HANDBOOK

OF



18 h.p. or 16 h.p. ENGINE.



PUBLICATION No. 1104A

PRICE - ONE SHILLING.

AUSTIN MOTOR CO. LTD. LONGBRIDGE :: BIRMINGHAM

HANDBOOK

OF



WITH 18 h.p. or 16 h.p. ENGINE.



11th EDITION.

THE AUSTIN MOTOR CO. LTD. LONGBRIDGE - BIRMINGHAM

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A FOREWORD

HE information contained in this handbook is intended only to guide and assist the owner or driver of an Austin car, to preserve the car in its proper satisfactory running condition. It must not be considered as a complete manual. The handbook does not, in any manner, vary or extend the liability of the company, which is limited to the Warranty issued with the car. Where no information is given for a particular adjustment, it may be regarded as one which the average owner would entrust to a garage. When the occasion for adjustments of this character arises, the owner should seek the aid of the local Austin Agent, whose address will be found in the list of agents supplied with the car. Both owner and agent are encouraged to call upon the Service Department of the Company for advice, whether upon the management of the car, the effecting of adjustments, or methods of repair. Owners need not suppose that they will have to apply all the attentions given in this book, but careful notice should be paid to the chapters dealing with maintenance.

NOTE.—See the statement with reference to the accessories, at the end of this book.

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THE Austin Sixteen Light Six is made to meet, and satisfy the demand for a moderate sized car of the highest class, giving luxurious comfort, and continuous good performance, at an economical price.

Apart from several special features in the engine, the general design is similar to that which has proved so successful in other Austin models. This car—one of the most successful in the Austin range—is therefore based on the very wide experience gained in a quarter of a century of motor manufacturing.

DETAILED SPECIFICATION

- Dimensions. Full car length, 14ft 8in. (4470 mm.) for 10ft. 0in. wheelbase, and 14ft. 0in. (4263 mm.) for 9ft. 4in. wheelbase. Track, 4ft. 8in. (1422 mm.). Ground clearance, 7¹/₂in. (191 mm.).
- Engine. 18 h.p., six-cylinders, water-cooled, detachable head. Bore 2.73 in. (69.5 mm.). Stroke 4,375 in. (111 mm.). Total capacity 153.7 cu. in. (2,510 cc.). R.A.C. rating, 17.9 h.p., b.h.p. 43 at 2,600 r.p.m.

YORK SALOON

THE

Engine.
16 h.p., six-cylinders, water-cooled, detachable head. Bore 2.58 in. Stroke 4.375 in. (65.5 x 111 mm.). Total capacity 137 cu. in. (2,249 cc.). R.A.C. rating, 15.9 h.p. Brake h.p. 38 at 2,600 r.p.m. The cylinders are monobloc and pistons aluminium. The valves are all on the nearside; induction and exhaust manifolds are mounted to provide a hot-spot. Lubrication is by gear-wheel pump in accordance with Austin practice.

Ignition. By battery and coil; the distributor is accessibly mounted and incorporates an automatic advance and retard mechanism.

Controls. Brake and gear levers are centrally situated; the change is of the ball type, and reverse is obtained by lifting the complete lever before making the side movement (see diagram on page 8). Foot accelerator is to the right of the foot-brake pedal. Foot operated "dip and switch" control to left of clutch pedal.

Clutch. Single dry-plate type which proves very sweet in action.

- **Transmission.** The gearbox has four speeds forward and a reverse. There is synchromesh engagement for top, third and second speeds. The gear ratios are 5.11, 8.18. 12.37, and 18.86 to 1. The rear axle is of live ³/₄ floating design, driven through spiral bevel gear; the outer casing carries the rear wheels, which run on ball bearings.
- Fuel System. Petrol tank of 10 gallons capacity with gauge registering on dashboard. The fuel is fed by pump to the Zenith carburetter.
- Starter. Electrical (hand operated switch).
- Steering. Worm and wheel, with provision for taking up wear.
- Front Axle. Forged I section.
- Wheels.Wire fitted with Dunlop Tyres 5.25 x 19.Export cars have 6.50—16 low pressure Dunlop tyres.
- Lighting By dynamo and battery; dip and switch headlights, with foot control.
- **Brakes.** Both the hand-lever and the foot pedal operate brakes on all four wheels. These brakes are of the expanding type, and easily adjustable.
- Springs. Semi-elliptic front and rear, fitted with hydraulic shock-absorbers and interleaved.
- **Instrument** Equipped with switch for illuminated panel, oil pressure gauge, engine starter switch, petrol gauge, air strangler control, clock, speedometer, ignition and lighting switches and warning light.
- **Bodywork.** Of Austin construction giving attractive lines with lightness and rigidity. All models have four wide doors (excepting, of course, the two-seater). Bodies are finished in cellulose. Upholstery and equipment is designed to afford the maximum comfort. All fittings chromium plated.
- **Equipment.** In addition to the electric lighting and starting equipment, and the instrument board fittings already referred to, the equipment includes direction indicators with automatic return switch, electric horn, driving mirror, electric windscreen wipers, hydraulic shock absorbers, license holder, spare wheel and tyre, luggage carrier, kit of tools as listed, and Triplex Toughened Glass.
- **Insurance.** We have arranged a special insurance at £14 12s. 6d. for the 16 h.p. and £15 2s. 6d. for the 18 h.p., for a full comprehensive policy.

THE AUSTIN SIXTEEN CHASSIS.



GEAR POSITIONS.



The above diagram shows the ball change. The reverse lies over to the right of "top" speed, and is "found" by lifting the ball upwards by means of the lever and moving to the position indicated

THE NEW CAR

IF YOU ARE NOT ALREADY FAMILIAR WITH AUSTIN CARS PLEASE READ THIS HANDBOOK CAREFULLY

N taking delivery of the new car give it a careful general examination to see that all is complete and in order; check the equipment, the tools, and see that any special requirements have been carried out to order.

Before running see that the car is supplied with ample fuel and water, and that the engine and gearbox have the necessary quantities of oil. The battery should contain the required anount of acid. For quantities of oil and acid see the sections under "Lubrication" and "Electrical Equipment."

Test the position of the clutch and brake pedals which are easily and readily adjustable to ensure a comfortable driving position, and easy reach and control.



The instrument board

A-Clock	D—Starter Button	H-Dash Lamp Switch
B—Ammeter	E-Warning Light	I-Switches
C-Oil Pressure	F—Throttle	J-Speedometer
Gauge	G-Petrol Gauge	

Starting the Engine.

Make sure that the change-speed lever is in neutral position, and the handbrake on.

Switch ignition on by inserting the key, and turning it to the right.

Pull the knob of the strangler control right out (which closes the air strangler) and operate the starting motor switch by pressing the knob firmly with the finger. Allow the knob to return gradually as the engine picks up speed.

Assist starting by depressing the clutch pedal, particularly in cold weather.

Starting Difficulties

After the foregoing instructions have been carried out, should the engine fail to start, the cause will come under one of the headings below.

If upon operating the starter switch the starter does not revolve, the starting system is out of order. See "The Electrical Equipment."

If the engine revolves but will not fire, the trouble must be looked for elsewhere as follows :--

If the engine revolves and the petrol supply is satisfactory and yet the engine does not fire, it is evident that the ignition system is at fault. See "The Ignition System."

If the items already mentioned are in order, but the engine does not start, or runs very erratically, it is probable that the carburetter is out of adjustment. See "The Carburetter."

An aid to easy starting is to refill the radiator with warm water. Avoid over enriching the mixture by using the air strangler when restarting a hot engine.

Do not allow the car to be run at high speed or the engine raced for the first 500 miles. Never leave the ignition switch on for any lengthy period while the engine is not running. The warning lamp on the switchboard will remind you of this.



PERIODICAL ATTENTIONS

N this and the following two pages is a handy summary of all the attentions described in this handbook. The attentions under the weekly and monthly headings are based on the assumption that the maximum mileage per week does not exceed 500. The occasional attentions should not be neglected if the car is to continue to run efficiently. For the first few hundred miles it is particularly important to see that all points receive plenty of lubricant, and to verify the various adjustments.

Weekly.

- 1. Examine the water level in the radiator and fill up within 2in. of the top.
- 2. Examine the oil level in the crankcase and replenish to the "maximum" mark on the float rod or dipstick.

3. Give a charge with the grease gun to the following :----

Steering shaft—1 Swivel axle pins—2 on each. Steering cross tube—1 each end. Steering side tube—1 each end.

4. Give a few drops of oil to the

Hand brake gear. Foot brake gear and joints. Engine control joints.

5. Test the tyres for correct pressures and examine them for cuts. (The minimum pressures that are recommended are given on another page).

Monthly.

- 1. Examine the battery, ignition leads, plug terminals and all electric cables.
- 2. Steering worm and worm wheel. Inject special oil.
- 3. Examine the oil level in the gearbox and fill to the level of the bottom of the plug hole.
- 4. Inject a gun-full of the special oil into the rear axle.
- 5. Fill the two front hub-caps with grease, only if required. If too much grease is used some will exude and cause trouble with the brakes. (All hub-caps have right-hand threads).
- 6. Lubricate the ignition distributor according to the instructions of the maker.
- 7. If necessary clean the commutator of the dynamo.
- 8. Check the tension of the fan belt and give a charge of grease to the fan bearing.
- 9. Grease the clutch withdrawal sleeve.
- 10. Oil the brake connections and brake shaft bearings.
- 11 Give a few drops of oil to steering column (top).





Occasionally.

Examine all bolts and nuts, such as road spring clips, cylinder head nuts, wheel nuts (these especially when the car is new), examine other parts such as steering connections and brake rods, neglect of which points might be followed by an expensive repair, and the inability to use the car for an extensive period. Test the oil filter to see if the oil is still flowing through it, and fit a new filter if the old one is choked. A new filter should be fitted every 10,000 miles. Drain the gearbox and refill with fresh oil (4 pints). Flush the radiator through. Clean the ignition distributor, and the contact breaker points (adjust the latter), the dynamo and starter commutators. Adjust the tappets, and the fan belt, decarbonize the engine and grind-in the valves. Check the alignment of the front wheels. Inject grease into the splined end of the Hardy-Spicer propeller shaft every 1000 miles.

For details of these attentions refer to the pages that follow.

DON'T!

Don't, please don't-

Leave the car in gear and with the handbrake off.

Make a fast run with the radiator muff down.

Fill the radiator with cold water when the engine is hot.

Be cruel to the starter if the engine will not fire.

Touch the starter switch while the car is in gear.

Lift the gear lever when changing gear for forward speeds.

Put an excessive quantity of lubricant in the gear box.

Forget the ignition switch when starting up.

Leave the ignition switched on when the engine is not running.

Coast with the engine running and the clutch held out.

Run the engine in a closed garage. (The exhaust gases are highly toxic and a very small amount in a restricted atmosphere will produce grave, if not fatal results).

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THE FUEL SYSTEM

HE supply of petrol to the carburetter is pumped from the tank at the rear.

The pump operates automatically and delivers the petrol to the carburetter in the exact quantity demanded, neither more nor less; an ingenious mechanism controls the operation.

How it Works.

By revolving shaft (G) the eccentric (H) will lift rocker arm (D), which is pivoted at (E) and which pulls the pull rod (F), together with diaphragm (A) downward against spring pressure (C), thus creating a vacuum in pump chamber (M).

Fuel from the rear tank will enter at (1) into sediment chamber (K) and through filter gauze (L) and suction valve (N) into pump chamber (M). On the return stroke, spring pressure (C) pushes diaphragm (A) upward forcing fuel from chamber (M) through pressure valve (O) and opening (P) into the carburetter.

When the carburetter bowl is filled the float in the float chamber will shut off the inlet needle valve, thus creating a pressure in pump chamber (M). This pressure will hold diaphragm (A) downward against the spring pressure (C) and it will remain in this position until the carburetter requires further fuel and the needle valve opens. The rocker arm (D) is in two pieces, the outer operating the inner one by making contact at (R) and the movement of the eccentric (H) is absorbed by this "break" when fuel is not required.

Spring (S) is merely for the purpose of keeping rocker arm (D) in constant contact with eccentric (H) to eliminate noise.



There are few moving parts in the pump apart from two automatic valves, two springs and a diaphragm, consequently, dismantling becomes an infrequent requirement. In the event of failure of any part, the replacement is easily obtained from any Austin dealer or any authorised service station of A.C. petrol pumps, who are prepared with parts and fixtures for repairing these pumps.

There are some service operations which can, if necessary, be done without referring to the dealer or service station ; and these are as follow :

LACK OF FUEL AT THE CARBURETTER.

Check and follow instructions :-

Petrol tank empty.-Refill.

Leaky tubing or connections.-Replace tubing and tighten all pipe connections at the fuel pump and petrol tank.

Bent or kinked tubing.-Replace tubing.

Filter Cover loose.-Tighten the nut, making certain that cork gasket lies flat in its seat and is not broken or unduly compressed.

Dirty Filter Screen.-Remove the filter cover and clean the screen. Make certain that the gauze is correctly replaced and the cork gasket is properly seated when reassembling, and that the fibre washer is under the head of the screw.

Leakage of Fuel at the Diaphragm.

Loose cover screws : Tighten the cover screws alternately and securely.

Note.—Sometimes there appears to be a leak at the diaphragm. whereas the leak actually exists at one of the pipe fittings, and the fuel has run down the pump to the diaphragm flange, appearing to originate there.

Caution.-Do not dismantle the pump body.

Flooding of Carburetter.

Carburetter needle valve not seating: Check carburetter for proper adjustment.

Important.—Do not attempt to dis-assemble the fuel pump further than described above, because it is absolutely necessary to use a special fixture in re-assembling the pump when once it is taken apart. When the above remedies do not correct the condition. replace with a new fuel pump, sending the old one to your nearest A.C. service station.

The Electric Petrol Gauge.

The electric petrol gauge is automatic and registers the contents of the petrol tank. It is active only when the ignition is switched on. consequently when the tank is being replenished, first switch off the ignition to stop the engine, then switch on again and the needle on the dial will record the amount of spirit which is poured into the tank. The gauge is very unlikely to fail but in this eventuality, Messrs. S. Smith & Sons (M.A.), Cricklewood Works, London, N.W.2. (the makers) or their depots will give prompt service.

"Leaded Fuels."

The advent of "leaded" fuels (petrols containing a small proportion of tetraethyl lead) on the British market has led to a number of queries concerning their use and effect in engines.

Provided that the same reasonable attention is given to valves and adjustments as with ordinary petrols there will be no trouble when using these fuels.

The appearance of the valves, when running on a "leaded" fuel, differs from that associated with ordinary petrol, but this is a well recognized fact to which no significance should be attached.

The deposit from such fuels can be removed by "scrubbing" the valves and their seats with a stiff wire brush, of the type used for cleaning files (a file card), after which the valves can then be "ground in" in the normal manner.

We would recommend this method of cleaning for all valves whether they have operated with "leaded" or ordinary fuels, as it eliminates the possibility of leaving small amounts of deposit on the valve seats which tend to cause damage or prolong the "grinding in" process.



ZENITH DOWNDRAUGHT CARBURETTER

The carburetter fitted is of the down-draught type It embodies the well-known Zenith principles of main and compensating jets.

The carburetter is mounted on top of the inlet pipe, because the fundamental advantage of downdraught carburation lies in the fact that fuel is assisted by gravity into the cylinders, instead of having to be lifted against it as is the case of normal vertical instruments. Petrol is drawn from the tank by a pump, and delivered to the carburetter through union A, passing through the gauze filter and the needle seating into the float chamber.



Referring to diagram 2, it will be seen that the float chamber (which is detachable from the carburetter) holds the main jet 1, compensating jet 2, slow running jet 3, and capacity tube 4. Actually the covers of the main and compensating jets are shown, and when these are removed, the actual jets will be revealed.

Petrol flowing into the float chamber will cause the float to rise, and when reaching a predetermined height will close off the needle valve, thereby regulating the petrol flow, and ensuring a constant level in the float chamber. Passing through the main and compensating jets, petrol will rise to the predetermined level in the compensating well, which contains the capacity tube, and is in direct communication with the atmosphere at the top, and the emulsion block by its bottom outlet. Petrol will flow along the channel underneath each jet, these uniting in a common channel in the emulsion block 5, which is attached to the float chamber. The outlet from this common channel in the emulsion block is the nozzle 6, which projects directly into the choke tube. It will be noticed that mixture issuing from the nozzle will strike a bar fixed in the choke tube, which has the effect of thoroughly atomising the petrol, and assisting distribution of the charge.

Dismantling and Cleaning.

There are no moving parts calling for attention in the Zenith carburetter. Consequently, it is only necessary to periodically clean out the instrument to ensure satisfactory operation. The float chamber bowl can be removed by taking out the holding down screws E. The hand should be placed underneath the bowl, so that when the screws are removed. the bowl can be drawn away. The petrol may be emptied into the tank. One of the holding down screws is squared at the end, and can be used to take out the jets, first

removing the jet covers. A small screw driver will remove the slow running jet. When cleaning the jets, do not pass anything through them that is likely to damage the carefully calibrated orifices. The most satisfactory and efficient method is to blow through them, and wash them in petrol. Swill out with a little petrol any sediment which may have collected in the bottom of the float chamber. It is not necessary to remove the emulsion block from the float chamber. Unscrew the petrol pipe connection F, and withdraw the filter gauze. Thoroughly clean this part by washing in petrol. When reassembling the filter, care must be taken to see that the washers G are correctly replaced.

Adjustments.

The carburetter is delivered with the setting that has been found by extensive experimental work to be most suitable for all-round conditions. The complete standard setting is as follows :---

Choke tube			 	25
Main iet			 	110
Compensating i	et		 	80
Slow running je	et		 	70
Capacity tube			 	3
Needle seating			 	25
		19		

The main jet has the greatest influence at high speeds, therefore alteration to this jet would affect maximum power and road speed.

The compensating jet. This jet has a controlling effect upon acceleration from low speeds, low speed pulling on hills, and quick "get-away" from cold.

The slow running jet measures the petrol supplied when the engine is idling. Petrol is drawn through this jet into a channel which has its outlet at the throttle edge. The petrol is atomised immediately on leaving the jet by air entering the carburetter at the base of the slow running adjusting screw B. The size of slow running jet should be such that smooth, regular idling is provided with the slow running screw B set approximately one complete turn open. This adjustment should always be made with the engine hot. The speed at which the engine idles can be regulated by means of the throttle arm stop screw C. Turning this in a clockwise direction increases the engine speed, and vice-versa. In all cases of difficulty with slow running, inspect the slow running jet which may be obstructed, and check the position of the screws B and C. Continued difficulty may be traced to air leaks at inlet pipe joints, etc., to the valves, or to the ignition system.

Starting from Cold.

Easy starting with the VEI carburetter is assured by an automatic air strangler. The strangler is situated in the air intake of the carburetter, and is closed by fully extending the dash-board control. By means of the hand throttle control, the throttle should be opened slightly to ensure an easy start.

To avoid the possibility of the strangler permitting excessively rich mixture passing into the cylinders, a diaphram has been embodied in the strangler flap, which will open and permit air to enter immediately the engine fires. The quick opening and closing of this diaphram when the engine is running, will cause a buzzing noise, and this will serve to remind the driver that the strangler is still in operation, and should be released. A half-way position is provided on the dash-board control, and it is advisable to run the engine for a few minutes during cold weather with the strangler in this position before attempting to drive the car away.

Failure to start readily.

The carburetter having been cleaned, and the ignition system, valves, etc., checked over, the following points should be examined :

- 1. Make sure the air strangler flap closes completely when the dash-board control is operated.
- 2. Ascertain that petrol is being supplied to the float chamber by the fuel pump.
- 3. The degree of throttle opening by the hand control, when the strangler has been closed, is important, as too much or too little will cause difficulty.

When cars are used in very hot climates, or at high altitudes, a slightly weaker setting than normal is usually required.

THE IGNITION SYSTEM

THE coil ignition equipment is provided with an automatic advance mechanism. Its advantages are particularly evident when accelerating and during hill climbing, the possibility of pre-ignition, knocking, or "pinking" being very much reduced.

The device is housed in the distributor unit and it consists of a centrifugally operated mechanism by means of which the ignition is advanced in proportion to the engine speed.

The control is packed with grease during assembly and no attention is required, except the occasional injection of a drop of thin oil (see page 21).

Very little attention is needed to keep the ignition equipment in first-class condition. We advise that the set should be inspected occasionally, and if necessary those parts referred to below should be cleaned and adjusted.

Distributor Unit.

Occasionally remove the distributor cover by pushing aside its two securing springs. See that the electrodes are clean and free from deposit. If necessary wipe out the distributor with a dry duster, and clean the electrodes with a cloth moistened with petrol. See that the carbon brush is clean and moves freely in its holder. Next examine the contact breaker, it is important that the contacts are kept free from any grease or oil. If they are burned or blackened, they should be rubbed down with fine carborundum stone, or if this is not available, very fine emery cloth may be used Afterwards, polish with a cloth moistened with petrol. Care must be taken that all particles of dirt and metal dust are wiped away. It is possible that misfiring may be caused if the contacts are not kept clean.

Contact Breaker Gap.

The contact breaker gap is adjusted before leaving the works, and it will probably need re-setting only at long intervals. It is not advisable to alter the setting unless the gap varies considerably from the gauge provided on the ignition screwdriver. If adjustment s necessary proceed as follows :—Turn the engine round slowly by hand until the points are seen to be fully opened, then using the ignition screwdriver, slacken the two screws securing the contact plate and move the plate until the gap is set to the thickness of the gauge. After making the adjustment care must be taken to tighten the locking screws. Do not attempt to clean up the points if they become ragged, but have them attended to by a skilled mechanic.



DISTRIBUTOR AND CONTACT BREAKER TYPE DK6A.

A-	-Distributor Moulding.
B-	-Electrode.
C-	-Contacts.
D	-Screws securing Contact Plate
E-	-Rotating Cam.

F—Condenser.
G—Rotating Distributor arm.
H—Metal Electrode.
I—Contact Breaker Pivot.

Lubrication.

The distributor main bearing is lubricated by means of an oiler through which one or two drops of thin machine oil should be added about every 1,000 miles. Give the cam the slightest smear of vaseline every 3,000 miles, or whenever it appears to be dry. Withdraw the distributor rotating arm from the top of the spindle (it just lifts off), and add a few drops of thin machine oil to the top of the spindle. Do not remove the screw exposed to view, as there is a clearance between the screw and the inner face of the spindle, through which oil passes to lubricate the automatic timing control.

About every 5,000 miles, place a single drop of thin machine oil on the pivot J on which the contact breaker works.

Renewing High Tension Cables.

To connect up the 7 mm. cable to the distributor or coil terminals, thread the lead through the terminal nut, bare the end of the cable about $\frac{1}{4}$ in., pass it through the washer and bend back the strands. Tighten the terminal to make a good connection.

Coil.

The coil unit requires no attention beyond seeing that the terminal connections are kept tight.

Plugs.

Difficult starting may be caused by dirty or incorrectly set sparking plugs. Plugs should be cleaned, and the points set to the gauge provided in kit.

Ignition Warning Lamp.

When the engine is stopped, unless only momentarily, the ignition switch should always be turned to the "OFF" position so as to prevent the battery being discharged by current flowing through the coil windings. To ensure that this does not happen, a warning lamp is provided in the instrument panel which gives a red light when the ignition is "on" and the engine is stationary. Should the bulb of the warning lamp fail, it can be withdrawn from its socket when the small cover plate, holding the red glass, is unscrewed. The replacement bulb should be No. 252 M.E.S. (2.5 volt, .2 amp. screw cap) type.

Timing the Ignition.

First remove the floor board over the clutch casing and take off the inspection cover. The engine is then turned by the starting handle until the compression of No. 1 cylinder is felt, then remove the sparking plug of that cylinder. While the engine is turned slowly, watch the flywheel through the inspection hole until the line marked 1-6, indicating the top dead centre positions of pistons No. 1 and No. 6, becomes visible.



The flywheel timing mark for the ignition.

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Correct Timing Position.

The engine should be turned until this line is $1\frac{1}{8}$ in., measured on the shoulder visible, before the vertical position. This is the correct position for setting the ignition timing when the ignition lever is fully advanced. Now turn to the distributor.

Remove the cover by springing back the two securing clips. The small screw on the clip fixing the control arm to the distributor casing, is slackened, the clip being kept at the full advance position, and the casing turned anti-clockwise until the contact breaker points just begin to open. The screw should then be retightened. The direction in which the rotating arm of the distributor is pointing should be noted and the distributor cover refitted, and secured in its proper position by the two clips. A small projection on the casing fits in a recess near one of the clips to secure the distributor cover in its correct position.

Working round the distributor cover in a clockwise direction, check that the leads are correctly connected in the order of firing, i.e., 1, 5, 3, 6, 2, 4.



COOLING SYSTEM

THE cooling of the engine is maintained by pump circulation in conjunction with a fan-cooled radiator and controlled by a thermostat. The radiator should be filled, with rain-water if possible, to within 2in. of the top. Do not fill right up to the top with water, as it will probably leak owing to expansion, when the engine becomes hot.

The Thermostat.

The Smith R.P. Thermostat automatically controls the flow of water to the radiator and maintains a temperature of 70 degrees centigrade on the road. It also ensures rapid warming up from cold.

The thermostat is in operation, i.e., controlling engine temperature when the knob is set on the "ON" position indicated on the dial.

If necessary during extremely hot weather the control may be placed out of action by turning the knob to the "OFF" position. When refilling the radiator after it has been emptied, the knob must be in the "OFF" position or an air lock will be formed.

This operation is not necessary when merely "topping" the radiator with water.

Use Soft-Water.

In order to prevent the gradual formation of deposits in the cooling system, with consequent impeding of the circulation, the use of hard water should be avoided. Rain water, syphoned from the top of the barrel where it is clean, should be used, or, failing that, water from the hot water tap.

The Radiator.

The entire circulating system should be thoroughly flushed out occasionally. To do this, open the drain tap, place a hose in the radiator filler, and run fresh water through, while for a short time racing the engine, then close the tap and fill up. Trouble arising from a damaged radiator generally necessitates its dismantling and dispatch to a repair depot.

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Fan Belt Adjustment.

The efficency of the cooling system depends to a noticeable degree on the fan. Keep the fan belt adjusted just taut, so that it will not slip. The adjustment is easily effected

The V-shaped rubber belt drives the dynamo and fan from a grooved pulley on the crank-shaft. To adjust the belt, slacken the two top bolts which hold the dynamo in position, and move the dynamo clockwise looking towards the front. This tightens the belt. The proper tension will allow about ³/₄ of an inch movement of the belt each way. Do not over tighten the belt, because this will put too great a strain on the dynamo and fan bearing. Re-tighten the two nuts previously loosened on the dynamo.



LOCKING

BOLTS

In Winter.

When running in frosty weather, it is well to make use of a radiator muff. In continuous cold weather it may be advisable to put the fan

out of action by removing the fan blades. The water should be drained from the radiator and circulating system when the car is to stand for any length of time.

BOLT

Care should be taken to see that the water is drained off *completely* for, in case of freezing, it will do harm by lodging in small places and expanding as it freezes. In Great Britain the climate does not very often call for the cooling system to be drained, but it is well to err on the right side and take due precautions against damage if frost be threatened.

The main tap is situated on the radiator bottom tank. The tap which drains the water jackets is close to the distributor. Both taps should be used to ensure that all the water is drawn off. Oil in the gearbox and back axle becomes contaminated with metallic particles from the gear teeth and these will cause unnecessary wear of the bearings unless removed. These units should also be drained periodically and may be flushed with a thin oil. This should be allowed to drain thoroughly, after which the unit should be filled to the correct level with fresh oil.

Choice of Lubricants.

For the convenience of our customers it has been decided to recommend officially in addition to Mobiloil; Shell and Castrol Oils. Each of these oils has the high grade standard of quality required by our Research Department and has proved entirely satisfactory in actual service. Moreover each of these oils has adequate distribution at garages and filling stations.

The makes and grades of lubricants recommended are as follows : For Engines.—Mobiloil "BB"; Castrol "XL"; "Triple Shell."

For easy starting during the winter months, Mobiloil AF or Castrol AA may be used, and in extreme freezing weather Mobiloil A. Triple Shell is suitable for winter or summer use.

For Gearboxes.-Mobiloil "BB"; Castrol "XL"; "Triple Shell."

- For Rear Axles and Steering Worm and Worm Wheel.-Mobiloil "C." Castrol "D." Shell Spirax Gear Oil or Jaba Oil "C."
- Wheel Hubs.—Mobilgrease No. 4; Castrolease Heavy: Shell Motor Grease.
- Grease Gun.—Mobilgrease No. 4; Castrolease Heavy; Shell Motor Grease.
- **H.T. Ignition Distributor and Lighting Dynamos.**—Gargoyle Velocite Oil "D"; Wakefield Oilit or Shell Household Oil.
- Springs, Squeaks and Rusty Parts.—Voco Penetrating Oil, Castrol Penetrating Oil. Shell Penetrating Oil, Wakefield Oilit.

It is important to use only high quality lubricants for engines and chassis lubrication. In addition to quoting the recommended brands in the above list the correct grades are also specified.

Always purchase lubricants in sealed packages or from branded cabinets.

The Engine.

The recommended lubricants are of the correct quality and viscosity for our units. The matter of the proper grade of oil is very important both in relation to the pump used to circulate the oil, and the gauge to register the pressure ; if a very thick oil were used on a cold day, the pump might be strained or the gauge broken. It is partly for this reason that the oil gauge will register 40 lbs. pressure whereas normally 20 lbs. is sufficient at ordinary speeds, or 20-30 lbs. when the car is new or the engine first started. After the first 500-800 miles running, drain the original oil from the reservoir by removing the plug in the bottom, while the engine is hot, and refill with new oil.

On this occasion remove the cylindrical gauze strainer by unfastening the six nuts which hold the strainer cover to the base of the oil reservoir. Take care that this work is not done where dust or other foreign matter is likely to be blown into the crankcase. Clean the strainer with paraffin, afterwards washing it with petrol; replace the strainer and fill up the crankcase with oil to the maximum level indicated on the float rod, approximately 1³/₄ gallons will be required. After the first change, the oil in the crankcase should be changed after every 2,000 miles running. Under no circumstances should petrol or paraffin be poured through the oil filler to clean out the engine.

After refilling with fresh oil to the correct level run the engine for a few moments to check that the oil is circulating and that the oil pressure gauge reading is correct.

Upper Cylinder Lubrication.

The use of an upper cylinder lubricant has been found to be beneficial to the running of the engine. It is used either by adding to the fuel when refilling the tank, or by fitting one of the special devices available, whereby the oil is sucked via the induction pipe into the engine, where it mingles with the explosive charge. Mixing with the fuel, however, is satisfactory and saves the trouble and expense of an extra fitment. When adding the upper cylinder lubricant to the fuel, do so according to the instructions given with the various brands of oil.

Gargoyle, Shell or Castrollo upper cylinder lubricants are suitable.

The Oil Pressure Gauge.

The oil pressure gauge on the instrument board gives at all times an indication as to whether the oiling system is working properly, and should therefore be looked at frequently while the engine is running.

Should the gauge fail to register a normal pressure, it may be due to lack of oil in the crankcase : if not, verify the adjustment of the relief valve, to be found at the rear end of the crankcase (near side,) and see that the ball seats properly. Should the gauge register no pressure, stop the engine immediately and look for a broken pipe, or other cause of no pressure.

When the engine is started on a chilly morning, the pressure may rise to 35 lb. or more (the gauge is strong enough to allow for this), but after the oil has circulated for a while and becomes warm the pressure should gradually drop to 20-15 lb., the low figure when running at moderate speeds, increasing to the high with acceleration of engine. It should be noted that when the car is standing and the engine is running slowly, pressure will probably drop very low.

Oil Pressure Regulation.

If for any reason the pressure in the system should require regulation, (which is made by varying the spring pressure on the relief valve) it should not be made until after the engine has run for say twenty minutes, in order that the oil may have reached its normal consistency. Also, while making the adjustment it is advisable to have the engine running at a speed sufficient to drive the car at about 25 m.p.h. on top gear. This relief valve should, however,

THE GREASE GUN

THE grease gun supplied with the tool kit of all Austin cars, is known as the Enots "Autolub" gun, and incorporates new features by which the chassis lubrication of the car is greatly simplified, and once the gun is charged all that is necessary is to keep pushing the ram of the gun against the nipple until the contents are exhausted.



The ram is automatically returned to its extended position by a spring. This action creates a vacuum in the gun by means of a valve, and thus refills the high pressure chamber contained in the ram.

Inside the nozzle of the ram, there is a small fibre washer, which ensures a good leakproof joint between the gun and the nipple, even though the gun is not applied squarely on to the nipple.

The ram is used for forcing grease through nipples. To use the grease gun as an oiler, first replace the screw-on cover of the ram, then remove the end cap from the barrel of the gun, pull out the cork plunger by means of the chain, and charge the gun with oil to about three-quarters of its capacity. Put the cap of the adaptor on the open end of the gun, and after removing the plug from the back axle, place the end of the adaptor into the greasing hole, and grasping the barrel, push. This will inject a large quantity of lubricant rapidly.

ELECTRICAL EQUIPMENT

THE lighting and starting units on Austin "16/18" Light Six cars are arranged for wiring on the single wire system, the return path of the current being provided by the frame instead of a second wire. It is essential that all units are in metallic contact with the frame. Should difficulties arise that cannot be understood or remedied from the information given below, application should at once be made to the Austin Service Department or the nearest service depot of the makers of the equipment.

The Dynamo.

This machine is specially designed to work in conjunction with a compensated voltage regulator unit incorporated in a combined cutout, regulator and fuse box mounted on the engine side of the dash (see page 36), which automatically controls the dynamo output to meet the varying requirements of the battery and load.

Thus when the battery is discharged, the dynamo gives a high output, so as to bring the battery back to its normal fully charged state in the minimum possible time. On the other hand, when the battery is fully charged, the dynamo gives only a trickle charge, which is sufficient to keep the battery in good condition, without any possibility of causing damage from overcharging. The dynamo gives an increase of output to balance the current taken by the lamps or other accessories when these are switched on.



DYNAMO BRUSHGEAR

A-Commutator. B-Screw C-Brush. D-Brush Spring Lever.

It will be seen that control of the dynamo output is entirely automatic; hence there is no charging switch.

The only parts calling for any attention are the commutator and brushes, which are readily accessible when the cover is removed. The commutator surface must be kept clean and free from any oil or brush dust. It may be cleaned with ordinary soft rag but if it has been neglected use fine glass paper. Blow away any carbon dust and see that the carbon brushes are wearing evenly, and move freely in their holders. To fit a new brush it is only necessary to release the brush tag, hold back the brush trigger, and then withdraw the worn brush from its holder. The new brush can then be fitted by reversing the above operations. The dynamo bearings are packed with grease before leaving the works and need very little attention. Add a few drops of oil through the lubricator provided at the drive end, every 1,000 miles. After a considerable mileage the dynamo should be dismantled for cleaning, adjustment and repacking the bearings with grease. This should be entrusted, preferably, to the nearest Service Depot. The reader is cautioned that far more trouble is caused by excessive oiling than by too little.

WIRING DIAGRAM.



Dynamo Fuses.

Fuses are provided in the dynamo main and field circuits to protect the machine in the event of anything being wrong in the charging circuit, e.g., a loose or broken battery connection. The fuses are of the cartridge type and are housed in the cut-out, regulator and fuse box, mounted on the engine side of the dash. If the dynamo fails to charge the battery at any time (indicated by a discharge reading being given on the ammeter during daytime running), check the wiring and then inspect the fuses. If either of these has blown, replace it with the spare fuse provided. If the new fuse blows after starting up, the cause of the trouble must be found, and we advise that the equipment is examined by one of our Service Depots. Never fit any fuse other than the Lucas standard fuse as originally fitted. The size of the fuse is marked on a coloured paper slip which can be seen inside the fuse.

Starting Motor.

The unit requires very little attention beyond keeping the commutator clean and free from oil, brush dust, etc., as with the dynamo. Before starting from cold do not neglect the preliminary precautions that you would observe if starting by hand.

Remember that although the starter will turn the engine over, however stiff, it is advisable to crank the engine over by hand for two or three revolutions, as this will considerably diminish the load for starting, especially in cold weather.

If the starter pinion jams when operating the starting motor switch, it can be released usually by putting the gear lever into gear, and rocking the car bodily backward and forward. If this method of release is not successful, turn the squared end of the starter motor shaft with a spanner after pulling off the small metal cap which fits over it. Make sure that the ignition is switched off before adopting this procedure.

Never use the starting motor to propel the car, as it throws too severe a strain upon the battery and starting motor.

Also, should the engine fail to start at the first attempt, don't press the starter switch until the engine is still, or the starter pinion, or the teeth with which it meshes on the flywheel, may be damaged.

Ammeter.

The ammeter indicates the current passing into or out of the battery. Suppose the dynamo is generating 6 amperes and that the side and tail lamps are in use, the lamps and ignition coil will take, say, $2\frac{1}{2}$ amperes, leaving $3\frac{1}{2}$ amperes for charging the battery; this is the figure shown on the ammeter.

It must be remembered when noting ammeter readings, that, normally, during daytime running, when the battery is in a charged condition the dynamo only gives a trickle charge, so that the charge reading will seldom be more than a few amperes.

When starting from cold, the driver will notice the rise of charging current until it reaches a steady maximum at a speed of, say 20 miles per hour, after which it will remain fairly high for perhaps 10 minutes or so, then fall to a steady charge which is most suitable for the particular condition of the battery.

The ammeter does not indicate the amount of current used by the starter.

Combined Cut-out Regulator and Fuse Box Unit.

This unit houses the cut-out, dynamo regulator and fuses together with spares, and forms a junction box for distributing the cables to the various accessories.



Cut-out & Regulator and Fuse Box Type RJF.

- A. Cut-out and regulator cover.
- B. Fuse Cover.C. Main Dynamo Fuse.
- F. Direction indicator and petrol gauge fuse. G. Side and tail lamp fuse.
- H. Dynamo field fuse.
- D. Auxiliary accessories fuse. E. Head lamp fuse.
- J. Spare fuses. K. Spare Dynamo field fuses.

The working of the regulator in conjunction with the dynamo is described on page 33.

The function of the cut-out is to close the charging circuit, as the increasing engine speed when the car is starting causes the dynamo voltage to rise above that of the battery. When the engine slows down the dynamo voltage falls below that of the battery, and the reverse action takes place, i.e., the cut-out opens and thereby prevents the battery from discharging itself through the dynamo.

The cut-out is accurately set before leaving the works and does not need any adjustment, and therefore the cover protecting it is sealed.

The circuits protected by each of the 6 fuses can readily be seen by reference to the illustration.

If it is suspected that one of the fuses has blown, remove the fuse from its holder and see whether there is a break in the fuse wire. Before replacing the fuse, inspect the wiring of the units that have failed, for evidence of short circuits or other faults that may have caused the fuse to blow, and remedy. If the fuse blows repeatedly and the cause cannot be traced, have the equipment examined by a Lucas Service Depot.

Battery.

It is of the utmost importance that the battery receives regular attention, as upon its good condition depends the satisfactory running of the starting motor, the functioning of the ignition, and the illumination of the lamps.

Regular Inspection.

At least once a month the vent plugs in the top of the battery should be removed and the level of the acid solution examined. If necessary, distilled water, which can be obtained at all chemists and most garages, should be added to bring the level up to the top of the separators. If, however, acid solution has been lost it should be replaced by a diluted sulphuric acid solution of 1.320 specific gravity. It is important when examining the cells that naked lights should not be held near the vents on account of the possible danger of igniting the gas coming from the plates.

It is advisable to complete the inspection by measuring the specific gravity of the acid, as this gives a very good indication of the state of charge of the battery. Clean and vaseline battery terminals.

Instruments known as hydrometers of various designs are used for the purpose of testing the specific gravity of the electrolyte, and may be obtained either from the Austin Service Department, or from the service depots of the makers of the equipment.

Lighting Switch and Ignition Key.

The lighting switch has three positions, reading from left to right they are :--

Off, Side lamps, Head lamps.

In the centre is a removable key, which when turned to the right switches on the ignition. When the car is stopped and the owner desires to leave it, the lever is moved to the central position and the key withdrawn. Until the key is again inserted and turned to the right the ignition is "off" and the car cannot be driven.

Mixing Acid.

When the battery arrives empty (as in cars delivered abroad) the first thing to do is to fill and charge it. For instructions see label on battery. This means that a fluid is prepared composed of one part (by volume) of pure brimstone concentrated sulphuric acid with 3 parts (by volume) of distilled water. Mix these in a glazed earthenware vessel. Great care must be taken in this operation. Add the acid in very small quantities, almost drop by drop, and stir with a glass rod.

Never add the water to the acid. This is highly dangerous, and a serious explosion may result.

This mixture generates heat, and it is important that the electrolyte (as the mixture is called) should not be used in the battery before it has been allowed to cool. Pour the electrolyte into the cells of the battery by means of a lead, glass or celluloid funnel, until it completely fills the cells to the bottom of the vent hole. Allow the battery to remain in this condition for 10 minutes or so, then put in more acid so that each cell is again filled to the same point with electrolyte.

The electrolyte will have a specific gravity of 1.320 when fully charged. Batteries may be charged at almost any service station.

Storage.

If the car is stored or garaged for any considerable period, remove the battery and leave it with an Austin Agent to be kept in condition, otherwise, if it is left, chemical action may badly damage it.

Electric Horn.

These 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 one of the horns becomes uncertain in its action, giving only a choking sound, or does not vibrate, 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.

If both horns fail, or become uncertain in their action, the trouble is probably due to a discharged battery, or in some cases a blown fuse.

It is also possible that the performance of the horn may be upset by the horn becoming loose on its mounting.

This can be ascertained by removing the horn from its mounting, holding it in the hand and pressing the push. If the note is still unsatisfactory, do not attempt to dismantle the horn, but return it to a Lucas Service Depot for examination.

Electric Windscreen Wiper.

To start the wiper, pull out the handle and swing it aside to engage the gears, and then move the switch to the "on" position. To stop the wiper, move the switch to the "off" position. Then pull out the handle to disengage the wiper blade from the gears and turn the end of the handle into the top of the switch control. This locks the cleaning arm out of the line of vision of the driver. The wiper requires absolutely no attention; all moving parts are packed with grease during assembly, and no lubrication is necessary.

When cleaning the windscreen, the wiper arm can be easily lifted from the glass, but care must be taken that it is not moved from side to side.

Direction Indicators.

Every 2-3 months, raise the arm and apply a drop of thin machine oil by means of a match-stick between the brass knob or profile and the small copper tongue spring and copper spindle.

If, at any time, the arm fails to light up when in operation examine the bulb. To remove the bulb, switch the indicator on, and then, supporting the arm in a horizontal position, move the switch to the off position.

Now withdraw the bulb holder, which is clipped into the underside of the arm by means of the metal tongue provided. Do not attempt to remove the bulb holder while the indicator is switched on, as this may cause a short circuit and so damage the indicator.

Bulbs fitted :- No. T123F, 6-watt festoon type.

The Wiring.

If a short circuit occurs in the wiring at any time, the wires will' become very hot, with the result that the insulation is liable to burn. The short circuit may be due to a loose connection, the accidental breakage of a wire, or the chafing through of the insulation.

In such an event, lift the rear floor board and immediately disconnect the battery. As soon as the wires have cooled an inspection can be made and the cause of the trouble traced, but we strongly recommend that the car should be put into the hands of a capable electrician as soon as possible.

The car can however, in an emergency be run after the battery has been disconnected from the electrical system, provided the battery is undamaged.

Remake all battery connections except the main cable to the positive terminal of the battery.

The ignition coil has three wires attached to it, one high tension and one low tension (two wires) leading direct to the distributor, the third (low tension) leading to the switch on the instrument board.

Disconnect only this latter wire and connect to the terminal from which it has been removed, a temporary insulated wire, the other end of which must be connected to the positive terminal of the battery.

Before starting the engine, however, the dynamo circuit must be closed to prevent serious internal electrical damage to the dynamo. This is effected by joining the dynamo terminal marked D+ with a wire to the body of the dynamo or any convenient earthing point, such as the dynamo fixing clamp screw.

THE LAMPS

To remove the front of the head or side lamps for a bulb replacement release the clamping screw on the underside of the lamp front. Do this carefully—don't drop the lamp front when the screw is unfastened. To remove a head lamp reflector, turn back the two ends of the cork washer at the top of the rim and withdraw the screw which can then be seen. The reflector can then be withdrawn by turning it to the left. In the case of a stop tail lamp bulb replacement, the front is removed by withdrawing the fixing screw. The lamp bulbs themselves are carried in the usual bayonet sockets and are easily removed by pushing them in, turning to the left, and then withdrawing them. The sizes of the bulbs are :-- Head, 1224 SVCD. Side, B.A.S. No. 10S (S.P.). Stop, Tail and Dash, B.A.S. No. 10S (S.P.).

Care of Reflectors.

The reflectors of the lamps are covered with a protective coating and any marks can be easily removed by means of a soft cloth.

Focussing.

Unless the focus of the bulb in the reflector is correct, quite half the possible light may be lost. A correct focus is secured by unscrewing the clamping screw at the back of the reflector and sliding the lamp holder in or out as required.



The lamp mounting.

Foot Operated "Dip and Switch."

This equipment enables the nearside headlamp reflector to be dipped and turned to the nearside of the road by means of a solenoid and plunger, and the offside lamp is simultaneously switched off. The control switch is arranged for foot operation. It is of the push-push type, that is, push to operate and push to switch off.

This mechanism requires little attention. The reflector is retained in position by spring catches. On removing the reflector of the nearside lamp all the mechanism in the lamp is accessible. See that the lighting cables are not fouling the reflector and so preventing movement—the cables should be slightly slack. The point of connection of the cable to the clamping screws of the lamp, should always be tight.

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Dipping Reflector Fuse.

A fuse is provided with the electrical dipper unit to protect the equipment in the event of the reflector failing to function properly. The fuse is of the cartridge type, and is carried in spring clips along side the dipping mechanism. If the reflector fails to function, remove the fuse from its holder and see whether there is a break in the fuse wire. A spare fuse is clipped to the reflector bracket.

If the fuse should blow repeatedly, and the cause cannot be found, have the reflector examined at the nearest Lucas Service Depot.



RUNNING Adjustments

LL the adjustments that the owner will find necessary to keep the car in good running order are fully described in the following pages.

Valve Tappet Adjustment.

To ensure that the full power of the engine is obtained and to maintain silent valve operation, it is essential to keep the tappets correctly adjusted. Remove all plugs, take off the valve covers and turn the engine slowly round with the hand starting crank. Stop turning when No. 1 inlet valve is fully open and check the



clearance of No. 1 exhaust valve. Work on each cylinder in turn, setting inlet clearance when exhaust valve is fully open, and vice versa. There should now be between the valve stem between the valve stem "A" and tappet screw "B" a clearance equal to the thickness of the thin blade of the combined sparking plug and tappet clearance gauge. If the clearance is other than this it should be

adjusted by loosening the lock-nut "C" and raising or lowering screw "B", taking care to tighten up the lock-nut when the adjustment is completed. Special spanners are provided in the tool kit for this operation. This adjustment should be checked when the engine has been run until it is warm.

Cleaning Combustion Chamber.

After about 2,000 miles' running it is advisable to remove the carbon deposited in the cylinder head and on the tops of the pistons, and to grind in the valves.

First draw off the cooling water. Remove the sparking plug leads from the cylinder head. Detach the top hose connection.

Take out the sparking plugs, remove the nuts holding down the head. In the place of the rear sparking plug insert the cylinder-head lifting-screw, and then, holding the water outlet at the front, rock the head gently until the joint is broken, without damaging the joint washer.



This washer should, in the ordinary course be in a condition to be replaced. The head can then be lifted clear.

When the head has been lifted the valves and the tops of the pistons will be exposed to view. All dirt or deposit should be removed. Before grinding-in the valves it will be necessary to lift each valve spring, leaving the split cotter clear.

The carburetter controls, throttle and air strangler, are disconnected, and the petrol feed pipe is detached at the union below the float chamber. The manifold is secured by nuts and studs in the cylinder block; these nuts are unscrewed. The four nuts holding the heat conductor to the centre of the exhaust manifold are also taken off, and the induction manifold can be lifted clear; the valve covers are removed. The valve spring lifter is fitted with the screw bearing on the valve head, and the cup fitting below the valve spring cup. On turning the screw the valve spring is compressed by the valve cup being lifted and the split cotter is then accessible; subsequently the valve cup and spring can be removed if necessary on slackening off the lifter screw.

Each valve is now tree to be rotated on its seat, when the tappets have been lowered clear of the stems.

Grinding-in the Valves.

A little grinding compound should be smeared evenly on its face, and the valve rotated backwards and forwards on its seating, advancing it a step at short intervals until the pitting is removed. Care should be taken that none of the compound enters the cylinders, and the valve and seating should be wiped clean after the operation. In refitting the split cotters and valves, the valve spring lifter is again used, the valve being in its guide, the spring and the valve spring cup fitted on the stem, and the spring compressed as before, the split cotter is then held round the valve stem resting on the collar at the bottom, and with the smaller diameter uppermost, and the lifter screw is slackened to allow the valve spring cup to come down over the cotter. Make quite sure that the cup is snug over the cotter, otherwise the cotter will fly out.

The joint washer should first be smeared evenly and lightly with Heldite liquid engine jointing, and then re-

The valve spring lifter in use.

placed with the side showing the words 'Austin Gasket' facing upwards. It will then make a tight secure joint.



When replacing the cylinder head it is most important that the nuts on the holding-down studs be tightened evenly, commencing first at the centre and working to the outside. Do not tighten any

one nut right home while the others are loose, and make sure that the centre nuts are tight first. The valve tappets must now be readjusted.



The order in which the nuts should be tightened.

Don't forget, after replacing the head, to refill the radiator. When the engine is warm go over the nuts again making sure that all are absolutely tight, and check the tappet adjustment.

Brake Adjustment.

Means are provided for adjustment to ensure both front and rear brakes being applied together.

When it becomes necessary to take up the wear of the brakes, note that the pedal of the footbrake will probably be very near the floor, indicating that it has reached nearly the full extent of its travel. The handbrake and footbrake are coupled.



To adjust the brakes to their original position and efficiency, commence with the footbrake. There is a four-winged adjusting nut A (shown in diagram), for this purpose. To take up the wear, turn this nut A clockwise looking from the rear, until the brakeshoes are hard on the drums, with the pedal depressed about two inches. When the pedal is released, the shoes will be just free of the drums.

The operation of adjusting the hand brake is a simple one. There is a hexagon adjusting nut (B on diagram) for this purpose. This nut should be turned in a clockwise direction, looking from the rear of the car, until the front end of the sliding link almost makes contact with the pin through the hand brake lever, which should be forward, i e., in the "OFF" position.

After continued use, one pair of shoe linings may have worn more rapidly than the others, and therefore will require separate adjustment. The same may apply after dismantling the brakes for any reason.

The individual adjustment of each brake is catered for by the rods which can be shortened or lengthened as required by slackening the lock nut and turning the hexagon formed on the rod.

Pedal Reach Adjustment.

To alter the position of the clutch and brake pedals, slacken and remove the clamping bolts, and set the pedal stalk in or out of the lever one or two notches until the pedal is in the most suitable position : then refit and tighten the bolts

Clutch Wear Take-up.

After the clutch has been in use for some time the wear of the friction surfaces will give rise to a need for adjustment in order to ensure the continued full engagement of the clutch.

The adjustment should be LOCKING such as to allow at least $\frac{1}{2}$ in. *free* downward movement of the clutch pedal by finger pressure. Lack of this free movement is serious, and does not permit the clutch to engage fully, because the pedal lever will touch the underside of the floorboard, and so prevent full contact of the clutch discs.

It is of the utmost importance to maintain this free movement of the clutch pedal, and it





Adjusting the clutch pedal.

should be inspected from time to time. Otherwise damage may be done to the clutch owing to the slipping of the plates.

The adjustment is obtained by slackening the locking bolt and setting the pedal lever in the direction of the arrow one or two notches on the small quadrant attached to the clutch operating shaft; then tighten the locking bolt.

Clutch Slip and Its Causes.

If the clutch slips when this adjustment has been made it is almost certainly due to the clutch having been misused. Some drivers are inclined to use the clutch instead of changing down to a lower gear, particularly when they are almost at the top of a hill and it is only necessary to change down for a few yards. Foot pressure is applied to the clutch to create a certain amount of slip (see "Driving"). This highly polishes the frictional surfaces and will eventually be the cause of persistent slip; finally in addition to burning out the clutch rings probably also distorting the centre plate and making renewal of this also essential. Sometimes however, clutch slip is due to oil penetrating to the clutch as a result of overfilling the gear-box. In such circumstances, petrol can be syringed on the clutch plate to wash off the oil so that the clutch regains its frictional characteristics. When injecting the petrol have the engine turned so that the plate is properly washed, and the petrol and oil are given an opportunity to drain away, also push the clutch in and out by the pedal so that the petrol is given a washing action. The petrol and oil should have sufficient time to evaporate or drain off through a hole in the bottom of the clutch pit.

After this operation it is advisable to lubricate the clutch withdrawal collar and the points where the declutching levers pivot, as the lubricant in these members may have been removed by the petrol.

Steering and Track Adjustment.

The adjustments on the steering gear take up end play in the steering column, end play in the worm wheel shaft, and varies the mesh of the worm and worm wheel in the box. This tightens or eases the steering and takes out backlash. There is always some backlash but it should not be allowed to become excessive.

To adjust the mesh of the steering worm and worm wheel, first loosen the nut on the adjustment bolt.

After the nut has been loosened the head of the bolt is turned in a clockwise direction to tighten. This draws the eccentric bush round and makes a closer mesh between the worm wheel and the worm on the steering column.

Finish by tightening up the nut on the adjustment bolt.

There is provision made for an accurate and practically permanent setting of the clearance in the thrust races. This is carried out by turning the knurled thrust adjustment ring in an anti-clockwise direction (looking from the top) after slackening off the four setscrews A. This adjustment will compensate for any slackness there may be. The end thrust of the worm wheel is also set by means of the adjustable thrust button, a washer, or washers, being removed from under its head, so that the play is taken up when it is screwed home tight.

An Austin agent should be asked to make these adjustments, for they are not easy to anyone but a skilled mechanic.



The track is adjusted by lengthening or shortening the crosssteering tube by screwing the socket on or off the tube as required. The best way to do this is not to remove the steering ball pin from the steering arm, but to remove the steering arm from the swivel axle without dismantling it from the cross tube assembly in any way. The wheels should not be lined up parallel but should be $\frac{3}{16}$ in. closer between the rims in front of the axle, than behind. This is to allow for working clearances and slight spring of parts, and ensures that when actually running the wheels are as near parallel as possible. As this adjustment may affect the engagement of the ball pins with the ball cups in the tube, which engagement is determined by shims, it is usually advisable for a mechanic to do this work.

The alignment should be regularly checked, and adjusted if necessary, otherwise excessive tyre wear will occur.

Shock Absorbers.

The setting of the Shock Absorbers is accurately determined and fixed at the Austin Works, and remains constant throughout the life of the car, therefore, no adjustments will be necessary. If the shock absorbers do not appear to be functioning correctly, consult any Lucas Depot or Austin dealer.

Every 8,000 to 10,000 miles, the level of the fluid in the recuperator chamber must be inspected by removing the filler plug, and the fluid replenished, if necessary, to within $\frac{3}{4}$ of an inch of the top. It is essential not to allow the recuperator chamber to become empty, otherwise the action of the shock absorber will be impaired.

Use only Luvax hydraulic shock absorber fluid. It can be obtained from any Lucas-C.A.V.-Rotax service depot, or from our local dealers, in sealed one-pint tins, with a special pouring spout. The use of unsuitable fluid is likely to affect seriously the working of the shock absorber.

For fuller information on Luvax hydraulic shock absorbers, see separate leaflet, a copy of which can be obtained on application.



RELINING THE BRAKES

FOR relining the front or rear brakes, first remove the wheel, the hub cap, and the axle nut under the cap. Extract the hubs with the hub extractor, screwed on in place

of the cap, by turning the centre screw of the extractor, so that the hub and bearings with the brake drum are pulled clear off the axle or keyed shaft, leaving the brake shoes accessible. Unhook the springs and remove the shoes from the cam and pivot pins.



The front brake assembly with the drum removed showing the dust cover, springs and pivot pin.

Remove the old linings by punching or drilling out the rivets. The new brake linings should be clamped to the shoes while the rivetting is in progress, as it is essential that they should bed down on the shoe over their whole area. Replace the shoes, each in the same position as it was before removal, and, on the rear axle, do not forget to insert the key in the shaft if it has been removed.

It is always necessary to reline all four brake shoes on the one axle at the same time, and after the relining it may be necessary to slack off the brake adjustment before the hub and brake drum can be replaced. It may be desirable to equalise the action of the front and rear wheels brakes, and both brakes on each axle (see page 45).

When replacing the hub make sure that it is right home in position then tighten the axle nut and lock it with a split pin. Finally re-adjust the brakes.

CARE OF THE TYRES

I their minimum recommended pressures, or early wear may occur and the tyre cord foundation will be disintegrated by the abnormal flexing. Also slack tyres are conducive to front wheel wobble and skidding. The tyres fitted as standard are of the medium pressure type, size 5.25—19. The minimum pressures are as follows :—

Model.		Front.	Rear. 1 or 2 passengers.	Rear Fully laden.
Tourer		28 lbs.	32 lbs.	37 lbs.
Saloon		28 lbs.	32 lbs.	37 lbs.
	65	0 16 1	Dulu tu	in any fitted

On export cars 6.50—16 low pressure Dunlop tures are titted. Pressures :— 20 lbs. 24 lbs. 28 lbs.

The table gives the minimum pressures allowable for maximum comfort. Should the steering, through wear or from other causes, at any time develop a tendency to wander or show signs of wobble, these pressures should be increased. It is important that both front tyres should be kept at the same pressure. In any case there is no reason why the pressures should not be more than the minimum figure given, as some drivers prefer their tyres harder than others.

A cursory glance should be given daily to see that none of the tyres is unduly slack, and a weekly test with a suitable gauge should be made to verify the pressures. Occasionally examine the tyre treads for cuts; bad cuts should be vulcanized.

Should the front tyres at any time show rapid signs of wear, suspect mis-alignment of the front wheels. The cure for this has already been given. Periodically change the wheels round from the front to the back or vice versa, also from the near side to the off side, also use the spare wheel in turn with the others. This equalises the wear of all five tyres.

With the well-base rims, should the tyre become deflated, the tube may be nipped by the cover; so when inflating it is advisable to hit the sides of the tyrc so that the tube goes up into the cover. This is facilitated if the wheel is jacked-up. A fine moulded line round the walls of the tyrc serves as a guide to show if the cover is fitted straight. This line should be $\frac{1}{2}$ in. to $\frac{3}{8}$ in. above the rim all the way round.



STORAGE OF THE CAR

T F the car is laid up in garage for long periods, the fuel, water, and oil should be drained off, and the batteries removed. The weight of the car should not be allowed to remain on the tyres. but both axles should be jacked up and supported on blocks. Before storage the car should be thoroughly cleaned and dried, and it should be left with dust sheets over it.

If the car is left with an agent for any repair that is likely to occupy some time, it is advisable to ask the agent to remove the battery and keep it in good condition.

CARE OF THE COACHWORK

F OR the car to look well and keep its beauty and smart appearance, the coachwork must be given its share of attention; it must not be neglected.

Washing.

The cellulose finish of the car is easily cleaned and polished. In summer weather when the car is only dusty the dust can be removed without water and there is little risk of damaging the finish. When the car is muddy, wash off well with clean running water. Remove any grease or tar splashes with petrol. Don't use the same sponge and cleaning cloths for the chasses and springs and other greasy parts as are used for the coachwork.

Polishing.

Dry off and then polish with one of the polishes now available. Such preparations impart a brilliant surface and preserve and beautify the coachwork. On no account should metal polishes be used, as are sometimes advised for cellulose. It has been found that the more the surface of the cellulose finish is rubbed by the polishing cloth, the smoother and more lasting is the lustre imparted.

Doors.

The doors should receive attention from time to time. Locks and hinges need oiling to keep them in good working order. The window regulators should not need attention for a considerable period, as they are packed with grease before leaving the works.

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DRIVING

HE driving seats are adjustable for position, and this convenience should be taken advantage of, also the adjustability of the control pedals.

Changing Gear.

The first gear is for emergency only. It is therefore usual to start in second gear. To pass from second to third gear, merely declutch and move the lever into third, and to pass from third to top, push out the clutch and move the lever to top position. The same movements are made in changing down. Top, third and second gears are in synchromesh engagement.

Always change down early when ascending a hill; never allow the engine to labour in any gear and expect it to pick up speed on changing into a lower one when the car has nearly stopped.

Keep the foot off the clutch pedal except in heavy traffic. Even then, do not allow the weight of the foot to be taken by the pedal. The slipping of the clutch caused by this practice heats and wears it badly, often destroying the clutch lining.

It is advisable to engage one of the lower gears before commencing a steep descent, with throttle closed or when descending a long hill. When using the hand-brake, keep the clutch in, throwing out the clutch at the last moment, if stopping the car.

Skidding.

Skidding is sometimes due to sudden braking on a greasy or loose surface; slack tyres encourage it. If the rear wheels skid, release the brakes, and turn the front wheels into the skid—that is, in the direction that the rear wheels are skidding.

A Good Driver.

Is never flurried; does not skid his tyres, either in starting or stopping, and uses clutch and brakes as little as possible.



- Release the hood by unscrewing the windscreen catches and undoing the press buttons on the body moulding (seen in 3). Lift the front hood member from near its centre and break the frame binge at the point shown. By standing on the running board this operation is easily effected.
 Swing the hood back and push the material clear of the hood irons. (Remove the left hand from the frame during this operation or it will get trapped as the frame closes). It is essential to stand in the back of the car to give sufficient reach for this movement.
 The front section of the hood is folded back with the material hanging clear in a loop to the rear.
 From the hood irons swing the entire hood over the back of the car until it is possible to reverse the hood support hinge.

- hood support hinge.
 Reverse the hood support hinge by pushing it down. This operation is important. The hood cannot be dropped forward until the hinge has been reversed.
 Swing the framework forward down to the body. Adjust the wing nuts on the anchoring screws and spring the screws into the forked brackets to secure the hood. After the material has been neatly doubled up on top of the folded frame, and the corners tucked in, the hood envelope can be fitted.
 An important preliminary is to have the anchoring screws pointing forward, and the small brackets, on which the hood rests when folded, upright.
 Before fitting the envelope after lowering the hood, secure the rear window by the "Lift-a-dot" fasteners on the rear of the body. The fold of hood material should be under, not above, the rear window when it is thus secured. The fasteners must be released before the hood can be raised.
 For raising the hood the hinge in the hood support member must be pulled upward.



TOOLS AND ACCESSORIES SUPPLIED WITH THE CAR.

Double-ended spanners :--3 in. x 1 in. 5 in. x 3 in. 7 in. $x \frac{1}{2}$ in. 5in. x 3in. 18 H.P. only. Water-pump spanner. Tappet-adjusting spanner. Screw-driver. Sparking-plug box spanner and tommy bar. Ignition key. Contact-breaker spanner. Tappet clearance and sparking plug gauge. Starting handle. Combination pliers. Wheel-nut brace. Hub-cap spanner. Lifting jack, with handle. Oil can.

Cylinder-head joint washer. Two hose clips. Tyre pump. 6in. adjustable spanner. Spanner for third motion shaft and starting nut. Valve spring lifter and screw. Enots grease gun and adapter. 5in. x 7 in. box spanner. Tyre levers. Set of 3 box spanners. Hub, steering arm, and worm wheel extractor. Cylinder-head lifting screw and rear axle drain plug spanner. Induction pipe washers 18 H.P. 2 Radiator hose clips. only. Envelope containing Austin

Note.—The jack supplied is of a special pattern and possesses a secondary lift within the main threaded pillar. When lifting a front wheel, the jack is used in the ordinary way. When it is required to lift a back wheel, the inner pillar is unscrewed (left hand thread) sufficiently to enable it to reach the axle. The jack is then operated by the shaft in the ordinary way and will provide ample wheel clearance.

literature.

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Each Number contains useful information on the adjustment and maintenance of Austin Cars.

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EQUIPMENT

APPLICABLE TO ALL MODELS.

NOTE.—All Austin Dealers carry stocks of genuine Austin replacements, and applications for spare parts should be made to them. Clients will then be certain that the replacement is made by parts manufactured by the Austin Motor Company and carrying their high reputation for quality and workmanship.

THE Austin Motor Co., Ltd., accept no liability under the terms of their Warranty for Tyres, Speedometers, or the Electrical Equipment, or other goods, including Coachwork not of its own manufacture.

All claims relating to any of these parts or fittings or orders for repairs to them, should be addressed to their manufacturers.

For our customers' convenience, we give below the names and addresses of the manufacturers or suppliers of the goods in question.

IMPORTANT.—When claims under guarantee are being made, it is absolutely necessary to quote the type and number of car, and also the commissioning date.

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"Lucas" and Joseph Lucas, Ltd., Gt. Hampton Street, Birmingham "C.A.V." and Dordrecht Road, Acton Vale, London, W.3.

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"Zenith" ... Zenith Carburetter Co., Ltd., 40-42, Newman Street London, W.1.

DRIVING MIRRORS.

"Lucas" ... Joseph Lucas, Ltd., Gt. Hampton Street, Birmingham.

ELECTRICAL EQUIPMENT.

(Dynamos, Starters, Cut-outs, Switchboards).

- "Lucas" ... Joseph Lucas, Ltd., Gt. Hampton Street, Birmingham and Dordrecht Road, Acton Vale, London, W.3.
- "C.A.V." C. A. Vandervell and Co., Ltd. Service by Joseph Lucas, Ltd., Dordrecht Road, Acton Vale, W.3.

LUCAS SERVICE DEPOTS.

BELFAST : 3-5, Calvin Street, Mountpottinger. Telegrams : "Servdep," Belfast. Telephone : Belfast 7017
BIRMINGHAM, 18 : Great Hampton Street. Telegrams : "Lucas," Birmingham. Telephone : Central 8401 (10 lines).
BRIGHTON : 85, Old Shoreham Road, Hove. Telegrams : "Luserv Brighton." Telephone : Preston 3001 (4 lines).
BRISTOL: 345, Bath Road. Telegrams: "Kingly, Bristol." Telephone: Bristol 76001 (4 lines).
CARDIFF: 54a, Penarth Road. Telegrams: "Lucas, Cardiff." Telephone: Cardiff 4603 (4 lines)
COVENTRY : Priory Street. Telegrams : "Lucas, Coventry." Telephone : Coventry 3068.
DUBLIN : Portland Street North, North Circular Road. Telegrams : "Luserv, Dublin." Telephone : Drumcondra 434 (6 lines).
EDINBURGH, 11 : 60, Stevenson Road, Gorgie. Telegrams : "Luserv, Edinburgh." Telephone : Edinburgh 62921 (4 lines).
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LEEDS : 64, Roseville Road. Telegrams : "Luserdep, Leeds." Telephone : Leeds 28591 (5 lines).
LIVERPOOL, 13: 450-456, Edge Lane. Telegrams: "Luserv, Liverpool." Telephone: Old Swan 1408 (4 lines).
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LONDON: 155, Merton Road, Wandsworth, S.W.18. Telegrams: "Luserv, Put, London." Telephone: Putney 5131 (6 lines) and
MANCHESTER: Talbot Road, Stretford. Telegrams: "Lucas, Stretford." Telephone: Longford 1101 (5 lines).
NEWCASTLE-ON-TYNE, 2 : 64-66, St. Mary's Place. Telegrams : "Motolite, Newcastle-on- Tyne."
In addition, there are Lucas-C.A.VRotax Official Battery Service Agents in important centres throughout the country.

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GREASE GUNS AND OIL INJECTORS.

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LIFTING JACKS.

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