by an adjusting screw and a calibrated scale marked R (retard) and A (advance) with a number of divisions between. The standard setting for the ignition is with the long line of the scale on the sliding portion against the mark on the selector body, thus leaving one division further possible advance and four divisions retard.

This setting is correct when using high-grade fuel with a clean engine, but should it be necessary at any time to use a low octane petrol or should pinking develop as a result of the need for decarbonising, the control can be retarded a little by turning the screw in an anti-clockwise direction. Do not forget to return it to the original position when reverting to high octane fuel or after decarbonising, as only in that position will the maximum performance be obtained.

FLYWHEEL MARKINGS.

The flywheel markings and timing pointer are visible when the inspection cover on the right-hand side of the flywheel housing is removed. (Fig. 6).

The markings and their meanings are as follows:—

- (1) The line against which the letters T.D.C. are stamped, when brought dead opposite the pointer, means that No. 1 piston is on Top Dead Centre, i.e., at the top of its stroke.
- (2) The line against which the letters F.A.15° are stamped, when set opposite the pointer, indicates the firing-point of No. 1 cylinder when the octane selector is set in the standard position on the sliding scale (i.e., the point at which the distributor points should be just opening, with the rotor in the firing position for No. 1 or No. 4 cylinder). It is 15° before T.D.C. (4 flywheel teeth). *Disregard the two other F.A. marks at 7° and 11°.*
- (3) The line against which the letters E.P. are stamped, when set opposite the pointer, indicates the point at which No. 1 exhaust valve should be at the peak of its lift (fully open). It is 114° before T.D.C. (31 flywheel teeth).

VALVE TIMING.

If the timing chain and hydraulic tensioner should have been removed, the procedure to re-time the engine is as follows. (See Fig. 11).

- (1) Set the exhaust tappets as instructed on Page 38 and slacken the inlet tappet adjusting screws as far as possible.
- (2) Rotate the camshaft in the running direction until No. 1 exhaust valve is fully open.

The use of a dial indicator is the only reliable method of determining this point. It should be mounted on a stud adjacent to No. 1 exhaust rocker and with its aid the possibility of an error in determining the exhaust peak is eliminated. It is possible to

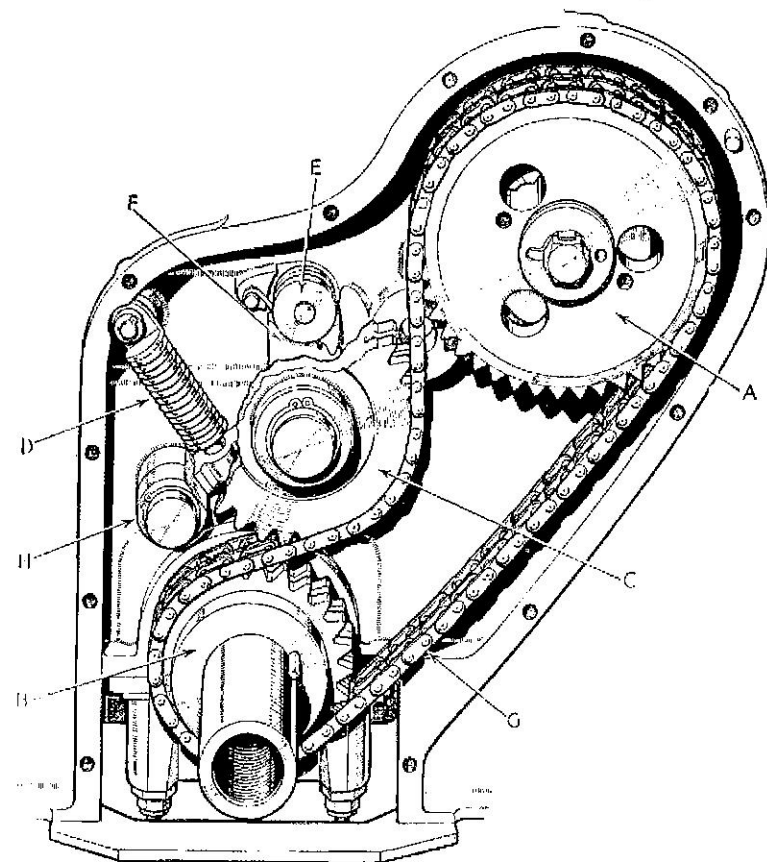


Fig. 11. Timing gears.

- | | |
|--------------------------|--------------------------------|
| A—Camshaft chainwheel. | E—Pawl. |
| B—Crankshaft chainwheel. | F—Ratchet. |
| C—Jockey pulley. | G—Timing chain (driving side). |
| D—Hydraulic tensioner. | H—Jockey pulley arm. |

do the job correctly without a dial indicator, but much time is wasted and the possibilities of an error very much magnified.

- (3) Rotate the engine in the running direction until the E.P. mark on the flywheel is in line with the pointer.
- (4) Fit the timing chain, ensuring that there is no slack on the driving side (G).
- (5) Hold the ratchet pawl (E) clear and replace the complete pulley (C, F and H), meshing the pulley with the chain.
- (6) Check the timing and correct if necessary. The camshaft chainwheel (A) is made with three irregularly spaced keyways, so that if the timing will not come correct in the first position tried, alternatives are provided.
- (7) Replace the hydraulic tensioner (D), comprising cylinder, piston and spring; these items must be assembled dry to prevent the formation of an air lock. Retain at its upper end with a split pin. Fit the circlip at (H), retaining the jockey pulley assembly. Engage the ratchet (E, F).
- (8) Set the inlet tappets as instructed below.

IGNITION TIMING.

- (1) Check the contact breaker clearance and adjust if necessary, using the combined feeler gauge and screwdriver supplied in the tool kit. The correct gap with the points fully open is .012 in. (0.30 mm.), see Page 63.
- (2) Rotate the engine in the running direction until the FA15° mark on the flywheel is in line with the pointer, with both valves on No. 1 cylinder closed.
- (3) The rotor of the distributor will now correspond with No. 1 cylinder high tension lead terminal.
- (4) Set the octane selector to the standard position on the sliding scale.
- (5) Set the distributor points just breaking by slackening the $\frac{1}{4}$ in. pinch bolt at the base of the distributor head and rotate the distributor bodily in the required direction. Do not forget to re-tighten the pinch bolt.

TAPPET ADJUSTMENT.

The firing order is 1, 3, 4, 2. The correct tappet clearance is .010 in. (0.25 mm.) on the inlet valves and .012 in. (0.30 mm.) on the exhaust valves, with the engine cold. Adjustment for this clearance is provided by a set-screw and lock-nut on the rocker. (See Figs. 12 and 13). When adjustment is required,

slacken the lock-nut and rotate the set-screw to give the correct clearance by means of a screwdriver. The lock-nut should be securely tightened after adjustment, great care being taken to ensure that this operation does not upset the clearance.

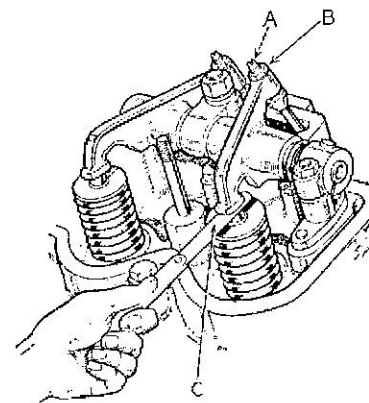


Fig. 12. Inlet tappet adjustment.

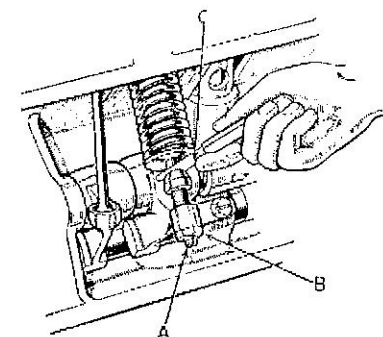


Fig. 13. Exhaust tappet adjustment.

A—Tappet adjusting screw. B—Lock-nut. C—Feeler gauge.

The tappet clearance should be set with the engine cold and it is essential to ensure that the valve to be adjusted is really closed. To do this, set the valve receiving attention fully open and then move the engine one complete turn to bring the tappet on to the back of the cam. It cannot be urged too strongly that the clearance must be correct if the best results are to be obtained.

SPARKING PLUGS

Lodge IILNR sparking plugs are fitted as standard equipment. Every 3,000 miles (5,000 Km.) or 100 hours, the plugs should be removed and cleaned and the electrode gaps re-set to 0.03—0.026 in. (0.60—0.65 mm.) if necessary.

CLUTCH

The clutch should be used purely for starting the car from rest and when changing gear. It is bad driving and detrimental to any clutch to "coast" hills with the clutch pedal depressed, so to make a habit of slipping the clutch when rounding corners, etc.

The clutch pedal adjustment is correct when there is $\frac{3}{4}$ in. (20 mm.) free movement measured at the pedal pad and the linkage should be re-set when the movement falls below this amount. Adjustment is provided by a nut on the end of the rod connecting the pedal to the clutch operating lever on the bell-housing; this nut is machined so that it locks itself at every half-turn against the joint-pin in the pedal lever. To increase the

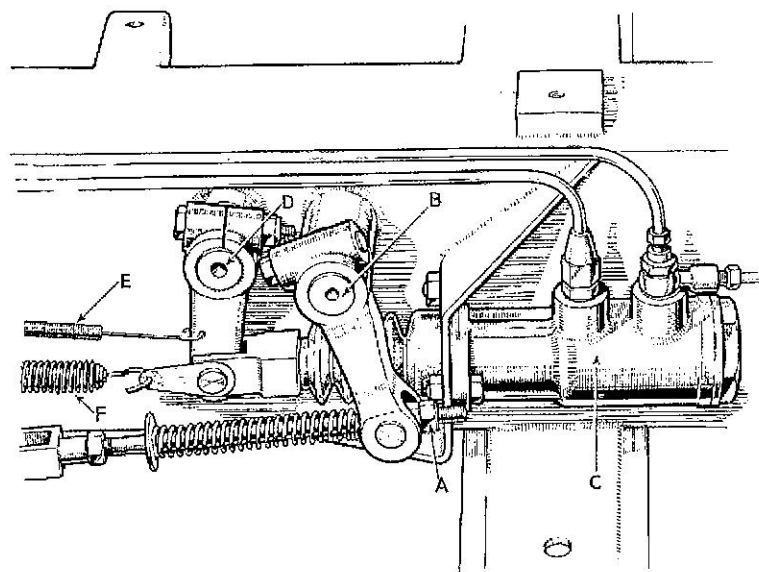


Fig. 14. Clutch adjustment.

- | | |
|--------------------------|--------------------------------|
| A—Clutch adjustment nut. | D—Brake pedal shaft. |
| B—Clutch pedal shaft. | E—Stop light actuating spring. |
| C—Brake master cylinder. | F—Brake pull-off spring. |

free pedal travel, turn the nut in an anti-clockwise direction half a turn at a time and make sure that the nut is against the pin, before checking the pedal movement. (Fig. 14).

COOLING SYSTEM

The system is designed to give very efficient cooling under all operating conditions, provided that the service attentions listed on Page 43 are carried out at regular intervals.

RADIATOR.

The radiator, which is constructed with cooling gills of a special design, is cowled to shroud the four-bladed fan mounted on the water pump spindle. Evaporation and consequent loss of coolant when operating at high temperature is prevented by pressurisation of the system by means of a sealed type filler cap. The cap incorporates a relief valve which opens and allows steam to escape at a pre-determined pressure; by this means the boiling-point of the coolant is raised appreciably above the normal 100°C. (212°F.). It is most unlikely that such a high

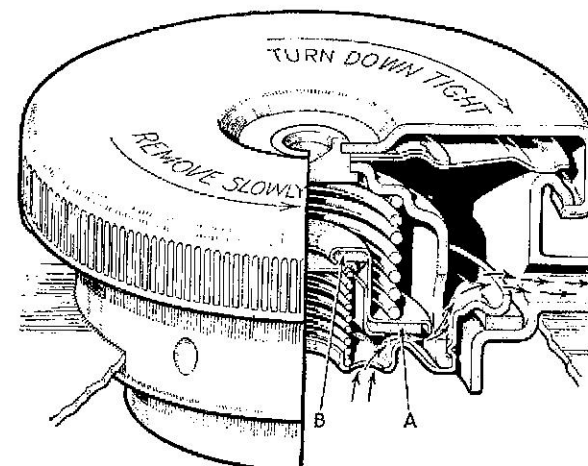


Fig. 15. Radiator filler cap.

- A—Pressure relief valve (steam escape → →)
B—Depression relief valve.

temperature would be reached under the most exacting conditions and even if it were, the relief valve permits the engine to be kept running without risk of damage. A vacuum valve is also fitted to the filler cap to relieve the depression resulting when the engine has cooled down after running at extremely high temperatures.

When removing the filler cap, first turn it anti-clockwise to the stop and allow all pressure to escape before pressing it down and turning further in the same direction to lift it off.

The radiator block drain tap is situated at the bottom on the right-hand side.

WATER PUMP.

The centrifugal pattern water pump is designed to give maximum service between overhauls and no adjustment is provided or necessary. It is mounted on the front of the cylinder block and, together with the fan, is driven by a pulley and "V" type belt from the crankshaft. (The belt also drives the dynamo). A sealed double-row ball bearing, integral with the pump spindle, is located in the water pump casing by a set-bolt; the bearing is packed with high melting point grease and requires no further lubrication throughout its life.

THERMOSTAT.

The thermostat is fitted in the housing at the front of the cylinder head above the water pump casing, to which it is connected by a tube and rubber joint ring. Its purpose is to provide

rapid warming-up by causing the coolant to circulate only round the engine until a pre-determined temperature is reached, when it opens to allow full circulation through the radiator. The unit operates at 167—190°F. (75—88°C.) and this setting cannot be altered in any way.

If overheating of the engine should occur, check that the thermostat is functioning correctly; to do this, remove the thermostat from its housing and run the engine; if the overheating is eliminated the unit is faulty and must be replaced.

FAN BELT.

As the belt is of the "V" type, the drive is on the sides of the belt and it is not therefore necessary to adjust it tightly and so put an excessive load on the water pump and dynamo bearings. The tension is correct when it is possible to depress the belt by thumb pressure approximately $\frac{1}{2}$ in. to 1 in. (12 mm. to 25 mm.), at a point midway between the fan and crankshaft pulleys.

Adjustment of the belt tension is provided by slackening off the two nuts on the dynamo pivot bolts and the set-bolt retaining the adjusting link to the dynamo, moving the dynamo outwards until the setting is correct and re-tightening the nuts and set-bolt.

DRAINING COOLANT.

The cooling system should be flushed out at least twice each year. It can be completely drained by opening the taps on the radiator block and on the right-hand side of the cylinder block at the rear; remove the radiator filler cap to prevent a vacuum which may impede thorough draining. When the water has ceased to flow, a piece of wire should be inserted in each tap to make sure that a blockage has not been caused by rust or scale from the system. Place a hose in the radiator filler neck and adjust the flow of water to equal that draining from the two taps; start the engine and allow it to run until the whole cooling system has been thoroughly washed out. Switch off the engine, close the taps, refill the radiator with clean water to the bottom of the filler neck and replace the filler cap. When filling, use soft water for preference (rain water will do), as this prevents to a great extent furring up of the inside of the radiator, cylinder jackets and pipes. The capacity of the system is 17 pints (9.5 litres).

CLEANING RADIATOR.

In the event of the cooling gills of the radiator becoming blocked with dirt, straw, etc., they should be cleaned by means of compressed air or water pressure applied from the rear, so forcing the foreign matter out through the front of the radiator. Never

use a metal implement for this purpose or serious damage may result to the radiator core.

SERVICE ATTENTION.

It is a good plan to always inspect the cooling system at the same time as the engine oil level is checked, i.e., daily under normal conditions. This care would largely prevent the possibility of a sudden and costly delay due to coolant loss and consequent engine failure. The inspection need only take a few moments and should include the following points:—

- (i) Water level in radiator—should be to the bottom of the filler neck.
- (ii) Condition of all water hoses—freedom from cracks and hose clips tight.
- (iii) Fan belt tension—a loose belt will lower the efficiency of the pump and fan and cause overheating.
- (iv) Check for water leaks.

FROST PRECAUTIONS.

In cold weather, when the temperature may drop below freezing point, precautions must be taken to prevent freezing of the water in the cooling system.

As a thermostat is fitted to the Land-Rover, it must be appreciated that it is possible for the radiator block to freeze when running in cold weather, even though the engine temperature is quite high; for this reason the use of an anti-freezing mixture is absolutely essential.

As some anti-freezing solutions have a corrosive effect upon the thermostat and other portions of the cooling system, we have found it necessary to recommend only pure ethylene glycol or good glycol-base solutions such as "Bluecol"; for your own protection we advise you, wherever possible, to use nothing else.

Anti-freezing solutions are far more "searching" at joints than water; before using them in your Land-Rover, it is therefore important to ensure that the coolant system is leak-proof. If any doubt exists regarding the condition of hoses, etc., they should be replaced. The table below gives the percentage volume of ethylene glycol required to safeguard against temperatures from 32°F. to -40°F. (0°C. to -40°C.).

TEMPERATURE.	COOLANT STRENGTH.	QUANTITY.
32°F. to -4°F. (0°C. to -20°C.)	67% water, 33% ethylene glycol.	11.5 pints (6.25 litres) 5.5 pints (3.25 litres)
-4°F. to -40°F. (-20°C. to 40°C.)	40% water, 60% ethylene glycol.	6.75 pints (3.75 litres) 10.25 pints (5.75 litres)

The anti-freezing mixture should be well mixed to the required strength in a separate container and added after thoroughly flushing out the system (do not simply add the correct amount of glycol through the radiator filler); run the engine for a short while to assist good circulation.

It is important when the winter is over, that steps be taken not only to drain off the mixture, but to flush the system through several times with very hot soda water in order to remove all traces. Failure to take this precaution may eventually, after a season or two of neglect, lead to the complaint of boiling.

If the vehicle is to be stored in cold weather, unless it is kept in a well-heated garage or anti-freezing solution has been added to the coolant, the system must be completely drained as instructed in the "DRAINING COOLANT" paragraph above. After the water has drained out, it is well to run the engine at a fast idling speed for **not more than half a minute**, so as to dry out any water that may have been retained in the bottom of the jacketing.

THE FUEL SYSTEM

The fuel system comprises the tank, pipe lines, sediment bowl, pump, carburettor and air cleaner. It is most important that the system be kept clean and free from water; periodically inspect for leaks.

Should the vehicle be stored for an extended period, it is well to completely drain the system to prevent the formation of gum which may cause trouble in the pump and carburettor. To effect complete draining, remove the drain plug in the bottom of the tank and replace when the tank is empty (Fig. 5); then run the engine until the petrol in the pipes and carburettor is used up.

FUEL TANK.

Petrol is carried in a tank below the front seat-box on the right-hand side. It rests in a stout steel cradle which forms a double bottom and protects the tank proper from damage by stones thrown up from the wheels or contact with any obstacle. The cradle is carried up both in front of and behind the tank, lipped over and bolted to the brackets on the chassis frame, thus relieving the tank of any strain due to possible slight distortion of the chassis frame under extreme conditions of use.

The filler is readily accessible by lifting the lid in the top of the seat-box on the right-hand side (Fig 4).

Except on a few early vehicles, a strap is provided on the back-rest panel to hold the lid in the open position. Turn the cap in an anti-clockwise direction to lift it off, which action will reveal a filler tube which can be drawn out and locked by a slight movement to the left, to facilitate filling. Care should be taken to prevent the entry of water or foreign matter.

The capacity of the tank is 10 Imperial gallons (45 litres). The filler tube may be completely withdrawn to clean the gauze filter in its lower end; a drain plug is provided in the bottom of the tank. The petrol level unit is mounted in the top of the tank and requires no attention.



"Care should be taken to prevent the entry of water."

Immediately in front of the filler is the petrol feed pipe extending downwards to the bottom of the tank; the lower end is shrouded with fine mesh wire gauze to form a second filter, which being surrounded by petrol is most unlikely to become choked.

SEDIMENT BOWL. Inserted in the feed pipe from the tank to the pump is a sediment bowl mounted on the right-hand side of the scuttle. Any foreign matter in the fuel settles in the glass bowl which can be removed for cleaning in petrol by slackening the thumbscrew below the bowl and swinging aside the wire holder. A fine gauze will be found in the body of the unit; this should also be removed and washed in petrol. When re-assembling, take care to replace the gauze correctly over the square inlet nozzle, and also ensure that the cork sealing washer for the bowl is in good condition.

The sediment bowl should be inspected and cleaned if necessary at the same intervals as the petrol pump filter, i.e., at every 6,000 miles (10,000 Km.).

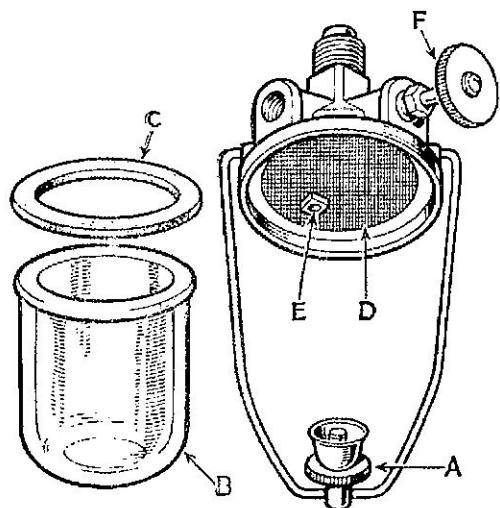


Fig. 16. Sediment bowl.

A—Thumbscrew.
B—Glass bowl.
C—Joint washer.

D—Filter gauze (fuel outlet).
E—Fuel inlet.
F—Shut-off tap.

A screw-down petrol supply shut-off tap is incorporated in the top of the sediment bowl and this will normally be left in the "ON" position; it is not necessary to close the tap when parking the vehicle, but this action would serve as a precaution against theft.

FUEL PUMP.

The S.U. electric fuel pump is mounted on the scuttle; it is wired through the ignition and hence will only operate when the ignition switch is "ON." Easy starting of the engine is assured, as the pump fills the carburettor float chamber immediately the ignition is switched on.

The pump is of the diaphragm type and will give prolonged service with the minimum of attention.

A gauze filter (A) is incorporated which can be easily withdrawn by unscrewing the hexagon brass plug (B) in the bottom of the pump body. The only maintenance normally required is the cleaning of this filter at every 6,000 miles (10,000 Km.); clean thoroughly in petrol using a stiff brush, **never use rag.**

Should fuel pump trouble be suspected, first disconnect the union at the pump end of the pipe from the pump to the carburettor and switch on the ignition. Satisfactory performance of the pump will then indicate that the fuel shortage is due either

to blockage of the flexible pipe to the carburettor, or more possibly to the carburettor float needle sticking up. If the pump will not function proceed as follows:—

- (i) Check that the pump filter is clear.
- (ii) Detach the sediment bowl and clean if necessary.
- (iii) Check that the pipe from the pump to the sediment bowl is clear by blowing down it with a tyre pump from the fuel pump end.
- (iv) Check that the pipe from the sediment bowl to the tank is clear by blowing from the bowl end.
- (v) Reconnect the pipes and replace the sediment bowl.
- (vi) Test the system for correct functioning.

Should the pump still not work satisfactorily, it may be due to a poor electrical connection or dirty contact points, which should be checked as follows:—

- (i) Disconnect the lead from the terminal (D) on the bakelite cover and strike it against the scuttle; the appearance of sparks will indicate that the current supply is in order.
- (ii) Remove the bakelite cover and touch the terminal with the lead. If the pump does not operate when the points are in contact and a spark cannot be struck off the terminal, it is probable that there is some dirt on the points (F). These may be cleaned by inserting a piece of card between them, pinching them together and sliding the card backwards and forwards.

Failure to rectify the trouble with this treatment will indicate that the pump itself is at fault, due to there being too much tension on the diaphragm. To release this tension, remove the body from the base of the pump by undoing the small screws which hold these two parts together. (The pump earth wire will be released from one of these screws). The diaphragm (G) will be adhered to the body of the pump and must be separated with the aid of a knife; care should be taken to prevent the diaphragm support rollers (H) from falling out during this operation. Replace the body on the pump base and assemble the screws loosely; before finally tightening it is advisable to stretch the diaphragm to its highest possible position by switching on the pump and holding the contact points together whilst tightening the screws.

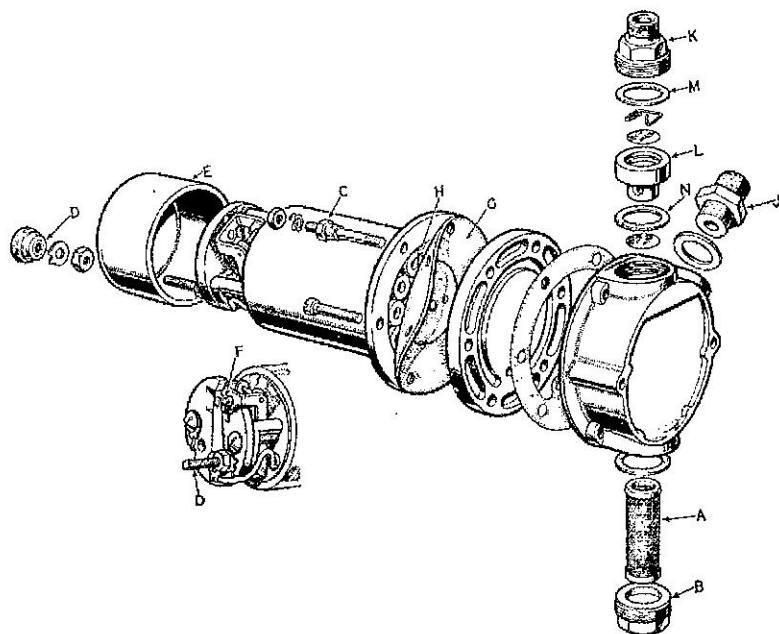


Fig. 17. Fuel pump.

- | | |
|----------------------|------------------------|
| A—Gauze filter. | H—Diaphragm rollers. |
| B—Filter plug. | J—Inlet union. |
| C—Earthing terminal. | K—Outlet union. |
| D—Feed terminal. | L—Valve cage. |
| E—Bakelite cover. | M—Thick orange washer. |
| F—Contact points. | N—Thin red washer. |
| G—Diaphragm. | |

If at any time the pump becomes noisy in operation an air leak on the suction side is indicated. The simplest way to check this point is to disconnect the flexible pipe from the carburettor and allow the pump to deliver into a can. If the end of the pipe is then submerged in the petrol and bubbles appear, it indicates an air leak which must be found and cured.

If the pump keeps on beating without delivering any petrol, it is possible that a piece of dirt is lodged under one of the valves. To locate and remove such an obstruction, unscrew the top union (K) and lift out the valve cage (L). When replacing it see that the thin hard red fibre washer (N) is below the valve cage and the thick orange-coloured one (M) above. A choked filter or an obstruction on the suction side will make the pump get very hot and eventually cause a failure.

The operations outlined above should effectively remedy any trouble likely to occur; if difficulty is still experienced, your local agent should be consulted.

AIR CLEANER.

A small centrifugal pre-cleaner separates out the coarser particles of foreign matter before the air passes into the top of the main cleaner body. The air is diverted down a large diameter tube in the centre of the cleaner, at the bottom of which a sharp reversal of direction takes place, thus depositing the majority of the dust into the oil reservoir in the detachable tray forming the bottom of the cleaner. It then passes up through the woven steel packing which fills the annular chamber surrounding the central tube, where the remaining particles are extracted and the clean air travels through the outlet elbow to the carburettor intake. (Fig. 18).

The complete cleaner may be removed from the vehicle by undoing the three large clips securing it to the support on the battery box. It is also necessary to disconnect the outlet elbow from the carburettor duct, by rotating a cam ring on the duct to release two clips.

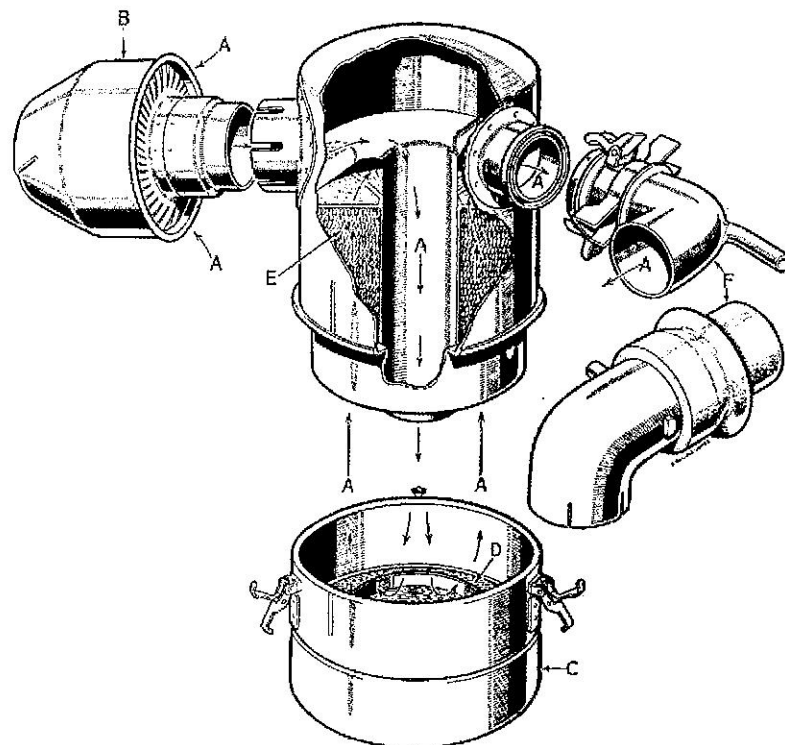


Fig. 18. Air cleaner.

- | | |
|----------------------------|--------------------------|
| A—Path of air shown —→ —→ | D—Oil level. |
| B—Centrifugal pre-cleaner. | E—Woven steel packing. |
| C—Oil bath. | F—Outlet to carburettor. |

The oil bowl forming the bottom of the cleaner is secured to the body by means of three further (small) clips; when replacing the bowl, align the white marks on the cleaner body and bowl to ensure correct location of the clips. The correct oil level in the bowl is indicated by a ring formed in the pressing; the capacity is approximately 2 pints (1,1 litre).

Two engine breather pipes from the oil filler tube and top rocker cover are led into the carburettor duct.

Attention to the air cleaner is extremely important, especially under dusty conditions, as it plays a very important part in preventing engine wear generally and cylinder bore wear in particular. If the vehicle is used mainly for road work, the oil bowl should be emptied, cleaned and refilled to the level mark with engine oil at each engine oil change; at the same time clean the filter gauze by swilling the cleaner body in petrol. When the vehicle is used for field work, clean and change the oil in the cleaner daily; under extremely dusty conditions, such as harrowing or scuffling, twice daily.

CARBURETTOR.

The Solex carburettor, type 32 PBI2, is fitted with a bi-starter and a two-phase acceleration and economy device, the operation of the bi-starter being fully described in the "STARTING PROCEDURE" section. No adjustment is normally required to the carburettor and the only manual setting provided is that to obtain smooth engine idling.

Slow-running adjustment.

Prior to making this adjustment it is important to ensure that the engine is in good mechanical condition; the compressions should be equal, the ignition system in order and the induction manifold free from air leaks. The throttle "pull-off" spring must pull the throttle right back to its stop, i.e., closed position; also make sure that the volume control screw (B) has not been broken or distorted by over-tightening, in which case a replacement must be obtained. (Fig. 19).

Then proceed with the adjustment as follows:—

1. Run the engine until it is hot—never set the idling with a cold engine.
2. Set the slow-running screw (A) until the idling is on the high side.

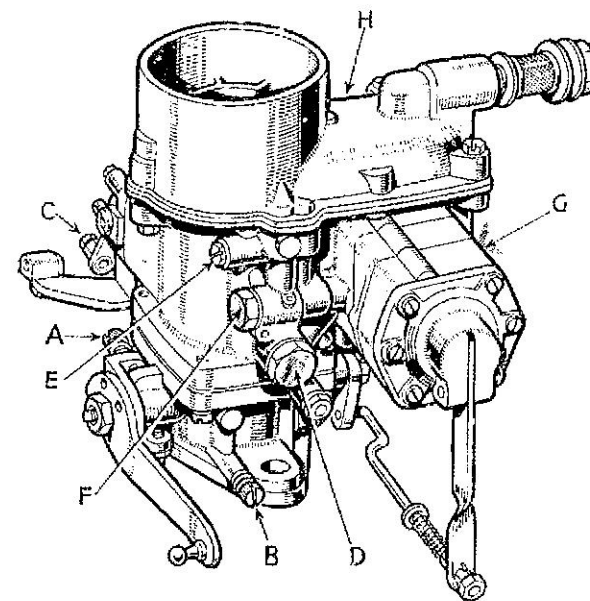


Fig. 19. Carburettor.

- | | |
|-----------------------|-----------------------|
| A—Slow-running screw. | E—Pilot jet. |
| B—Volume screw. | F—Pump jet. |
| C—Bi-starter. | G—Economy jet. |
| D—Main jet. | H—Starter petrol jet. |

3. Slacken the volume screw (B) until the engine begins to hunt.
4. Screw it in very gradually until the hunting just disappears.
5. If the engine speed is too high, reset the slow-running screw to slow it down to an idling speed of about 500 R.P.M.
6. This may cause a resumption of slight hunting. If so, turn the volume control screw gently in a clockwise direction until the idling is perfect.

Carburettor jet cleaning.

Reference is made in the "IN CASE OF TROUBLE" section on Pages 80 and 82 to carburettor jet cleaning.

It is most unlikely that trouble will be experienced with blocked jets, but Fig. 19 will help you to locate and remove the jets which may need cleaning. These are:—

- (i) Main petrol jet, the jet proper is screwed in to the inner end of the carrier (D), which must be removed to gain access to the jet.

- (ii) Pilot jet (E) has a screwdriver slot in the hexagon head.
- (iii) Accelerator pump jet (F) is located between the main and pilot jets.
- (iv) Economy jet (G) is located at the side of the accelerator pump housing, opposite the pump jet.
- (v) Starter petrol jet (H) is a plain hexagon-headed unit at the rear of the carburettor.

STEERING

The Burman Steering Gear fitted to this vehicle is of the worm and nut type, the inner column having a multi-start thread on which operates a cylindrical nut made of a special bronze alloy. The nut is free to move longitudinally in the main steering box housing, while in the side of the nut is a hardened steel bush in which operates a ball-headed extension of the rocker shaft. This latter is set at right-angles to the nut and carries the drop arm at the other end.

All end thrusts are taken by a three-piece fully adjustable ball bearing situated at the top of the steering column immediately under the steering wheel.

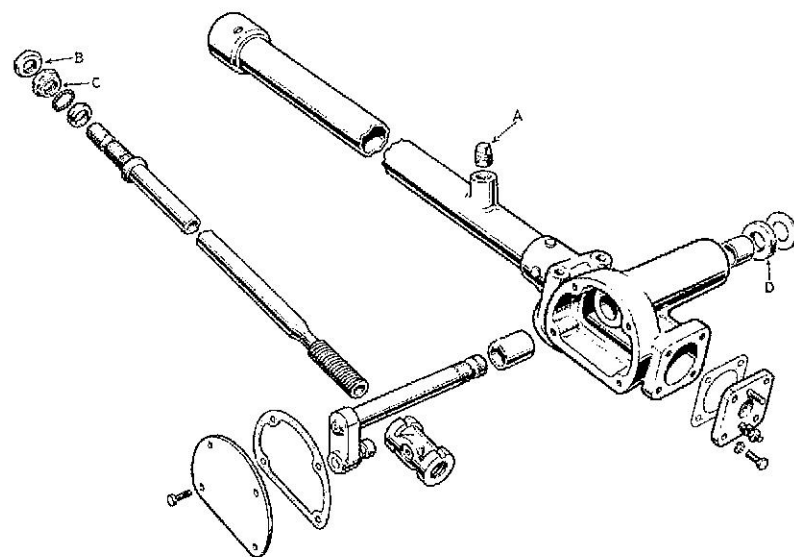


Fig. 20. Steering gear.

A—Oil filler plug.
B—Lock-nut.

C—Adjusting nut.
D—Felt washer.

GENERAL MAINTENANCE.

It is very important that the steering box be regularly topped-up with a good quality gear oil. (See Page 32).

The journal bearing situated at the top of the column is packed with grease before leaving the works and should not require any attention for many thousands of miles.

The only adjustment provided is to this top journal bearing. This consists of a cup secured by a lock-ring in the top of the outer column and two races, the lower one being fitted to the inner column before assembly, after which the balls are put in place and the top race adjusted by a hexagon nut and lock-nut.

Wear or end play on the inner column can therefore be taken up by first partially drawing away the steering wheel to allow access to the lock-nuts; then unscrew the top nut, pull down the lower nut until end play disappears and finally screw down the lock-nut absolutely tight.

The adjustment just described should rarely need attention and no other part of the gear calls for adjustment. Should the occasion arise to remove the drop arm, care should be taken not to damage the felt washer; if it becomes damaged a replacement should be obtained.

BRAKING SYSTEM

DESCRIPTION. The wheel brakes, operated by the foot pedal, are of the Girling Hydrastatic type, while the hand-brake operates a Girling Mechanical brake unit mounted on the output shaft from the transfer box.

BRAKE ADJUSTMENT. No adjustment is required or provided on the wheel brakes to take up lining wear, the design being such that the brake shoes are always in the correct position relative to the drum.

Periodic adjustment of the transmission brake unit will be required; proceed as follows (see Fig. 21):—

Release the hand-brake. Adjustment is made by means of the adjuster wedge spindle protruding from the front of the brake back-plate; during rotation of the adjuster a click will be felt and heard at each quarter revolution. Rotate the spindle as far as possible in a clockwise direction, i.e., until the brake shoes contact the drum. Then unscrew the adjuster two clicks, and give the brake a firm application to centralise the shoes; the brake drum should now be quite free to rotate. No other adjustment to the hand-brake system is necessary to compensate for lining wear.

SUSPENSION

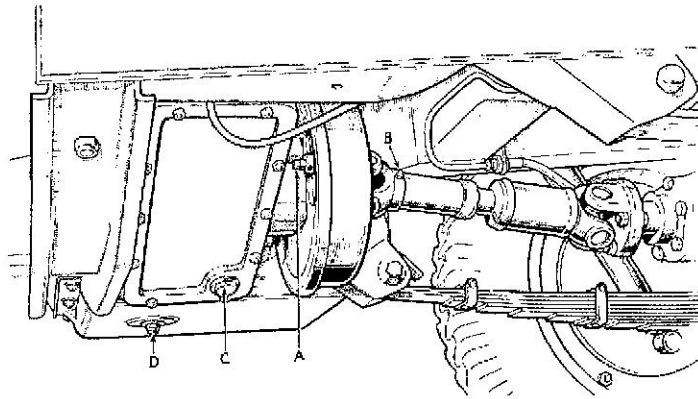


Fig. 21. Transmission brake adjustment.

- | | |
|---------------------------------------|--------------------------------|
| A—Transmission brake adjuster. | C—Transfer box oil drain plug. |
| B—Propeller shaft lubrication nipple. | D—Petrol tank drain plug. |

HYDRAULIC RESERVOIR.

The fluid reservoir for the hydraulic wheel brake system is fitted at the front of the dash panel (Fig. 4). The fluid level should be inspected weekly and topped-up as necessary until the reservoir is three-quarters full. Use only genuine Girling Crimson Brake Fluid, which can be obtained from any Rover Dealer or Girling Agent.

BLEEDING THE BRAKE SYSTEM.

If the level of the fluid in the reservoir is allowed to fall too low, or if any section of the brake pipe-line is disconnected, the brakes will feel "spongy" due to air having been absorbed into the system. It will be necessary to remove this air-lock by "bleeding" the brake system at the wheel cylinders. Bleeding must always be carried out at all four wheels, irrespective of which portion of the pipe-line is affected. Proceed as follows:—

Attach a suitable length of rubber tubing to the bleed nipple on the brake back-plate (Figs. 8, 9 and 10) and place the lower end of the tube in a glass jar. Slacken the bleed screw behind the nipple and pump the brake pedal slowly up and down, pausing at each end of each stroke, until the fluid issuing from the tube shows no sign of air bubbles when the tube is held below the surface of the fluid in the jar. Then tighten the bleed screw before removing the tube from the fluid in the jar.

Repeat these operations for the three other wheels in turn. It is well to continually replenish the fluid in the reservoir while pumping, to ensure that the level does not fall too low and cause another air-lock to be formed.

The semi-elliptic leaf springs and the spring shackles are fitted with rubber bushes, which need no lubrication attention. The front road springs are interchangeable, as are the rear. As a safeguard in the event of main spring leaf fracture, the ends of the second leaf are curled over the bushes, to afford some measure of support until the defect can be rectified.

Spring control is by Woodhead-Monroe hydraulic dampers, mounted on rubber bushes at top and bottom. This pattern damper is a double-acting control unit which ensures a smooth damping of the spring oscillations on both bump and rebound. By means of a special seal in the damper, the hydraulic fluid is kept in circulation in such a manner that leakage is not possible and therefore no topping-up is required at any time.

Should the dampers require attention as a result of accidental damage, they cannot be repaired by garages or service stations and should therefore be returned to your Rover agent, who will be able to supply replacement units.

WHEELS AND TYRES

Two types of wheel are supplied for the Land-Rover, a plain well-base pattern or a divided ("split-rim") wheel; the divided wheel may readily be identified by the ring of bolts securing the two halves together.

The Avon 6.00/16 6-ply "Traction" tyre supplied as standard equipment is ideal for general cross-country work, towing, etc., and it is also serviceable on road or track.

Its tread form makes it uni-directional, i.e., it must be fitted the correct way round to ensure efficient tread cleaning when operating on soft ground. When the tyre is fitted correctly the "V" treads should be pointing to the front at the top of the wheel.



Fig. 22.
Avon 6.00/16 "Traction" tyre.

As alternative equipment, Avon 7.00/16 "Super Traction" tyres can be supplied. These

have been specially designed for the Land-Rover to ensure maximum wheel grip and driving power when operating over soft mud, ploughland and all unprepared surfaces. Although the "tractor pattern" tread will ride smoothly on hard surfaces, it is not recommended that this type be used extensively for road service.

This also is a "uni-directional" tyre and should be fitted according to the directional arrow on the sidewall.

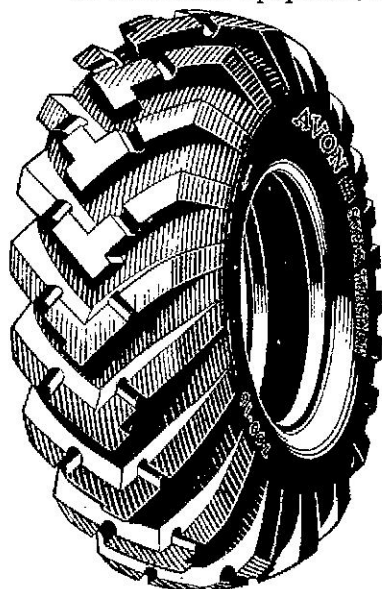


Fig. 23.
Avon 7.00/16 "Super Traction" tyre.

Tyre Pressures.

It is most important that the correct tyre pressures be maintained as indicated in the table below, as they have a big influence on tyre life and performance.

RECOMMENDED PRESSURES FOR AVON 6.00/16 6-PLY "TRACTION" AND 7.00/16 "SUPER TRACTION" TYRES.		
CONDITIONS OF SERVICE	PRESSURE	
	Lbs. per sq. in.	Kg. per sq. cm.
Normal road & cross country	22—24	1.5—1.7
Exceptionally soft ground	15	1.0
Rough, hard ground	26	1.8

The reduced pressure quoted for use on soft ground should only be employed when absolutely essential and the pressure must be restored to the correct figure immediately upon returning to normal operations.

The tyre pressures should be checked weekly, using the pressure gauge supplied in the tool kit; at the same time it is advisable to check the wheel nuts for tightness. In order to obtain accurate pressure readings, it is most important that the tyre gauge be used in a horizontal position.

Fitting Spare Wheel.

Owing to the uni-directional treads of both the "Traction" and "Super Traction" tyres, it may be necessary to reverse the spare tyre on its wheel (depending on which side of the vehicle it is to be fitted) to ensure efficient tread-cleaning.

Changing Tyre Positions.

To ensure best tyre mileages and even wear, change the position of the tyres on the vehicle (including the spare) every 2,000 miles (3,500 Km.) by shifting the wheels round. If it is desired to change the wheels round the vehicle in order, it will be necessary to reverse certain of the tyres on their wheels; alternatively the front and rear wheels may be interchanged on each side of the vehicle, the spare wheel fitted to give it a spell of duty and one of the other wheels removed to become the spare.

TYRE REMOVAL AND FITTING.

The procedure for removal and fitting tyres differs for the two types of wheel, as indicated in the instructions which follow:—

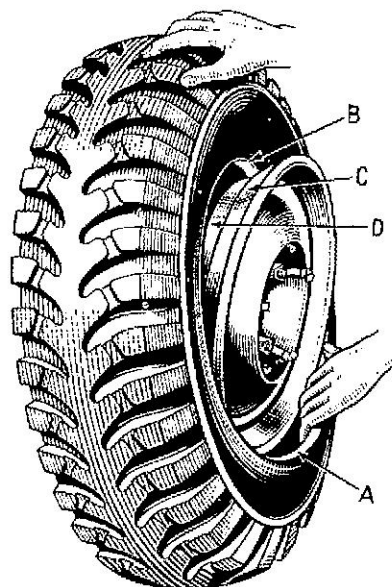


Fig. 24. Well base rim wheel.

You cannot pull the cover edge at "A" over the rim edge until the cover edge at "B" is pushed off the rim shoulder "C" down into the well "D," then the cover edge at "A" comes over the rim easily. Remember the cover edges are inextensible — force will only damage the cover and cannot stretch the edge.

To Remove Tyre from Well-base Rim Wheel.

Remove all valve parts. At a point opposite the valve, push the edges of the cover into the well-base of the rim. Insert two small levers carefully on either side of the valve and lift up the cover. The cover edge will then come over the rim easily.

To Fit Tyre to Well-base Rim Wheel.

Slightly inflate the tube and slip it into the cover. Position the wheel flat on the ground with the valve hole uppermost. Place the cover (with the tube inside) on top of the wheel, with the valve pointing upwards and in line with the valve hole on the correct side of the rim.

Push the first edge of the cover over the rim, making sure that it is pushed down into the well-base. Insert the valve

through the valve hole and fit the second edge, using method as for the first bead and starting at a point opposite the valve. The last piece may be gently levered over the rim—be careful not to nip the tube.



"Gently levered over the rim."

Finally, fully inflate the tyre and in its upright position bounce on the floor several times, check that the cover is evenly fitted, entirely deflate, then reinflate to the correct pressure.

NOTE:—Tyre bead wires are inextensible; do not attempt to stretch the edges of the cover over the rim but make use of the well-base of the rim.

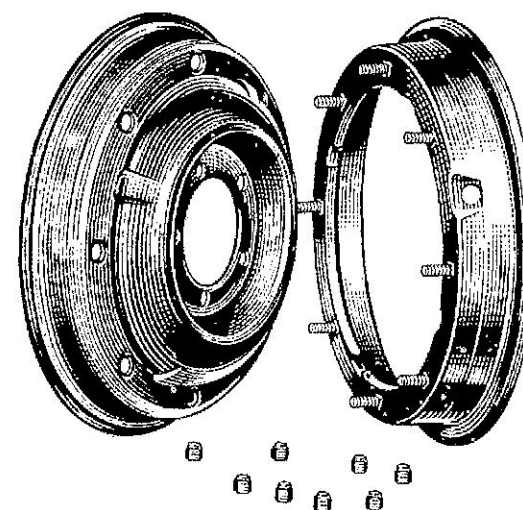


Fig. 25 Divided type wheel.

Divided Type Wheels—Tyre Removal and Fitting.

The operation with this type of wheel is effected by the separation and joining of the two pressings.

Removal.

It is important to **deflate fully** before slackening the clamps on divided type wheels. Failure to do so may involve the risk of personal injury.

Fitting.

Slightly inflate the tube in the cover before bolting the pressings together. Tighten the clamping nuts before inflating to the proper pressure. Do not over-inflate.

WHEEL BALANCING.

Before the vehicle leaves the factory, the wheels and tyres are balanced with the aid of small weights secured to flanges on the inner side of the wheel by means of set-bolts. It is advisable to check the wheel balance whenever a tyre is refitted; your dealer will be able to do this for you, or it can easily be carried out as follows:—

Jack up and remove one of the front wheels, so that the hub can then be used for checking the balance of the wheel to which the tyre has been re-fitted. Mount this wheel on the hub and secure with at least three nuts; when correctly balanced the wheel should not continue to revolve when turned to any position and this condition can be achieved by adjustment of the number and position of the balance weights.

When the balance is correct, remove the wheel and replace the original road-wheel.

CONDITIONS AFFECTING TREAD WEAR.

Incorrect Pressure.

This condition gives rise to a bad running shape of the tyre, resulting in irregular wear in the case of under-inflation and rapid wear in the case of over-inflation.

Speed.

High speed means rapid tread wear, not only because of the speed itself, but because of the extra braking entailed.

Climatic Conditions.

Tread wear is always more rapid in summer than in winter because of the higher road temperatures and drier conditions of the roads.

Oil and Grease.

Tread rubber rapidly absorbs oil and grease and its resistance to wear deteriorates in consequence. Remove oil and grease with a rag moistened in petrol.

Stopping and Starting.

Sudden acceleration and hard braking subject the tread to severe strains; rapid wear results.

Surfaces.

Abrasive surfaces mean cut treads and lower mileages.

Mechanical Irregularities.

Conditions such as misalignment and faulty brakes can cause irregular and very rapid wear.

TYRE SERVICE.

The Avon India Rubber Co. are always at your service to advise you on tyre problems.

Write to any of the addresses below:—

THE AVON INDIA RUBBER CO. LTD.,
MELKSHAM, WILTS., ENGLAND.

Stock and Service Depôts:—

LONDON, W.C.1: Mabledon Place.
BRISTOL, 2: Narrow Plain, St. Phillips.
BIRMINGHAM, 3: 41/42, Livery Street.
MANCHESTER, 1: 4, Whitworth Street West.
NEWCASTLE, 1: 21, Oxford Street.
GLASGOW C.1: 205, High Street.

AVON TYRES (N.I.) LTD.
BELFAST: 17/21, Glengall Street.

LUCAS ELECTRICAL EQUIPMENT

The electrical equipment fitted to the Land-Rover is designed and manufactured to give long periods of service without any need for adjustment or cleaning. The small amount of attention which is required is described in Section 1, and this procedure should be followed to ensure that the best Service is obtained.

Section 2 gives information on the operation of the various items of equipment and describes the method of setting the lamps and the carrying out of replacements, such as bulbs, high tension cables, etc., which may become necessary from time to time.

All owners of Lucas equipment are urged to take advantage of the facilities offered by the Lucas Service Organisation, with its many Service Depots and Agencies throughout this country and overseas.

SECTION 1.

LUBRICATION & GENERAL MAINTENANCE

After the first 750 miles (1,000 Km.).

DISTRIBUTOR.

Remove the moulded distributor cap and turn over the engine by hand until the contacts in the distributor are fully opened. Check the gap with the gauge on the screwdriver supplied in the tool kit. This gauge has a thickness of .012 in. (0.30 mm.) and if the setting is correct the gauge should be a

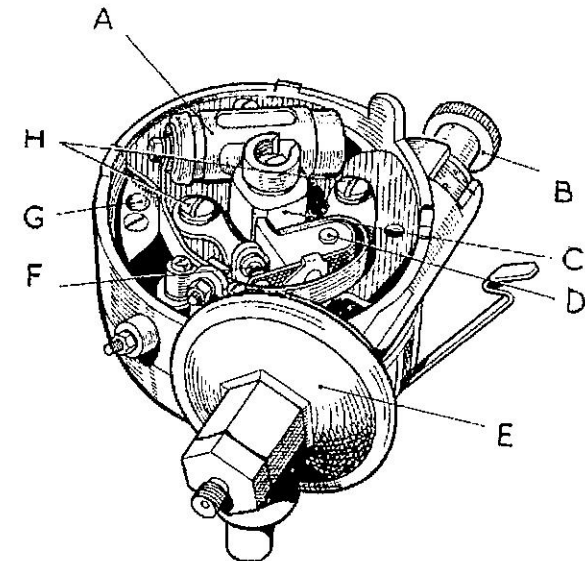


Fig. 28. Contact breaker.

- | | |
|--------------------------|----------------------------------|
| A—Condenser. | E—Diaphragm housing. |
| B—Octane selector. | F—Contacts. |
| C—Cam. | G—Lubricator. |
| D—Contact breaker pivot. | H—Screws securing contact plate. |

sliding fit. If the gap varies appreciably from the gauge the contact breaker must be adjusted. To adjust, keep the engine in position to give the maximum opening of the contacts and slacken the two screws which secure the contact plate. Move the plate until the gap is set to the thickness of the gauge and then fully tighten the locking screws.

Monthly or every 1,000 miles (1,500 Km.).

BATTERY.

Remove the filler plug from each cell of the battery and examine the level of the electrolyte in each cell. If necessary,

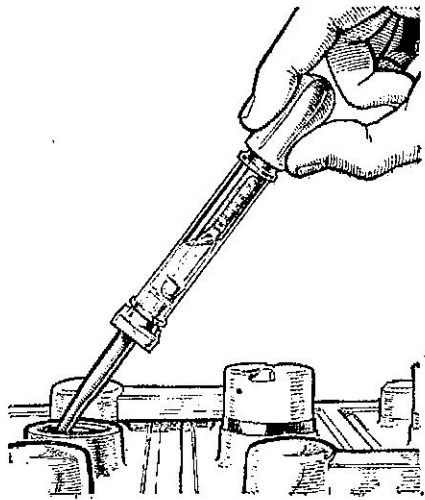


Fig. 27. Topping-up battery, using a hydrometer.

add sufficient distilled water to bring the electrolyte level with the tops of the separators. A hydrometer will be found useful for topping up as it prevents the distilled water from being spilled on top of the battery. Do not use tap water and do not use a naked light when examining the condition of the cells. Examine the terminals and if they are corroded, scrape them clean and coat with petroleum jelly.

Wipe away all dirt and moisture from the top of the battery and make sure that the connections are clean and tight.

NOTE:—In hot climates it will be necessary to top-up the battery at more frequent intervals.

In very cold weather it is essential that the vehicle be used immediately after topping-up, to ensure that the distilled water is thoroughly mixed with the electrolyte. Neglect of this precaution may result in the distilled water freezing and causing damage to the battery.

Every 3,000 miles (5,000 Km.) or 100 hours.

Carry out the procedure for every 1,000 miles (1,500 Km.) and the following:—

DISTRIBUTOR—LUBRICATION.

Cam.

Lightly smear the cam with a very small amount of Mobilgrease No. 2 or if this is not available, clean engine oil can be used.

Cam Bearing and Distributor Shaft.

Lift the rotor off the top of the spindle by pulling it off vertically and add a few drops of thin machine oil to lubricate the cam bearing and distributor shaft.

Replace the rotor correctly and push it on to the shaft as far as it will go, otherwise there is a risk of the moulded cap becoming burned or tracked.

Automatic Timing Control.

Carefully add a few drops of thin machine oil through the hole marked "OIL HERE" in the contact breaker base plate.

Contact Breaker Pivot.

Place a small amount of Mobilgrease No. 2 or clean engine oil on the pivot on which the contact breaker lever works. Do not allow oil or grease to get on to the contacts.

Every 6,000 miles (10,000 Km.) or 200 hours.

Carry out the procedure for every 1,000 miles (1,500 Km.) and 3,000 miles (5,000 Km.) and the following:—

DISTRIBUTOR—CLEANING.

Wipe the inside and the outside of the moulded distributor cap with a soft, dry cloth, paying particular attention to the space between the metal electrodes. See that the small carbon brush on the inside of the moulding works freely in its holder.

Examine the contact breaker. The contacts must be free from grease or oil. If they are burned or blackened, clean them

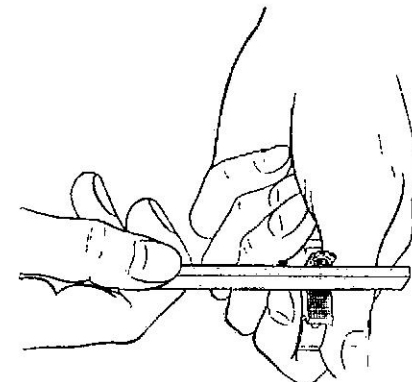


Fig. 28. Cleaning contacts, with moving contact removed.

with a fine carborundum stone or with very fine emery cloth. Afterwards wipe away any trace of dirt or metal dust with a petrol-moistened cloth. Cleaning of the contacts is made easier if the contact breaker lever carrying the moving contact is removed. To do this, slacken the nut on the terminal post and lift off the end of the contact breaker spring which is slotted to facilitate removal. The lever can then be lifted off its pivot pin. After cleaning and replacing, check the contact breaker setting.

If the contacts are badly burned, they should be replaced. Replacement contacts must only be fitted in pairs. To remove the moving contact, follow the procedure outlined in the previous paragraph. To remove the plate carrying the fixed contact take out the two screws complete with spring and plain washers. Fit the replacement contacts by reversing these instructions and set the contact breaker gap to .012 in. (0,30 mm.) by means of the gauge supplied in the tool kit.

Contact Breaker—Checking and Adjustment.

Turn the engine by hand until the contacts are fully opened and insert the gauge, provided on the ignition screwdriver, between the contacts. If the setting is correct, the gauge will be a sliding fit, but if the gap varies appreciably from the gauge, the setting should be adjusted. Keep the engine in the position to give maximum opening of the contacts and slacken the two screws securing the plate carrying the fixed contact. Move the plate until the gap is set to the thickness of the gauge and afterwards tighten the two screws.

SECTION 2.

GENERAL INFORMATION

BATTERY

Occasionally check the condition of the battery by taking hydrometer readings of the specific gravity of the electrolyte in each of the cells. Readings should not be taken immediately after "topping-up" the cells. The specific gravity readings and their indications are as follows:—

1.280 1.300 (32° 34° Baumé) Battery fully charged.

About 1.210 (25° Baumé) Battery about half discharged.

Below 1.150 (19° Baumé) Battery fully discharged.

These figures are given assuming the temperature of the solution is 60°F. (15.5°C.). If the electrolyte temperature exceeds this, .002 must be added to hydrometer readings for each 5°F. (3°C.) rise to give the true specific gravity at 60°F. (15.5°C.). Similarly .002 must be subtracted from hydrometer readings for every 5°F. (3°C.) below 60°F. (15.5°C.).

The readings for all cells should be approximately the same. If one cell gives a reading very different from the rest, it may be that acid has been spilled or has leaked from this particular cell or there may be a short circuit between the plates. In this case the battery should be examined by a Lucas Service Depot or Agent.

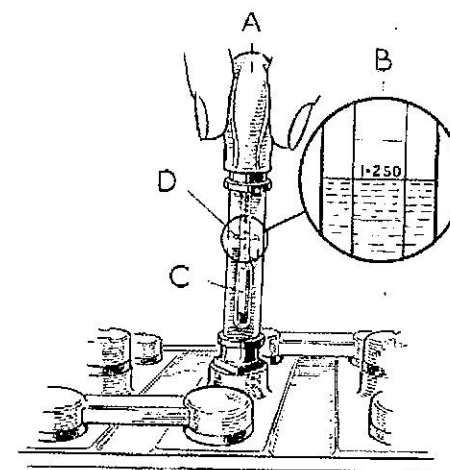


Fig. 20. Taking hydrometer readings.

A—Hold tube vertical.
B—Take readings at eye level.

C—Float must be free.
D—Do not draw in too much electrolyte.

When taking specific gravity readings, examine the condition of the electrolyte in the hydrometer; it should be fairly clear. If it is very dirty, it is possible that the plates are in a bad condition and the battery should be sent to a Lucas Service Depot or Agent for overhaul.

NOTE:—If the vehicle is to be left in the open in very cold weather, care must be taken to ensure that the battery is in a good state of charge, otherwise there is danger of the electrolyte freezing and consequent damage to the battery.

DYNAMO

The dynamo is of the compensated voltage type and operates in conjunction with the regulator unit which is housed along with the cut-out in the control box.

The regulator causes the dynamo to give an output which varies according to the load on the battery and its state of charge. When the battery is discharged, the dynamo gives a high output so that the battery receives a quick recharge which brings it back to its normal state in the minimum possible time.

On the other hand, if the battery is fully charged, the dynamo is arranged to give only a trickle charge which is sufficient to keep it in good condition without any possibility of causing damage to the battery by overcharging.

The regulator also causes the dynamo to give a controlled boosting charge at the beginning of a run which quickly restores to the battery the energy taken from it when starting. After about 30 minutes running, the output of the dynamo falls to a steady rate, best suited to the particular state of charge of the battery.

At about every 20,000 miles (30,000 Km.) or 500 hours, unscrew the lubricator at the end of the dynamo, lift out the felt pad and spring and about half fill the lubricator with high melting-point grease. Replace the spring and felt pad.

Many years of experience with this type of dynamo have shown that normally the brushgear and commutator will not require any attention by the owner. When the vehicle is undergoing a general overhaul, say after about 50,000 miles (80,000 Km.), it is advisable to have the dynamo checked for brush or commutator wear by a Lucas Service Depot or Agent.

Occasionally inspect the dynamo driving belt and adjust if necessary to take up any undue slackness by turning the dynamo on its mounting (see Page 42). Care should be taken to avoid over-tightening the belt and to see that the machine is properly aligned, otherwise undue strain will be thrown on the dynamo bearings.

Ammeter Readings.

When noting ammeter readings, it must be remembered that during daytime running when the battery is in good condition, the dynamo gives a trickle charge, so that the charge reading will seldom be more than three or four amperes.

A discharge reading may be given immediately after switching on the headlamps. This usually happens after a long run, when the voltage of the battery is high. After a short time, the battery voltage will fall, and the regulator will respond, causing the dynamo output to balance the load.

When starting from cold, the charging current will rise until it reaches a steady maximum at a speed of say, 20 m.p.h. (35 k.p.h.) after which it will remain fairly high for about 10 minutes and then fall to a steady charge which is most suitable for the particular state of charge of the battery.

It will be noticed from the ammeter readings that the dynamo does not charge at very low engine speeds. This is because it is not rotating fast enough to generate sufficient energy to charge the battery. The cut-out, which is an automatic switch connected between the dynamo and the battery, allows the flow of current from the dynamo to the battery only. It closes when the dynamo is running fast enough to charge the battery and opens when the speed is low or the engine is stationary, thus preventing current flowing from the battery through the dynamo windings.

CONTROL BOX

This unit is mounted on the scuttle and houses the cut-out and dynamo voltage regulator.

The cut-out and regulator are accurately set before leaving the works and they must not be tampered with. The cover protecting them is sealed.

FUSE

The single fuse is located, together with a spare, under a separate cover alongside the control box on the scuttle. It protects the horn, windscreen wiper, petrol tank level unit and the stop lights.

A blown fuse is indicated by the failure of all the units protected by it, and is confirmed by examination of the fuse, which can easily be withdrawn from the spring clips in which it fits. If it has blown, the broken ends of the wire will be visible inside the glass tube.

Before replacing a blown fuse, inspect the wiring of the units that have failed for evidence of a short circuit or other fault which may have caused the fuse to blow and remedy the cause of the trouble first.

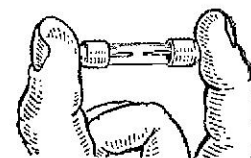


Fig. 30. Blown fuse.

It is important to use replacement fuses of the correct value (25 amp); the fusing value is marked on a coloured paper slip inside the glass tube of the fuse.

If the new fuse blows immediately and the cause of the trouble cannot be found, have the equipment examined at a Lucas Service Depot.

STARTER

When starting, observe the following points:—

1. See that the controls are properly set. (See Page 14).
2. Operate the starter switch firmly and release it as soon as the engine fires.
3. Do not operate the starter when the engine is running. If the engine will not fire at once, allow it to come to rest before operating the switch again. (See Page 15).
4. Do not run the battery down by keeping the starter on when the engine will not start.

In the event of the starter pinion becoming jammed in mesh with the flywheel, it can usually be freed by turning the starter armature by means of a spanner applied to the shaft extension at the commutator end. This is accessible by pulling off the small cap which is secured by two screws.

If any difficulty is experienced with the starter not meshing correctly with the flywheel, it is probable that the presence of dirt on the starter drive is preventing the free movement of the pinion on its sleeve and the sleeve and pinion should be washed with paraffin. Alternatively, the drive may have been damaged owing to mis-use.

As in the case of the dynamo, the starter brushgear and commutator will not normally require attention by the owner, but should be checked by a Lucas Service Depot or Agent when the car is undergoing a general overhaul.

LAMPS

Replacement of Bulbs.

Lucas Genuine Spare Bulbs are sold by any reputable garage and are specially tested to ensure that the filament is in the correct position to give the best results with Lucas Lamps. To assist in identification Lucas Bulbs are marked on the metal cap with a number; when fitting a replacement see that it is the same number as the original bulb.

It is advisable to replace bulbs after long service before they actually burn out, as often the filament may sag and cause a reduction in the performance of the lamp.

Replacement Bulbs.

				LUCAS	VOLT.	WATT	
Headlamps	...	...	...	No. 171	12 ...	36/36	Double filament
Sidelamp	...	...	...	No. 207	12 ...	6	Single pole
Stop and tail lamps	...	...	...	No. 207	12 ...	6	Single pole
Instrument panel lights	..			No. 207	12 ...	6	Single pole
Ignition and mixture control							
warning lights	...	...	...	No. 970	2.5 ...	.5	M.E.S.
Oil pressure warning light	...			—	12 ...	2.4	M.E.S.

SETTING

The setting of the headlamps should be checked by placing the vehicle in front of a blank wall at the greatest possible distance, taking care that the surface on which the vehicle is standing is not sloping relative to the wall.

The lamps are fitted with dual-filament bulbs and must be set so that the main beams of light are parallel with the road and with each other. If adjustment is necessary, slacken the fixing nut at the top of the lamp and move the lamp on its adjustable mounting to the required position. Finally tighten the locking nut. The mounting is accessible when the bonnet top panel is raised.

FOCUSSING

To enable the best light to be obtained from the headlamps the bulb filaments must be as near as possible to the focal points of the reflectors. If a bulb is out of focus, the lamps will have a poor range and will cause dazzle to approaching traffic. Before lamps leave the Works, the bulbs are focussed to give the best results and provided that Lucas Genuine Spare Bulbs are fitted as replacements, it should not be necessary to alter the setting. If, however, an ordinary bulb has to be fitted, it may be necessary to re-focus by slackening the screw on the clamping clip and moving the bulb backwards and forwards until the best lighting is obtained.

When focussing, it is an advantage to cover one lamp while testing the other. If the lamp does not give a uniform long range beam without a dark centre, the bulb needs adjusting. Tighten the clamping clip after the best position for the bulb has been found.

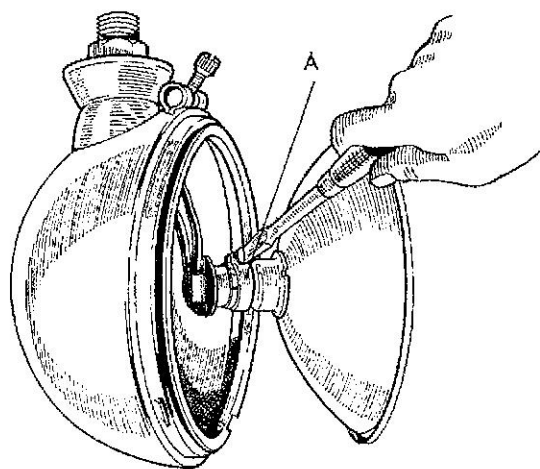


Fig. 31. Headlamp focussing.

A—Clamping clip securing bulb-holder.

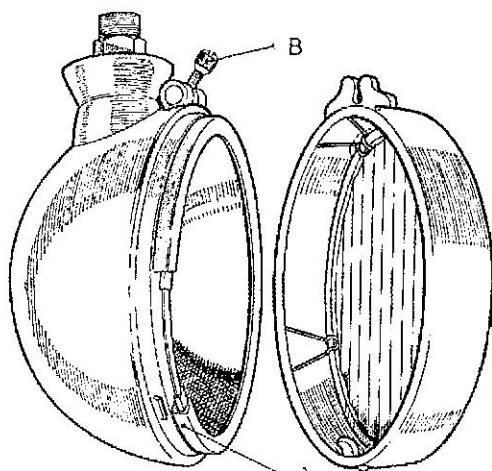


Fig. 32. Headlamp glass and reflector removal.

A—Rubber bead securing reflector. B—Screw securing lamp front.

REMOVING LAMP FRONTS, REFLECTORS AND BULBS

Headlamps.

To remove the lamp front, slacken the fixing screws at the top of the lamp and swing it upwards. Remove the front from the top of the lamp first. The reflector is secured to the lamp body by means of a rubber bead and can be withdrawn when this is removed. When replacing, the projection on the reflector rim must be fitted into the location at the bottom of the lamp body and the reflector must be secured by refitting the rubber bead, the thicker lip of which must be located between the reflector rim and the lamp body.

When refitting the lamp front, locate the bottom of the rim first, then press at the top and secure by means of the fixing screw.

Sidelamps.

Slacken the screw at the top of the lamp locating it in the scuttle panel and turn the lamp in a clockwise direction until the tongue at the bottom is disengaged from the scuttle. The lamp front and reflector can then be withdrawn.

The bulb is accessible when the holder which is clipped to the back of the reflector is turned to the left and pulled off.

When refitting the front and reflector, locate the tongue on the lamp in the slot in the scuttle and turn the lamp in an anti-clockwise direction. Finally secure by means of the locating screw.

Stop and Tail Lamps.

To effect bulb replacement, slacken the securing screw and swing open the cover; the bulbs are then accessible in the lamp body.

Cleaning Lamps.

The reflectors are protected by a transparent and colourless covering which enables any accidental finger marks to be removed with chamois leather or a soft cloth without affecting the surface of the reflector; metal polish must not be used for cleaning reflectors.

HORN

All horns before being passed out of the Works are adjusted to give their best performance and will give a long period of service without any attention; no subsequent adjustment is required.



"If the horn becomes uncertain in its action."

If the horn fails or becomes uncertain in its action, it does not follow that the horn has broken down. First ascertain that the trouble is not due to some outside source, e.g., a loose connection or short circuit in the wiring of the horn; the trouble is probably due to a discharged battery or blown fuse. If the fuse has blown, examine the wiring for the fault and then replace the fuse.

It is also possible that the performance of a horn may be upset by the fixing bolt working loose, or by some component near the horn being loose. If after carrying out the above examination the trouble is not rectified, do not attempt to dismantle the horn, but return it to a Lucas Service Depot or Agent.

WINDSCREEN WIPER

To start the wiper, pull out the handle to disengage it from the switch. Then move the switch lever to the left to the "on" position.

To stop the unit, move the switch downwards to the "off" position, pull out the handle and turn the end into the top of the switch control.

No adjustment or lubrication is necessary, as the gears are fully lubricated before leaving the Works.

Replacement of Arm and Blade Assembly.

To remove the arm and blade assembly, slacken the fixing nut and tap sharply to release the collet which clamps the arm on to the spindle. Then remove the complete assembly.

When fitting the replacement arm and blade, slacken the securing nut and push the arm fixing brush over the end of the spindle as far as it will go. Secure by tightening the nut.

Replacement of Blade.

Take out the rubber bush securing the blade to the arm. Insert the tongue on the replacement blade through the slot in the arm and secure it by fitting the rubber bush through the hole in the tongue.

COIL IGNITION EQUIPMENT

Renewing the High Tension Cables.

The high tension cables are those connecting the coil to the distributor and the distributor to the sparking plugs. When these cables show signs of perishing or cracking they must be replaced by 7 mm. rubber-covered ignition cable.

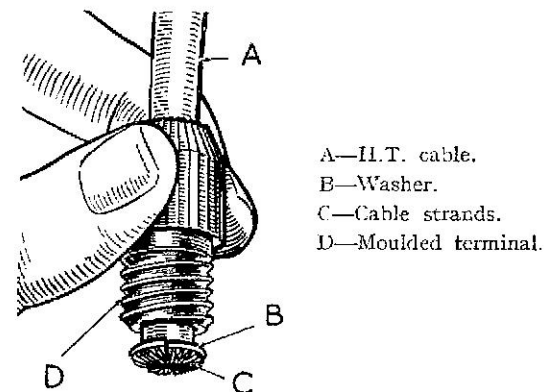


Fig. 33. Fitting H.T. cable to ignition coil.

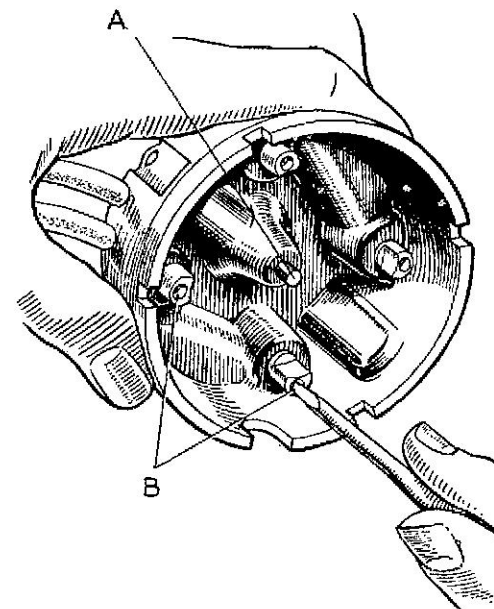


Fig. 34. Connecting H.T. cable to distributor.

A—Carbon brush.

B—Screws securing cable.

The method of connecting H.T. cable to the coil is to thread the knurled moulded nut over the cable, bare the end of the cable for about $\frac{1}{4}$ in. (7 mm.), thread the wire through the washer removed from the end of the original cable and bend back the wire strands. Screw the nut into its terminal.

To connect cables to the distributor, unscrew the pointed fixing screws on the inside of the moulding and push the cables, which should not be bared but cut off flush to the required length, well home into their respective terminals and tighten the fixing screws. The screw securing the centre cable is accessible when the carbon brush is removed.

The Coil.

The coil requires no attention beyond keeping its exterior clean, particularly between the terminals, and occasionally checking that the terminal connections are quite tight.

The Ignition Switch and Warning Light.

The ignition switch, besides forming a means of stopping the engine, is provided for the purpose of preventing the battery being discharged by the current flowing through the coil windings when the engine is stopped. A red warning light on the instrument panel appears when the ignition is switched on and the engine is running very slowly or is stationary.

Should the warning lamp bulb burn out, this will not in any way effect the ignition system, but it should be replaced as soon as possible in order to safeguard the battery.

Mixture Control Warning Light.

The appearance of the amber mixture control warning light on the instrument panel indicates that the "COLD START" control has been left out inadvertently and must be pushed right in at once.

If the warning lamp bulb burns out, it will not affect the operation of the mixture control, but it should be replaced as soon as possible to ensure that the control is pushed "home" at the earliest possible moment, and so safeguard against unconscious driving with the mixture control in an intermediate position, with consequent high petrol consumption and dilution of the engine oil.

Oil Pressure Warning Light.

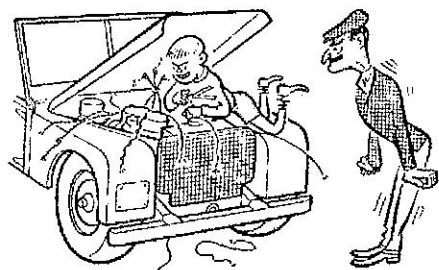
The oil pressure warning light on the instrument panel glows when, for any reason, the engine oil pressure drops below 10 to 12 lb. per sq. in. (0,7 to 0,8 Kg.). It will, therefore, light up when the engine is stationary and will go out when the engine has started and the oil pressure has built up to exceed this figure. Should the warning light appear at any time during normal vehicle operation, the engine must be stopped immediately and the cause ascertained; usually it will be due to low oil level in the sump.

Should the warning lamp bulb burn out, it should be replaced as soon as possible to safeguard the engine.

IN CASE OF TROUBLE

LOCATION AND REMEDY OF FAULTS

Although every precaution is taken to eliminate all possible



"Failure may develop through damage to the wiring."

causes of trouble, failure may occasionally develop through lack of attention to the equipment, or damage to the wiring. The following pages set out the recommended procedure for a systematic examination to locate and remedy the causes of some of the more probable faults which may occur during the life of the vehicle.

All the checks listed can be readily carried out without special equipment ; if the fault is not located in this way, consult your local Rover agent who will be able to investigate the defect more closely.

ENGINE FAILS TO START.

1. Check that the ignition is switched ON.
2. Check visually that there is sufficient petrol in the tank. (Page 45).
3. Check that the cold start control is set correctly for starting. (Page 14).
 - (i) Engine HOT—Control right IN.
Accelerator DEPRESSED.
 - (ii) Engine COLD—control right OUT.
Foot clear of accelerator.
4. Check that the engine is being turned at an adequate speed by the starter motor ; this speed will be recognised after some experience with the vehicle.
If the cranking speed is too low:—
 - (i) Check the battery connections for tightness and cleanliness.
 - (ii) Check the state of charge of the battery by switching on the headlamps and pressing the starter button ; if the headlamps go out or very dim when the starter is operated, the battery requires re-charging from an independent electrical supply.

It should be possible to start the engine by cranking with the starting handle.

5. Remove the cable from each sparking plug terminal in turn and hold it so that the end is about $\frac{1}{4}$ in. (7 mm.) away from some metal part of the chassis, while the engine is turned over ; if sparks jump the gap regularly, the coil and distributor are functioning correctly.
 - (i) If the sparks are strong and regular, remove and clean the sparking plugs and re-set the electrode gaps to .023—.026 in. (0.60—0.65 mm.).
 - (ii) If the sparks are NOT regular:—
 - (a) Check that the distributor rotor is in position.
 - (b) Check that the L.T. connections on the coil and distributor are clean and tight.
 - (c) Check that the distributor points are:—
 1. Clean.
 2. Opening and closing correctly.
 3. Correctly set when open—gap .012 in. (0.30 mm.). See Page 65.
 - (d) Check that current is present at the S.W. terminal on the coil, by disconnecting the wire at the coil end and touching it against the S.W. terminal, with the ignition switch "ON" and the distributor contact-breaker points closed. If sparks occur, low tension current is flowing through the coil correctly ; if there is NO SPARK, either the coil or the low tension wiring is defective and your agent should be consulted.
 - (iii) If the sparks are weak and in addition there is a flashing at the distributor contact breaker points, a faulty distributor condenser is indicated.
 - (iv) If the sparks are present on some leads, but not on others, check the distributor cap for cracks and the plug leads for faulty insulation.
6. Disconnect the petrol pipe from the carburettor and check that petrol is delivered to the carburettor when the ignition is switched "ON." If petrol is not delivered from the pipe:—
 - (i) Check that the pump "ticks" when the ignition is ON, with the pipe still disconnected. If not, the fault is probably in the pump wiring. (Page 46).

- (ii) Check that the petrol shut-off tap on the sediment bowl is "ON." (Page 46).
 - (iii) Check that the petrol pipes and filters are clear. (Pages 44—47).
 - (iv) Check that there are no air leaks in the suction line to the pump, in particular at the sediment bowl. (Page 46).
7. Check that the manifold drain pipe (below the carburettor) is not blocked, by depressing the accelerator pedal fully two or three times and noting that a few drops of petrol run out of the drain pipe. If not, remove and clean the pipe.

ENGINE STARTS BUT SOON STOPS.

1. Check that the controls are set correctly. (Page 14).
2. Check the petrol feed to the carburettor, by disconnecting the pipe from the carburettor and noting the petrol flow with the ignition switched "ON."

If there is little or no flow:—

- (i) Check the petrol level in the tank.
 - (ii) Check that the air vent in the filler cap is clear.
 - (iii) Check the petrol pump for correct operation. (Page 46).
 - (iv) Check that the petrol filters are clear. (Pages 44—47).
 - (v) Check that the petrol pipes are clear (Pages 44—47).
3. Check that the carburettor jets are clear, in the following order. (Page 51):—
 - (i) Starter petrol jet.
 - (ii) Main jet.
 - (iii) Pilot jet.
 4. Check for a fault in the ignition circuit by connecting a wire between the "A" connection on the voltage regulator box and the "SW" connection on the coil, thus by-passing the ignition switch. At the same time, the wire from the ignition switch must be disconnected from the coil.
 5. Remove the carburettor top cover and check that there is no water in the float chamber.

ENGINE MISFIRES.

Engine running on less than four cylinders, either intermittently or continually.

1. Stop the engine and endeavour to re-start with the starter motor to check the state of the battery and connections. If the battery is in a low state of charge, it will need re-charging from an independent electrical supply, and the charging circuit should be checked as directed on Pages 82—83.
2. Remove the lead from each sparking plug in turn and check:—
 - (i) By holding the end of the lead about $\frac{1}{4}$ in. (7 mm.) away from a metal part of the engine with the engine running. Sparks should jump the gap regularly.

If NO SPARK is present on one or more cylinders:—

- (a) Check for moisture on the H.T. leads or distributor.
- (b) Check, clean and re-set the distributor contact-breaker points to .012 in. (0.30 mm.) as necessary. (Page 65).
- (c) Check the distributor cap for cracks and the plug leads for faulty insulation.

If the SPARK is IRREGULAR on all cylinders:—

- (a) Check for moisture as in (i) (a).
 - (b) Check the distributor points as in (i) (b).
 - (c) Check the cap and leads as in (i) (c).
 - (d) Check the L.T. connections for tightness and cleanliness.
 - (e) Check for flashing or "blueing" of the contact-breaker points. If present, the distributor condenser should be replaced.
 - (f) Check for a fault in the ignition circuit by connecting a wire between the "A" connection on the voltage regulator box and the "SW" connection on the coil, thus by-passing the ignition switch. At the same time, the wire from the ignition switch must be disconnected from the coil.
- (ii) For any audible alteration in the running of the engine, as each lead is removed. No alteration

will indicate that the sparking plug in question is at fault:—

- (a) Remove and clean the plug ; re-set the gap to .023—.026 in. (0.60—0.65 mm.) as necessary.
 - (b) If still faulty, fit a new sparking plug.
3. If the “ missing ” is accompanied by “ spitting back ” through the carburettor, a valve may be sticking. This can often be cured by slowly dropping oil or upper cylinder lubricant into the carburettor intake, while the engine is running.

LACK OF ENGINE POWER.

1. Check that the carburettor throttle is opening fully.
2. Check that the brakes are not binding and that the tyre pressures are correct. (Page 57).
3. Check that the carburettor jets are not blocked (in the following order). See Page 51:—
 - (i) Main jet.
 - (ii) Pump jet.
 - (iii) Economy jet.
4. Check that the carburettor accelerator pump is opening correctly by depressing the accelerator pedal two or three times with the engine stationary and noting that there is a petrol discharge from the manifold drain pipe.
5. Check the ignition timing. (Page 38).
6. Check tappet adjustment. (Page 38).
7. If items 1—6 are satisfactory, it is probable that the engine needs decarbonising and your Rover agent should be consulted.

CHARGING CIRCUIT

1. Battery in Low State of Charge.

- (a) This state will be shown by lack of power when starting, poor light from the lamps and hydrometer readings below 1.200, and may be due to the dynamo either not charging or giving low or intermittent output. Check the ammeter reading when the vehicle is running steadily in top gear with no lights in use; a definite steady charge should be indicated. The ignition warning light will not go out if the dynamo fails to charge, or will flicker on and off in the event of intermittent output.

- (b) Examine the charging and field circuit wiring, tightening any loose connections, or replacing broken cables. Pay particular attention to the battery connections.
- (c) Examine the dynamo driving belt; take up any undue slackness by turning the dynamo on its mounting. (See Page 42).
- (d) If the cause of the trouble is not apparent, have the equipment examined by a Lucas Service Depot or Agent.

2. Battery Overcharged.

This will be indicated by burnt-out bulbs, very frequent need for topping-up of battery and high hydrometer readings. Check the ammeter reading when the vehicle is running steadily—with a fully charged battery and no lights or accessories in use, the charge reading should be of the order of only 3—4 amperes. If the ammeter reading is in excess of this value, it is advisable to have the regulator setting tested and adjusted if necessary by a Service Depot or Agent.

STARTER MOTOR

1. Starter Motor Lacks Power or Fails to Turn Engine.

- (a) See if the engine can be turned over by hand. If not, the cause of the stiffness of the engine must be located and remedied.
- (b) If the engine can be turned by hand, first check that the trouble is not due to a discharged battery.
- (c) Examine the connections to battery, starter and starter switch, making sure that they are tight and that the cables connecting these units are not damaged.
- (d) It is also possible that the starter pinion may have jammed in mesh with the flywheel, although this is by no means a common occurrence. To disengage the pinion, rotate the squared end of the starter shaft by means of a spanner in the opposite direction to normal rotation.

2. Starter Operates, but Does Not Crank Engine.

This fault will occur if the pinion of the starter drive is not allowed to move along the screwed sleeve into engagement with the flywheel, due to dirt having collected on the screwed sleeve. Clean the sleeve carefully with paraffin.

3. **Starter Pinion Will Not Disengage from Flywheel When Engine is Running.**

Stop the engine, and see if the starter pinion is jammed in mesh with the flywheel, releasing it if necessary by rotation of the squared end of the starter shaft in the opposite direction to normal rotation. If the pinion persists in sticking in mesh, have the equipment examined at a Service Depot. Serious damage may result to the starter if it is driven by the flywheel.

LIGHTING CIRCUITS

1. **Lamps Give Insufficient Illumination.**

- (a) Test the state of charge of the battery, recharging it if necessary either by a long period of day-time running or from an independent electrical supply.
- (b) Check the setting of the lamps, and that the headlamp bulbs are in focus. (See Page 71).
- (c) If the bulbs are discoloured as a result of long service, they should be replaced. On lamps in which the reflector surface is accessible, see that it is clean.

2. **Lamps Light When Switched On, but Gradually Fade Out.**

As para. 1. (a).

3. **Brilliance Varies with Speed of Vehicle.**

- (a) As para. 1. (a).
- (b) Examine the battery connections, making sure that they are tight, and replace faulty cables.

4. **Lights Flicker.**

Examine the circuits of the lamps for loose connections.

5. **Failure of Lights.**

- (a) As para 1. (a).
- (b) Examine the wiring for a loose or broken connection, and remedy.

LUCAS SERVICE DEPOTS

BRITISH ISLES.

All owners are urged to take advantage of the facilities offered by Lucas Service.

For the benefit of users of our equipment, we have established Service Depots in all large towns, which are not only at your disposal for repairs, overhauls and adjustments, but to give free advice. If you experience any difficulty with any part of the equipment, do not hesitate to consult us; we shall be only too pleased to be of assistance. The best course to adopt is to call at our nearest Service Depot, the addresses of which are given below, when the equipment can be examined as a whole.

If it is necessary to replace any part, order Genuine Lucas Spares. It is obvious that only the designers and manufacturers of the equipment are in a position to make replacement parts which will give satisfactory and lasting service.

When corresponding with Depots, or when ordering spare parts, give the model and year of the engine; the unit of equipment; and particular part in question. Units of equipment are identified by letters and numbers stamped or moulded on some part of the article. It is essential to quote this marking, to ensure that correct replacements are sent. Illustrated spare parts lists are available on application; state year and model.

BELFAST

Telephone: Belfast 25617

BIRMINGHAM, 18

Telephone: Central 8491

BRIGHTON, 4

Telephone: Hove 1146

BRISTOL, 4

Telephone: Bristol 75001

CARDIFF

Telephone: Cardiff 4603

DUBLIN

Telephone: Dublin 72601

EDINBURGH, 11

Telephone: Edinburgh 62921

GLASGOW, C.3

Telephone: Douglas 3075

LEEDS, 8

Telephone: Leeds 28501

LIVERPOOL, 13

Telephone: Stonycroft 4721

LONDON

Telephone: Shepherds Bush 3160

LONDON

Telephone: Leytonstone 3361

MANCHESTER

Telephone: Longford 1101

NEWCASTLE-ON-TYNE, 1

Telephone: Newcastle 25571

51/55, Upper Library Street

Telegrams: "Servdep, Belfast"

Great Hampton Street

Telegrams: "Lucas, Telex, Birmingham"

85, Old Shoreham Road, Hove

Telegrams: "Luserv, Brighton"

345, Bath Road

Telegrams: "Kingly, Bristol"

54a, Penarth Road

Telegrams: "Lucas, Cardiff"

Portland Street North, North Circular Road

Telegrams: "Luserv, Dublin"

60, Stevenson Road, Gorgie

Telegrams: "Luserv, Edinburgh"

4/24, Grant Street (St. George's Road)

Telegrams: "Lucas, Glasgow"

64, Roseville Road

Telegrams: "Luserdep, Leeds"

450/456, Edge Lane

Telegrams: "Luserv, Liverpool"

Dordrecht Road, Acton Vale, W. 3

Telegrams: "Dynamagna, Ealux, London"

757/759, High Road, Leyton, E. 10.

Telegrams: "Luserdep, Leystone, London"

Talbot Road, Stretford

Telegrams: "Lucas, Stretford"

64/68, St. Mary's Place

Telegrams: "Metoilite, Newcastle-on-Tyne"

IN ADDITION THERE ARE LUCAS OFFICIAL SERVICE
AGENTS AND SPARES STOCKISTS IN IMPORTANT
CENTRES THROUGHOUT THE WORLD
LISTS ON APPLICATION.

EXTRA EQUIPMENT

SEATS.

Unless extra seats are ordered with a new vehicle, the Land-Rover is normally delivered with a driver's seat only, but either one or two passengers' seats may be easily installed at any time.

Each seat cushion is fitted with two rubber plugs which locate in holes in the seat-box, thus making it readily detachable but at the same time ensuring that it will not move when in use. The holes in the seat-box are covered with small plates secured by self-tapping screws and these must be removed and discarded when additional seats are to be installed. (Fig. 3).

The seat back-rests are secured to the back-rest panel by means of steel brackets which bolt to the top rail; the holes in the top rail are already pierced on all vehicles and the new back-rest may be easily secured using the bolts and nuts provided. (Fig. 35).

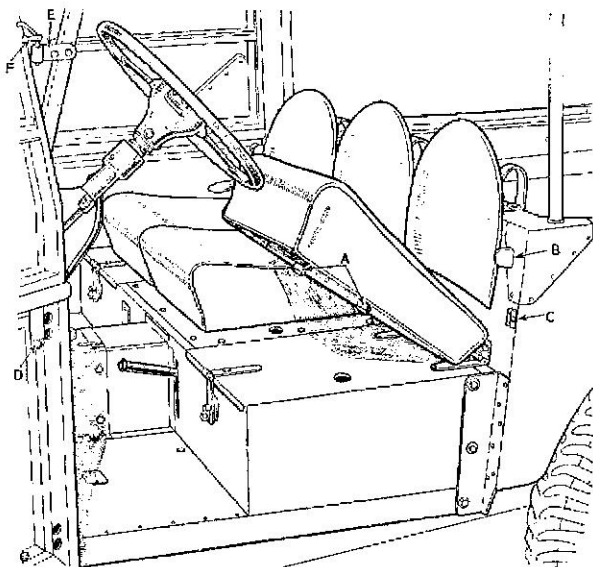


Fig. 35. Seat fitting.

A—Seat location buffers.
B—Angle stop piece.
C—Striking Plate.

D—Sidescreen securing nut
and washer.
E—Steady plate.
F—Steady arm.

DOORS.

The doors may be removed or replaced as shown in Fig. 37, with the sidescreen detached and the door panel swung forward parallel with the front wing.

Doors may be fitted to a vehicle not previously so equipped, in which case they are supplied complete with locks and rubber buffers already attached, but with the angle stop pieces, striking plates and fixings packed separately.

The procedure for fitting is as follows:

(i) Offer up the door in the "wide open" position to the female hinges welded to the scuttle and slide it downwards so that the hinge pins engage. Oil the hinges lightly and close the door.

(ii) Now fit the angle stop piece as shown in Fig. 36, and secure with the bolts provided; the fixing holes in the back-rest panel are slotted and the stop-piece should be adjusted prior to tightening the bolts, so that when the door is closed the upper rubber buffer is slightly compressed against the stop and the lower one against the side of the seat-box, so that the door panel is flush with the body panel.

(iii) Slide the striking plate between the door and the body, level with the door catch and hold it inwards tightly against the catch; scribe lines along the top, bottom and outer edges of the striking plate on the body panel to locate its correct position. Open the door and, using the striking plate offered up within the scribed lines as a template, drill the three $\frac{3}{16}$ " clearance fixing holes; fit the striking plate and secure with the screws provided. Close the door once more, check that the door catch engages with the inner jaw of the striking plate and that there is no rattle.

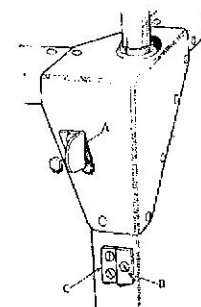


Fig. 36. Fitting striking plate.

A—Angle stop piece. B—Striking plate.
C—Door catch must engage with this jaw.

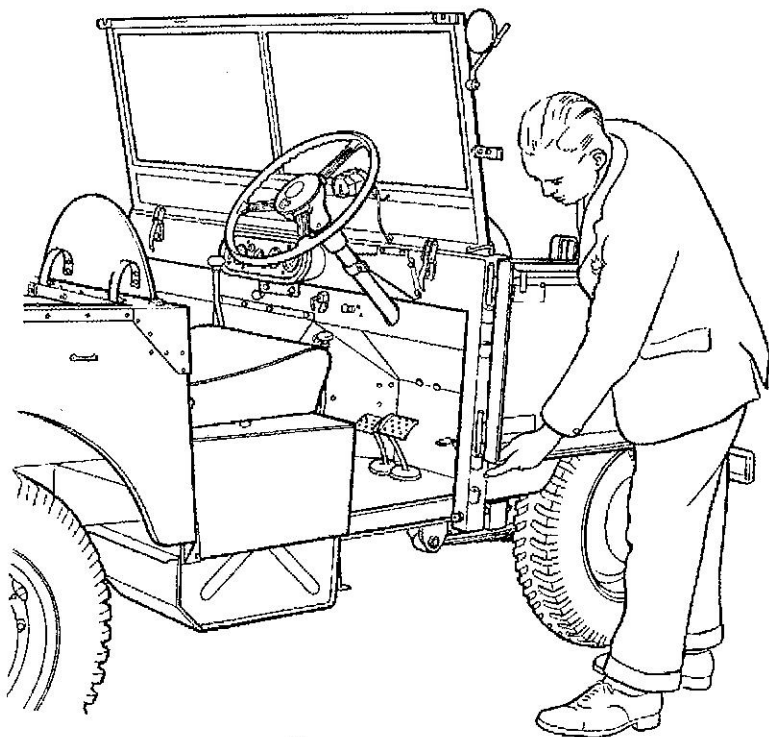


Fig. 37. Door fitting.

SIDESCREENS.

The method of fitting the sidescreens is shown in Fig. 38 ; secure with nuts and washers on the fixing pins to prevent rattles (Fig. 35). When fitting a sidescreen to a vehicle not previously so equipped, it will also be necessary to fit the steady plate to the windscreen frame. Having fitted the sidescreen, push the steady plate on to the steady arm welded to the sidescreen frame and bolt it to the windscreen, using the bolts provided. The steady plate may, of course, be left in position whenever the sidescreen is subsequently removed.

HOODS.

Two types of hood are available for the Land-Rover, known as the "3-seater" pattern (Fig. 44) which covers the front seat only and the "7-seater" which encloses the complete vehicle (Fig. 39) ; a detachable rear curtain (Fig. 41) is supplied with each type of hood. In conjunction with the doors and sidescreens, complete all-weather protection is thereby ensured.

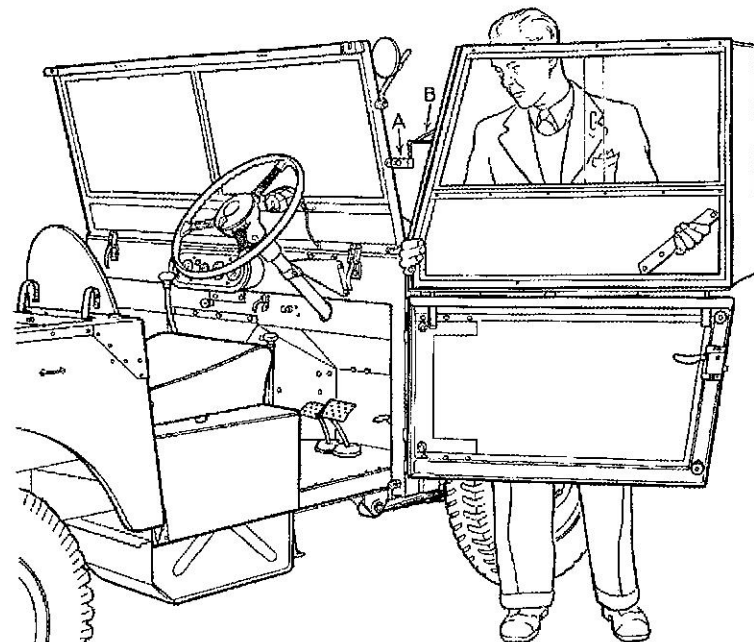


Fig. 38. Side-screen fitting.

A—Steady plate.

B—Steady arm.

Fitting the 7-seater Hood.

Select the two hood-sticks; these are large U-shaped tubular members, the rear one having two flat staples on the top rail. Slacken off the thumbscrews (C) below the sockets inside the rear corners of the body, insert the rear hood-stick (B) in the sockets and tighten the screws. Fit the front hood-stick (A) in a similar manner. (Fig. 41).

Next select the four thin cranked tubular stays which are fitted between the windscreen and hood-sticks. The two shorter stays (D) with thumbscrews at one end should be fitted between the windscreen and front hood-stick so that the cranks throw the stays outwards; at each end the slot slips down behind the washer under the thumbscrew on the bracket. Fit the longer stays (E) in a similar way between the front and rear hood-sticks and tighten the four thumbscrews (F). (Fig. 40).

Four long webbing straps are supplied, two of which have hooks at one end whilst the others have buckles attached some way from the ends. Attach the hooked straps (G) to the special loops provided on the windscreen top rail (open ends of the hooks downwards) and buckle the other ends to the top rail of the front hood-stick, so that the straps are taut. Now buckle the other top straps (H) to the front hood-stick, adjacent to the front

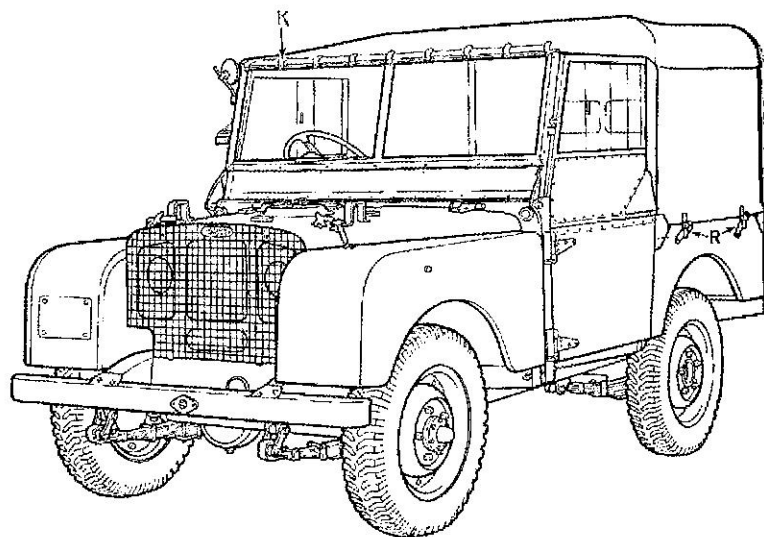


Fig. 39. 7-seater head.

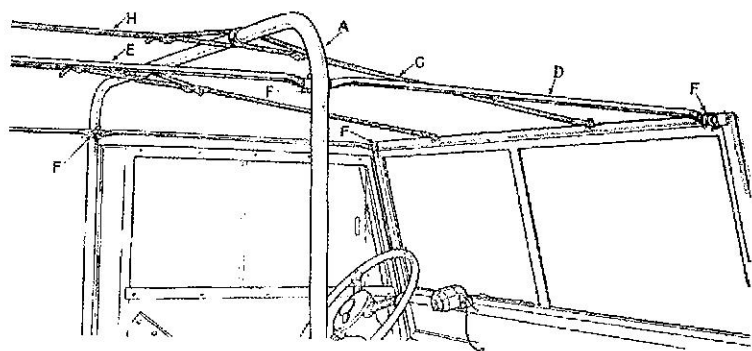


Fig. 40. Front hood straps and stays.

A—Front hood-stick.
B—Rear hood-stick.
C—Front tension strap.
D—Front hood stay.
E—Rear hood stay.
F—Thumbscrews securing stays.
G—Front tension strap.
H—Rear tension strap.
K—Front hood eyes.
R—Side securing strap.

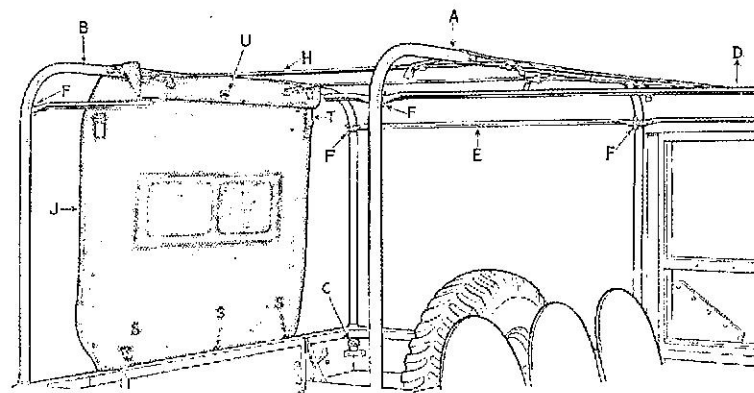


Fig. 41. Rear hood straps and stays.

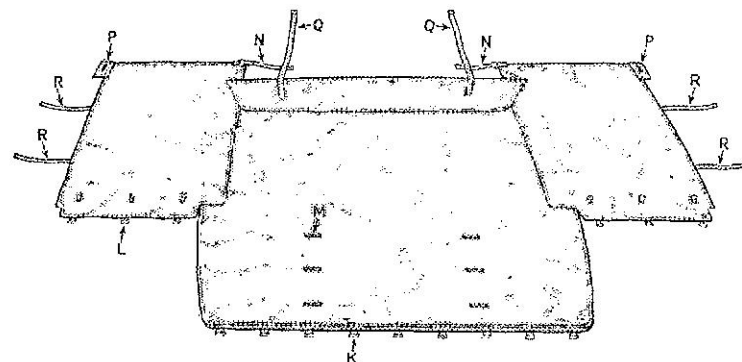


Fig. 42. 7-seater hood.

A—Front hood-stick.
B—Rear hood-stick.
C—Socket.
D—Front hood stay.
E—Rear hood stay.
F—Thumbscrews securing stays.
H—Rear tension strap.
J—Rear curtain.
K—Front hood eyes.
L—Hood securing eyes at front hood-stick.
M—Webbing loops.
N—Top valance strap.
P—Leather tongue.
Q—Rear straps securing curtain.
R—Side securing strap.
S—Curtain fixing clip.
T—Top curtain strap.
U—Eye for securing rear curtain.

straps; fold the edge of the rear curtain (J) over the top member of the rear hood-stick, pass the ends of the straps through the metal eyes in the curtain and buckle the straps taut. Fig. 41). The webbing loops on the rear curtain should be on the outside and the straps (T) at the top corners should not be fastened at this stage.

Place the hood over the hood-sticks and engage the eyes (K) at the front with the hooks on the outside of the top rail of the windscreen. The front sides of the hood may now be wrapped round the upright members of the front hood-stick; secure them by placing the eyes (L) over the wire loops and threading the webbing tongues through the loops. Unhook the front roof-straps from the windscreen, thread them through the webbing loops (M) sewn to the inside of the hood top, re-fasten them to the windscreen and tension. (Fig. 42).

Draw the rear valances round the upright members of the rear hood-stick; pass the straps (N) at the top corners of the valances over the top member, down through the staples and buckle them up. Now push the leather tongues (P) at the bottom of the valances over the staples on the body on either side of the tail-board; pass the long webbing straps (Q) (sewn to the top rear of the hood) down through the loops on the sides of the rear curtain, thread them through the staples to retain the leather tongues and buckle them up. (Fig. 43).

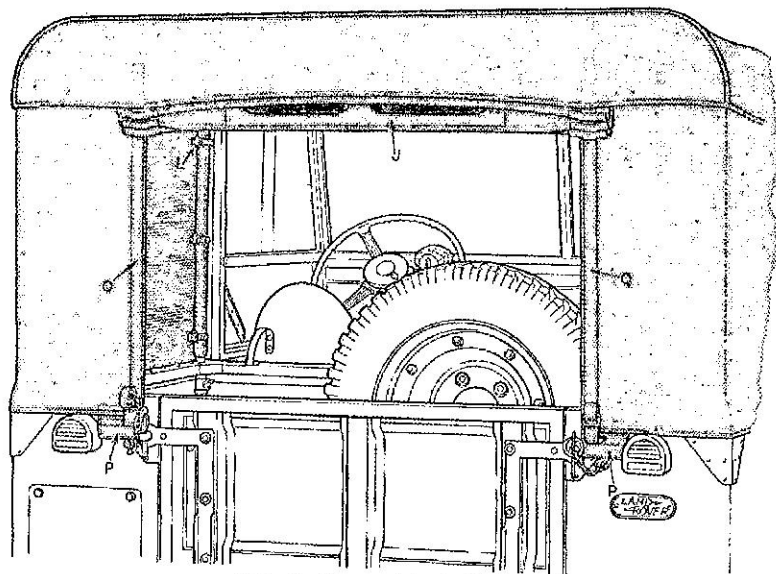


Fig. 43. Rear curtain installation.

J—Rear Curtain.
L—Hood securing eyes.
P—Leather tongue.
Q—Rear straps securing curtain.

Strap the sides of the hood (R) to the staples on the body (two on each side) and hook the three alloy clips (S) at the bottom of the rear curtain under the top rail of the tail-board. Finally attach and tighten the straps (T) at the top corners of the rear curtain to the top member of the hood-stick.

If it is desired to raise the rear curtain without removing it completely, detach the alloy clips from the tail-board and slide the curtain up the straps to the top; hook the centre clip into the elongated eye (U) in the centre at the top and tuck up the corners neatly.

Fitting the 3-seater Hood.

Slacken off the thumbscrews below the sockets inside the front corners of the body, insert the large U-shaped hood-stick (A) in the sockets and tighten the screws. (Fig. 41). Then fit the two stays (D) between the windscreen and the hood-stick, securing them at each end by means of the thumbscrews (F).

Attach the hooked ends of the two long webbing straps (G) to the loops on the windscreen top rail (open ends of the hooks downwards). Fold the edge of the rear curtain (J) over the top member of the hood-stick, pass the ends of the straps through the metal eyes in the curtain and buckle the straps taut (Fig. 41); the webbing loops on the rear curtain should be on the outside and the straps (T) at the top corners should not be fastened at this stage.

Place the hood over the hood-stick and straps and engage the eyes (K) at the front with the hooks on the outside of the

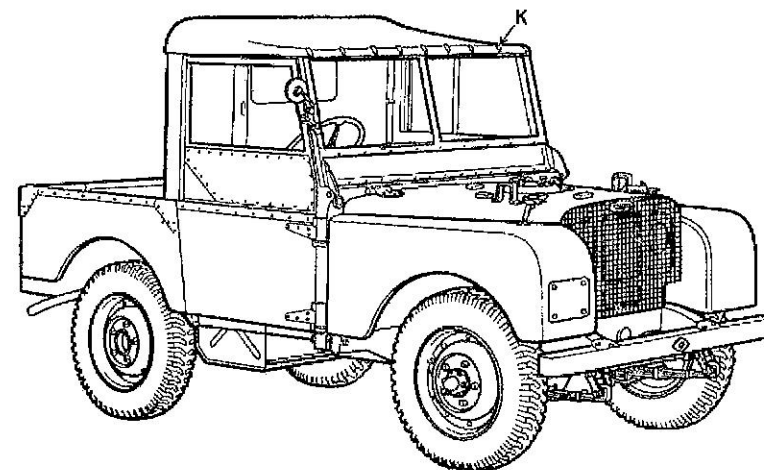


Fig. 44. 3-seater hood.
K—Front hood eyes.

windscreen top rail. The sides of the hood may now be wrapped round the upright members of the hood-stick; secure them by placing the eyes (L) over the wire loops and threading the webbing tongues through the loops. Unhook the roof tension straps (G) from the windscreen, thread them through the webbing loops (M) sewn to the inside of the hood top, re-fasten them to the windscreen and tension. (Fig. 42).

Secure the rear valances by passing the top straps (N) over the top member, down through the staples and buckling them up; secure the bottom straps to the outer staples on the seat back-rest panel.

Now pass the long webbing straps (Q), sewn to the top rear of the hood, down through the loops on the sides of the rear curtain and secure them to the inner staples on the seat back-rest panel.

Hook the three alloy clips (S) at the bottom of the rear curtain under the top rail of the seat back-rest and finally attach and tighten the straps (T) at the top corners of the rear curtain.

If it is desired to raise the rear curtain without removing it completely, detach the alloy clips from the back-rest panel rail and slide the curtain up the straps to the top; hook the centre clip into the elongated eye (U) in the centre at the top and tuck up the corners neatly.

TRAFFICATORS

Provision is made on the Land-Rover for trafficators, which can either be fitted to order on a new vehicle or supplied later as extra equipment. (Fig. 45).

The operation switch, mounted on the windscreen panel, should be moved through about 45° in the direction of the proposed turn; it must be returned by hand to the central "OFF" position when the turn has been completed.

PASSENGER'S HAND-RAIL

A hand-rail can be fitted for the convenience of front seat passengers when traversing rough ground. It is mounted on the dash as shown in Fig. 45.

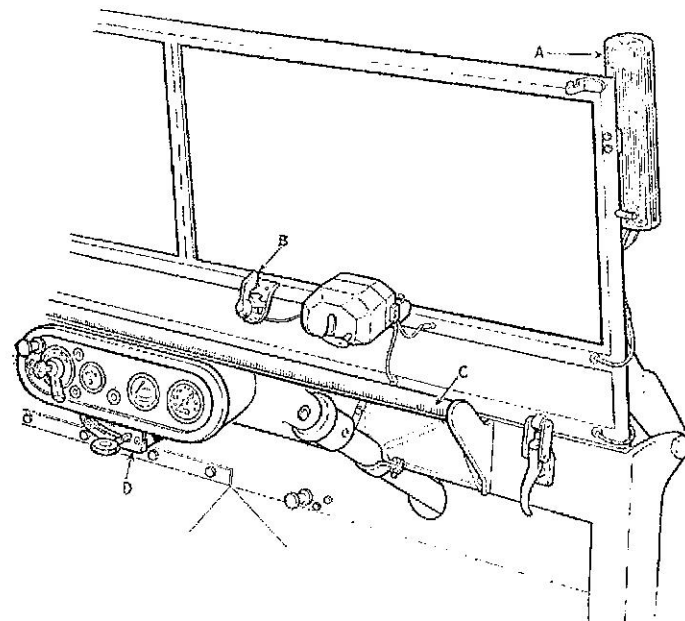


Fig. 45. Trafficators and hand-rail.

A—Trafficator.

B—Trafficator switch.

C—Hand-rail.

D—Governor control quadrant.

SPARE WHEEL CARRIER

The spare wheel is normally stowed in the depression in the body floor as shown in Fig. 2, being retained by means of a clamp and wing-nut. When it is desired to utilise the entire body space for load-carrying, an alternative carrier for the spare wheel mounted on the bonnet top can be supplied (Fig. 1).

The mounting plate is secured to the bonnet panel with nine rivets and includes two clamps and captive bolts which clamp over the inner edge of the wheel. To ensure even weight distribution, four support blocks are supplied which should be bolted to the panel so that the weight is taken on the tyre wall; the two thick blocks should be used at the sides and the thin ones at front and rear. (Fig. 44).

With the spare wheel carried on the bonnet in this way, it is not possible to fold the windscreen into the horizontal position.

TOWING ATTACHMENTS

Two forms of towing attachment can be supplied as extra equipment for the Land-Rover—a towing plate and a pintle-pin and bracket.

TOWING PLATE.

The towing plate is designed to suit a large variety of farm appliances and machinery, this fact being well shown by the notes which follow regarding the different positions in which it may be fixed to the rear of the chassis. (Fig. 46).

The rear drawbar (integral with the chassis rear cross-member) has ten holes at 3 in. (75 mm.) centres along its length, whilst the towing plate is provided with two fixing holes at 6 in. (150 mm.) centres, so that it may be secured at any point along the drawbar.

As the plate is cranked 1 in. (25 mm.) and the standard fixings supplied include distance pieces 1 in. (25 mm.) long, it can be fitted to give any one of eight different heights of the towing eye, ranging from 9 $\frac{3}{4}$ in. (248 mm.) above ground level (or 9 $\frac{1}{4}$ in. (235 mm.) below the centre of the power take-off splined output shaft) to 14 $\frac{1}{2}$ in. (368 mm.) above ground level (or 4 $\frac{1}{2}$ in. (114 mm.) below the take-off shaft).

The towing hole in the plate is $\frac{7}{8}$ in. (22.2 mm.) dia., positioned 8 $\frac{9}{16}$ in. (205 mm.) to the rear of the fixing holes (1 $\frac{1}{8}$ in. (35 mm.) to the rear of the end of the output shaft).

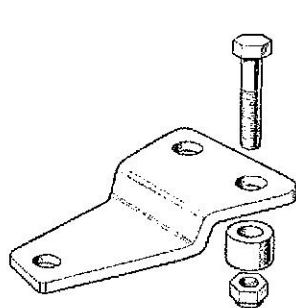


Fig. 46. Towing plate.

PINTLE-PIN AND BRACKET.

This item comprises a jaw-bracket bolted to the centre of the rear chassis cross-member and the normal type pintle-pin retained by a chain; it can be used for towing a trailer of almost any pattern (Fig. 47). Provision is also made for connections to stop and tail lamps at the rear of the trailer if required. A three-pin plug, which is normally protected by a rubber socket when not in use, is fitted as standard in the right-hand side of the rear chassis cross-member, and a suitable socket complete with

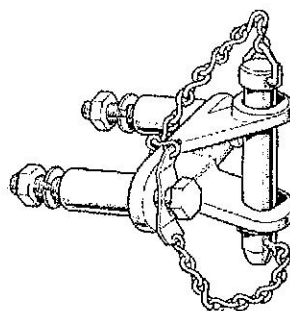


Fig. 47. Pintle jaw.

12 ft. (3.65 m.) of cable can be supplied as an extra item of equipment. The three pins in the plug are numbered and the connections are as follows:—

No.	Position	Cable colour	
1	Top	Black	Earth to stop, tail lamp casing
2	Bottom L.H.	Green with purple	Feed to stop lamp
3	Bottom R.H.	Red	Feed to tail lamp

COMBINE HARVESTER TOWING PLATE.

A special towing plate can also be supplied to order, to suit standard combine-harvester equipment. It is secured to the rear drawbar in a similar way to the towing plate described above.

POWER TAKE-OFF UNITS

The lay-out of the Land-Rover transmission has been arranged so that power take-off drives for auxiliary equipment can be taken from two points. A pulley drive fitted immediately behind the gearbox (called the centre power take-off) can be used for driving appliances such as an arc welder or compressor mounted on the vehicle, while the take-off unit at the rear, with spline and pulley drive, is for the purpose of driving all kinds of farm machinery, both stationary and towed. Either or both of these drives may be readily installed at any time and their presence in no way affects normal operation of the vehicle.

The drive is taken through a dog-clutch on the rear of the gearbox mainshaft and incorporates a flanged output shaft (Fig. 6). Selector mechanism is bolted to the top of the transfer casing, the selector lever being accessible through the hinged cover plate in the centre of the seat-box (Fig. 3), to engage the power take-off drive, the selector knob must be pushed forward.

No maintenance attention is required at this point, as lubrication is provided by the oil in the transfer casing.

When either pattern of power take-off drive is fitted, an engine governor is usually incorporated and full instructions for its use will be found on Page 103.

CENTRE POWER TAKE-OFF.

The driving pulley, usually of the multi-belt pattern, is supplied with the special equipment to be mounted in the vehicle and bolts directly on to the flanged output shaft. Appropriate

operating instructions will be given by the equipment manufacturer, but mention must be made here of one important maintenance point. When multiple drive belts are used, it is essential that each belt carry an equal share of the load. Some stretching of the belts will occur in service, so that should one break or become damaged, all must be replaced. In the event of the belts being removed at any time, they should be marked and replaced in the same pulley grooves as originally fitted.

With belts of the "V" type, the drive is taken on the sides and it is not therefore necessary to adjust them tightly and so put an excessive load on the pulley bearings. The tension is correct when it is possible to depress the belts by thumb pressure approximately $\frac{1}{2}$ in. to 1 in. (12 mm. to 25 mm.) at a point midway between the pulleys.

As the pulley drive is taken from the rear of the gearbox, it follows that the pulley speed will vary with the ratio selected in the main gearbox and a wide speed range is thus obtainable. The table below gives the pulley speed in each gear for each position of the governor control; reference should always be made to this chart to enable the operating speed of the equipment to be set as nearly as possible to that recommended by the manufacturer.

CENTRE POWER TAKE-OFF PULLEY R.P.M.

Governor position	Engine R.P.M.	MAIN GEAR CHANGE LEVER IN :			
		First	Second	Third	Top
1	1500	500	735	1010	1500
2	1650	550	810	1110	1650
3	1800	600	880	1210	1800
4	1950	650	955	1310	1950
5	2100	700	1030	1410	2100
6	2250	750	1100	1510	2250
7	2400	800	1175	1610	2400
8	2550	850	1250	1710	2550
9	2700	900	1320	1810	2700
10	2850	950	1395	1915	2850
11	3000	1000	1470	2015	3000

When it is desired to use the power take-off with the vehicle stationary, the transfer change lever must be set in the neutral (central) position. To engage the drive, set the engine at idling

speed, depress the clutch pedal, engage the required gear in the main gearbox and with the clutch pedal still depressed, engage the take-off drive by pushing the selector lever forward, easing the clutch as necessary to obtain engagement; release the clutch pedal and move the governor quadrant control to the required position.

To disengage the drive, move the governor control to the lowest position, depress the clutch pedal, disengage the take-off drive and return the main gear change lever to neutral. Before re-engaging the drive, always allow the driven equipment to "coast" to a stand-still, to prevent undue strain on the drive mechanism.

When selecting governor and gear-change lever positions to arrive at the correct speed for driving any particular item of equipment (with the vehicle stationary) the aim should always be to choose as high a gear ratio as possible, provided that the throttle is not fully open when working under load. The use of a high gear will keep the engine speed down to a minimum and so result in economical fuel consumption.

In cases where the equipment is to be driven with the vehicle on the move, the gear and governor positions selected will of course be dictated to a large extent by the vehicle speed required, but an endeavour should be made to keep the main gearbox ratio as high as possible. The vehicle speeds in all combinations of gears and governor positions are given in the chart on Page 101.

REAR POWER TAKE-OFF.

The rear power take-off unit, mounted on the rear chassis cross-member, is driven by a propeller shaft from the flanged output shaft at the rear of the gearbox; the standard six-splined output shaft (ten splines on early vehicles) is on the centre-line

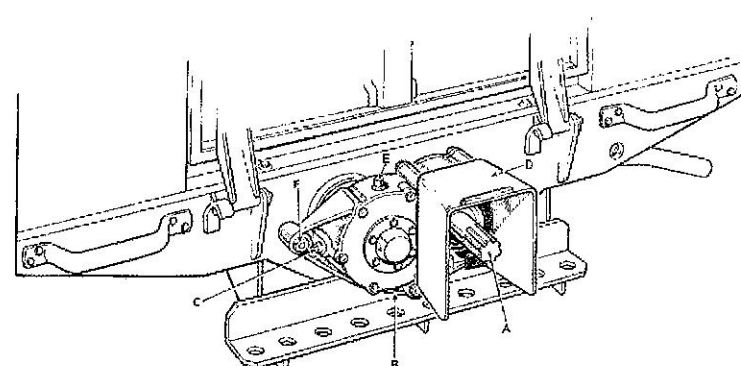


Fig. 48 Rear power take-off.

- A—6-splined output shaft.
- B—Drain plug (under casing).
- C—Oil level/filler plug.
- D—Shield for output shaft.
- E—Breather.
- F—Three attachment bolts.

of the vehicle and provides power for towed equipment, such as a mower, binder, etc. (Fig. 48).

A grease nipple is provided at the sliding joint on the propeller shaft and this should be lubricated at intervals of 500 hours, using one of the greases listed on Page 32.

The power take-off housing is provided with a drain plug and a combined oil level/filler plug at the side. Check the oil level every 30 hours by removing the level plug ; if any oil runs out, allow it to do so, but if the level is low add oil of the correct grade (Page 32) until it reaches the bottom of the level hole. Replace the plug securely.

The oil should be completely drained after the first 25 hours' running and thereafter at every 100 hours, by removing the drain plug in the bottom of the housing. Refill with new oil (Page 32) to the bottom of the level hole ; the capacity of the unit is approximately 1 pint (0.60 litre).

Selection of the most satisfactory positions for the governor quadrant control, main gear-change lever and transfer gear-change lever will depend on various factors :—

- (i) Type of ground to be negotiated.
- (ii) Power required to pull any particular item of equipment.
- (iii) Crop conditions.
- (iv) Recommended speed for the equipment to be used.

The table below gives the vehicle and output shaft speeds for all positions of the governor control and in all gears ; this should be used to arrive at the correct relationship between the vehicle and take-off shaft speeds for the particular job in hand.

When the rear power take-off is to be used with the vehicle stationary, the transfer lever must be placed in the neutral position ; for all other work, the correct transfer ratio must be used, as shown in the chart. The procedure for engaging and disengaging the drive is identical with that for the centre power take-off (Page 98) ; certain farm machines will be damaged if driven in reverse and care must be taken in such cases to disengage the take-off drive when it is desired to reverse the vehicle.

A guard is provided for the splined output shaft and this should always be fitted to ensure the safety of the operator.

REAR POWER TAKE-OFF

Shaft Speeds (R.P.M.) and Vehicle Speeds (M.P.H.) (with 4.7—1 Axle Ratio, 6.00/16 Traction Tyres and 5:6 Power Take-off Reduction).

Governor position	Transfer Box In	MAIN GEAR CHANGE LEVER IN :								Engine Speed
		FIRST		SECOND		THIRD		TOP		
		Take-off R.P.M.	Vehicle Speed	Take-off R.P.M.	Vehicle Speed	Take-off R.P.M.	Vehicle Speed	Take-off R.P.M.	Vehicle Speed	
1	Low	415	3.0	610	4.4	840	6.0	1250	8.9	1500
	High	415	7.5	610	11.0	840	15.0	1250	22.5	
2	Low	460	3.3	670	4.8	920	6.6	1375	9.8	1650
	High	460	8.3	670	12.0	920	16.5	1375	25.0	
3	Low	500	3.6	735	5.3	1010	7.2	1500	10.5	1800
	High	500	9.0	735	13.0	1010	18.0	1500	27.0	
4	Low	540	3.9	795	5.7	1090	7.8	1625	11.5	1950
	High	540	9.8	795	14.5	1090	19.5	1625	29.0	
5	Low	585	4.2	855	6.1	1175	8.4	1750	12.5	2100
	High	585	10.5	855	15.5	1175	21.0	1750	31.5	
6	Low	625	4.5	920	6.6	1260	9.0	1875	13.5	2250
	High	625	11.5	920	16.5	1260	23.0	1875	34.0	
7	Low	670	4.8	980	7.0	1340	9.6	2000	14.5	2400
	High	670	12.0	980	17.5	1340	24.0	2000	36.0	
8	Low	710	5.1	1040	7.4	1425	10.0	2125	15.0	2550
	High	710	13.0	1040	19.0	1425	25.5	2125	38.0	
9	Low	750	5.4	1100	7.9	1510	11.0	2250	16.0	2700
	High	750	13.5	1100	20.0	1510	27.0	2250	40.5	
10	Low	790	5.7	1160	8.3	1590	11.5	2375	17.0	2850
	High	790	14.0	1160	21.0	1590	28.5	2375	42.5	
11	Low	835	6.0	1225	8.8	1650	12.0	2500	18.0	3000
	High	835	15.0	1225	22.0	1650	30.0	2500	45.0	

REAR PULLEY DRIVE.

The 8 in. (200 mm.) rear pulley unit (Fig. 49) is so designed that it may be attached to the rear drive unit in place of the guard by means of four spring washers and nuts, thus making for easy installation and removal.

A combined oil level/filler plug is provided at the side of the housing. Check the oil level every 30 hours by removing the plug ; if any oil runs out, allow it to do so, but if the level is low

add oil of the correct grade (Page 32), until it reaches the bottom of the level hole. Replace the plug.

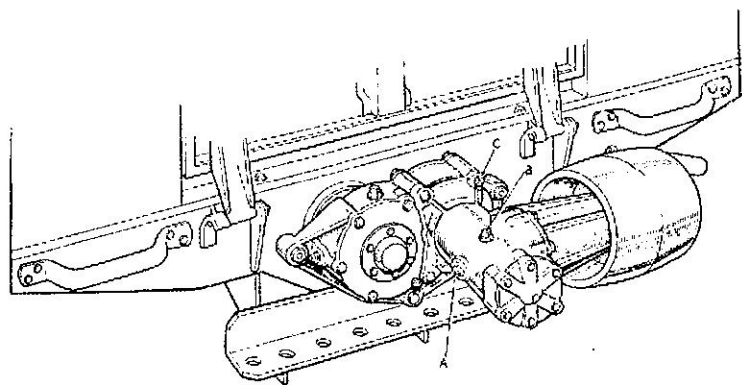


Fig. 49. Rear pulley drive.

- A—Oil level/filler plug.
B—Breather.
C—Four attachment points.

The oil should be completely drained after the first 25 hours' running and thereafter at every 100 hours ; refill with new oil (Page 32) to the bottom of the level hole ; the capacity of the unit is approximately $\frac{3}{4}$ pint (0,50 litre).

It is most important to ensure alignment of the belt in the centre of the pulley and also to obtain the correct tension on the belt ; the belt tension is correct when the hand-brake will hold the vehicle and the two sides of the belt cannot be compressed completely together by hand at a point midway between the vehicle and the driven machine.

The table below gives the pulley speed in each gear for each position of the governor control ; reference should always be made to this chart so that the operating speed can be set as nearly as possible to that recommended by the equipment manufacturer. When selecting governor and gear-change lever positions to arrive at the correct driving speed, the aim should always be to choose as high a gear ratio as possible, provided that the throttle is not fully open when working under load. The use of a high gear will keep the engine speed down to a minimum and so result in economical fuel consumption.

REAR POWER TAKE-OFF PULLEY. R.P.M.

Governor position	Engine Speed	MAIN GEAR CHANGE LEVER IN :			
		First	Second	Third	Top
1	1500	360	525	720	1070
2	1650	390	575	790	1180
3	1800	430	630	865	1285
4	1950	465	680	935	1390
5	2100	500	735	1010	1500
6	2250	540	785	1080	1610
7	2400	570	840	1150	1715
8	2550	610	890	1225	1820
9	2700	645	945	1295	1930
10	2850	680	995	1365	2035
11	3000	715	1050	1440	2145

CHAFF GUARD

A fine-mesh chaff guard can be supplied as an extra component to prevent the radiator becoming clogged when the vehicle is used for farm work such as reaping, etc.

The guard is clamped behind the existing radiator grille by means of the grille securing bolts.

ENGINE GOVERNOR

An engine governor can be supplied as extra equipment, the use of which is essential when either the centre pulley or rear power take-off pulley is utilised ; it would also be found most convenient for many jobs necessitating use of the rear splined output shaft.

It is mounted on a bracket (B) affixed to the front of the thermostat housing (Fig. 50) and is belt-driven from the front groove of the water pump and fan pulley.

The two lower fixing holes in the mounting bracket are slotted to allow for belt adjustment ; the tension is correct when it is possible to depress the belt by thumb pressure approximately

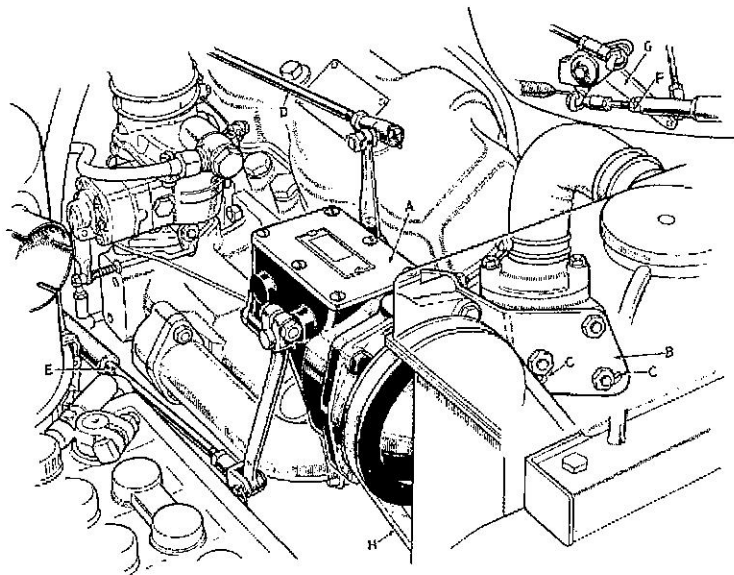


Fig. 50. Engine governor.

- | | |
|--------------------------------|-----------------------------------|
| A—Governor. | E—Linkage to throttle. |
| B—Mounting bracket. | F—Adjustment on throttle linkage. |
| C—Adjustment slots. | G—Carburettor bell-crank. |
| D—Linkage to quadrant control. | H—Driving belt. |

$\frac{1}{2}$ in. (12 mm.) at a point midway between the fan and governor pulleys. Connection to the throttle linkage is by rod (E) which is provided with a length adjustment (F) at the bell-crank end. The link (D) connects the governor to the operating lever and quadrant mounted on the scuttle panel below the instrument board. (Fig. 45).

The quadrant has notches giving 12 positions for the operating lever. The notch to the extreme right is for use when the governor is not required and with the lever in this position the throttle opening is not influenced by the governor mechanism. In order to bring the governor into operation, the control lever must be moved to the left into one of the remaining 11 notches; with the lever in the first operating notch, the throttle is opened until the engine is running at 1,500 R.P.M. and the governor will then allow for variations in load applied at the power take-off, so controlling the engine speed at that figure. Each succeeding notch represents an increase in engine speed of 150 R.P.M. so that the eleventh and last notch on the extreme left of the quadrant will provide an engine speed of 3,000 R.P.M.

Instructions for selecting the correct governor control position are given in the "POWER TAKE-OFF UNITS" section.

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READING - T. Baker & Sons, Friar Street.
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RUGBY - Sam Robbins Ltd., Bilton Road.
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Telephone: Jersey Cen. 55.
Telegrams: Motors, Jersey.

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Telegrams: Garage Vulcain, Tangier.

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Kyber Pass Motors, 42, Kitchener Street, AUCKLAND C.1., New Zealand.
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Telegrams: Kypam.
Wellington Motors Ltd., 189, Willis Street, WELLINGTON C.2., New Zealand.
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Telegrams: Not to hand.

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Telephone: Centralbord 58985.
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Telephone: 2225/7.
Telegrams: Jondew, Calcutta.

PAKISTAN (WEST) - Dewar's Garage and Engineering Works, P.O. B.893, 4, Grant Road, KARACHI, Pakistan.
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Telegrams: Not to hand.

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Telephone: Not to hand.
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Telephone: 63467.
Telegrams: Victorgar, Lisbon.

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Telephone: Not to hand.
Telegrams: Not to hand.

RHODESIA (SOUTHERN) Puzey and Payne, Kingsway, SALISBURY, Southern Rhodesia.
Telephone: 2392.
Telegrams: Dodge, Salisbury.

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Telegrams: Mitcotts.

SPAIN - - Petrolifera Transportes S.A., Menorca 16, MADRID, Spain.
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Telegrams: Leymotors, Madrid.

Romagosa y Compania, Valencia 295, BARCELONA 9, Spain.
Telephone: 80181.
Telegrams: Carbauto, Barcelona.

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Telegrams: Wikmanlund, Stockholm.

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Telegrams: Autobaum, Zurich.

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Telegrams: Not to hand.

TANGANYIKA - See KENYA.

TRANSJORDAN - See PALESTINE.

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Telephone: 26886-23378.
Telegrams: Horatorsa, Montevideo.

U.S.A. - - Plimley Automobile Co. Ltd., 654, Burrard Street, VANCOUVER B.C., Canada.
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Telegrams: Plimley.

TECHNICAL SERVICE

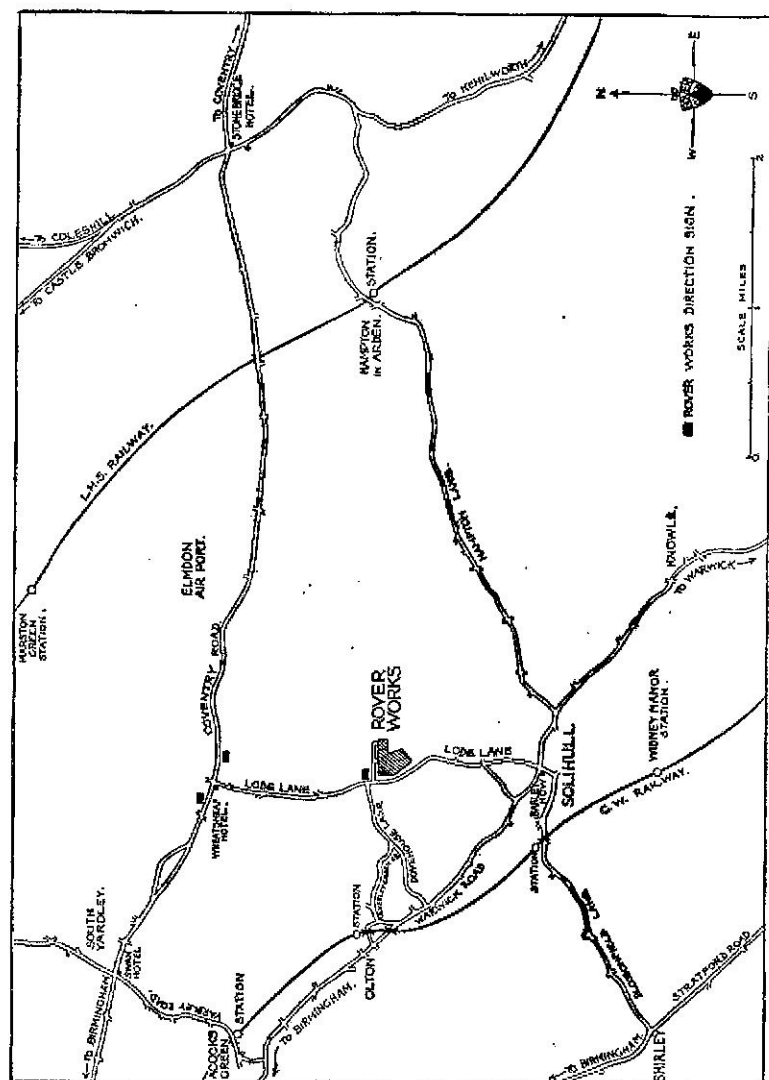


Fig. 51. Map showing location of our Solihull Works.

Instructions are given in this book for items of routine maintenance to which due attention should be paid if smooth and efficient running of your Land-Rover is to be ensured.

In addition, however, there may be times when you desire additional information, either on repair work beyond the scope of this manual or when some difficulty is experienced.

We are always pleased to give such cases our special attention and to reply as fully as possible to any queries you may raise by letter or when you visit either of our Service Depots at Solihull and London. The map on the opposite page should assist you in finding our Solihull factory.

Complete instructions can be supplied for any operation which you may desire to carry out on your Land-Rover.

Should you contemplate taking your Land-Rover overseas, we can give assistance both from the point of view of the location of our dealers throughout the world as well as advice on spare parts, etc.

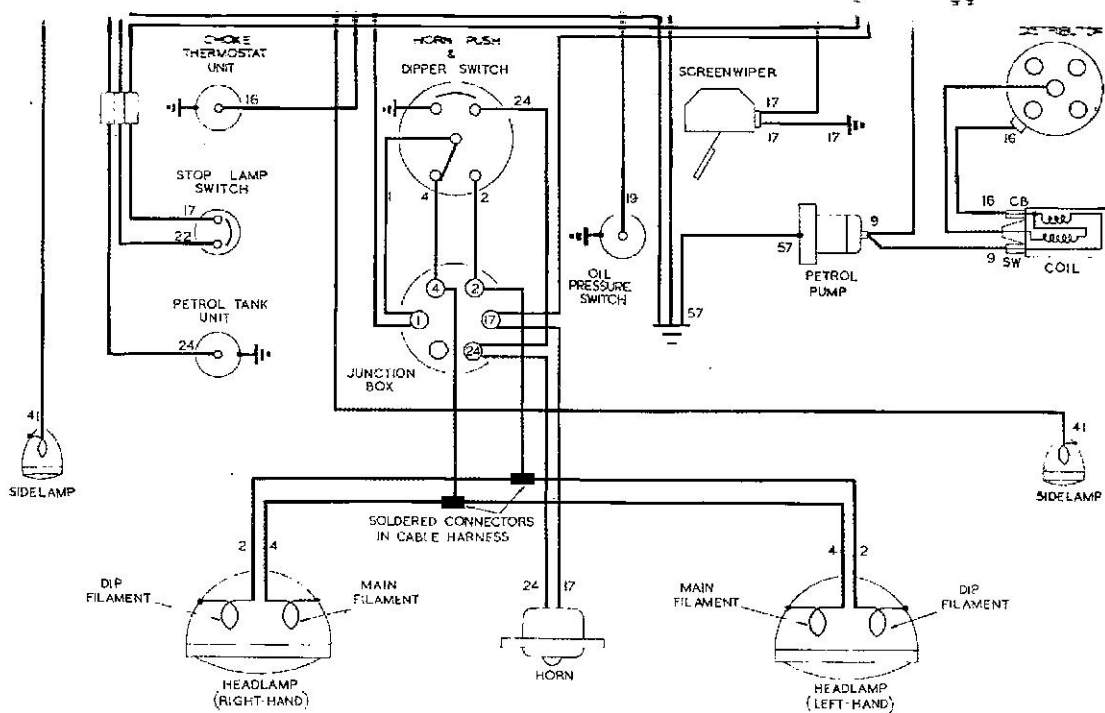
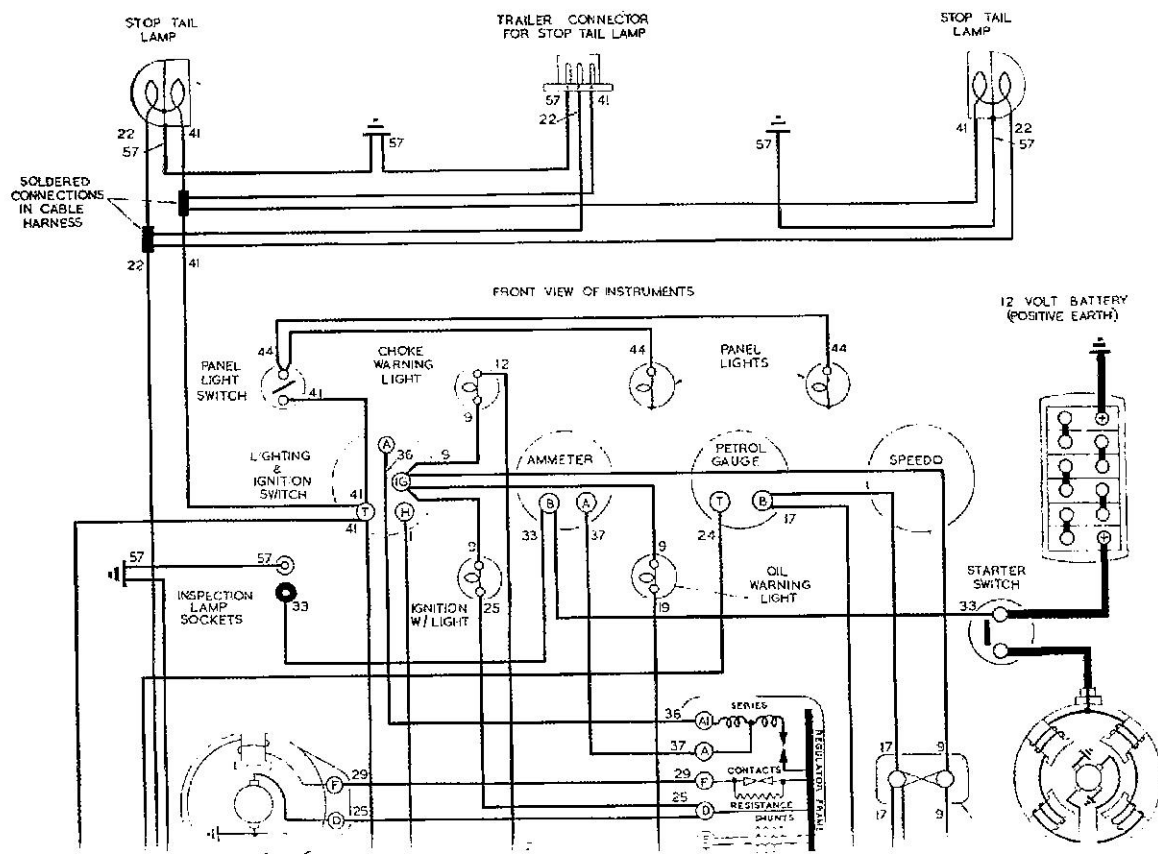
Please address enquiries under all these headings to:—

THE ROVER CO. LTD.,
TECHNICAL SERVICE DEPT.,
SOLIHULL,
BIRMINGHAM,
ENGLAND.

Telephone: SHELDON 2461.

Telegrams: Rovrepair, Solihull.

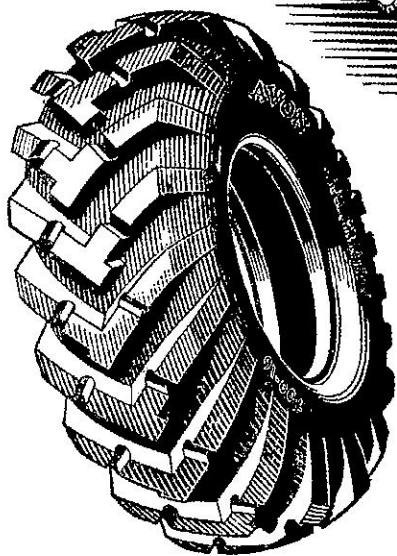
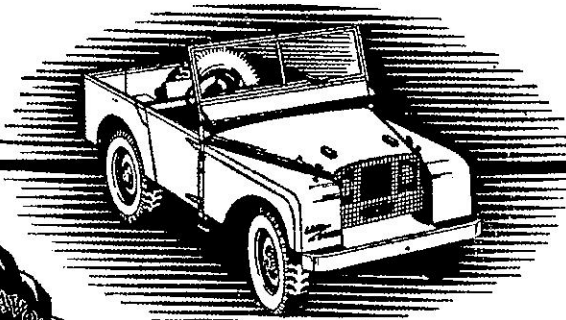
LAND-ROVER WIRING DIAGRAM



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
3 BLUE with YELLOW	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
4 BLUE with WHITE	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
5 BLUE with GREEN	18 GREEN with RED	31 YELLOW with BROWN	44 RED with WHITE	57 BLACK
6 BLUE with PURPLE	19 GREEN with YELLOW	32 YELLOW with BLACK	45 RED with GREEN	58 BLACK with RED
7 BLUE with BROWN	20 GREEN with BLUE	33 BROWN	46 RED with PURPLE	59 BLACK with YELLOW
8 BLUE with BLACK	21 GREEN with WHITE	34 BROWN with RED	47 RED with BROWN	60 BLACK with BLUE
9 WHITE	22 GREEN with PURPLE	35 BROWN with YELLOW	48 RED with BLACK	61 BLACK with WHITE
10 WHITE with RED	23 GREEN with BROWN	36 BROWN with BLUE	49 PURPLE	62 BLACK with GREEN
11 WHITE with YELLOW	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
12 WHITE with BLUE	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

The **LAND-
-ROVER**
is equipped with
AVON TYRES



*For use on exceptionally
soft surfaces*



For farm and road use

THE AVON INDIA RUBBER COMPANY LTD., MELKSHAM, WILTS. EST. 1885

