



**TRIUMPH
SPORTS CAR**

*Instruction
Book*

FIVE SHILLINGS

ERRATUM

Page 46 Fig. 28. Rear Axle Section.
For Commission No. TS.1300
read TS.13000.

INSTRUCTION BOOK

Part No. 501528/2

TRIUMPH SPORTS CAR TR 2 & TR 3

SECOND EDITION

FIRST PRINTING

Manufactured by

THE STANDARD MOTOR CO. LTD.

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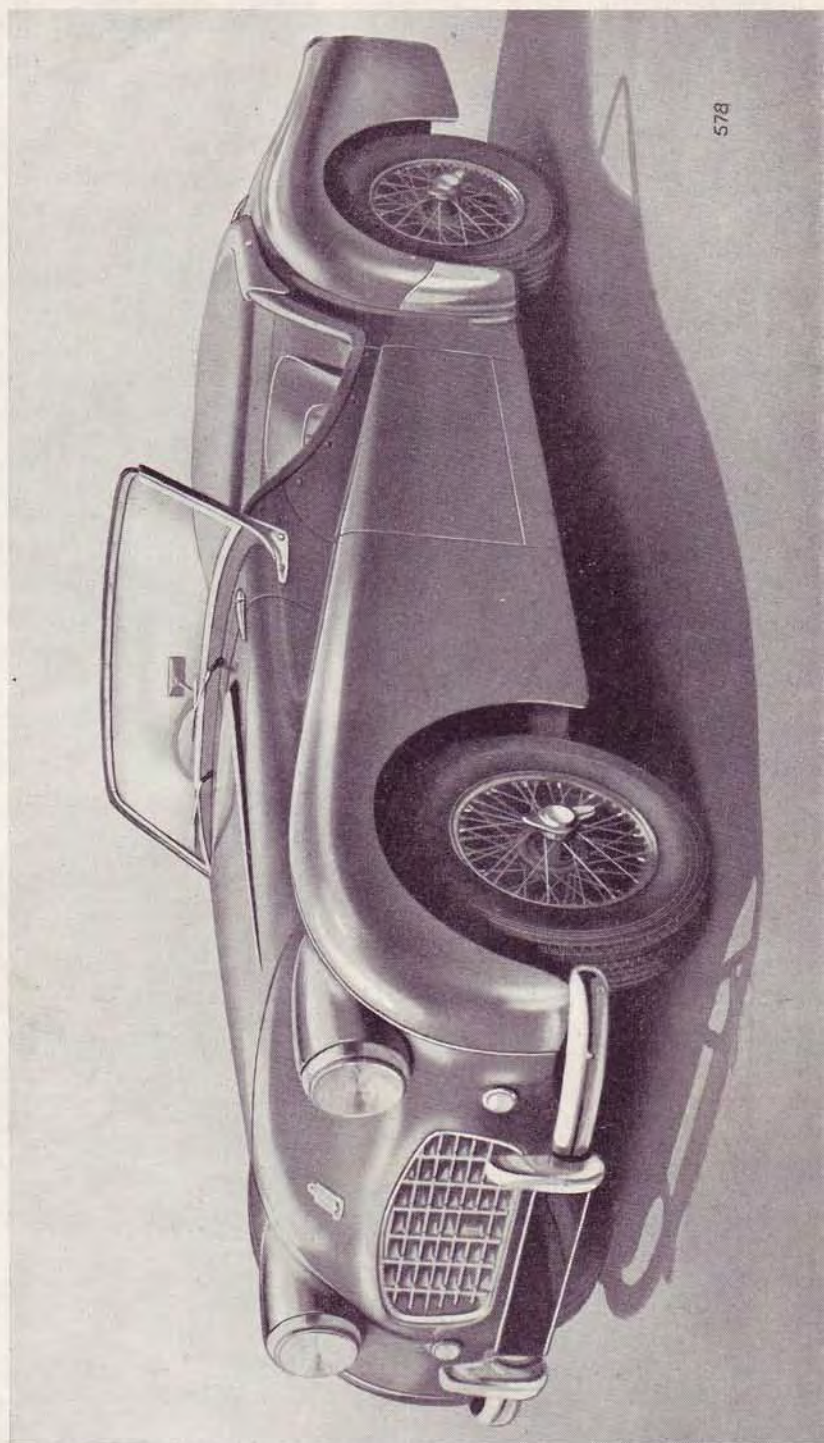
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THE TRIUMPH TR3 SPORTS CAR

FOREWORD

The vehicle has been designed so that a minimum of attention is required to keep it in satisfactory running order. There are, however, certain maintenance operations which must be undertaken regularly, and the object of this instruction book is to assist even the non-technical owner to understand the various operations required, and so ensure that the vehicle receives regular and correct attention.

If in any doubt about the vehicle's performance the owner should at once consult a Triumph dealer, preferably the one from whom the car was purchased. Triumph dealers are very carefully selected and are suitably equipped to give satisfactory and expert after sales service.

There is a Service School at the factory at which our dealers' representatives acquire a first hand knowledge of up-to-date service procedure. Valuable information is given regarding special methods and equipment which greatly assists in getting the various operations performed more expeditiously.

SPARE PARTS SERVICE

To ensure the best possible service on replacement parts it is important to note the following points :—

- (a) The policy of the Triumph Motor Company is not to supply spare parts direct to the general public, but all supplies are directed through Distributors who, in turn, will supply their Dealers. The name and address of the Distributors and Dealers can be obtained from the Service and Spares Directory included with each motor vehicle.
- (b) It is recommended that only "**Stanparts**" (*i.e.*, genuine Standard/Triumph spare parts) are used, only these carry a guarantee. Experience gained by the manufacturers ensures that only highest quality material is used and the strictest accuracy maintained in manufacture.
- (c) If in doubt about a particular part required, it is always advisable to give the vehicle commission number and engine number, in addition to the fullest description possible.

THE STANDARD CAR REVIEW is a journal published monthly which gives authentic information regarding the activities and products of The Standard & Triumph Motor Co. Ltd. It is obtainable from most Triumph dealers. Please write to the Publicity Department **for a free specimen copy.**

Owners of this model who wish to be kept informed of modifications and competition tuning hints should register as a member of the Triumph Sports Owners' Association; details are given in the booklet enclosed with this literature, or apply to the Publicity Dept., Triumph Motor Co. (1945) Ltd., Canley, Coventry, for a copy of the book, together with enrolment form.

The Company reserves the right, on the sale of any vehicle, to make before delivery, without notice, alterations to or departures from the specification, design or equipment, detailed, described or illustrated in this or other Company publications.

LICENCE DATA

Car number (Commission number)	.....	.....	.....	Plate on dash
Engine number	.....	.....	.....	On cylinder block
(Both numbers are to be seen by lifting the bonnet).				
Cubic capacity	.....	.....	.....	121.5 cu. in. (1991 c.c.)

GENERAL SPECIFICATION

Number of cylinders	.....	.....	.....	.....	4
Bore of cylinders	.....	.....	.....	.....	3.268 in. (83 mm.)
Stroke of crank	.....	.....	.....	.....	3.622 in. (92 mm.)
Compression ratio	.....	.....	.....	.....	8.5
Firing order	.....	.....	.....	.....	1, 3, 4, 2
Brake H.P. (Road Setting)	.....	.....	.....	TR2 90 at 4,800 r.p.m.	
				TR3 100 at 5,000 r.p.m.	

Oil Capacity

Engine	From Dry (see page 13)	11 pints	(6.25 litres)
	Drain and Refill	10 pints	(5.7 litres)
Gearbox		1½ pints	(0.8 litres)
„ with overdrive—From dry		3½ pints	(2.0 litres)
	Drain and Refill	2¾ pints	(1.6 litres)
Rear Axle		1½ pints	(0.8 litres)

Water Capacity of cooling system	.....	13 pints	(7.4 litres)
with heater fitted	.....	14 pints	(8 litres)

Fuel Capacity	.....	TR2 12½ galls.	(57 litres)
		TR3 12 galls.	(54.5 litres)

Dimensions:

Wheelbase	.....	7' 4"	(224 cm.)
Track—Front	.....	3' 9"	(114 cm.)
Rear	.....	3' 9½"	(116 cm.)
Ground clearance (under axle)	.....	6"	(15.2 cm.)
Turning circle (between kerbs)	.....	32' 0"	(9.75 metres)
	with disc brakes	35' 0"	(10.6 metres)
Tyre size	.....		5.50"—15"

Overall Dimensions:

Length	.....	12' 7"	(384 cm.)
Width	.....	4' 7½"	(141 cm.)
Height (unladen)—Hood erect	.....	4' 2"	(127 cm.)
	Top of screen	3' 10"	(117 cm.)
	Hood down and screen removed	3' 4"	(102 cm.)

Weights (excluding extra equipment)

Complete, tank full of	TR2	TR3
petrol	18 cwts. 3 qrs. 7 lbs. (955 kg.)	19 cwts. 0 qrs. 7 lbs. (970 kg.)
Shipping weight	17 cwts. 2 qrs. 21 lbs. (902 kg.)	17 cwts. 3 qrs. 21 lbs. (910 kg.)

GENERAL SPECIFICATION

VALVE TIMING. [With valve-rocker clearance set at 0.015" (0.38 mm.)].

Inlet valve opens 15° before top dead centre.

Exhaust valve closes 15° after top dead centre.

(15° before or after T.D.C. is equivalent to 0.081" piston travel or 1.5" (3.81 cm.) measured round the flywheel adjacent to the starter teeth).

VALVE-ROCKER CLEARANCES (see page 26).

IGNITION TIMING (see page 27).

Set to fire at 4° before top dead centre (distributor contact points just opening). As the advance is fully automatic, the setting is at full retard.

Contact breaker gap should be set at 0.015" (0.4 mm.).

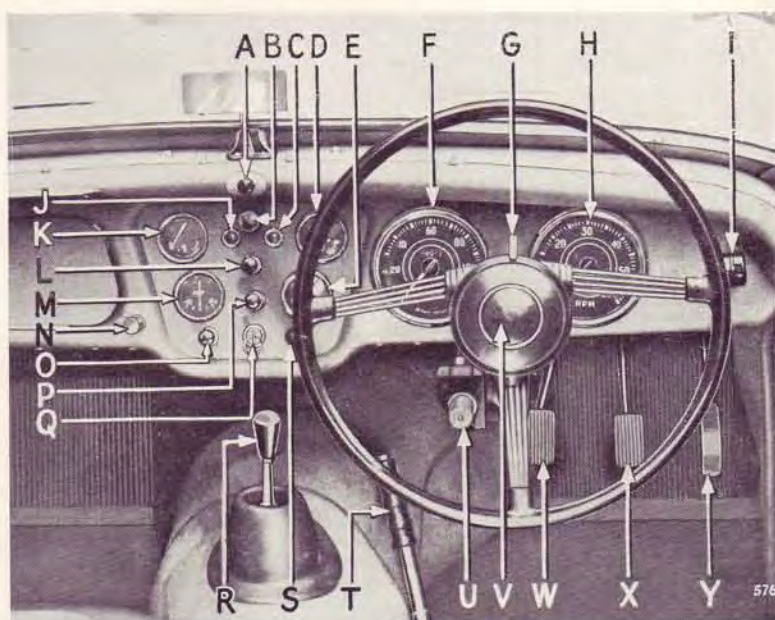
ROAD SPEED DATA

	O.D. Top	Top	O.D. 3rd	3rd	O.D. 2nd	2nd	1st	Re- verse
Gearbox Ratios	0.82	1.00	1.09	1.325	1.64	2.00	3.38	4.28
Overall Ratios :								
3.7 Axle	3.03	3.7	4.02	4.9	6.07	7.4	12.5	15.8
4.1 Axle	3.28	4.1	4.35	5.3	6.57	8.0	13.5	17.1
Engine Speeds (3.7 axle)								
Using Dunlop Tyres :								
at 10 m.p.h.	410	500	540	660	820	1000	1630	2130
at 10 km./hr.	250	310	340	410	510	620	1050	1320
Using Michelin X Tyres :								
at 10 m.p.h.	420	515	560	680	850	1020	1720	2280
at 10 km./hr.	250	320	350	420	530	630	1070	1340
Engine Speeds (4.1 axle)								
Using Dunlop Tyres :								
at 10 m.p.h.	440	550	580	710	890	1080	1830	2300
at 10 km./hr.	270	340	360	440	550	670	1140	1450
Using Michelin X Tyres :								
at 10 m.p.h.	450	565	600	730	910	1100	1860	2350
at 10 km./hr.	290	360	380	460	510	690	1160	1470

MANAGEMENT OF CAR

CONTROLS, SWITCHES AND INSTRUMENTS

The position of the controls, switches and instruments will readily be understood by reference to Fig. 1.



- | | | |
|--------------------------------------|-----------------------------|---------------------------|
| A Scuttle Ventilator Control. | H Tachometer. | P Side-head Lamp Switch. |
| B Instrument Panel Light Switch. | I Overdrive Control Switch. | Q Ignition Lock. |
| C Direction Indicator Warning Light. | J Ignition Warning Light. | R Gear Change Lever. |
| D Oil Pressure Gauge. | K Fuel Contents Gauge. | S Choke Control. |
| E Water Temperature Gauge. | L Windscreen Wiper Switch. | T Handbrake Lever. |
| F Speedometer. | M Ammeter. | U Headlamp Dipper Switch. |
| G Direction Indicator Switch. | N Screen Wash Control. | V Horn Button. |
| | O Starter Switch. | W Clutch Pedal. |
| | | X Brake Pedal. |
| | | Y Accelerator Pedal. |

Note :- In left-hand drive cars D changes with K and E with M. F and H remain in the same relationship to the steering wheel.

Fig. 1. Controls, switches and instruments (R.H. Drive).

CONTROLS

Clutch. Press pedal to disengage drive from engine to gearbox. **Do not rest your foot on the pedal when driving, or hold clutch out to free wheel.**

Bonnet Locks. To release, on earlier models pull the knob under the dash panel on the right hand side. On later models insert the end of the carriage key, provided for the boot lid, in the two patented fasteners at either side of the front of the bonnet and twist to release. The safety catch in both cases is situated under the front of the bonnet and can be released by the fingers.

MANAGEMENT OF CAR—Controls, Switches and Instruments

Choke Control. See page 9 for full instructions.

Gear Lever. See Fig. 2 for gear positions.

Handbrake. Pull to operate rear wheel brakes. The lever will be held in any position by pressing the button on top of the lever and releasing the lever. To release ratchet, first pull lever when the pawl will automatically spring out of engagement with the ratchet and the lever is free to release the brakes.

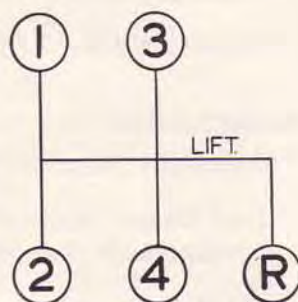


Fig. 2. Gear positions.

Radio Controls. See page 42.

Overdrive Control. See page 42.

Petrol Tap. This is situated on the left-hand side of the frame adjacent to the front wheel panel. To turn on the supply, pull the tap upwards (see Fig. 29, lubrication chart), twist to lock in the open position.

Seat Adjustment. The seats are adjustable for "leg length" after operating the lever which is situated at the side of the seat.

Screen Washer (where fitted). To operate, push the control knob.

Scuttle Ventilator. To open ventilator pull control knob.

SWITCHES

Brake Light. The switch is connected to the brake pedal mechanism, but will operate the red rear light only with the ignition switched on.

Direction Indicators. These self-cancelling indicators will only operate with the ignition switched on, and a warning light will flash on the dash panel when the switch is operated.

Head, Tail and Parking Lamps. Pull knob to switch on parking lights. Turn slightly clockwise and pull again to switch on the head lights. Press foot operated switch to dip head lights, press again for "full on" position, in which position a small red light appears at the bottom of the speedometer dial.

Horn. Press button in centre of steering wheel to operate horns.

Ignition. Insert key and turn clockwise to switch on. Do not leave the switch "on" when engine is stationary, to avoid the battery being discharged by the current flowing through the coil windings.

Panel Lights. Pull knob to switch on panel lights. These lights will only operate when the parking lights are switched on.

Starter Motor. Press to operate engine starter (see page 9 for full instructions).

MANAGEMENT OF CAR—Controls, Switches and Instruments

Windscreen Wiper. Pull to operate wipers ; they will only function when the ignition is switched on. Push to stop when arms are in the desired parking position.

Heater Switch. See page 42.

INSTRUMENTS

Ammeter. Indicates the flow of current into or out of the battery.

Fuel Gauge. Registers the amount of fuel in the tank. It operates automatically when the ignition is switched on.

Oil Pressure Gauge. Indicates pressure of oil being pumped to the bearings.

The gauge should read 70 lb./sq. in. (4.9 kg./sq. cm.) minimum when the car is travelling at normal speeds and the oil is hot. Only a low pressure may be registered when the engine is idling or running at low speeds ; this is quite normal.

Speedometer. Registers vehicle's speed and total distance covered, and is fitted with a trip which is cancelled by pushing up the serrated knob (situated under the instrument) and turning anti-clockwise.

Tachometer. Indicates the speed of rotation of the engine in revolutions per minute. (See page 10).

Ignition Warning Light. Glows red when ignition is switched on with the engine idling or stopped. It is an indication that current is being drawn from the battery for the ignition circuit, or other purposes that are controlled by the ignition switch.

Water Temperature Gauge. The gauge shows the temperature of the cooling water at the thermostat. Under normal motoring conditions the water temperature should not exceed 185°.

MANAGEMENT OF CAR.

DRIVING THE CAR

TO START THE ENGINE

IMPORTANT—When starting the engine at any time :

If the engine does not start when the starter is operated, **do not re-operate until both starter motor and engine have come to rest.** This is to avoid damage to the starter pinion.

Starting when Engine is Cold

Place the gear lever in the neutral position and see that the handbrake is on. Pull the carburettor choke control out to the stop, switch on the ignition and press the starter switch button. When the engine has become sufficiently warmed up, turn the choke control and allow the control to spring back to the **half-out** position and turn to lock in this position. After one or two minutes driving, as the engine warms up, it will be possible to permit the control to return home without causing the engine to run with undue hesitation. If the battery has been allowed to get into a run-down condition, it is better to use the starting handle. When the engine fails to start, do not keep the choke control out too long or the sparking plugs will become wet with petrol and it will be necessary to remove and dry them. When the car has been left standing for some considerable time, the fuel level in the carburettor float chambers may have become rather low, due to evaporation. The hand primer on the fuel pump can be used under such circumstances, before the starter is operated, (see page 29).

When starting in very cold conditions, the clutch pedal may be depressed when operating the starter to relieve the motor of the considerable drag in the gearbox.

Starting with Engine Warm or Hot

When restarting the engine while it is still hot the accelerator pedal should be depressed to about one-third of its travel before pressing the starter button, the choke control should not be used.

Warming up

In order to minimise cylinder wear the engine should be warmed up quickly when starting from cold in winter ; the engine may be " idled " for a minute to let the oil circulate, but it should not be allowed to idle for long periods, neither should the engine be raced up to high speeds. An engine speed of approx. 1,500 r.p.m. may be regarded as a desirable warming up speed.

DRIVING THE CAR—The Engine

DRIVING

Gear Changing

For a smooth gear change into a synchronised gear the movement should be slow and deliberate. The gear lever must always be moved right home to secure full engagement. Do not attempt to engage reverse gear whilst the car is travelling forward.

Desirable Speed Limits (Particularly in gears lower than top)

The engine is capable of “revving” very fast, yet the driver should avoid continued “over-revving,” which is most likely to occur in the lower gears.

We strongly recommend that in all gears the driver shall not drive the car continuously at engine speeds above 4,500 r.p.m. However, during acceleration in the gears it is permissible to attain 5,000 r.p.m. for short periods, which speed is indicated by the red mark on the tachometer.

NEW ENGINES (see running adjustments)

During the early stages of a new vehicle's life, for at least the first 500 miles (800 km.), the working surfaces of the engine will be bedding down. The power and performance will improve only if during the running-in period the vehicle is carefully driven at moderate speeds.

We recommend that the engine should be driven at speeds not exceeding 3,500 engine r.p.m. during this period, and suggest that “running-in” should be progressive. No harm is done if the engine is allowed to “rev” fairly fast so long as it is thoroughly warm and provided it is not **pulling hard**. Do not let the engine pull hard at low speeds, always select a lower gear.

GENERAL UPKEEP REGULAR INSPECTION

Every 250 miles (400 km.) the oil level should be checked when the engine is cold, and topped up if necessary. Withdraw dipstick ((F) Fig. 3) and wipe clean, then insert and push fully home before withdrawing for reading. Should the level be at the lower mark on the dipstick, 4 pints (2.2 litres) of oil will be required for topping up. The regular addition of oil not only maintains the correct level, but also tends to keep up the quality of the lubricant. Replenishment is via the cap (D) which does NOT require unscrewing but may be lifted straight off.

Weekly,

Check : The water level in the radiator and if necessary replenish. Use clean rain water and keep the neck of the filler at least half full of water. Re-check after the engine has been warmed. The use of hard water results in a deposit on the inner side of the cooling surfaces, thus reducing efficiency.

Tyre pressures. The correct pressures are given on page 21. It is usually a good plan to have the spare tyre inflated to a slightly higher pressure than that recommended, as it is a simple matter to reduce the pressure should the tyre be required for use.

The acid level in the battery at (A) and maintain it so that it is just **level** with the top of the separators. **Overfilling may cause the acid to spill and subsequently attack the surrounding metal panels.** Use only distilled water when replenishing (obtainable from the local chemist or garage). Keep the filler plugs screwed tight to prevent leakage of acid. Do not overfill or the acid may splash out and do damage, and never use a naked light when checking the acid level.

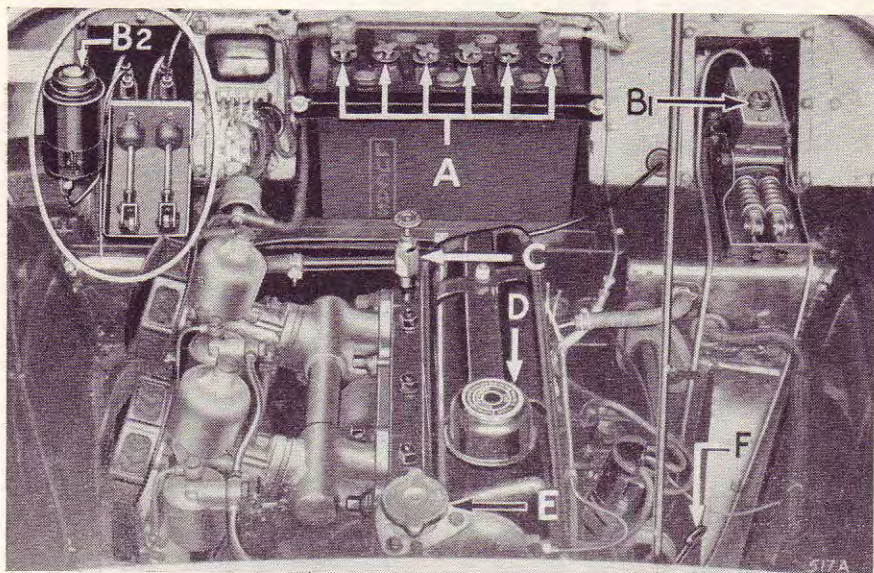


Fig. 3. View under bonnet.

GENERAL UPKEEP—Cooling System and Lubrication

COOLING SYSTEM

Filling (see page 11).

Draining

For the purpose of draining, taps are provided in the bottom tank of the radiator and at the rear of the cylinder block on the right-hand side. As the cooling system is pressurised it will be necessary, when draining, to remove the radiator cap (E), Fig. 3.

If a heater is fitted, ensure that the cock is open before draining.

Anti-Freeze Mixtures

We recommend the use of Smith's "Bluecol," Duckham's Anti-freeze, Esso Anti-freeze or Shell "Snowflake" Anti-freeze (inhibited Glycol base compound) in order to protect the cooling system during frosty weather and reduce corrosion to a minimum. The cooling system is fitted with a thermostat and there is a risk of the radiator block freezing while the engine is running during the warming up period when the thermostat is shut, even though the car has been left in a warm garage and water is not frozen at the start of the run.

We recommend that you provide for the cooling system ample protection against a sudden fall in temperature down to 0° F. (—18° C.) during frosty weather by using 3 pints of anti-freeze.

In countries where sub-zero temperatures prevail, consult your Triumph dealer regarding the quantity of anti-freeze required.

It is inadvisable to use anti-freeze for more than one season since the inhibitor becomes exhausted and the components in contact with the cooling water may corrode.

LUBRICATION

This is one of the most important subjects in connection with the upkeep of a car, and careful attention to the following instructions will be amply repaid by the results obtained

For the recommended periods of lubrication, see the lubrication chart folded inside the rear cover of this book. The correct lubricants to be used are given on pages 51 and 52.

GENERAL UPKEEP—Lubrication

Draining

To drain the engine, gearbox and rear axle, remove the plug provided beneath each unit. This process is assisted by opening the filler to allow ingress of air and by draining when the oil is hot, *i.e.*, immediately after a run.

ENGINE

Low viscosity oils are recommended for use in the engine sump. These are each of the correct viscosity and character to afford complete lubrication protection. Additives which dilute the oil or otherwise impair this protection must **not** be used. After many thousands of miles running the rate of oil consumption will increase. When the rate becomes higher than 1 gallon per 1,000 miles (1 litre per 400 km.), it will be desirable to use the next heavier grade of the brand of oil you normally employ.

Engine Oil Drain Period

The frequency of the drain period should be related to the driving conditions to which the vehicle is subjected. A period of 3,000 miles (5,000 km.) is recommended as the interval for average driving conditions as defined below. It should be reduced for unfavourable conditions and may be extended for definitely favourable conditions.

Favourable

Long distance journeys, with little or no engine idling, on well surfaced roads, reasonably free from dust.

Average

Medium length journeys on well surfaced roads with a small proportion of stop/start operation.

Unfavourable

Any of the following :

- (a) Frequent stop/start driving.
- (b) Operation during cold weather, especially when appreciable engine idling is involved.
- (c) Where much driving is done under dusty conditions.

We have found the use of an upper cylinder lubricant to be an advantage, particularly in new engines, and recommend the use of such a lubricant, particularly until the engine is thoroughly "run-in." The lubricant should be mixed with the fuel in the proportions given on the container. Such lubricants may be used with advantage throughout the life of the vehicle, particularly during wintry weather.

GENERAL UPKEEP—Lubrication

Carburettors

Every 6,000 miles (10,000 km.) unscrew the brass hexagon plug in the top of each of the carburettors and top up with current engine oil to the level of the inner hollow shaft. Apply oil also to the throttle linkages on the engine, do not oil the bearings of the transverse rod attached to the scuttle as this will seriously deteriorate the sealing composition.

The Oil Cleaner

The oil cleaner has been designed to filter the oil to a very fine degree and the only attention it requires is to see that the filtering cartridge (B) is removed and that a new replacement cartridge is fitted at periods not exceeding 6,000 miles (10,000 km.). Later models employ a "full-flow" cleaner, and since a very "fine" filter cartridge is fitted it is important that this operation is carried out, otherwise, as the filter becomes choked, unfiltered oil will be passed to the engine via the balance valve in the cleaner. To renew the cartridge, unscrew the securing bolt and remove the container, the cartridge can then be withdrawn. On some models it may be necessary to unclip and swing the crankcase breather tube rearwards to provide sufficient room for container removal.

Wipe out the container to remove foreign matter trapped by the filter, using a non-fluffy cloth, and inspect afterwards to make certain that no cloth fibres remain.

It may be desirable to discard the old container washer (A), replacing it with a new one each time the cartridge is renewed. When re-assembling the container, ensure that the washer is correctly positioned in the groove in the filter body. Do not tighten the bolt (C) more than is necessary to obtain an oil-tight joint.

Approximately one pint of oil will be lost due to the removal of the container, and the sump should be topped up with new oil after assembly.

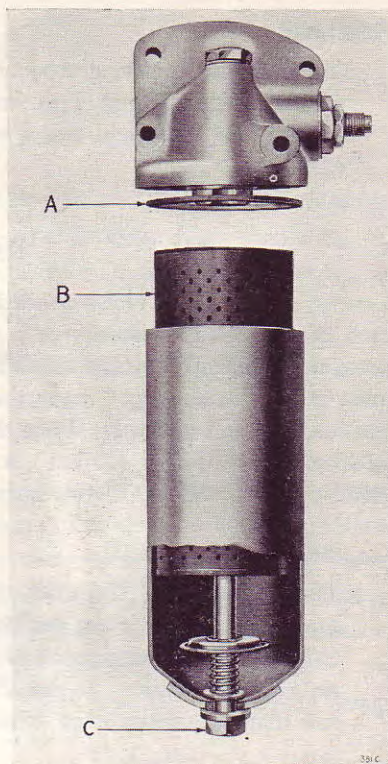


Fig. 4. Oil Cleaner "full-flow" type.

GENERAL UPKEEP—Lubrication

The container should not be disturbed until cartridge renewal is required ; as the accumulated dirt on the outside of the container may fall inside and thus be carried into the bearings when the engine is re-started.

Ignition Distributor (see Fig. 5)

Every 6,000 miles (10,000 km.), the cam (B) should be smeared lightly with engine oil. A pronounced squeak occurs when the cam is quite dry. Withdraw the moulded rotor arm from the top of the spindle and apply a few drops or thin machine oil around the edge of the screw (A) to lubricate the cam bearings and distributor spindle. At the same time, place a single drop of clean engine oil on the pivots (C) and (D).

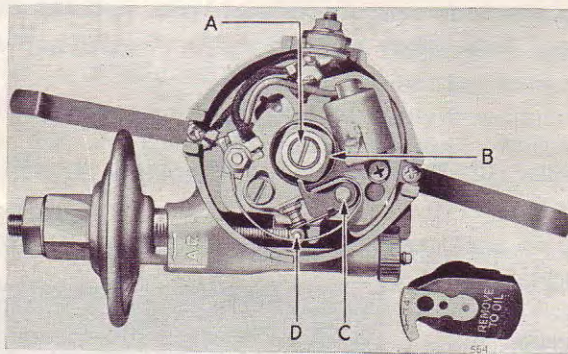


Fig. 5. Ignition distributor.

Water Pump

There is one nipple provided (see arrow, Fig. 6) to which the grease gun should be applied every 6,000 miles (10,000 km.). Give **five strokes only** with the gun.

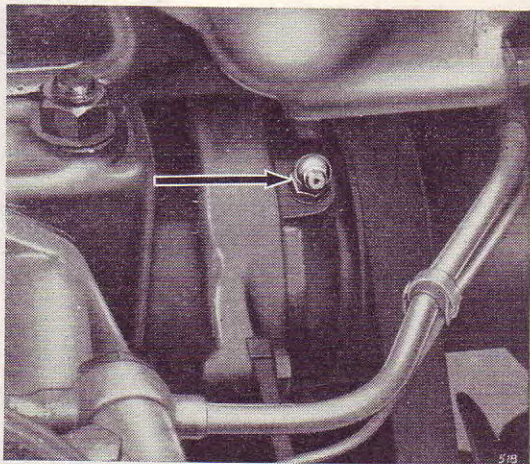


Fig. 6. Water pump lubrication.

GENERAL UPKEEP—Lubrication

Dynamo and Starter

The dynamo front bearing is packed with grease before leaving the works, and after a considerable mileage the dynamo should be removed for cleaning, adjustment and repacking of the bearing with grease. This should be done preferably by the nearest Triumph or Lucas Service Depot. Every 12,000 miles (20,000 km.) pour a few drops of engine oil through the hole in the centre of the rear end cap.

The Starter is fitted with special bearings which require no lubrication.

Air Cleaners. Every 6,000 miles (10,000 km.) it is advisable to remove the air cleaners and wash in petrol, particularly the gauzes, after which soak the gauzes in oil and allow to drain before finally wiping over and refitting. It is very important to refit the air cleaners in the correct manner. Ensure that the holes immediately above the setscrew holes in the carburettor are lined up with the similarly positioned holes in the cleaner.

Oil Filler Cap. Every 6,000 miles (10,000 km.) remove and swill the cap in fuel, dry off and re-fit.

GEARBOX

Every 6,000 miles (10,000 km.) the oil level should be checked and topped up if necessary.

To check the oil level, remove the rubber plug from the gearbox domed cover, thus exposing the dipstick (see Fig. 7). Withdraw dipstick and wipe clean, then insert stick and push it fully home before withdrawing for reading. The correct level is to the top mark. The dipstick orifice is also the gearbox oil filler.

If an overdrive is fitted, see also page 42.

Every 12,000 miles (20,000 km.) the gearbox should be drained and refilled with new oil.

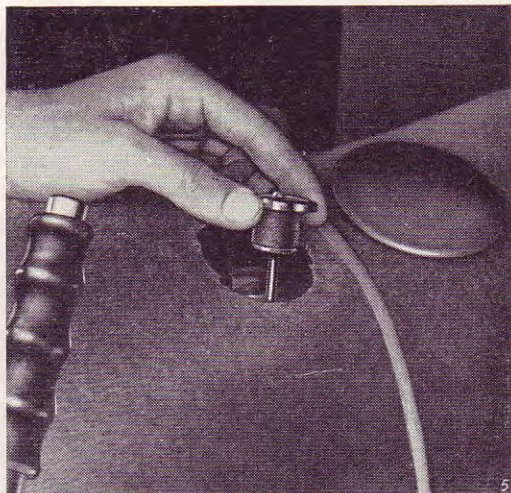


Fig. 7. Gearbox oil filler and dipstick.

REAR AXLE

The hypoid bevel gears fitted in the rear axle require special lubricants to ensure efficient operation and long life. As these are special oils, it is advisable to completely drain and replenish with new "Hypoid" oil every 6,000 miles (10,000 km.); and in any event do not exceed a period of 12,000 miles (20,000 km.).

GENERAL UPKEEP—**Lubrication**

It is advisable to have the oil level checked during this period, and especially after the first 1,000 miles, and replenish if necessary to level with the bottom of the threads in the filler orifice. Should a top-up be necessary, investigate the cause of oil loss. The filler plug is accessible from underneath the car, being fitted to the rear axle cover (see arrow **A** Fig. 8). Clean away mud before unscrewing the filler plug to avoid grit falling into the axle.

BRAKE AND CLUTCH OPERATION

It is important that the filler cap on the combined hydraulic fluid reservoir, integral with the master cylinders (see arrow **B1** or **B2** Fig. 3, page 11), should be removed every 6,000 miles (10,000 km.), the fluid level checked and topped up if necessary. The reservoir should be filled to within one inch (2.5 cm.) of the top, and never less than half full (see page 51 or 52 for the correct fluid).

Later models with disc brakes have a circular reservoir which has an inner chamber; this supplies the clutch operation mechanism. The correct fluid level is to the top of this inner chamber.

As the cups in the master and all operating cylinders are pure rubber, it is imperative to use only the recommended special fluid. Mineral oils would, in a very short time, distort and ruin them.

Clutch Shaft Bearings

The grease gun should be applied to the clutch shaft bearing grease nipples (one at each side of the clutch housing) every 6,000 miles (10,000 km.). One shot only is sufficient. The nipples are accessible from underneath the car. [See arrow (C), Fig. 19, page 31].

Clutch and Brake Pedal Bearings

The oil can should be applied to the various pivots, etc., of the pedal linkages, both under the bonnet and in the driving compartment.

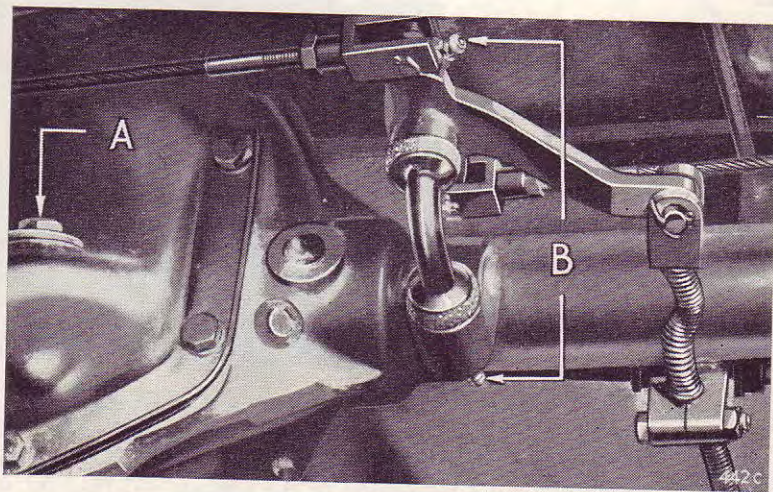


Fig. 8. Rear axle oil filler and handbrake compensator.

GENERAL UPKEEP—Lubrication

Handbrake Cable Conduit

A grease nipple is fitted in the conduit, as shown in the lubrication chart, to which the grease gun should be applied every 6,000 miles (10,000 km.).

During the winter months it is very important to keep the cable regularly lubricated, as this prevents the entry of water which on cold nights will freeze, thus locking the brake cable.

When lubricating the cable, grease is forced both ways and the gun should be pumped until grease exudes at the end of the conduit.

Handbrake Compensator

Two grease nipples are provided on the compensator which is situated on the rear axle casing (see arrow **B**, Fig. 8).

ROAD WHEEL HUBS

Front

Recharging the hubs with grease on later models involves removing the hubs, washing the bearings to remove all traces of the old grease before liberally coating the rollers and races with new grease. This should be carried out every 12,000 miles (20,000 km.). Where disc brakes are fitted do not disturb the pipe unions but unbolt and move the complete caliper, to allow the hub and disc to be removed.

When replacing, ensure that the inner race is tight against its shoulder. Tighten the hub nut until resistance is felt to hub rotation, then slacken off the nut by one flat of the hexagon and fit the split pin. This work should be preferably undertaken by your local Triumph agent who has the necessary equipment for the task.

If disc brakes are fitted and the car is being used in competitions, slacken off the hub nut one half flat and insert the split pin through one of the two holes provided.

Rear

These bearings are lubricated via a nipple (see arrow, Fig. 9) situated facing downwards at the rear of the brake backing plate. Give five strokes of the grease gun every 6,000 miles (10,000 km.).

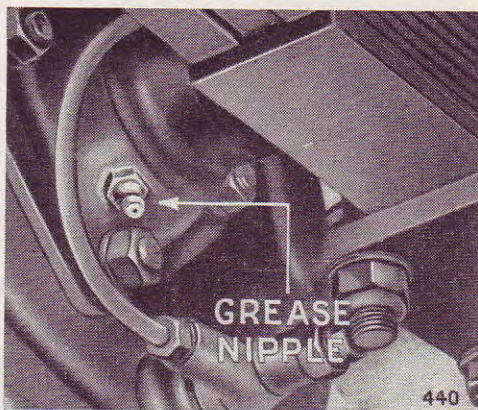


Fig. 9. Rear hub lubricator.

FRONT SUSPENSION AND STEERING

Nipples are provided for the lubrication of the steering swivels (**A**), outer tie rod, ball joints, outer bushes of the lower wish-bones (see **B** Fig. 10),

GENERAL UPKEEP—Lubrication

and the steering slave drop arm pivot. Do not lubricate the joints attached to the drop arms as they contain rubber. The inner bushes of the wish-bones on early models also contains rubber. Later models have nylon bushes which should be lubricated with oil occasionally. A pronounced squeak develops should these bushes become dry. It is an advantage when greasing the lower suspension swivels to jack up, under the road spring frame, until the front wheel is free of the ground. This will allow grease to cover the thrust faces. Greasing of these points should be carried out at least every 1,000 miles (1,600 km.).

To lubricate the steering box, remove the rubber plug situated on the steering column and top up with oil to the level of the orifice. This should be carried out every 6,000 miles (10,000 km.).

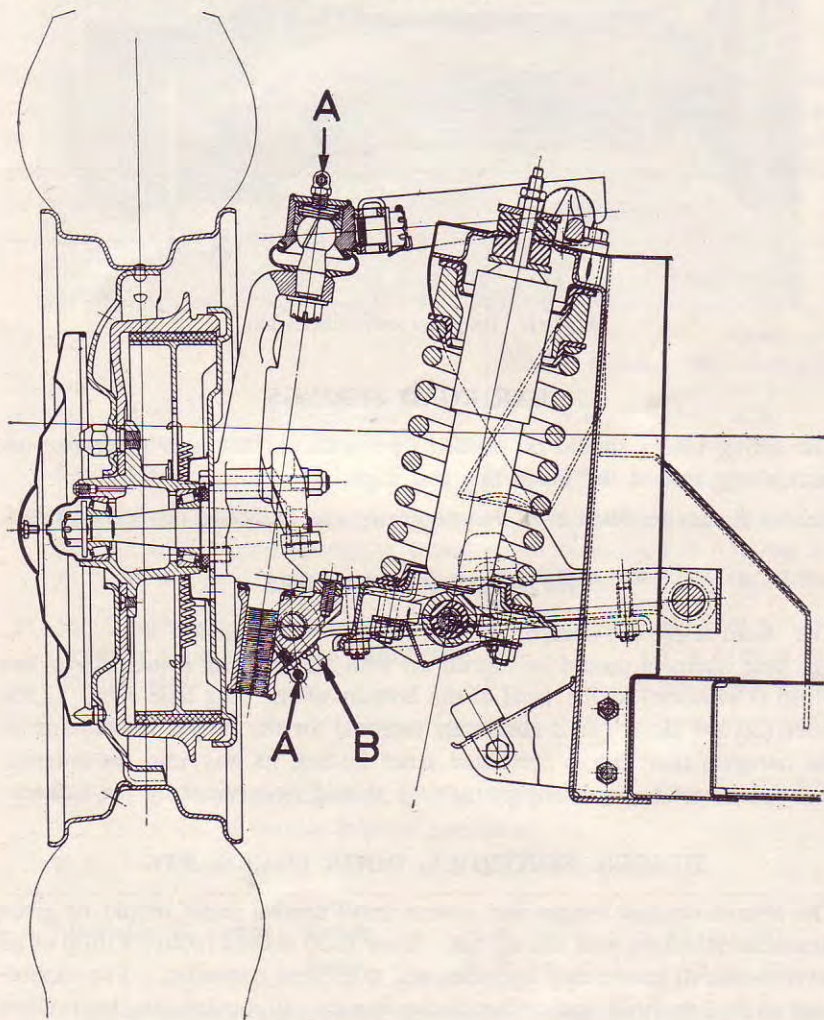


Fig. 10. Front suspension lubrication.

GENERAL UPKEEP—Lubrication

PROPELLER SHAFT

The universal joints are of the needle roller bearing type and together with the splines should be lubricated every 6,000 miles (10,000 km.).

The nipple (B) at each end of the shaft should be supplied with oil for the bearings and the nipple (A) with grease for the splines.

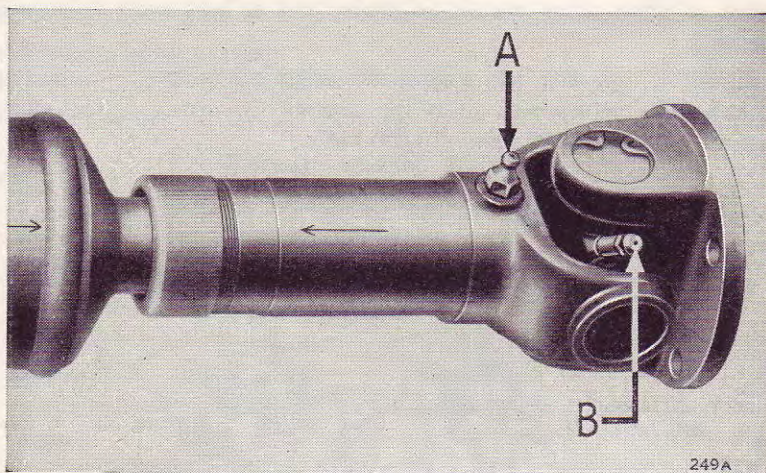


Fig. 11. Propeller shaft lubrication.

REAR ROAD SPRINGS

The spring blades should be painted over with old rear axle or engine oil, particularly around the blade tips and clips.

Rubber bushes are fitted in all the rear spring eyes and must not be lubricated.

HYDRAULIC DAMPERS

The front telescopic dampers do not require "topping up."

The rear dampers should be topped up with **Armstrong Shock Absorber Fluid (Crimson)** to the level of the bottom of the plug hole every 12,000 miles (20,000 km.). It is absolutely essential for the proper functioning of the dampers that dirt is prevented from finding its way into the interior. If the dampers become inoperative they should be serviced by the makers.

HINGES, CONTROLS, DOOR LOCKS, ETC.

The bonnet catches, hinges and several small control joints should be given occasional attention with the oil can. Door locks should receive a drop of oil every month to ensure easy operation and to prevent corrosion. The connections on the handbrake and ratchet mechanism, etc., all require attention to allow the controls to work freely and prevent unnecessary wear.

GENERAL UPKEEP—Tyres

TYRES

The maintenance of correct tyre pressure is a large factor in tyre life and the steering and suspension of the car.

Examine the tyres occasionally for flints or other road matter which may have become embedded in the tread. Clean off any oil which may have got on the tyres by using fuel sparingly. Driving into or over sharp edged kerbs is liable to fracture the walls of the tyres and should be avoided where possible.

Tyre Pressures

Dunlop :	Front	.....	22 lb./sq. in. (1.55 kg./sq. cm.).
	Rear	.....	24 lb./sq. in. (1.7 kg./sq. cm.).

These recommendations listed below apply to cars used under ordinary road conditions either in the U.K. or Overseas. Where cars are to be used for racing or special high speed testing where a sustained speed of more than 110 miles per hour is anticipated, it is desirable that the Dunlop Rubber Company should be consulted as to the need for tyres of full racing construction.

OPERATING CONDITIONS	MAXIMUM ROAD SPEED	
	Up to 100/105 m.p.h.	Over 100/105 m.p.h.
(a) Normal motoring in G.B. and under similar road and traffic conditions elsewhere.	N.E.	R.S.
(b) Continental type touring with lengthy periods at sustained speeds in excess of 85/90 m.p.h.	N.E. + 6 lb./sq.in. (0.42kg./sq.cm.)	R.S. + 6 lb./sq. in. (0.42 kg./sq.cm.)
(c) Motoring which is predominantly and regularly of the high speed Continental touring type.	R.S.	R.S. + 8 lb./sq. in. (0.56 kg./sq.cm.)

Key:—

N.E. Normal equipment, *i.e.* Dunlop or Dunlop Fort, as case may be, at regular inflation pressures.

R.S. Road Speed tyres at regular inflation pressures.

Michelin X Tyres :	Front	.....	24 lb./sq. in. (1.7 kg./sq. cm.).
	Rear	.....	28 lb./sq. in. (1.97 kg./sq. cm.).

These pressures should be increased by 5 lb./sq. in. (0.35 kg./sq. cm.) if the car is driven consistently hard and fast.

GENERAL UPKEEP—Tyres

Changing Position of Tyres

It is recommended that front tyres be interchanged with rear tyres at least every 3,000 miles (5,000 km.). Diagonal interchanging between left front and right rear and between right front and left rear provides the most satisfactory first change, because it reverses the direction of rotation and keeps the wear of the tyres even and uniform.

FRONT WHEEL ALIGNMENT

The alignment of the front wheels is most important in its effect on tyre wear and good steering. Excessive toe-in will lead to severe tyre wear, particularly on the "kerb side" front tyre.

Correct Wheel Alignment. The wheels should **Toe-in** $\frac{1}{8}$ ".

When using Michelin X tyres set **Parallel to Toe-in** $\frac{1}{16}$ ".

To Check and Adjust Wheel Alignment

If adjustment is found necessary it should be carried out equally on the two outer tie-rods. When adjustment is complete ensure that the ball joints are in the centre of "swing" before securely tightening the tie-rod locking nuts.

THE JACK

A screw jack is provided which is adapted to lift either side of the car as required.

To fit the jack in position shown, turn up the carpet and remove the small cover plate situated just in front of the seat.

Engage the lower lip of the boss with the bottom edge of the square hole, then swing the jack into a vertical position and lift to ensure correct engagement, making sure that it is right home in its socket. Apply the handbrake or chock the wheels which will remain on the ground before operating the jack handle.

If a jack is used under the rear axle case, **take care** to ensure that the jack pad does not touch the rear cover plate when lifting, otherwise there is a risk of damage and consequent oil leak.

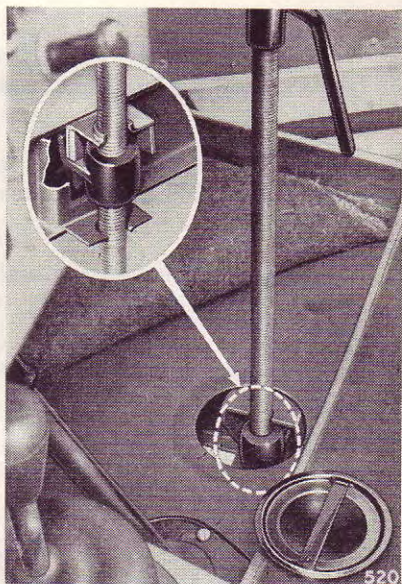


Fig. 12. Jacking the car.

BODYWORK

Dust may be removed from the exterior using a soft cloth only, but if it has been wet at any time it is advisable to use a sponge and water. Always use water when removing mud and when the car is clean finally wipe over with an almost dry chamois leather. Washing alone will not keep up the brilliance of the paintwork over an indefinite period and it may become necessary to use a cleaner to remove all grease and dirt. It is advisable to acquire the cleaner from a reputable dealer who will be able to advise you on the best cleaner to suit the particular paintwork of your car, afterwards polishing with some suitable preparation.

Special cleaners are available for removing traffic film and tar. Chromium plated parts need cleaning with soap and water, and wax polishing is beneficial. If, due to neglect, the plate becomes spotted, it may be necessary to use a chromium plate cleaner.

The interior of the car should be dusted occasionally and the carpets brushed with a stiff brush. The upholstery may be cleaned by the application of a little soap and damp cloth, followed by a final wipe down with an almost dry sponge or wash leather. When a vacuum cleaner is available it can be used with advantage to help clean the interior.

DOOR ADJUSTMENT

The doors are provided with special locks which, when correctly adjusted, prevent any movement of the closed door. Only the striking plate requires repositioning when adjustment becomes necessary.

This adjustment should preferably be carried out by a coach fitter.

HOOD STOWAGE

It is necessary to remove the hood cover altogether when the car is required to run in the open condition. Take care not to fold the material too sharply. The hood supports may then be hinged down flat behind the seats. When refitting the hood after erecting the hood supports always fasten the hood to the body first and then pull it over the supports to fasten to the screen. When the hood has been fastened down a rubber backed roll of material attached to the hood and running along the top edge of the windscreen should be opened out and fitted over the top lip of the windscreen frame to complete the sealing of the hood.

HOOD FASTENERS

Two types of fasteners are used, "Lift the Dot" and "Tenax" (early models only had "Tenax"). When fitting either type it is only necessary to push the fasteners over the securing stud as shown in Fig. 13. With the "Tenax" type (as illustrated) do not press or pull the small knob before engagement as there will be a risk of damage to the inner prongs. After fitting, the knob may be pressed to ensure correct engagement.

To remove the fasteners, either pull the small knob or in the case of the "Lift the Dot," do as its title suggests, lift the outer edge.

BODYWORK

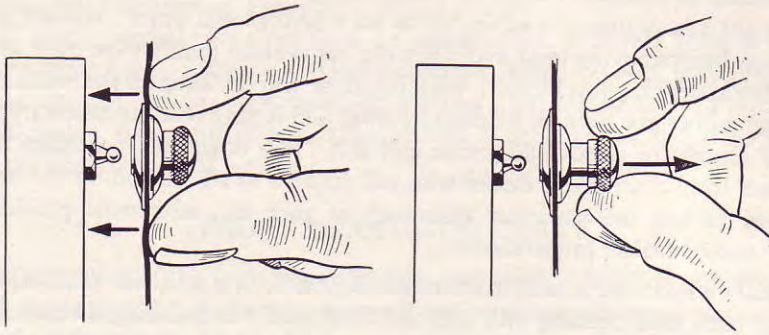


Fig. 13. "Tenax" hood fasteners.

It may be found advantageous when removing the fasteners from the screen, to relieve the tension on the fasteners by applying a slight hand pressure, in the forward direction, to the corner of the hood where it passes over its supports.

SPARE WHEEL AND TOOL STOWAGE

The spare wheel is housed in a compartment under the luggage locker. A key is provided for the panel locks and to open, insert the key and give a half turn towards the centre of the car to release each catch. The tools are stowed as shown in Fig. 14. To place them in position the spare wheel should be withdrawn about six inches (15 cm.).

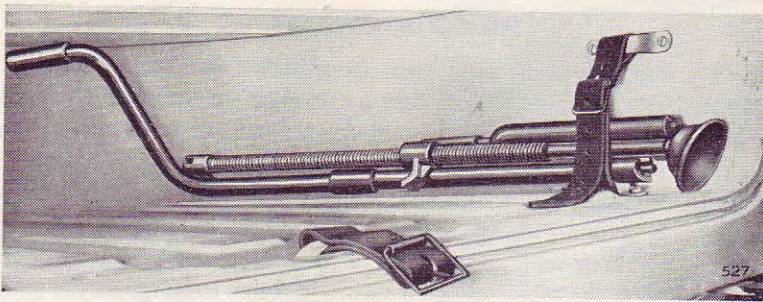


Fig. 14. Tool stowage.

RUNNING ADJUSTMENTS

Various adjustments are necessary from time to time in order to keep the mechanism in efficient running order. The periods between depend largely upon the manner in which the car is used and no definite time can be given here for carrying out these corrections. The car should be examined however every 6,000 miles (10,000 km.) and any adjustments which appear necessary can then be made (see page 35).

ENGINE

Decarbonising and Valve Grinding

It is recommended that the cylinder head be removed for decarbonising and valve grinding after the first 5,000 miles (8,000 km.). This is chiefly to give attention to the valve seats, the metal of which becomes stabilised during this period. Thereafter it will be found that decarbonisation will be required only after a period of about 20,000 miles (32,000 km.). Providing that the engine is running satisfactorily after this period and that each cylinder gives a normal compression, showing that the valves are seating reasonably well, it is much better to leave it alone.

The grinding of the valves becomes necessary in order not only to increase the efficiency of the engine, but to prevent a badly seating valve becoming worse and getting burnt.

We recommend that the work should be carried out by the skilled mechanics at your nearest Triumph Dealer. For those who desire to do this work themselves, the main points to watch are outlined below :

1. The procedure of turning the crankshaft in order that the compression will "break" the seal of the cylinder head should not be practised with this design of engine.

Once the cylinder head has been removed it is important that the crankshaft is not rotated unless the cylinder sleeves are firmly clamped down against their seatings. This can be accomplished by using two tubes and washers fitted over the cylinder head studs marked 4 and 5, Fig. 15, to overlap the adjoining cylinder liners, each being secured with a cylinder head nut. If this precaution is not observed the sleeves may rise, with consequent risk of water leaking into the crankcase after assembly. On removal of the head and withdrawal of the push rods, the passage ways in the block leading to the camshaft and thence to the crankcase and sump must be sealed off with a clean rag or masking tape. The same applies to the rocker shaft oilway, both in the head and the block, to prevent the entry of carbon particles which could do serious harm to the engine.

2. A stick of soft solder is the most suitable tool for removing the carbon. On no account should emery cloth or sandpaper be used.
3. It has been found advantageous to remove the tappets and clean the insides just prior to refitting the cylinder head to ensure that any chips of carbon which may have fallen into the chamber are removed from the push-rod seatings.

RUNNING ADJUSTMENTS—Engine

4. A new gasket must be fitted each time the cylinder head is removed. The plain side of the gasket must be downwards against the cylinder block and should be coated on both sides with "WELLSEAL" or similar non-setting sealing compound.
5. When replacing the cylinder head nuts, tighten them gradually in the sequence shown in Fig. 15, in order to produce an even pressure on the gasket and prevent undue strain in the cylinder head casting.
It will be necessary to recheck the nut tightness when cold to 100-105 lb. ft.
6. The valve springs are close-coiled at one end and should have the close-coiled end towards the cylinder head when refitting. Before tightening down the rocker pedestals, screw back each adjusting screw and ensure that the ball ends of these screws engage correctly with the push-rods. Failure to attend to these items may result in damage to the push-rods. The auxiliary inner valve springs must be fitted to the exhaust valves.
7. Smother the rocker gear with oil, particularly where the rockers bear on to the valves before replacing the rocker cover. Ensure that the cork washer is undamaged and shellaced to the cover, otherwise oil may leak through the joint.

Cylinder Head Nuts

After the first 1,000 miles (1,600 km.) the cylinder head nuts should be checked for tightness, with engine hot, in the order shown in Fig. 15.

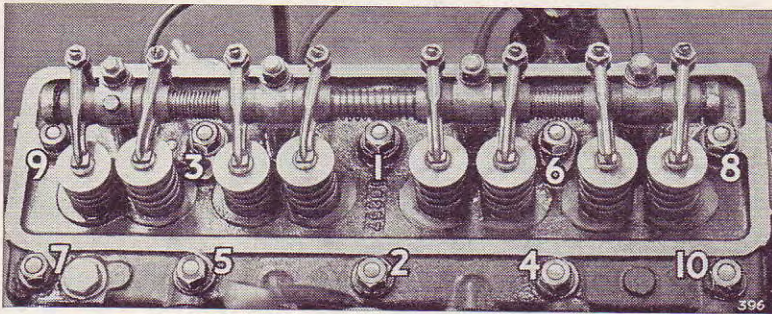


Fig. 15. Order of tightening cylinder head nuts.

Valve-Rocker Clearances (measured cold)

On earlier models the running clearances are .010" (0.25 mm.) inlet and .012" (0.3 mm.) exhaust. Where aluminium rocker pedestals are fitted (later models) the valve-rocker clearances should be set at 0.010" (0.25 mm.) inlet and exhaust for both normal and high speed motoring.

RUNNING ADJUSTMENTS—Engine

Adjustment

Remove the rocker cover and turn the engine crank with the aid of the starting handle for half a revolution after the valve to be adjusted has closed. It is easier to do this if the sparking plugs are removed. This also provides an opportunity for inspecting and checking the sparking plug gaps.

Slacken the lock nut and adjust the rocker screw with a screwdriver until the gauge is a sliding fit between the top of the valve stem and the rocker face.

Now tighten the lock nut and check that the clearance has not altered.

Ignition Timing

On initial assembly the ignition is set as stated on page 5.

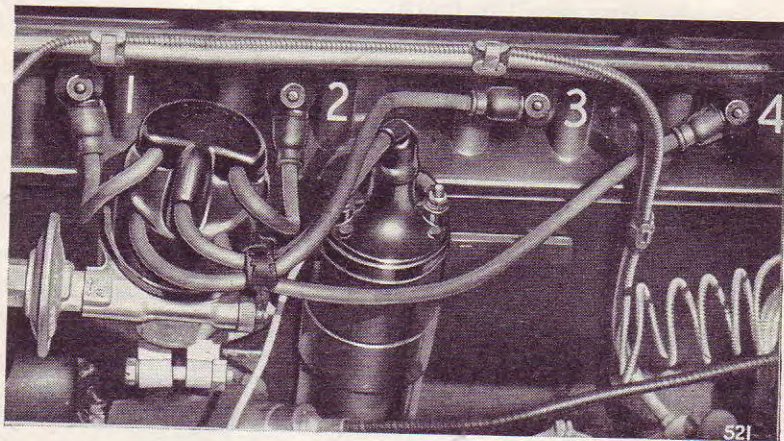


Fig. 16. Ignition leads.

Premium grade fuels of 95 octane (research method) or higher must be used for these engines, and with this fuel a "clean" engine will not "pink." However, with a substantial amount of carbon build up, it may be necessary to retard the ignition slightly so that "pinking" is only just audible when pulling hard with the engine speed above 1,500 r.p.m. To advance ignition, rotate the knurled screw as indicated. Each division on the distributor vernier scale represents 2° of the distributor, *i.e.*, 4° on the crankshaft.

The firing order is 1, 3, 4, 2.

To obtain **T.D.C.** position turn the crankshaft until the small hole in the belt pulley is in line with the pointer attached to the timing cover. Four degrees is equivalent to $\frac{3}{16}$ (4.7 mm.) measured on the circumference of the crankshaft fan pulley.

Valve Timing

See page 5 for correct valve timing.

RUNNING ADJUSTMENTS—Engine

Sparking Plugs

The sparking plugs were adopted for original equipment after lengthy tests and as sparking plug types vary in suitability for different engines, it is important that the correct type of plug be fitted when making replacements, this is: Champion No. L10S— $\frac{1}{2}$ " reach.

In countries where the octane rating of the fuel is low, making it necessary to use the lower compression ratio, it may be desirable to use Champion L10 plugs.

For high speed touring however, use Champion No. L11S— $\frac{1}{2}$ " reach. The gaps (*i.e.*, the width between the firing point of the centre electrode and earth point) are originally set and should be maintained at 0.025" (0.62 mm.). Incorrect gap settings may cause misfiring or erratic slow running. Faulty plug leads or cracked porcelain insulation in the sparking plug will also cause faulty ignition, see also page 9.

Sparking plugs should be thoroughly cleaned, checked and adjusted (if necessary) for gap setting after 6,000 miles (10,000 km.) use and at 12,000 miles (20,000 km.) should be replaced by new plugs.

Carburettors (Twin S.U.)

TR2: Type H4, Standard Needle F.V.

For high speed and competition work use G.C. needles.

TR3: Type H6, correct needle for normal and competition work S.M.

Adjustment

As the needle size is determined during engine development, adjustment of the carburettors is confined to correct idling adjustment. Remove the

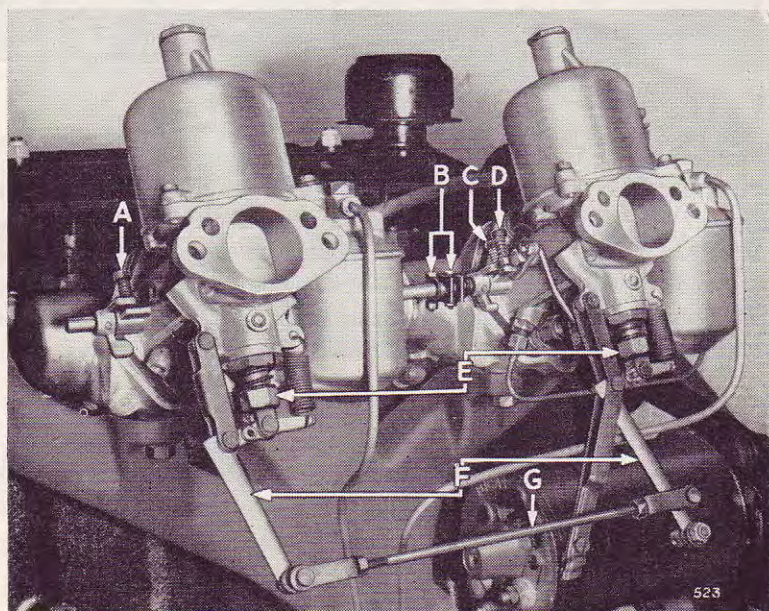


Fig. 17. Carburettors.

RUNNING ADJUSTMENTS—Engine

air cleaners and run the engine until it has attained its normal running temperature slacken one of the clamping bolts (B) on the throttle spindle connection and disconnect the mixture control link (G) by removing one of the fork swivel pins. Adjust the idling speed to approximately 500 r.p.m. by moving each throttle adjusting screw (A) & (C) an equal amount. By listening to the hiss in the intakes, adjust the throttle adjusting screws until the intensity of the hiss is similar on both intakes. This will synchronise the throttles. When this is satisfactory, the mixture should be adjusted by screwing both the jet adjusting nuts (E) up or down to exactly the same extent, at the same time keeping the jet levers (F) pressed forward to ensure that the jets are hard up against the nuts, until even running is obtained. As these are adjusted, the engine will probably run faster, and it may therefore be necessary to unscrew the throttle adjusting screws a little, each by the same amount, in order to reduce the speed. When the mixture is correct on both carburettors, lifting the piston of one of them with a penknife blade should make the engine beat become irregular from excessive weakness. If lifting the piston about $\frac{1}{8}$ " (3 mm.) on one carburettor stops the engine and lifting the other about $\frac{1}{8}$ " increases the engine speed, this indicates that the mixture on the first carburettor is set weak and the second is set rich. The first one should, therefore, be enriched by unscrewing the jet adjusting nut one flat at a time and the second should be weakened off by screwing up the jet adjusting nut in a similar manner. When the mixture is correct, the exhaust beat should be regular and even.

If it is irregular, with the splashy type of misfire and a colourless exhaust, the mixture is too weak. If there is a regular or rythmical type of misfire in the exhaust beat, together with a blackish exhaust, then the mixture is too rich. This should be noted when the air cleaners are again in position. When reconnecting the mixture control link, make sure that the jet levers are pressed forward and the control rod adjusted correctly for length so that the clevis pins may be inserted freely while the jets are in this position. The throttle spindle interconnection clamping bolts (B) should now be tightened.

The desired fast idle necessary when the choke is in operation is controlled by adjusting screw (D).

For further information on the tuning, adjustment and maintenance of S.U. carburettors, you are advised to get in touch with the S.U. Carburettor Co. Ltd., Wood Lane, Erdington, Birmingham 24, from whom the necessary literature may be obtained.

Fuel Pump

The mechanically operated fuel pump, mounted on the left-hand side of the crankcase, provides a constant pressure of fuel to the carburettor. A hand primer is fitted, which can be used to pump fuel to the carburettors

RUNNING ADJUSTMENTS—Engine

if the float chamber is not already full, under which condition a slight pumping resistance is felt before the lever reaches its stop. This resistance ceases when the chamber is full.

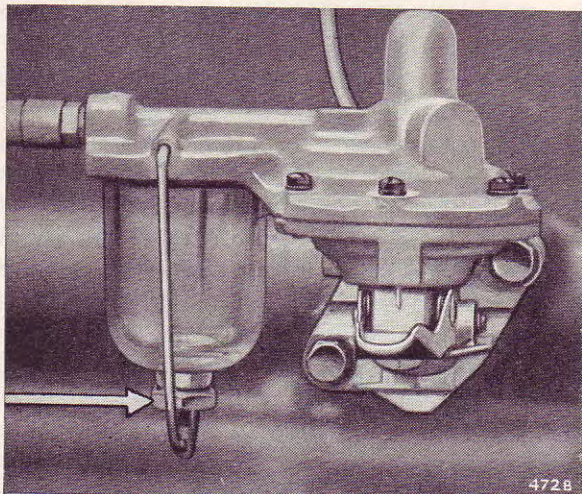


Fig. 18. Fuel pump.

The glass bowl acts as a sediment chamber for the petrol passing to the pump. The foreign matter collects on the underside of the gauze and, being washed off by petrol, sinks to the bottom of the bowl. To remove the sediment, detach the bowl by unscrewing the nut at its base and wash out the bowl with the fuel that will be in it. When refitting the bowl, tighten the nut just sufficient to ensure a fuel-tight joint, as over-tightening may result in damage.

If the pump fails to supply fuel to the carburettors it is advisable to attend to the following points : (a) inspect the fuel pipe unions, which (if any are loose) should be tightened up, (b) a blockage may have been caused in the fuel pipe, which may be removed by blowing through the pipe with the aid of a tyre pump.

If, after attending to the above points, the pump still fails to operate, it should be renewed and the old pump sent to the nearest A.C. or Triumph Service Station.

Before doing any work on the carburettors or fuel pump which involves disconnecting a fuel pipe it is important to turn off the fuel supply at the tap on the chassis end of the flexible pipe. Failure to do this will allow the petrol to drain away from the tank.

RUNNING ADJUSTMENTS—Clutch

CLUTCH

A Borg & Beck single dry plate hydraulically operated clutch is fitted and as it is correctly set before leaving the works, it will be some considerable time before it requires re-adjustment. The hydraulic master cylinder for the clutch has a common filler with the brake system. (See arrow (B) Fig. 3, page 11.)

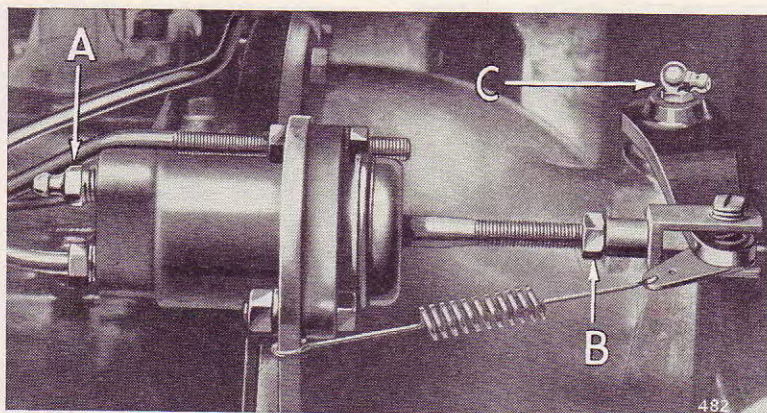


Fig. 19. Clutch adjustment.

There is, however, a partition in the container to ensure that any possible defect in one system does not affect the other.

Adjustment of the mechanism can normally only be judged as necessary at the connecting rod between the operating cylinder and the shaft operating lever end, see Fig. 19. The correct setting is when there is .075" (1.9 mm.) end float of the rod between operating cylinder and lever, in the "foot off" condition. To achieve the correct setting, measure the total movement of the operating lever by hand and if different from the specified amount release the locknut (B, Fig. 19) and adjust the length of the connecting rod to the correct figure. The adjustable connection between pedal and master cylinder is set on initial assembly and **MUST NOT** be tampered with as it will never require adjustment. If a pipe has been disconnected, it will be necessary to bleed the system. A bleeder nipple is shown by the arrow (A fig. 19). For instruction on bleeding the system, see page 34.

BRAKES

The pedal operates the brakes on all four wheels hydraulically, whilst the handbrake control operates the brakes on the rear wheels by means of cables.

RUNNING ADJUSTMENTS—Brakes

See page 17 for checking level of fluid in reservoir. If it is found to be particularly low, it is an indication that a leak has developed somewhere in the system and it should be traced and rectified without delay.

It must be remembered that the presence of oil, grease or similar foreign matter on a drum brake shoe will seriously affect the coefficient of friction and in

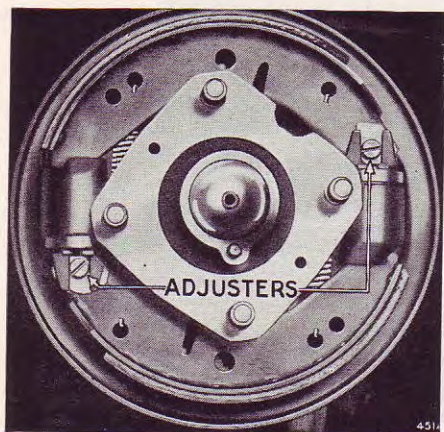


Fig. 20A. Front assembly.

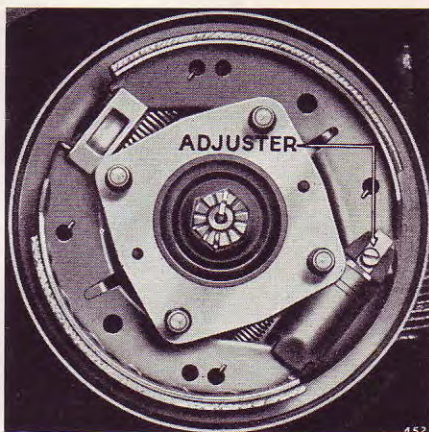


Fig. 20B. Rear assembly.

Lockheed Brakes.

consequence the retarding effect of that particular brake, in spite of the fact that it is being applied with the same force as the others. In such cases the brake drum should be thoroughly cleaned with fuel and the brake shoes replaced by new replacement shoes. Cleaning the brake shoe is not satisfactory.

Do not re-line the shoes but fit either genuine Lockheed or Girling replacement shoes, depending upon the installation. These shoes have the right type of lining machined to the correct radii.

Should the shoes be removed, care must be exercised to ensure that the pull-off springs are located behind the shoes and hooked through the correct holes, as shown.

Adjustment of Brake Shoes

Lockheed Brakes (fitted up to Commission No. TS.13000)

After a considerable mileage it may be found necessary to adjust the brakes. This is evident when the brake pedal has to be depressed to within 1" of the floor before the brakes operate. There are TWO adjusters to each front wheel and ONE to each rear wheel as shown.

RUNNING ADJUSTMENTS—Brakes

The following procedure should be followed to correctly adjust the brakes:

1. Apply the brakes hard, with the car stationary, to position the shoes in the drum, then release brake.
2. Jack up the car, remove the nave plates and road wheels.
3. Rotate hub until hole provided in the brake drum coincides with screwdriver slot in micram adjuster.
4. Insert a screwdriver and turn the adjuster clockwise until the shoe contacts the brake drum, then turn adjuster back one notch. There is a constant drag on the rear wheels due to the action of the differential and the axle oil. Do not confuse this with the brake drag.
5. Replace wheels and nave plates, then remove jack.

Girling Brakes (fitted on cars Commission No. 13001 and future)

The disc brakes, fitted to the front axles, are self-adjusting and should only need replacing when the shoe pads are reduced to approximately $\frac{1}{8}$ " (3 mm.) thickness.

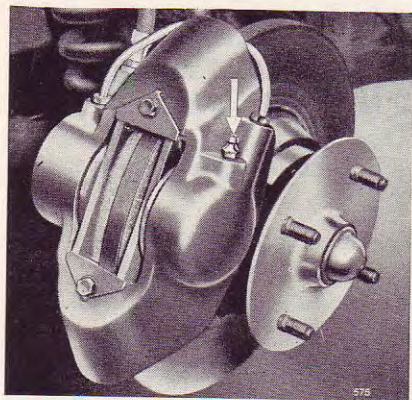


Fig. 21A Front Assembly.

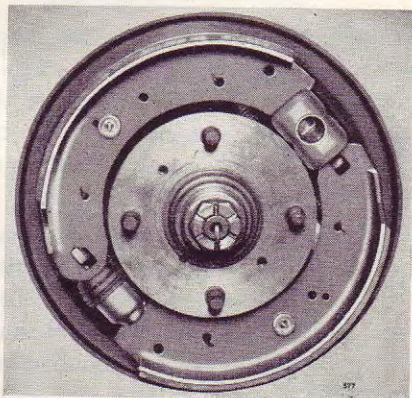


Fig. 21B Rear Assembly.

Girling Brakes.

The rear brakes are provided with a small adjuster which is positioned on the backing plate, above the axle case, and easily accessible with the road wheel removed. To correctly adjust the shoes, turn the adjuster clockwise until the shoes are hard against the drum, then slacken off adjuster by one notch. The general precautionary remarks as mentioned for the Lockheed brakes applies equally to the Girling assemblies.

RUNNING ADJUSTMENTS

Handbrake Adjustment (both makes)

Adjustment of the rear brake shoes as previously described automatically readjusts the handbrake mechanism. The cables are correctly set before leaving the works, and only maladjustment will result from tampering with the mechanism.

Bleeding the Brake and Clutch Hydraulic System

If a pipe joint is uncoupled, the wheel cylinder cups or clutch operating cylinder are inspected or replaced, the system must be bled in order to expel any air which may have been admitted.

Air is compressible, and its presence in the system will affect the working of the brakes and clutch.

Whilst the majority of owners will prefer to have these operations carried out by a Triumph Agent, for the benefit of those desiring to carry out their own running adjustments, the procedure is as follows :

1. Wipe clean the bleeder nipple and fit a piece of rubber tube over it, allowing the tube to hang in a clean container partially filled with fluid, so that the end of the pipe is below the level of the fluid.
2. Unscrew the bleeder nipple one complete turn with a suitable spanner. There is only one bleeder nipple to each wheel and one nipple on the clutch operating cylinder.
3. The fluid reservoir should be filled before commencing the bleeding operation, and must be kept at least half-filled during the whole operation, otherwise more air will be drawn into the system via the master cylinder. Always clean the area around the plug before removing it; this will lessen the risk of grit falling into the chamber after removal of the plug.
4. Depress the pedal quickly and allow it to return without assistance. Repeat this pumping operation with a slight pause between each depression of the pedal. Observe the flow of fluid being discharged into the glass jar and when all air bubbles cease to appear, hold the pedal firmly down and securely tighten the bleeder nipple.

NOTE.—Depending upon the position at which a pipe joint in the brake system has been uncoupled, it will be necessary to bleed the system at either both front or both rear wheels. If the pipe was uncoupled at the master cylinder, then the system must be bled at all four wheels.

PROPELLER SHAFT

If the propeller shaft has been taken apart for any reason it is essential when re-assembling the front end splines to see that the arrows on the universal joint and propeller shaft end are in line (see Fig. 11, page 20), so that the propeller shaft will transmit uniform motion.

RUNNING ADJUSTMENTS

HYDRAULIC DAMPERS

The front telescopic dampers fitted do not require any adjustment or topping up. If the dampers are removed, or for some reason new ones are fitted, it is advisable to hold them the right way up (in the case of the rear dampers check the level of the fluid and replenish if necessary), then pump the pistons to each end of the stroke. This pumping action dispels any air which may have entered the chambers. After this operation check the fluid level in the rear dampers, and in both cases keep the dampers the right way up until they are fitted into place.

LOOSE BOLTS AND NUTS

All the vital nuts are locked in position by split pins, locking wire, or by an additional lock nut or lock washer. It is, however, desirable that the car should be examined every 6,000 miles (10,000 km.) so that if any nut is found to be loose it may be tightened. The wheel nuts can periodically be checked by the owner himself and occasionally removed, oiled and refitted.

The general examination of the chassis is a mechanic's job.

ELECTRICAL SYSTEM

A 12 volt earth return (or one wire) lighting and starting set is fitted. **One cable should be disconnected from the battery terminal before removing any electrical unit, otherwise there is a risk of a serious "short."**

A list of the maker's numbers and descriptions of all electrical equipment will be found on page 41.

IGNITION

Failure of the red warning light will not affect the ignition system, but the bulb should be replaced at the earliest opportunity. The high tension leads should be examined occasionally and if they are perished or worn through, replace with the correct ignition cable, which should be obtained only from your dealer, and should be of the correct length.

The moulded distributor cover should be removed occasionally and wiped all over with a soft cloth. See that the carbon brush on the inside of the moulding works freely in its holder. Clean away any trace of dirt or dust around the contact breaker points. The points should be adjusted to give a maximum gap of 0.015" (0.5 mm.). The distributor fitted to this vehicle has the radio suppressor built into the distributor head. This, of course, means that an outward inspection of the ignition and coil leads a suppressor will not be apparent. **If a replacement or spare distributor head is required, take care to ensure that it is of the correct type with the long carbon pick-up, which is, in fact, the suppressor.**

THE BATTERY

Keep the terminals clean and well covered with petroleum jelly. If they are corroded, scrape them clean, assemble and cover with petroleum jelly. Wipe away all dirt and moisture from the top of the battery, and make sure that the connections are clean. Do not over-tighten the wing nuts securing the battery as this may result in the case becoming cracked.

THE DYNAMO

The dynamo is of the compensated voltage type and operates in conjunction with the regulator unit which is housed alongside the cut-out in the control box. The regulator unit ensures that the dynamo charges the battery at the rate best suited to its condition. It automatically provides a large charging

ELECTRICAL SYSTEM—Dynamo, Control Box and Fuses

current for a discharged battery and a low trickle charge for a battery in the fully charged state. The cut-out, operated by dynamo voltage, prevents discharge of the battery through the dynamo when the dynamo is not charging, in which condition the ignition warning light will be glowing.

Belt Tightness

It is important that the belt is sufficiently tight to drive the dynamo but not too tight as would put undue load on the dynamo and water pump bearings. The correct tension is achieved when the belt can be pressed inwards $\frac{1}{2}$ "— $\frac{3}{4}$ " (13—19 mm.) on the longest run, *i.e.*, from the dynamo pulley to the crank pulley. **It is essential after adjustment has been made to securely tighten the fixing bolts.**

THE STARTER MOTOR

Cleaning and Lubrication

The starter brush gear and commutator will not normally require attention. After 48,000 miles (80,000 km.) however, it is advisable to have the unit serviced at a Triumph or Lucas Service Depot.

Should the starter pinion become jammed in mesh with the flywheel, then it can be released by turning the crankshaft with the starting handle in the normal manner, or select top gear and rock the car backwards and forwards until the pinion releases itself. Do not forget to switch off the ignition when carrying out this operation.

CONTROL BOX

The control box, mounted on the scuttle, houses the voltage regulator and cut-out. These units are carefully and accurately set before leaving the works and must not be tampered with.

FUSES

The fuse carrier is located forward of the control box and houses two operating and two spare fuses. The top fuse (50 amp.) protects the horn, while the other fuse (35 amp.) protects those items which can only operate when the ignition is switched on, *i.e.*, direction indicators, windscreen wipers, brake light, petrol gauge and heater (if fitted). When replacing a fuse, it is important to use the correct replacement; the fusing value is marked on a coloured paper slip inside the tube.

A blown fuse will be indicated by the failure of all the units protected by it and is confirmed by examination of the fuse. If it is not possible to locate the cause of the trouble and the new fuse blows immediately, the equipment should be examined by a Triumph or Lucas Agent or Service Depot.

ELECTRICAL SYSTEM—Lamps

LAMPS

Head Lamps

The lamps fitted to this vehicle have the reflector and glass sealed as a unit. The bulb has a "pre-focus" cap accurately located and correctly positioned relative to the reflector, thus no adjustment to focusing is required when a replacement bulb is fitted.

It is not possible with these types of lamps to alter the direction of dip entirely by fitting bulbs of the opposite dipping characteristics, as some of the dip effect is produced by the shape of the glass in the lens.

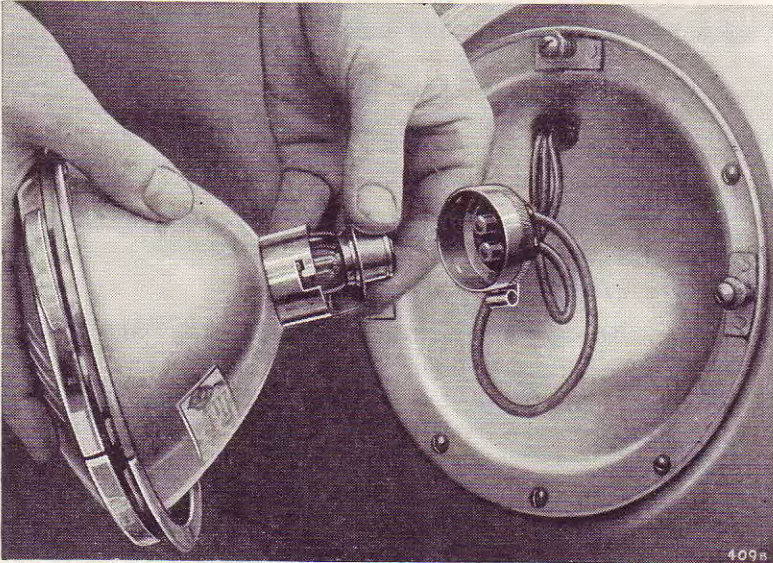


Fig. 22. Head lamp light unit with backshell removed.

BULB REPLACEMENT

Withdraw the front rim after removing the securing screw. Press in the lamp unit against the tension of the three adjusting screw springs and turn in an anti-clockwise direction until the key-slot holes in the rim line up with the screw heads. The lamp unit can then be drawn off. Do not rotate any of the screws, as this will affect the alignment of the reflector when assembled.

Rotate the back shell anti-clockwise and pull off, then the head lamp bulb can be removed. (See Fig. 22). Care should be taken to see that the bulb does not drop out.

LAMP ALIGNMENT

The lamp must be set to ensure that the beam is projected below the horizontal, taking into account that the lamp must be dipped slightly more to compensate for road inequalities and heavy loads which may be carried in the rear of the vehicle.

ELECTRICAL SYSTEM—Lamps

TO CHECK AND ADJUST ALIGNMENT

Park the car in front of a garage door or wall and square to it. The car must stand on level ground and the front of the lamps should be approximately 25 ft. (7.5 m.) from the "screen." The car should be unladen and the tyres at the correct pressures.

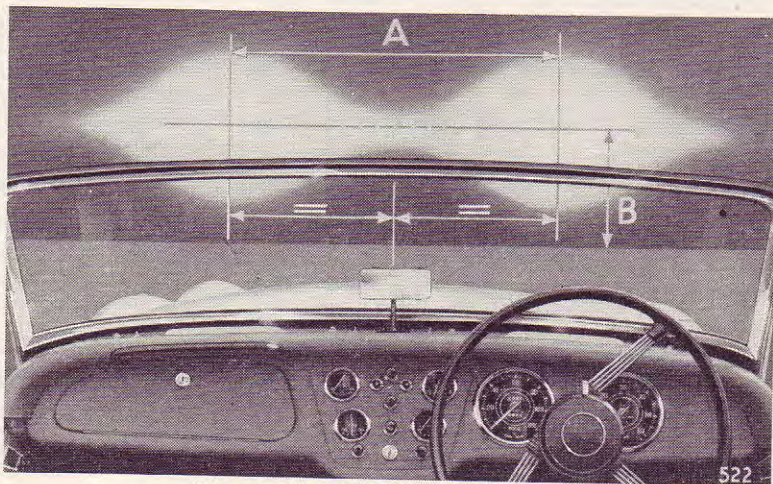


Fig. 23. Head lamps correctly aligned.

A point should be marked on the screen in line with the centre of the bonnet. Two crosses should be drawn on the "screen" 27" (680 mm.) above the ground level as indicated by (B), and 35½" (1,150 mm.) apart (A), measured equally about the centre point (see Fig. 23). Switch on the head lamps and adjust the lamps, if necessary, until the centre of each circle of light coincides with the centre of its respective cross.

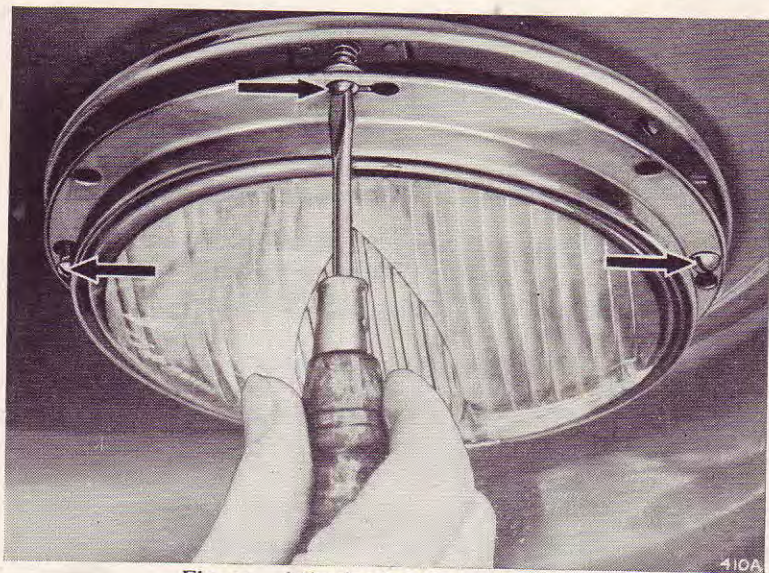


Fig. 24. Adjusting head lamp alignment.

ELECTRICAL SYSTEM—Lamps, etc.

If adjustment is necessary, proceed as follows :

Withdraw the front rim after removing the securing screw. Remove the dust-excluding rubber. This will reveal three screws (see arrows, Fig. 24), which can be adjusted to align the reflector correctly. When the correct alignment has been obtained, replace the rubber and rim.

It is advisable to start adjustment with each screw screwed out half-way ; this will ensure correct fitting of the rim when assembled.

Parking Lamps (Front) and Direction Indicator Flashing Lamps

To remove bulb, peel back the rubber ring and remove rim, then the bulb can be withdrawn. When replacing rim, first slip the edge over the two small lugs, then peel back rubber as rim is fitted. Ensure that the rubber is located correctly over the rim edge, otherwise vibration may cause the rim to become detached.

Tail and Direction Indicator Flashing Lamps

To gain access to the bulb, remove the cover, which is secured by two screws.

Number Plate Illuminator and Brake Lamp

To gain access to the bulbs, remove the securing screw and withdraw the cover.

Ignition Warning Light

Direction Indicator Warning Light

High Beam Warning Light

Each bulb holder can easily be withdrawn from the rear of the panel for bulb renewal.

Instrument Panel Lights

Replacing these bulbs is best left to the safe hands of a Service Station.

WINDSCREEN WIPER

For operation, see page 8.

DIRECTION INDICATORS

These are of the flashing type operating in the dual filament bulbs in the parking lamps at the front and the tail lights at the rear. The flasher unit is situated close to the control box underneath the bonnet.

WINDTONE HORNS

Each electric horn, before being passed out of the works, is adjusted to give its best performance and will give long periods of service without any attention. No adjustment is required in service.

If for any reason the note is unsatisfactory, do not attempt to dismantle the horn, but return it to a Lucas Service Depot for examination.

ELECTRICAL SYSTEM—Specification

ELECTRICAL COMPONENT SPECIFICATION

SPECIFICATION OF EQUIPMENT			BULBS			
	Model	Service No.		Lucas No.	Voltage	Watt.
Battery	GTW9A/2	4011557	Head Lamps			
Control Box	RB106/2	37182	Left-hand dip, both lamps (home model)	404	12	60/36
Coil	B12 type L	45012D	Left-hand dip, both lamps (export model)	354	12	42/36
Dynamo	C39PVL/2 type LO	22258B	Right-hand dip " " " Vertical dip " "	301 360	12 12	36/36 45/35
Distributor	DM2 type V167	40403A or 40480A	Parking Lamps			
Starter	M418G type V164	25541E	Tail Lamps			
Fuse Box	S.F.6	033240	Number Plate Illumination and Brake Lamp	380	12	6/21
Flasher Unit	F.L.3	35010A	Ignition and High Beam Warning Lights, Panel Lights and Direction Indicator Warning Lights	987	12	2.2
Horns	WT618LN HN	69046E 69047E				
Windscreen						
Wiper Motor	DR 2	073105				
Petrol Gauge	Jaeger No.		Fuses	50 amp.		Service No. 188219
Tank Unit	TA 150			35 amp.		188218

OPTIONAL EXTRAS

RADIO

For operating instructions, see the radio leaflet provided with the set. The set is protected against possible electrical damage due to a short by a 5 amp. fuse housed in the main lead union. The aerial mast should always be lowered when the set is not operating.

HEATER

The heater is of the re-circulating type, with a combined rheostat and ON/OFF switch on the dash panel to regulate the speed of the fan. At the right-hand rear end of the cylinder head, under the bonnet, a screwed cock can be turned to vary the amount of hot water which is to be fed to the heater unit from nil to maximum flow. Shutters on the underside of the heater unit control the downward flow of air from the heater into the car. Closing the shutters will not affect the air flow to the demister slots.

OVERDRIVE

Operation

The Laycock de Normanville overdrive unit effects a reduction in overall gear ratio to 3.03 by means of a train of epicyclic gears which are brought into action by a hydraulically operated cone clutch. Movement of the electrical switch mounted on the outside of the dash panel will bring the overdrive into operation. To take the overdrive out of operation, return the switch to its original position. The electrical circuit is only complete when the gear lever is in the position of top gear on earlier models and top, 3rd or 2nd gears on later models. Care should be taken on the earlier models not to move the gear lever out of the position of top gear at road speeds in excess of 75 m.p.h. (120 k.p.h.), and it should be remembered also that if the overdrive switch is made, returning the gear lever from third to top gear will automatically re-engage the overdrive unit.

Lubrication

The oil used for both lubrication and for the hydraulic pump is the same as and connected with that of the gearbox. The two units also having a common filler orifice in the gearbox top cover. With an overdrive fitted it is inadvisable to use hypoid gear oils as these may be detrimental to the operation of the unit.

Draining

There is a drain plug fitted to the overdrive unit, and when draining the gearbox it is necessary to remove both the drain plug on the gearbox and the drain plug on the overdrive unit.

WIRE WHEELS

Cars fitted with disc brakes have detachable hub extensions each secured by four nuts. This should be checked occasionally for tightness and especially after the first 500 miles from new or when replacement parts are fitted. The correct tightness is 60-65 ft. lb.

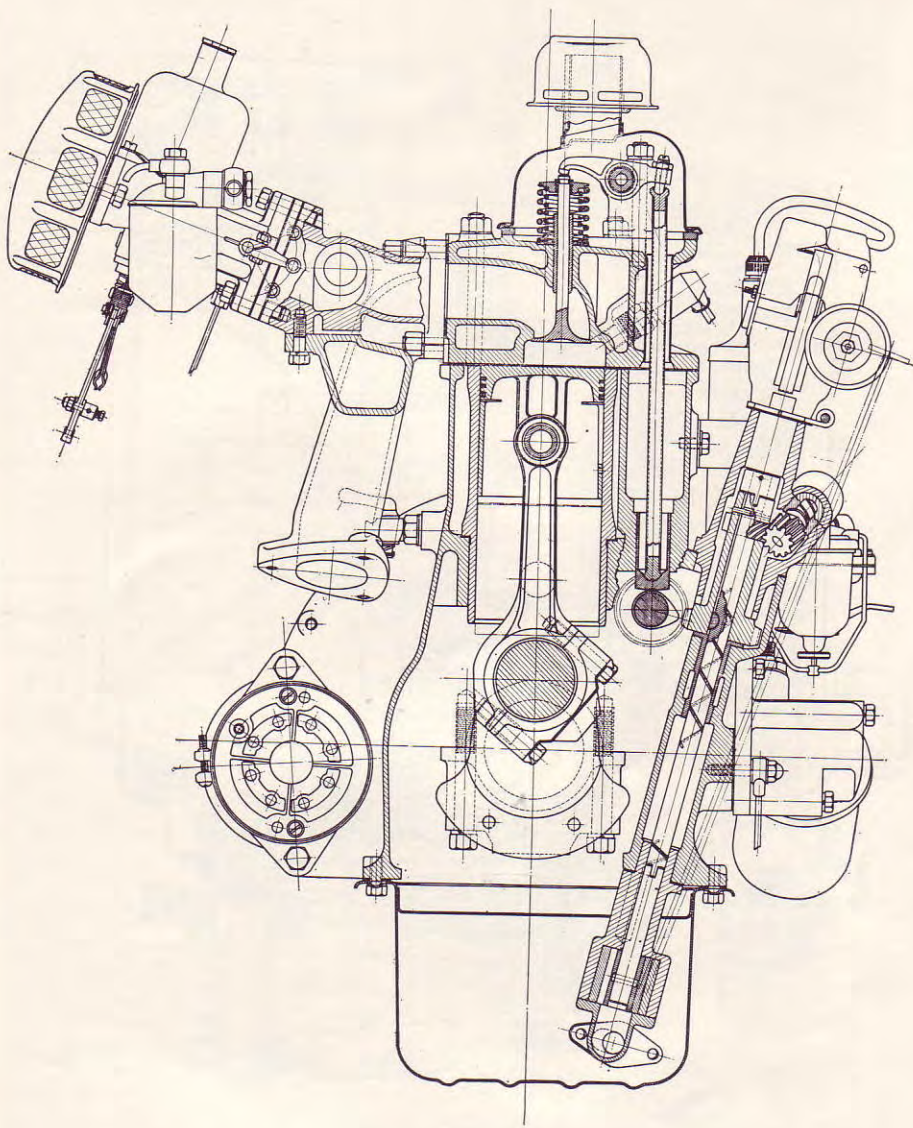


Fig. 25 Engine cross section.

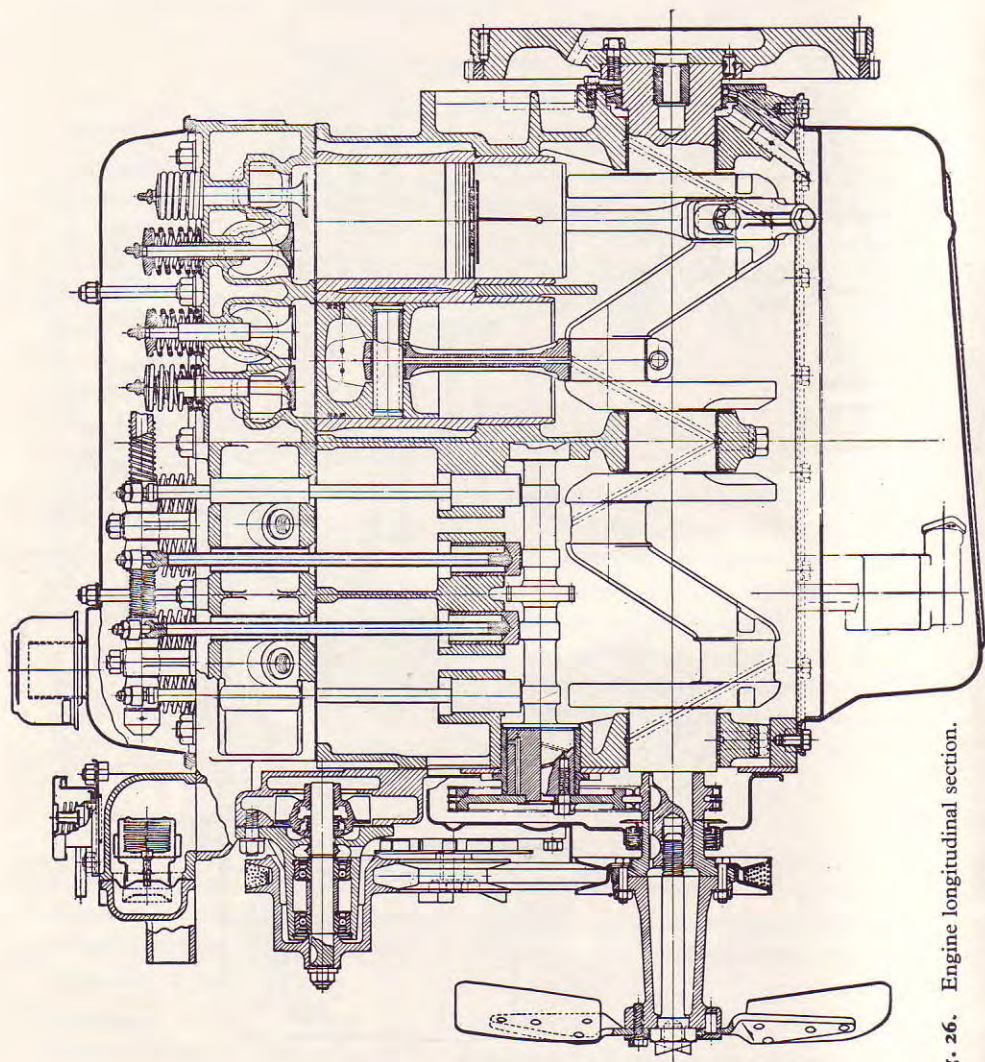


Fig. 26. Engine longitudinal section.

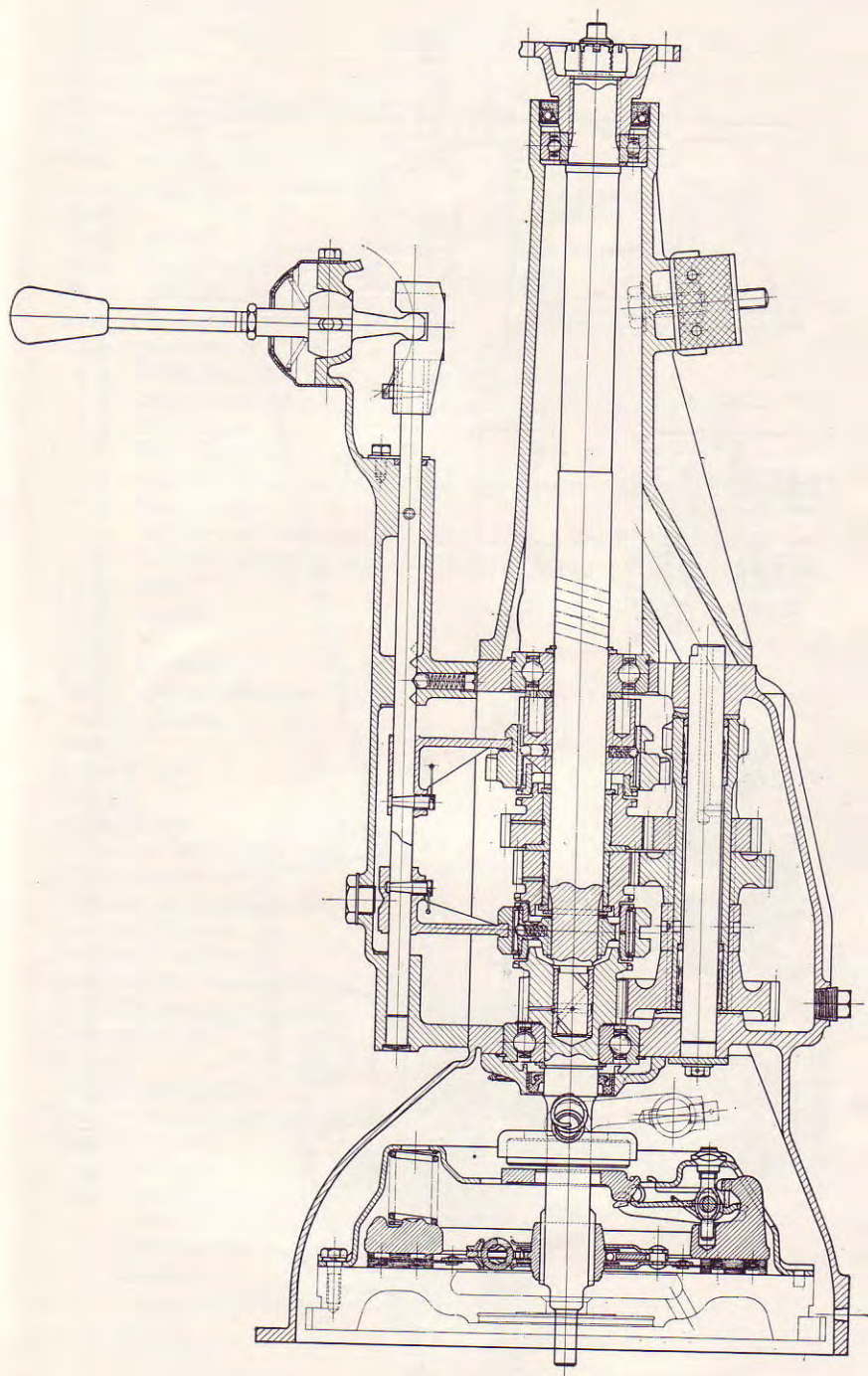


Fig. 27. Gearbox Section.

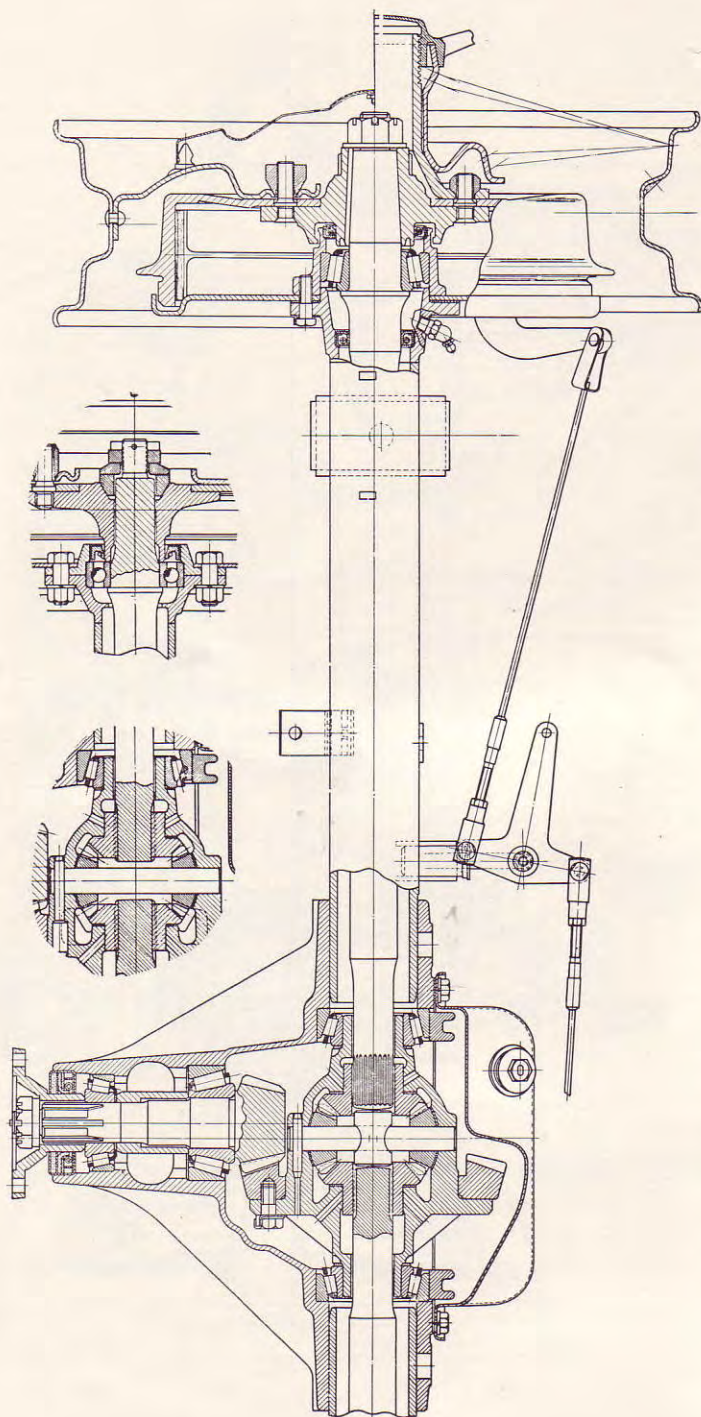


Fig. 28. Rear axle section (inserts indicate axle arrangement for cars up to Commission No. TS.1300).

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RECOMMENDED LUBRICANTS—OVERSEAS

COMPONENT		MOBIL OIL	WAKEFIELD	B.P. ENERGOL	SHELL	ESSO	DUCKHAM'S	S.A.E.
ENGINE	Air Temperature °F. Over 70°	Mobiloil "AF"	Castrol XXL	Energol Motor Oil S.A.E. 40	Shell X-100, 40	Essolube 40	Duckham's "Forty"	40
	40° to 70°	Mobiloil "A"	Castrol XL	Energol Motor Oil S.A.E. 30	Shell X-100, 30	Essolube 30	Duckham's NOL "Thirty"	30
	10° to 40°	Mobiloil Arctic	Castrolite	Energol Motor Oil S.A.E. 20W	Shell X-100, 20/20W	Essolube 20	Duckham's NOL "Twenty"	20
	—10° to —25°	Mobiloil 10W	Castrol Z	Energol Motor Oil S.A.E. 10W	Shell X-100, 10W	Essolube 10	Duckham's NOL "Ten"	10
	Below —10°	Mobiloil 5W	Castrol ZZ	Energol Motor Oil S.A.E. 5W	Shell X-100, 5W	Esso Extra Motor Oil "Zero"	Duckham's NOL "Five"	5
Upper Cylinder Lubricant		Mobil Upperlube	Castrollo	Energol U.C.L.	Shell Donax U	Esso Upper Motor Lubricant	Duckham's Adcoids	—
GEAR- BOX	Over 70°	Mobiloil BB	Castrol XXL	Energol Motor Oil S.A.E. 50	Shell X-100, 50	Essolube 50	Duckham's NOL "Fifty"	50
	10° to 70°	Mobiloil A	Castrol XL	Energol Motor Oil S.A.E. 30	Shell X-100, 30	Essolube 30	Duckham's NOL "Thirty"	30
	Below 10°	Mobiloil Arctic	Castrolite	Energol Motor Oil S.A.E. 20W	Shell X-100, 20/20W	Essolube 20	Duckham's NOL "Twenty"	20
STEERING GEARBOX AND REAR AXLE	Over 10°	Mobilube GX 90	Castrol Hypoy	Energol E.P. S.A.E. 90	Shell Spirax 90EP	Esso XP Compound 90	Duckham's Hypoid 90	EP 90
	Below 10°	Mobilube GX 80	Castrol Hypoy 80	Energol EP S.A.E. 80	Shell Spirax 80EP	Esso XP Compound 80	Duckham's Hypoid 80	EP 80
	Below 10°	Mobilube GX 140	Castrol Hi-Press	Energol EP S.A.E. 140	Shell Spirax 140EP	Esso XP Compound 140	Duckham's NOL EPT 140	EP 140
PROPELLER SHAFT JOINTS								
FRONT WHEEL HUBS REAR WHEEL HUBS and ENGINE WATER PUMP (Hand Gun)	Over 10°	Mobilgrease M.P.	Castrol W.B.	Energol C ₃	Shell Retinax A	Esso Multi-purpose Grease H.	Duckham's LB10	—
	Below 10°		Castrol Heavy					
	Below 10°		Castrol CL					
CHASSIS, Grease Nipples (Hand or Pressure Gun)								
Oil Points (Oil Can) Body and Chassis	Over 10°	Mobiloil Arctic	Castrolite	Energol Motor Oil S.A.E. 20W	Shell X-100, 20/20W	Esso Handy Oil	Duckham's NOL "Twenty"	20
	Below 10°							
REAR ROAD SPRINGS								
HANDBRAKE CABLES								
BRAKE AND CLUTCH RESERVOIR	Over 10°	Mobilgrease M.P.	Castrol Cable Grease	Energol C ₃ G	Shell Retinax A	Esso Spring Grease	Duckham's Keenol KGr6	—
	Below 10°							
Lockheed								
Girling								

PAINT WITH OLD REAR AXLE OR ENGINE OIL

GENUINE LOCKHEED HYDRAULIC BRAKE FLUID

WAKEFIELD GIRLING BRAKE AND CLUTCH FLUID

RECOMMENDED LUBRICANTS—BRITISH ISLES

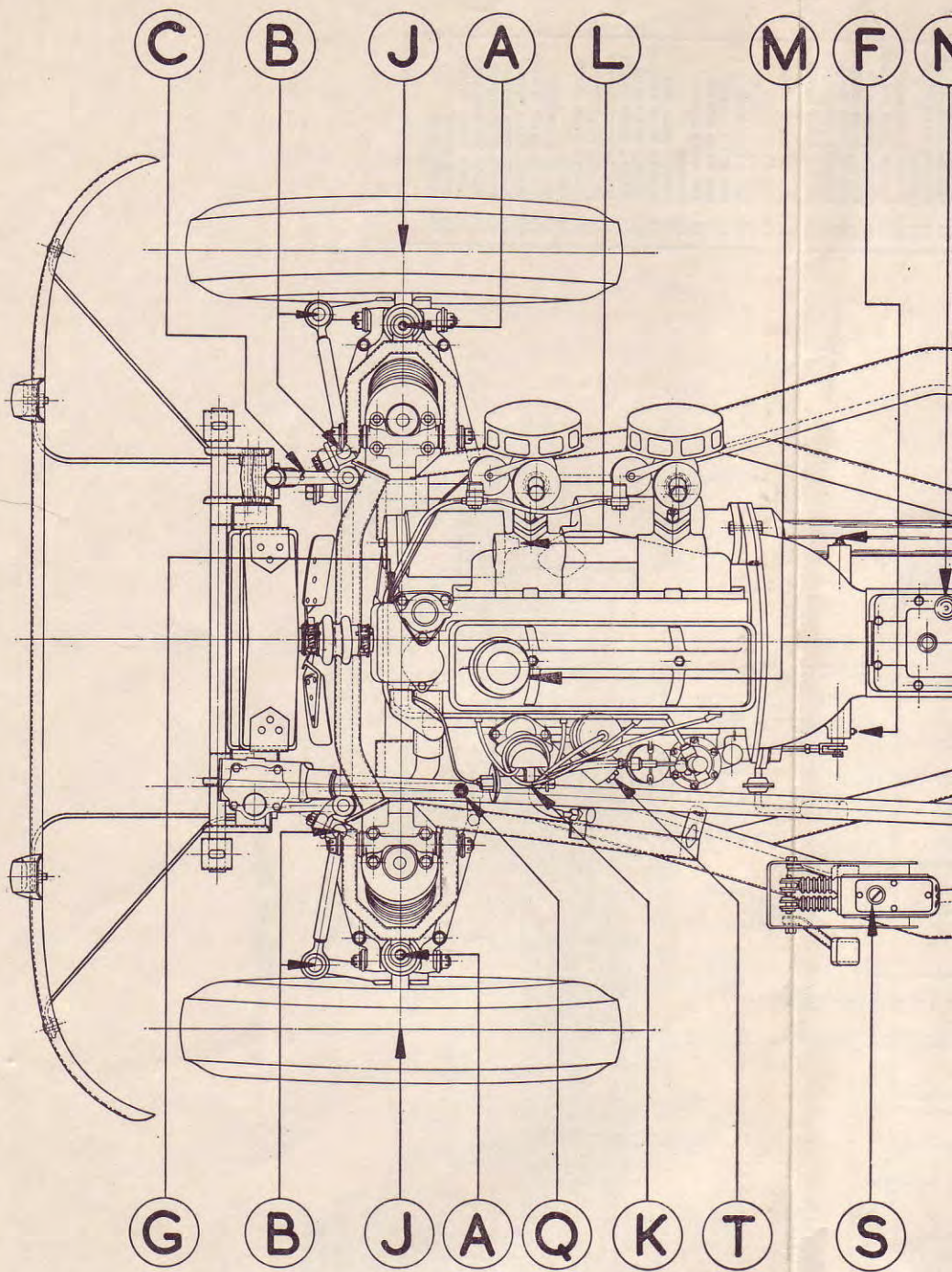
COMPONENT	Esso	DUCKHAM'S	MOBIL OIL	WAKEFIELD	B.P.	SHELL
ENGINE Summer	Esso Extra Motor Oil 20W/30	Duckham's NOL "Thirty"	Mobiloil A	Castrol XL	Energol S.A.E. 30	Shell X-100 30
	Winter	Duckham's NOL "Twenty"	Mobiloil Arctic	Castrolite	Energol S.A.E. 20W	Shell X-100 20/20W
Upper Cylinder Lubricant	Esso U.C.L.	Duckham's Adcoids	Mobil Uppertube	Castrollo	Energol U.C.L.	Shell Donax U
GEARBOX	Essolube 30	Duckham's NOL "Thirty"	Mobiloil A	Castrol XL	Energol S.A.E. 30	Shell X-100 30
REAR AXLE STEERING GEARBOX	Esso Expee Compound 90	Duckham's Hypoid 90	Mobilube G.X. 90	Castrol Hypoy	Energol EP S.A.E. 90	Shell Spirax 90 E.P.
PROPELLER SHAFT JOINTS	Esso Expee Compound 140	Duckham's NOL EP 140	Mobilube G.X. 140	Castrol Hi-Press	Energol E.P. S.A.E. 140	Shell Spirax 140 E.P.
FRONT WHEEL HUBS				Castrolase W.B.		
REAR WHEEL HUBS and ENGINE WATER PUMP (Hand Gun) CHASSIS, Grease Nipples (Hand or Pressure Gun)	Esso Multi-purpose Grease H.	Duckham's LB10	Mobilgrease M.P.	Castrolase Heavy	Energol C3	Shell Retinax A
				Castrolase CL		
Oil Points (Oil Can) Body and Chassis	Esso Handy Oil	Duckham's NOL "Twenty"	Mobil Handy Oil	Castrolite	Energol S.A.E. 20W	Shell X-100 20/20W
REAR ROAD SPRINGS		PAINT WITH OLD REAR AXLE OR ENGINE OIL				
HANDBRAKE CABLES	Esso Graphite Grease	Duckham's Keenol KG 16	Mobilgrease M.P.	Castrolase Brake Cable Grease	Energol C3G	Shell Retinax A
BRAKE AND CLUTCH RESERVOIR Lockheed Girling		GENUINE LOCKHEED HYDRAULIC BRAKE FLUID				
		WAKEFIELD GIRLING BRAKE AND CLUTCH FLUID				

A FEW DON'TS FOR BEGINNERS

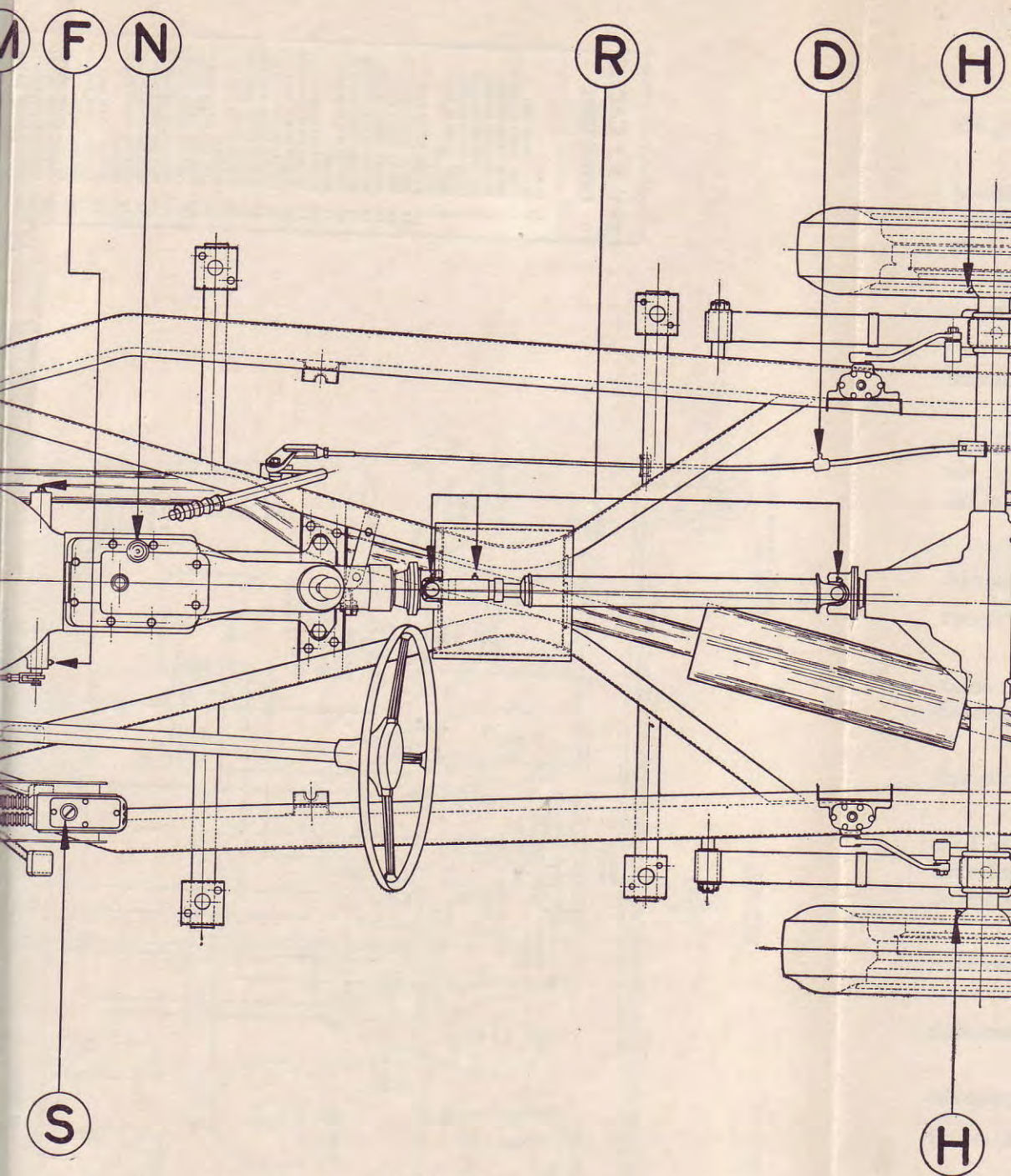
- DON'T** neglect to read this Handbook, and if any point is not clear, ask for further instructions from your Dealer.
- DON'T** run the engine for any considerable time whilst in an enclosed space, such as a garage with doors closed. The dangers of carbon-monoxide poisoning from the exhaust gases are very real under such circumstances.
- DON'T** neglect to pay regular attention to lubrication and always use a good lubrication as recommended.
- DON'T** rev. the engine immediately after starting up, but give the oil time to circulate, see page 9.
- DON'T** continue to run the engine if the oil pressure gauge indicates an abnormally low pressure or if the needle fluctuates unduly, but examine the engine to find the cause. This may be lack of oil.
- DON'T** run the engine with too little water in the radiator.
- DON'T** allow the engine to run too fast during the first 500 miles, see page 10.
- DON'T** forget to make full use of the gearbox when climbing hills. Don't change "up" too soon.
- DON'T** continue to run the car if it is felt that there is some slight defect or falling off in power. Investigate this and if it cannot be traced get in touch with the nearest Triumph Dealer.
- DON'T** neglect your tyre pressures and examine the covers for flints as well—this will save money (see page 21).
- DON'T** omit to readjust the alignment of the headlamps if they have become incorrectly adjusted. More pleasure will be obtained when driving at night and other road users will not be inconvenienced (see page 38).
- DON'T** forget to switch off the ignition and put on the hand brake when the car is at rest.
- DON'T** neglect the level of the acid in the battery—which is quite accessible by raising the bonnet.
- DON'T** forget to engage a lower gear when about to descend a very steep hill.
- DON'T** omit to read "The Highway Code," a copy of which can be obtained from the local licensing authority.

Fig. 29. LUBRICATION CHART—Fold Out.

Ref.	ITEMS	DETAILS	PAGE REF.	MILEAGE INTERVAL (Thousands of Miles)
A	Steering Swivels (4 nipples)	THREE OR FOUR STROKES	18	1
B	Outer Tie Rod Ball Joints (4 nipples)		18	1
C	Steering Slave Drop Arm Pivot (1 nipple)		18	1
	Lower Wishbone Outer Bushes (4 nipples)		18	1
D	Cable (1 nipple)	FIVE STROKES	18	6
E	Handbrake Compensator (2 nipples)		18	6
F	Clutch Shaft Bearings (2 nipples)		17	6
G	Engine Water Pump (1 nipple)		15	6
H	Rear (2 nipples)	REMOVE AND REPACK	18	6
J	Hubs Front (2 nipples)		18	6
K	Ignition Distributor	OIL AS RECOM- MENDED	15	6
	Handbrake Lever		20	6
	Carburettor Dashpots and Control Linkages		14	6
	Door Locks, Hinges, Bonnet Safety Catch, Boot and Spare Wheel Locks		20	6
L	Dynamo		16	12
M	Engine Sump ————— 250 MILES	TOP UP OIL LEVEL	11	3
		DRAIN & REFILL WITH NEW OIL	13	
	Oil Filler Cap	WASH	16	6
N	Gearbox —————	TOP UP OIL LEVEL	16	6
		DRAIN & REFILL WITH NEW OIL	16	12
P	Rear Axle	THREE OR FOUR STROKES	16	6
Q	Steering Gearbox		19	6
R	Propeller Shaft Splines (1 nipple)	GREASE GUN OIL GUN	20	6
	Universal Joints (2 nipples)		20	6
	Road Springs	CLEAN AND OIL	20	6
	Air Cleaners	OIL AS RECOMMENDED	16	6
S	Hydraulic Brake and Clutch Reservoir	TOP UP FLUID LEVEL	17	6
T	Oil Cleaner	RENEW CARTRIDGE	14	6

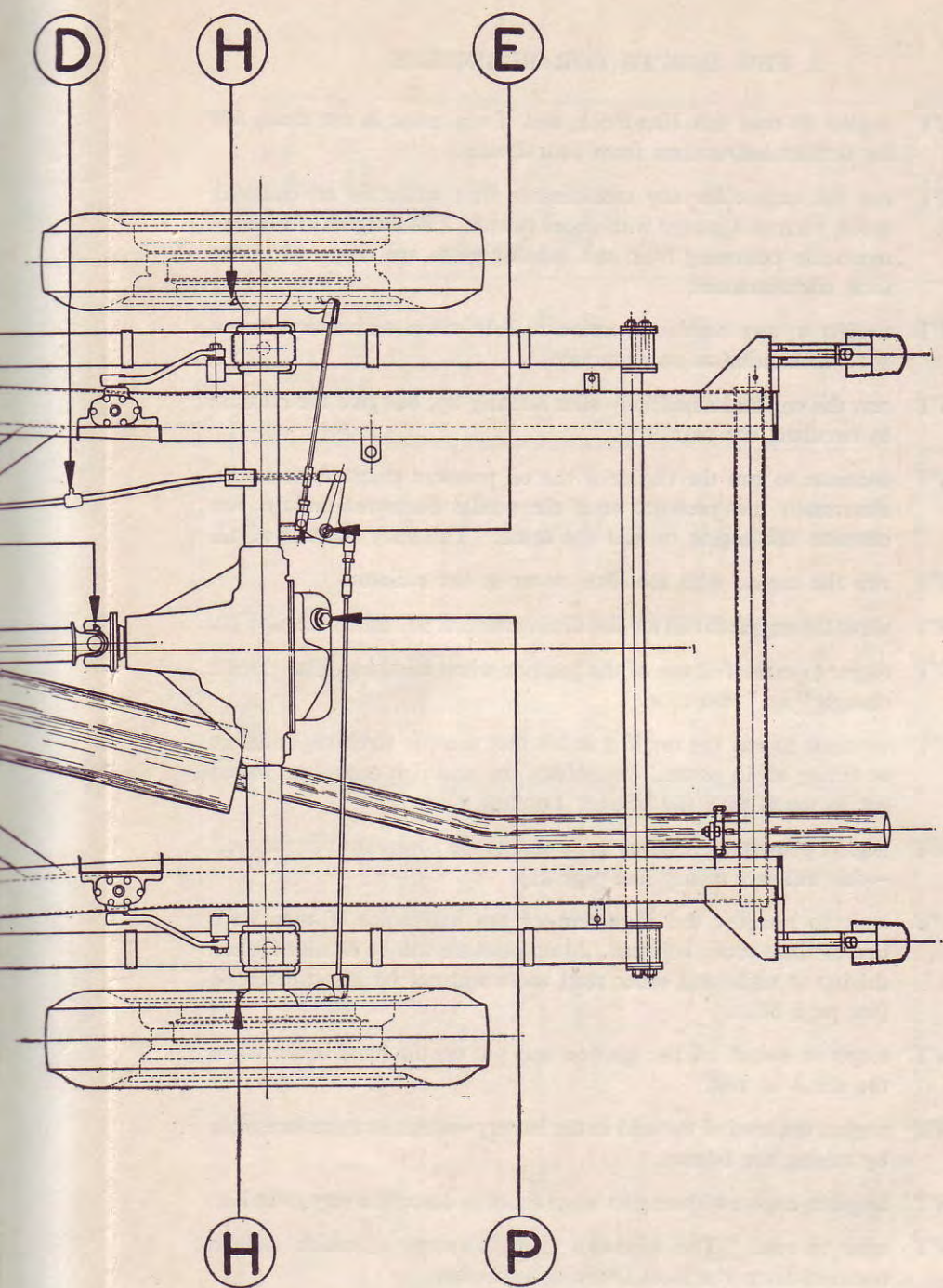


The chart is laid out to simplify lu
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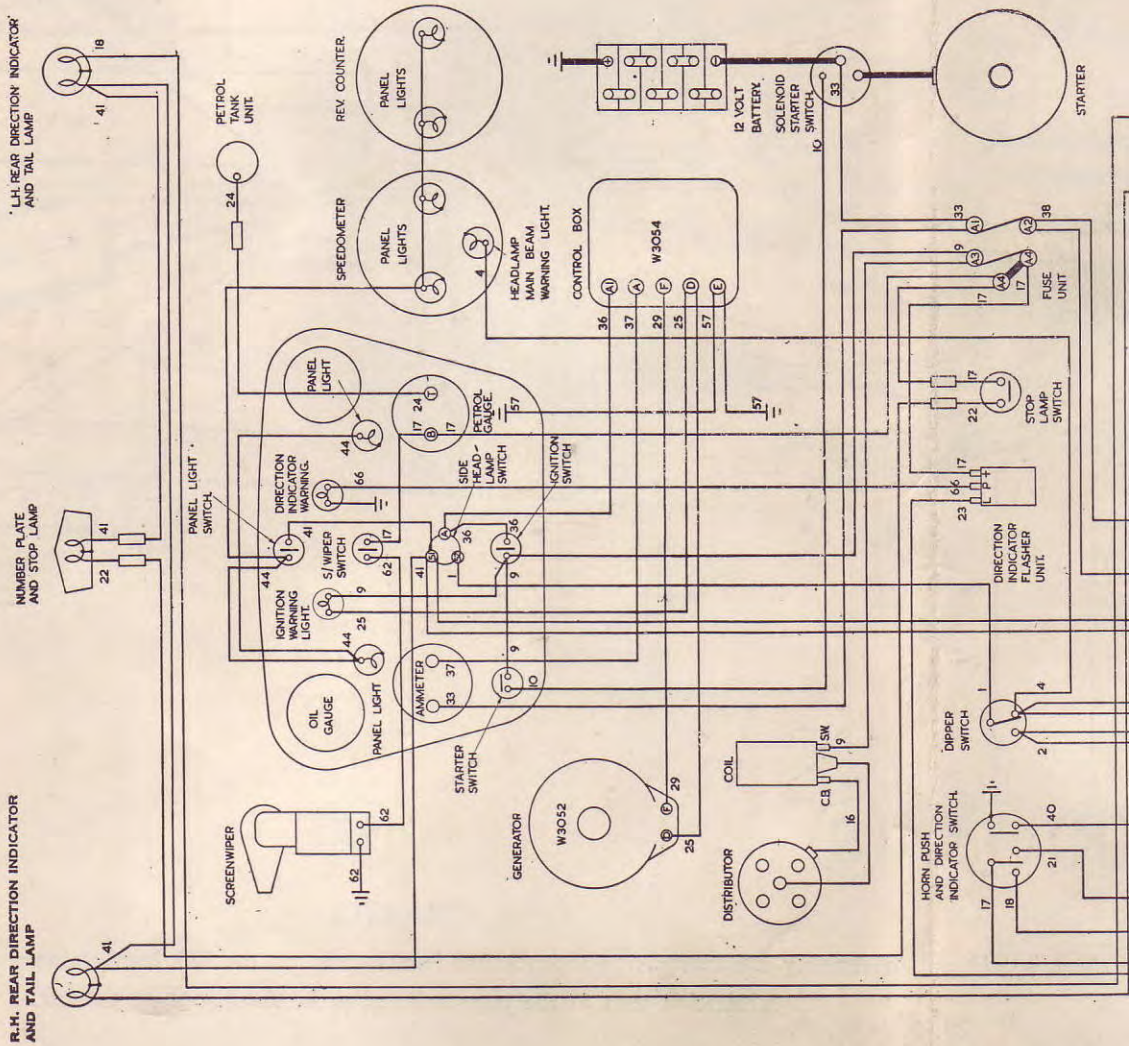
to simplify lubrication. The encircled letters refer to the left hand column of the chart. For method of lubrication turn to the page referred to in the respective column.



nn of the chart. For methods of

KEY TO CABLE COLOURS

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



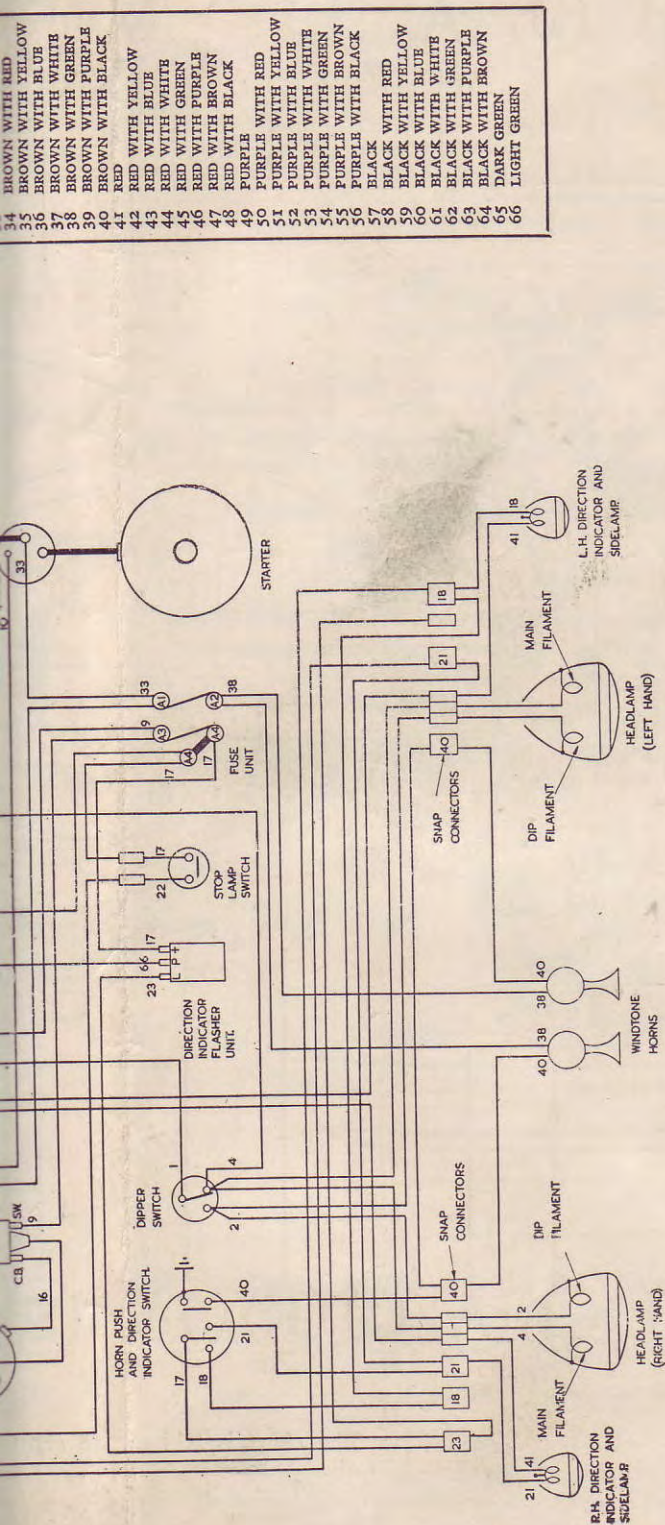


Fig. 30. Wiring Diagram.

