BSA

OWNER'S HANDBOOK

MODEL B44
441 c.c. O.H.V.
VICTOR SPECIAL
SHOOTING STAR

MODEL B25
249 c.c. O.H.V.
STARFIRE
(Including Fleetstar version)

00–4144

Owner's Handbook

for

BSA

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VICTOR SPECIAL

SHOOTING STAR

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STARFIRE

(Including Fleetstar version)

B.S.A. MOTOR CYCLES LIMITED,

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Telegrams and Cables ... 'SELMOTO', Birmingham

WESTERN U.S.A.

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EASTERN U.S.A.

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INTRODUCTORY NOTES

This Handbook is intended to acquaint the B.S.A. owner with details of the controls, general maintenance and technical data which may be required for normal operation of the machine.

It does not contain the information necessary to carry out complete stripping for major overhauls, decarbonising, etc. but, if any owner feels competent to carry out this type of work, a comprehensive Workshop Manual and an illustrated Spares Catalogue can be obtained from his local B.S.A. dealer.

Owners in the British Isles can obtain these publications direct from B.S.A. Motor Cycles Ltd., Service Department, Birmingham 11.

Always quote full motor and frame numbers when ordering.

It is important that, after the specified mileage, the machine is returned to the B.S.A. dealer for inspection in accordance with the details given on the Warranty (Guarantee) Registration Card.

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TECHNICAL DATA

Motor Number:—On left side of crankcase below the cylinder.

Frame Number:—On front motor/frame lug.

	Victor Special	Shooting Star	Starfire
MOTOR:			
Cylinder bore (mm.)	79	79	67
Stroke (mm.) ...	90	90	70
Capacity (cu. in.) ...	27	27	15
Capacity (c.c.) ...	441	441	247
Compression ratio ...	9.4 : 1	9.4 : 1	10 : 1 (Fleet Star 8.5 : 1)
Valve timing (.015 in. clear):			
inlet opens b.t.d.c.	51 deg.	51 deg.	51 deg.
inlet closes a.b.d.c.	68 deg.	68 deg.	68 deg.
exhaust opens b.b.d.c.	78 deg.	78 deg.	78 deg.
exhaust closes a.t.d.c.	37 deg.	37 deg.	37 deg.
Piston rings:			
compression (in. wide)	1/16	1/16	1/16
scraper (in. wide) ...	1/8	1/8	1/8
Piston ring gaps:			
minimum (in.) ...	.009	.009	.009
maximum (in.) ...	.014	.014	.013
Spark plugs	Champion N4	Champion N4	Champion N3
Points gap:			
minimum (in.) ...	.020	.020	.020
maximum (in.) ...	.025	.025	.025
Spark timing (fully advanced)	29—31 deg.	29—31 deg.	37 deg.
Maximum safe r.p.m.	7,000	7,000	8,500
SPROCKETS, CHAINS, RATIOS:			
Gear ratios—high ...	5.36	5.14	6.92
third ...	6.7	6.42	8.6
second	8.84	8.47	11.4
first ...	14.2	13.6	18.3
Clutch friction plates	4	4	4
Chain sizes—front ...	3/8 in. pitch (Duplex).	3/8 in. pitch (Duplex).	3/8 in. pitch (Duplex).
rear ...	5/8 in. pitch x 1/4 in.	5/8 in. pitch x 1/4 in.	3/8 in. pitch x 1/4 in.
Teeth on:			
motor sprocket ...	28T	28T	23T
transmission (gear-box) sprocket ...	17T	17T	16T
clutch sprocket 18/36 ...	52T	52T	52T
rear chainwheel ...	49T	47T	49T

TECHNICAL DATA—*continued*

	Victor Special	Shooting Star	Starfire
CAPACITIES:			
Fuel tank (gallons) ...	3 U.S.;	3½ British	3 U.S.; 3½ British
(liters) ...	11.5	14.5	11.5 14.5
Oil tank (pints) ...	5 U.S.; 4 British	5 U.S.; 4 British	5 U.S.; 4 British
(liters) ...	2¼ 2¼	2¼ 2¼	2¼ 2¼
Transmission (gearbox):			
(pints)	⅝ U.S.; ½ British	⅝ U.S.; ½ British	⅝ U.S.; ½ British
(c.c.)	280 280	280 280	280 280
Primary chaincase:			
(pints)	⅛ U.S.; ¼ British	⅛ U.S.; ¼ British	⅛ U.S.; ¼ British
(c.c.)	140 140	140 140	140 140
Front forks (pints) ...	2/5 U.S.; ⅓ British	2/5 U.S.; ⅓ British	2/5 U.S.; ⅓ British
(c.c.) ...	190	190	190
WHEELS:			
Tire size—front ...	3.25–19	3.25–18	3.25–18
rear ...	4.00–18	3.50–18	3.50–18
Tire pressures:			
front (p.s.i.) ...	16	16	16
rear (p.s.i.) ...	16	20	22
Brakes, dia.			
front (in.)	8	7 (2 L.S.)	7 (2 L.S.)
rear (in.)	7	7	7
CARBURATION:			
Type	R930/38	R930/38	R928/7
Bore (mm.)	30	30	28
Main jet (mm.) ...	240	240	170
Pilot jet (mm.) ...	622/107	622/107	622/107
Throttle valve ...	3½	3½	3
Needle position ...	1	1	1
Needle jet (in.) ...	.106	.106	.106
GENERAL DETAILS:			
Overall length (in.) ...	82	83	83
Wheelbase (in.) ...	52	52	52
Ground clearance (in.)	8	7½	7½
Seat height (in.) ...	32	31	31
Overall height (in.) ...	41	42	42
Handlebar width (in.)	32	28	28
Weight (lbs.) ...	306	329	306
(kg.)	139	149	139

The recommended inflation pressures are based on a rider's weight of 154 lb. If the rider's weight or additional load in the form of a pillion passenger or luggage exceeds 154 lb. increase the tire pressures as follows:—

FRONT TIRE:—Add 1 lb. per square inch for every 28 lb. increase above 154 lb.

REAR TIRE:—Add 1 lb. per square inch for every 14 lb. increase above 154 lb.

THE CONTROLS

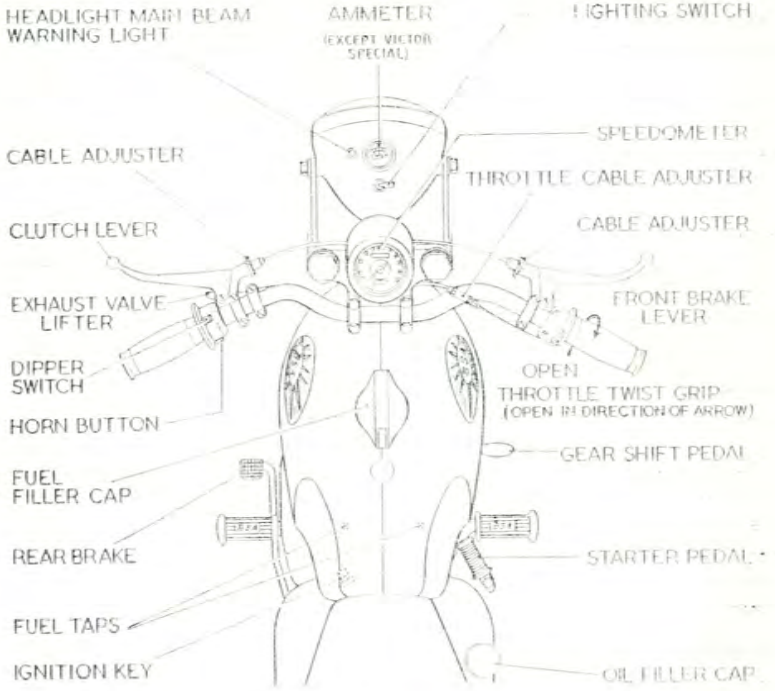

FIG. 1. The controls

(Specification details vary according to model, e.g. the *Victor Special* is not fitted with an ammeter and the exhaust valve lifter is not fitted on the *Starfire*).

TAKING OVER THE MACHINE

Before running the machine make sure that the oil tank, transmission (gearbox), primary chaincase and front forks are properly topped-up with oil and that the battery is filled and charged (see appropriate chapters for filling instructions). Normally these preparations will be carried out by the dealer who is selling the machine and the new owner has only to arrange the controls to his liking for the machine to be ready for the road.

The new rider should make sure that he is quite familiar with all the controls before attempting to ride the machine. The foot controls are adjustable, and should be positioned so that they can be reached without moving the feet from the footpegs. Handlebars should be adjusted so that a comfortable and natural riding position is achieved.

Make sure that the bolts (*A*) Fig. 2, retaining the handlebar clamps are tight after completing any adjustment. The brake pedal stop pin should be set so that the pedal is situated comfortably below the foot (see Rear Brake Pedal, page 10).

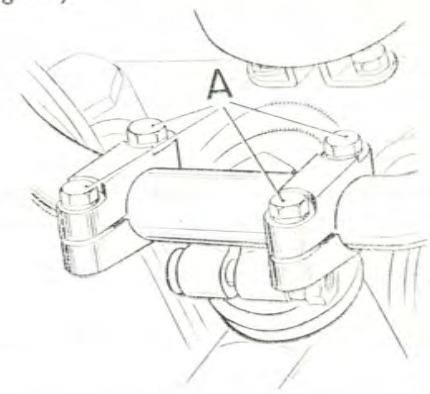

FIG. 2.
Adjustment of the handlebars.

Gasoline (petrol)

For best performance the octane rating of the fuel used should not be less than 98. (For the Fleet Star only, the fuel used may be 95 octane.)

Note

Fuels containing alcohol must not be used in fiber-glass tanks.

HANDLEBAR CONTROLS

Twist Grip

Mounted on the right handlebar, it controls the throttle opening and consequently the motor speed. To open the throttle (i.e., to increase motor speed) turn the grip so that the top moves towards the rider. Excess slackness in the cable can be removed by means of an adjuster

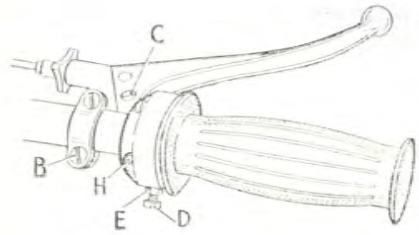

FIG. 3.
Adjustments to the twist grip control.

incorporated in the cable. The rotary stiffness of the twist grip can be varied by means of the adjuster screw (*D*) Fig. 3, and locknut (*E*). It is set for average requirements when leaving the factory, but can be re-adjusted to suit individual preference.

The twist grip body can be moved after slackening the screws (*H*). Tighten securely after adjustment.

Front Brake

The lever is mounted on the right handlebar in front of the throttle control and its position can be adjusted after slackening the screws (*B*) Fig. 3. The looseness of the lever is adjusted by rotation of screw (*C*) after slackening its locknut. Grip the lever gently to operate the brake. The main adjuster for all models except the *Victor Special* is situated mid-way in the cable (Fig. 28). Finger adjustment for the cable is provided at the adaptor on the lever.

Stoplight Switch (Front Brake)

Incorporated in the brake cable at (*F*) Fig. 28, and (*H*) Fig. 25, this switch does not require any adjustment.

Clutch

The lever is mounted on the left handlebar and its position can be adjusted after slackening of the screws (*E*) Fig. 4. The looseness of the lever is adjusted by rotation of screw (*F*) Fig. 4, after slackening its locknut. Grip the lever to free the clutch, i.e., disengage the drive between the motor and the rear wheel. Finger adjustment for the clutch cable is provided at the adaptor (*D*) Fig. 4, on the lever. A greasing point is provided in the cable at (*B*) Fig. 22.

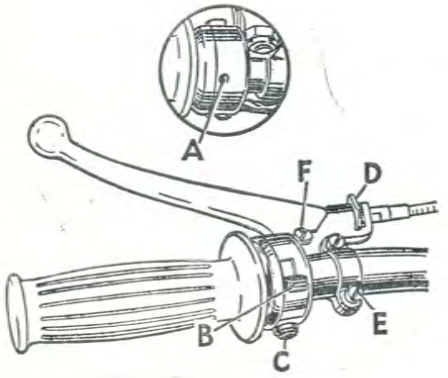

FIG. 4.
The left handlebar controls.

Exhaust Valve Lifter *(B44 models only)*

This is the small lever mounted on the left handlebar and it must be depressed in order to raise the exhaust valve and therefore relieve engine compression.

Horn

A combined horn push-button (*C*) Fig. 4, and headlight dipper switch is operated from the left handlebar.

OTHER HAND CONTROLS

Gas (Petrol) Taps

Turn down the levers to open the taps. For normal running, open the right side tap only, when a reserve supply will be retained which can be fed to the carburettor after the left side tap is opened. Always turn off the taps when parking. The taps can be removed as necessary for cleaning of the filters. On the *Victor Special* only, pull out the knurled button and turn to lock in position.

Headlight Dipper Switch

This control is combined with the horn button and is mounted on the left handlebar (*B*) Fig. 4. It controls the switching from main to dipped headlight beam.

The housing can be adjusted for position after releasing the locking screw (*A*) Fig. 4.

When the headlight is on main beam, a warning light is visible on top of the lamp.

Headlight Switch

The switch has three positions: (a) all lights off, (b) pilot, tail, and instrument lights on, (c) head, tail and instrument lights on, with the separate switch on the handlebar controlling the main and dipped headlight beam.

In all switch positions, the charging rate from the alternator varies with the condition of the battery, decreasing as the battery becomes fully charged and vice versa.

Ignition Switch

This is operated by a detachable key (*K*) Fig. 5, which when in the counter-clock position, switches off the ignition and can be withdrawn. Always place in this position when the motor is stationary and remove the key when leaving the machine. Turn the key to the clockwise position to switch on the ignition and leave in this position when the motor is running. The switch is located on the left side of the frame at the rear of the petrol tank (Fig. 1).

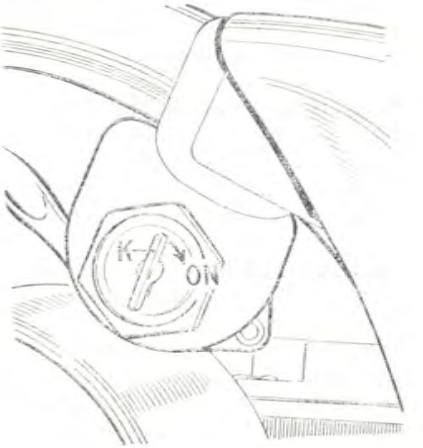

FIG. 5.
Operating the ignition switch.

Tickler (Carburettor)
The carburettor float chamber is fitted with a spring-loaded plunger which, when depressed, prevents the float from rising, thus rapidly replenishing the level of fuel in the chamber. The plunger (or tickler) should be used for a brief interval only, otherwise the level of fuel in the float chamber will rise excessively, resulting in flooding of the carburettor and loss of fuel (see starting instructions, page 11).

FOOT CONTROLS

Gearshift Pedal
Operated by the right foot, the gearshift mechanism is of the positive stop type and following a shift of gear, the lever returns to its central position as soon as foot pressure is released.

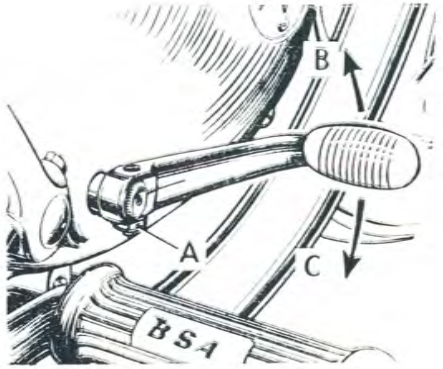

FIG. 6.
The gearshift pedal.

Neutral position is between first and second gears, and downward movement (*C*) Fig. 6, of the lever selects a lower gear, whilst an upward movement (*B*) Fig. 6, selects a higher one. The pedal can be re-positioned as required after releasing its pinch bolt (*A*).

Rear Brake Pedal (Fig. 7)
Operated by the left foot, the pedal is equipped with an adjustable stop (*S*) and locknut (*R*), which should be set so that the pedal pad lies comfortably below the foot ready for instant use. Any adjustment to this pedal position may require re-adjustment of the rear brake.

Stoplight Switch (Rear Brake)
This is actuated by the brake pedal and is operated by the adjustable stop (*T*) Fig. 7, locked by the nut (*W*). Whenever the brake pedal is adjusted, check that the switch still functions and if necessary, reset the position of the stop. With the switch plunger fully depressed and the brake pedal against its stop, there should be $\frac{1}{32}$ in. gap between the stop (*T*) and the plunger.

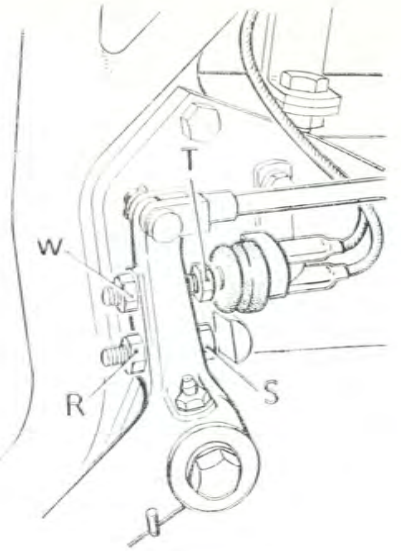

FIG. 7.
Adjustment of the brake pedal.

Starter Pedal
The folding pedal on the right side of the machine behind the foot-peg. Depression of the pedal rotates the motor.

INSTRUMENTS

Speedometer
The 'trip' mileage can be be reset to zero by rotation of the control knob on the side of the instrument.

Ammeter
The instrument indicates whether the battery is being charged or discharged. This is shown as (+) i.e., charge, or (—) i.e., discharge. An ammeter is not fitted to the *Victor Special*.

Revolution Counter (fitted to special order only)
Driven direct from the motor, this records its revolutions per minute.

DRIVING

To Start the Motor
Stand astride the machine and make sure that the gears are in the neutral position, which lies between the first and second gears. Should the machine be in gear it will move forward as the starter is depressed.

Turn on the gas (petrol) and if the motor is quite cold, depress the carburettor tickler momentarily. Note that it is neither necessary nor desirable to oscillate the plunger rapidly, as this may damage the float.

Switch on the ignition by turning the key in a clockwise direction, see Fig. 5.

Open the twist grip a small amount only, because excessive opening may prevent easy starting, and push the starter pedal down slowly until resistance is felt; then depress and immediately release the exhaust valve lifter lever (B44 models only) and give the pedal a firm downward swing which should set the motor in motion. If the motor fails to start at the first attempt, repeat this procedure, being careful to avoid rapid kicking at the pedal which will serve no purpose and may damage the operating mechanism. The ignition control is set automatically in the retarded position for starting, and advances as the motor speeds up.

Note that while it is necessary to use the tickler when starting from cold, this should not be necessary when the motor has already reached its normal running temperature.

To Stop the Motor

Select the neutral gear position and close the throttle, so reducing the motor speed to 'tick-over', and turn the ignition switch to the 'off' position.

Using the Transmission (Gearbox)

Correct use of the transmission (gearbox) must be made in order to obtain best results in all-round performance, especially with regard to acceleration and to the attainment of maximum speed.

For **maximum** acceleration and **maximum** speed the motor must be driven up to peak r.p.m. in the gears. In particular, to obtain maximum speed it is essential to obtain peak r.p.m. in third gear before changing into high gear.

Riding Hints

Use the throttle to control the speed of the machine, as gentle but definite braking is obtained by merely closing the throttle. On wet roads and particularly under icy conditions, the use of the motor as a brake is to be recommended. A shift to lower gear increases the braking effect.

Try to anticipate the need to shift gear or to brake, so that changes in speed are smoothly carried out. Always use both brakes together and apply them smoothly and progressively. Never accelerate or brake fiercely, especially on bends or wet roads. Both actions are signs of an inconsiderate driver.

Breaking-in

The 'breaking-in' process is the most important period in the life of the motor, and the handling it receives during the first 1,000 to 1,500 miles will determine the service it will provide in return.

Breaking-in should commence at one-third to half-throttle and for the first 500 miles the speeds should not exceed those given on the label. Thereafter the throttle opening may be progressively increased as the mileage builds up until at the end of the breaking-in period full throttle can be employed.

If excessive speeds are used in the early stages there is risk of seizure and other troubles and in any case until the machine has been properly 'broken-in' it cannot be expected to give its best performance.

Smooth throttle control and selection of the correct gear for the prevailing conditions will ease the work of the motor. In particular avoid violent acceleration and do not allow the motor to pull hard on hills in a high gear when a shift to a lower gear would ease the load. This ensures that all parts of the machine are properly broken-in and are quite free.

When breaking-in is completed, balance the wheels (see page 39).

Do not let the oil level in the tank get too low, as economy in oil may prove very expensive at a later date and running consistently with the oil level too low may cause the oil to become unduly hot. It must be remembered that the oil cools as well as lubricates, and a new motor tends to run a little hotter than one that is well 'broken-in'.

After the first 250 miles, and again at 500 miles, drain and refill the oil tank with fresh oil and clean the filters. The correct grades of oil are given in the lubrication chart. The oil in the transmission (gearbox) should also be changed after the first 500 miles.

Further oil changes should be carried out in accordance with the instruction under Routine Lubrication.

ROUTINE MAINTENANCE

The following list of items requiring regular attention will serve as a guide as to when maintenance should be carried out. The method of carrying out the various adjustments will be found under the appropriate heading in the later chapters. **The mileage figures quoted are based on normal road work but for machines used for competition purposes, the periods between servicing should generally be reduced.**

Whenever any work is carried out on the machine, attention to detail and scrupulous cleanliness must be observed. All joints must be clean and gaskets in good condition before reassembly. Threads must be kept clean and free from grit, and exposed threads should be oiled or greased before assembly. Good fitting wrenches should be used at all times and nuts must be tightened firmly, but wrenches longer than standard length should not be employed as they may cause failure through over-tightening.

Take care when cleaning the machine that dirt is not introduced into the electrical system, brakes, air cleaner, etc. Do not attempt to rub off dry dirt or mud but wash off with a copious supply of clean water, preferably from a hose. Any oily areas should be treated with a proprietary detergent before being hosed down.

Chromium plating should be washed clean and an abrasive cleaner must not be used.

Apply a good quality polish to the enamelled parts.

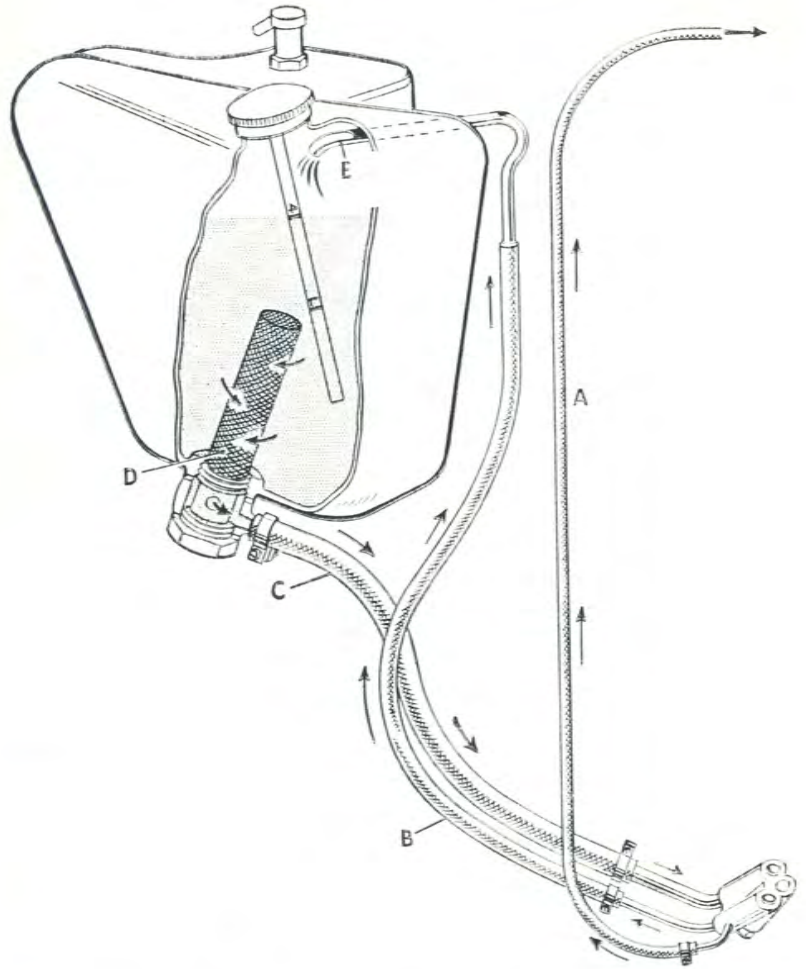

FIG. 8. The oil tank, filter, and pipe lines for the *Victor Special* models. (The principle is similar for all other models, but constructional details differ).

Lubrication System

The lubrication system is of the dry sump type and is operated by a double-gear pump situated in the bottom of the crankcase on the right-hand side (see Fig. 9). Oil is drawn from the tank to the supply pump (top set of gears) and is then pumped past the non-return valve (A) Fig. 9, through the hollow mainshaft to the big-end.

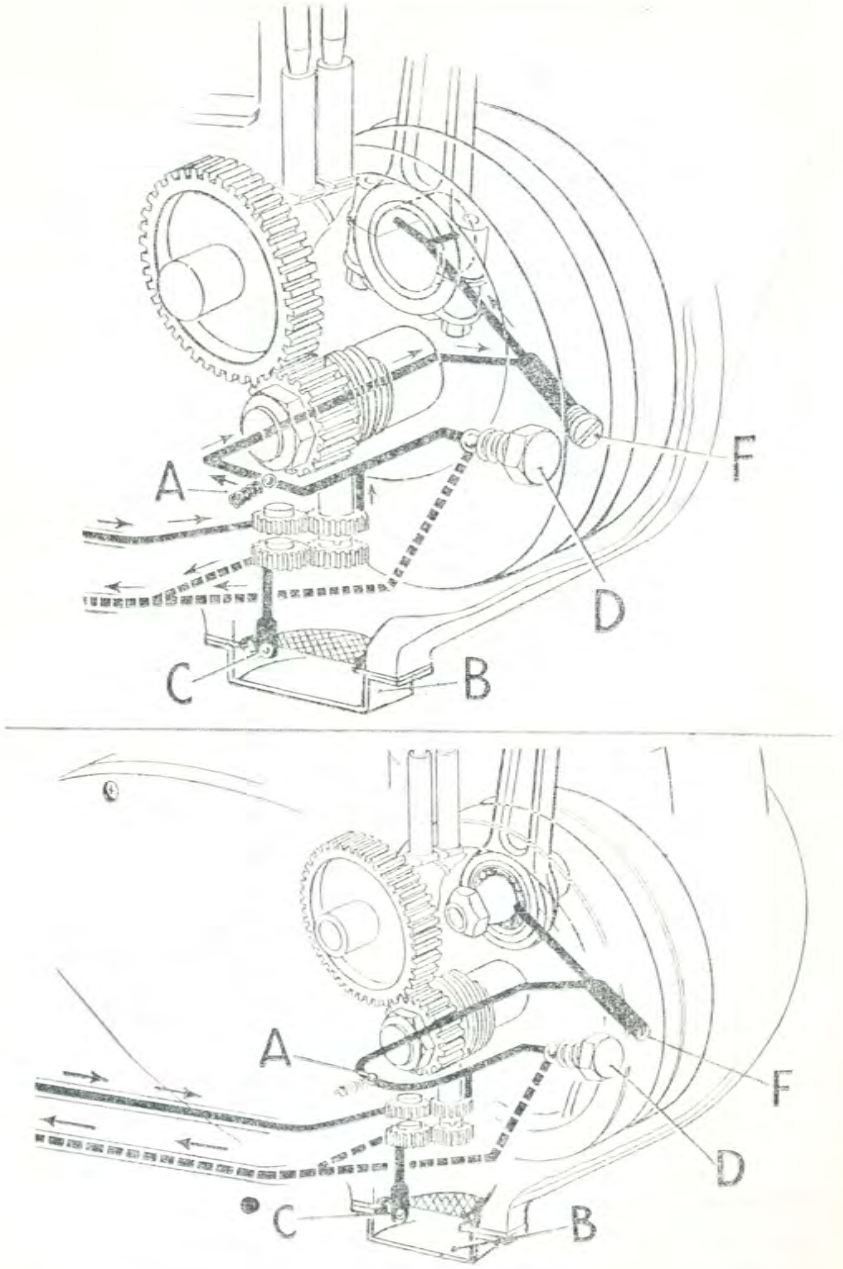

FIG. 9. Diagrammatic illustration of the engine lubrication system showing the ball valves. (The upper illustration applies to the *Starfire*).

After lubricating the motor the oil flows down through a filter to the bottom of the crankcase from which it is drawn by the return pump (lower set of gears) past the non-return oil valve (*C*) Fig. 9, and delivered up the return pipe to the tank. If the tank filler cap is removed while the motor is running the returning oil should be seen issuing from the pipe (*E*) Fig. 8. The flow of oil will in all probability contain air bubbles, but this is a normal condition, and is due to the larger capacity of the return pump. **If there is no flow from the pipe, stop the motor immediately and investigate the cause (see Pump Ball Valve, page 18).**

A bypass pipe (*A*) Fig. 8, leads a supply of oil to the rockers, push rod ends, etc.

The valve (*A*) Fig. 9, prevents oil transfer from the tank to the crankcase while the machine is standing, and together with the sludge trap (*F*), does not require attention until such time as the motor is completely dismantled.

A bypass valve (*D*) Fig. 9, ensures a constant pressure in the system. Surplus quantities of oil are discharged into the oilway between the pump and the tank. This valve should not be removed until the motor is dismantled for servicing.

Changing the oil

This should preferably be done immediately after running, so that the oil is warm and will, therefore, flow more freely. Unscrew the filter (*D*) Fig. 8, and drain off the oil into a suitable receptacle. After cleaning the filter, refill the tank with motor oil in accordance with the recommendations in the lubrication chart. The tank capacity is 5 U.S. pints (4 British pints), given by the line marked "4" on the dipstick attached to the filler cap.

Filters

Remove the oil tank and crankcase filters for cleaning at regular intervals (see Routine Lubrication, page 29) and this can be carried out in conjunction with the change of oil. Wash thoroughly in gasoline (petrol) and make sure that all fluid has evaporated before replacing. Refill the tank with the correct grade of oil.

The crankcase filter is retained by the sump (*B*) Fig. 9, which is released following removal of four nuts of the self-locking type. They must always be used at this point, and replaced when worn.

Following replacement of the filter, it will ensure immediate lubrication of internal parts if a small quantity of motor oil (say, half a pint) is added to the crankcase, and the starter pedal operated twenty or thirty times with the ignition switched off, until oil is seen issuing from the return pipe in the tank.

The oil can be inserted through the aperture exposed by removal of the plug on the left side of the crankcase immediately in front of the cylinder barrel. It will be necessary to allow sufficient space in the oil tank to receive the additional quantity of oil.

This proceedure should also be followed when the motor cycle has not been used for an appreciable time.

Crankcase Breather
The breather pipe which emerges from the timing case near the clutch cable must be examined regularly and maintained clear of any obstruction.

Oil Pipes
If at any time the oil pipes are disconnected, it is essential for the delivery pipe (*C*) Fig. 8, from the oil tank filter to be attached to the inner crankcase union pipe when they are re-connected, i.e., the pipes cross over.

Pump Ball Valve
When the crankcase filter is removed for cleaning, it is a good opportunity to check the ball valve (*C*) Fig. 9, carried in the pump suction pipe. The ball must be free on its seating. If the ball adheres to its seating, there will not be a return flow of oil to the tank and the crankcase may become flooded. Alternatively, if the crankcase contains an excessive quantity of oil this may be due to the ball not seating properly caused by a particle of foreign matter, so allowing oil to pass through the pump to the crankcase when the motor is stationary.

Valve Clearances
These must be set when the motor is quite cold and the clearances should be .008 in. (intake) and .010 in. (exhaust).

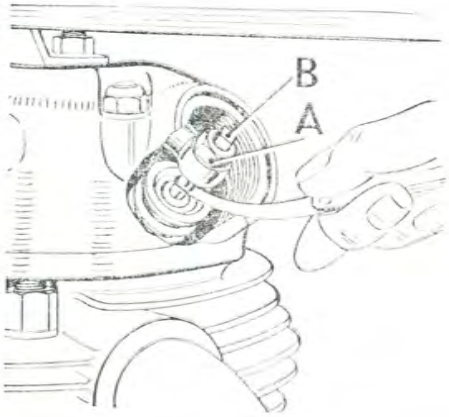

FIG. 10.
Checking the valve clearances (*Shooting Star and Victor Special*).

Shooting Star and Victor Special
Remove the inspection caps and take out the spark plug so that the motor can be rotated easily by hand. It may be necessary to slacken the carburettor flange nuts to provide clearance for the removal of the intake inspection cap. Rotate the motor forward until the intake valve has just closed, i.e., the push rod is just free to rotate. This is the correct position for checking or adjusting the exhaust valve clearance.

When the exhaust valve clearance has been adjusted, rotate the motor forward again until this clearance is just taken up, i.e., just

before the valve actually starts to open. This is the correct position for checking and adjusting the intake valve clearance. Check the valve clearances by sliding a feeler gauge between valve stem and adjusting pin, as shown in Fig. 10.

If the clearance requires adjusting, slacken the locknut (*A*) Fig. 10, and adjust pin (*B*) until a feeler gauge of the correct thickness will just slide between the valve and pin.

Holding the pin in its new position, retighten the locknut. Check the clearance again to make sure that tightening the locknut has not affected the setting.

Starfire
The clearance between the rocker arm and valve stems is adjusted by means of eccentric rocker spindles, although the gauge is still inserted through the inspection aperture as shown in Fig. 10.

Check the clearances using the same procedure described under Valve Clearances, and if adjustment is necessary this should be carried out as follows.

Remove the push rod inspection cover on the right side of the rocker box, which will expose the slotted ends of the rocker spindles (Fig. 11), and then slacken the locknuts on the opposite ends of the spindles.

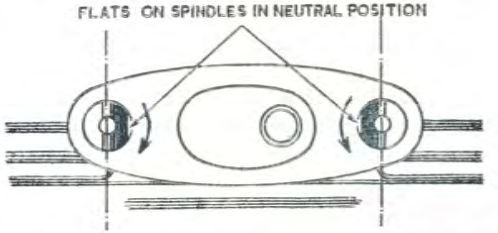

FIG. 11. Adjustment of the valve clearances (*Starfire*).

To obtain the correct clearances, rotate the exhaust rocker spindle in a counter-clock direction and the intake spindle in a clockwise direction (see arrows). The full range of adjustment is indicated by the shaded sections and it is therefore advisable to start with the spindle flats in the vertical or neutral position.

Note:—During adjustment it may be found that one of the rocker spindles has reached the end of its thread and can no longer be turned forward, in which case the spindle must be turned back through 360 degrees before commencing adjustment.

Tighten the spindle locknuts firmly after adjustment.

Exhaust Valve Lifter, (*Victor Special and Shooting Star*)
It is essential that the cable length is adjusted so that there is always ample clearance between the lobe on the exhaust rocker arm and the lifter spindle (Fig. 12).

The setting should be such that there is appreciable movement of the handlebar lever before considerable resistance indicates that the faces of the lobe and spindle are in contact and hence that the exhaust valve is about to be lifted off its seat against the spring pressure.

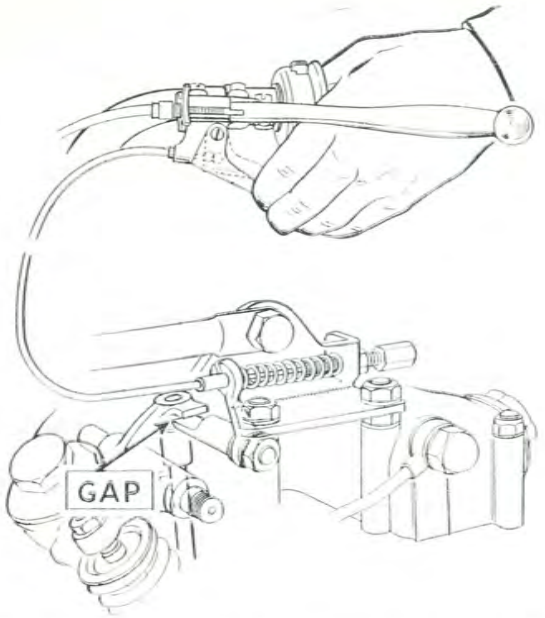

FIG. 12. Exhaust valve lifter clearance (*Shooting Star and Victor Special*).

Incorrect setting of this control will cause difficult starting, a burnt valve, or other troubles.

Contact Breaker (Fig. 14)
After the first 500 miles and thereafter every 2,000 miles, the contact points gap should be examined and reset as necessary.

The unit is contained in a separate compartment and becomes accessible when the circular inspection cap is removed from the timing cover on the right side of the motor.

The condenser is mounted separately and is located on the frame in front of the battery.

Cleaning
The contacts must be absolutely clean at all times. If they are burned or blackened, clean with a fine carborundum stone or very fine emery cloth, afterwards wiping away any trace of dirt or metal dust with a clean cloth moistened with gasoline. Cleaning of the contacts is made easier if the moving contact is withdrawn and it can be lifted off its post after unscrewing the nut which secures the end of the spring. When reassembling, make sure that the insulating pivots, bushes and washers are correctly replaced.

Gap Setting
When the points are fully opened, the gap should be set to .015 in. (.38 mm.). To check the setting, first remove the spark plug so that

the motor can be rotated slowly until the 'heel' on the arm of the moving contact is on the peak of the cam. In this position the gap will be at its maximum, when the setting can be verified with the aid of a feeler gauge. If incorrect, slacken the fixing screw (*D*) and adjust the plate carrying the fixed contact point, by means of the eccentric pin (*E*), until the gap is correct. Retighten the screw and check for adjustment.

Lubrication
Apply a **very small amount** of thin grease to the felt pad (*J*) which lubricates the cam (*F*). Do not use an excessive quantity because it is most important that the contact points are kept free from lubricant, otherwise misfiring and difficult starting may occur.

Advance and Retard Mechanism
The spark timing is automatically advanced and retarded by means of a governor mechanism behind the contact breaker.

Inspect the mechanism when checking the contact breaker adjustment, and make sure that the two governor weights (Fig. 14) move freely. Oil each bearing (*G*) with a drop of light oil. Do not overlubricate or the excess oil may find its way on to the contact breaker points.

Spark Timing
Before carrying out any check on the spark timing, the contact breaker gap should first be verified and, if necessary re-adjusted as above.

The importance of accurate spark timing cannot be over emphasized.

Remove the spark plug so that the motor can be rotated without resistance due to compression, and engage high gear to enable the motor to be turned either backwards or forwards by rotation of the back wheel.

The motor can be timed accurately with the aid of a degree plate, for which purpose the primary chaincase cover must be removed and the plate mounted centrally on the mainshaft (Fig. 13). A pointer should be attached to some convenient part of the motor.

Rotation of the motor through several degrees near the top dead centre position produces a very small movement of the piston, which is extremely difficult to detect. It is preferable to have some form of stop (such as a dummy plug with a projection into the cylinder head), so that the piston can be brought gently against it by rotating the motor forwards or backwards as far as possible in each direction. If degree plate readings are taken in each position, the point midway between them is easy to calculate and this will be at precise top dead center. The pointer and the zero position on the plate must be set to coincide.

Should the cylinder head be off when the motor is timed, a straightedge placed across the top of the cylinder barrel will act as a suitable stop.

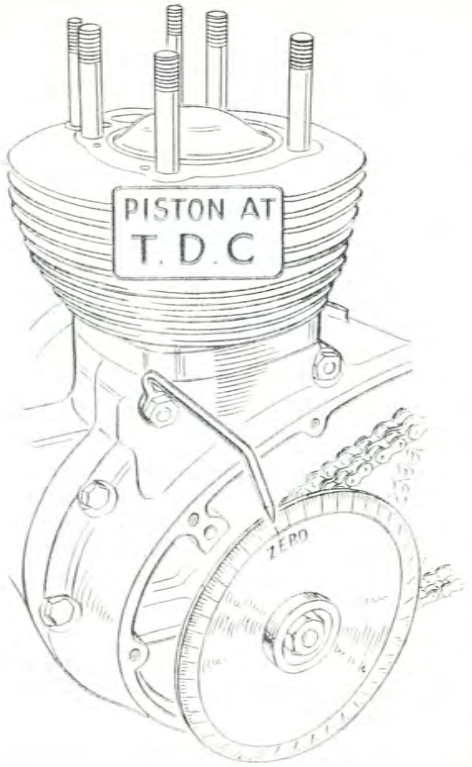

FIG. 13. The mounting of the degree plate.

The next step is to set the auto-advance mechanism of the contact breaker in the fully advanced position. Carefully remove the central securing bolt to avoid releasing the whole mechanism, withdraw the

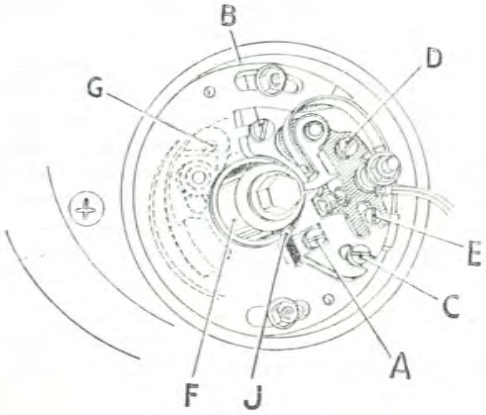

FIG. 14.
The contact breaker.
(Part of the auto-advance mechanism is shown behind the mounting plate).

washer and temporarily replace the latter with another washer having a hole just large enough to fit over the cam bearing, thus allowing the washer to bear against the side face of the cam. Replace the bolt, but before tightening, rotate the cam to its limit in a counter-clock direction, hold in position, and tighten the bolt. This will lock the auto-advance mechanism in the fully advanced position which is the correct position for timing the spark.

To check the spark setting, first determine the top dead center position of the piston (compression stroke) by the above method, at which point both valves will be closed. Rotate the motor backwards about 45 degrees and then bring it forward slowly until the contact breaker points are just opening. A battery and bulb in series with the contact breaker points will indicate the instant at which they separate (Fig. 15). The crankshaft should then be a predetermined number of degrees before top dead center, the figure varying with different models (see table, page 24).

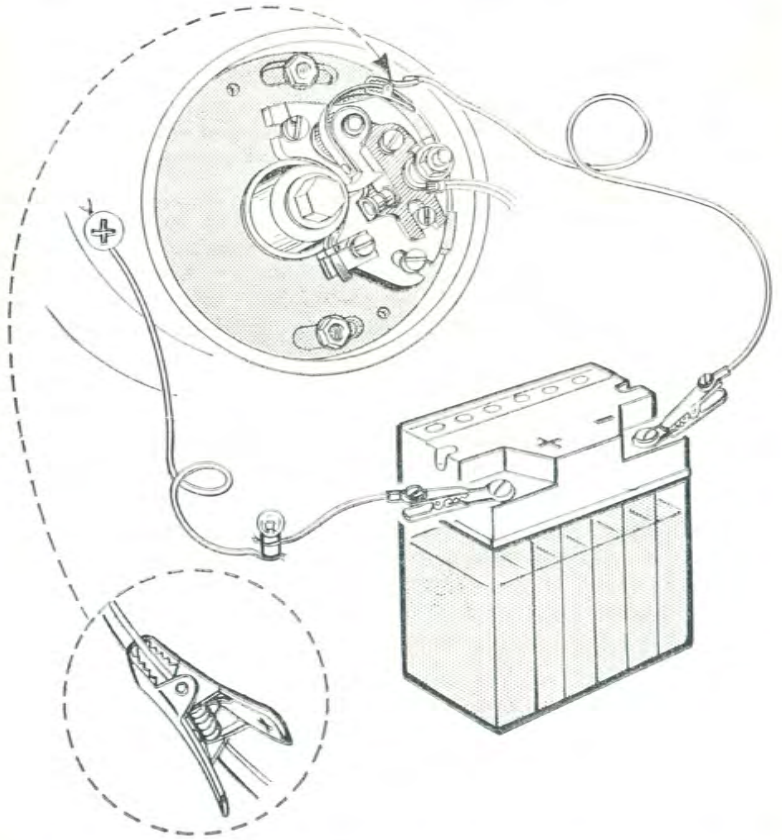

FIG. 15. The connections for checking the opening of the contact breaker points

TABLE OF SPARK TIMINGS

	Shooting Star	*Victor Special*	*Starfire*
Spark timing fully advanced (crankshaft degrees)	29—31	29—31	37
Piston distance before top dead center (in.)	.284—.323	.284—.323	.342

If the spark setting is not correct, slacken the two screws (*A*) and (*B*) Fig. 14, which secure the plate carrying the contact breaker assembly and adjust the eccentric pin (*C*) until the points are just opening.

Firmly tighten the screws and check for adjustment. Do not forget to remove the special washer fitted temporarily behind the contact breaker securing bolt, otherwise the auto-advance mechanism will be inoperative.

Spark Timing by 'Strobelight'

While the previous method of timing the spark will give quite good results in experienced hands, the best method of obtaining precise spark timing is by means of a 'strobelight', an instrument possessed by most B.S.A. dealers.

Provision is made on all engines for the use of this device, comprising a pointer on the interior of the chaincase cover and marker line on the alternator rotor, both of which are exposed after the removal of the circular cover on the front of the chaincase. The strobelight must be connected in accordance with the manufacturer's instructions.

Run the motor at a speed high enough to ensure that the automatic control has moved the spark timing to the fully advanced position. With the strobelight beam projected through the aperture, the marker line on the rotor appear to become stationary and, if the timing is correct, will be exactly opposite the pointer.

Should adjustment be required, slacken the two screws (*A*) and (*B*) Fig. 14, which secure the plate carrying the contact breaker assembly and adjust the eccentric pin (*C*) until the points are just opening and the above condition obtained. Retighten the screws securely.

Spark Plug

Champion plug types N3 or N4 are recommended according to model (see page 4). Fitting sizes are 14 mm. diameter by $\frac{3}{4}$ in. reach.

The plug should be cleaned on an abrasive blast machine and afterwards, the sparking surfaces of the electrodes on standard type plugs should be dressed with a fine file in order to restore clean, flat, parallel faces. It is most important that the gap should be reset to

specification, .020—.025 in. Gap adjustment should be made by bending the side wire. The threads of the plug, and the gasket seat should be wiped clean and smeared with graphite grease before refitting the plug to the motor. The upper portion of the insulator should be also wiped clean after fitting, and prior to connecting the high-tension cable. It is good practice to wipe periodically the top of the insulator with a clean cloth in order to remove any accumulation of grime or dust, etc., as such deposits can be conductive, and result in poor plug performance.

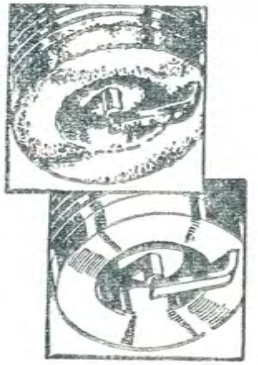

FIG. 16. The spark plug.

(above)—Fouled with burnt oil, or soot.

(below)—Correct.

The special non-detachable steel gaskets are designed to last the life of the plug.

When refitting the plug, screw in as far as possible by hand, and then use a socket wrench for final tightening, to avoid possibility of damage to the insulator.

THE AMAL CARBURETTOR

The twist grip controls the supply of air to the motor by means of the throttle slide and its attached needle controls the supply of fuel, thus providing a balanced mixture. The needle has grooves at its upper end and it is secured in the throttle slide by the spring and by the circlip which locates in one of the grooves. The throttle valve size and the needle position are carefully set before despatch from the factory and no alteration to these settings is necessary or desirable.

Mixture control at tick-over and low speeds is by the pilot jet which has an adjustable air supply. An adjustable throttle stop is also provided to regulate the slow-running speed.

For normal road purposes, the standard settings will prove suitable. Under racing conditions the main jet size may require some alteration to comply with the atmospheric conditions, and the fuel used. Always check the carburation in the following order and always at normal motor temperature:—

(1) Main jet for power at full throttle

(2) Pilot jet for idling

(3) Throttle cut-away for correct pick-up from idling

(4) Needle position for good acceleration from quarter to three-quarter throttle

(5) Finally re-adjust the pilot jet setting.

Main Jet Size

The smallest jet which gives the greatest maximum speed should be selected, keeping in mind that if too small a jet is fitted overheating may occur. Provided that the correct spark plug is being used, (see page 4), it can provide an indication of whether the mixture is correct. After a run at full throttle stop the motor at once, without allowing it to run slowly, and remove the plug. If the plug end is grey put in a bigger main jet. The plug end should be a smooth jet black, but if it is a sooty black, the mixture may be too rich.

Alternative methods of checking the main jet size are as follows: ride at low speed in high gear and then open the throttle wide when, if the carburettor is properly jetted, the machine should accelerate steadily to maximum speed. If the motor misfires (below maximum speed) reduce the throttle opening and if the speed increases, the jet is too large. Fit a size smaller jet and repeat the test.

If it is suspected that the jet is too small, ride at full throttle in high gear and if the motor misfires and the speed does not increase when the throttle opening is reduced, then the jet is too small. This condition should be corrected as soon as possible otherwise piston seizure may occur.

Pilot Jet Adjustment

Screwing in the pilot air screw restricts the air supply, thus giving a richer mixture, and unscrewing it gives a lean mixture. The best way to adjust is to screw in the pilot air screw until the mixture is obviously too rich and the motor starts to run irregularly, then unscrew the adjuster until the motor runs evenly. When the proper adjustment has been determined, the motor may be running too fast and in this case the throttle stop should be unscrewed until a steady and even tick-over is achieved. If considerable alteration to the throttle stop has been made, the pilot air screw should be re-adjusted. Both throttle stop and pilot air screw are fitted with O-rings to retain the adjustment by friction. Do not attempt to obtain an excessively slow tick-over as it will probably become unreliable under different atmospheric conditions.

The throttle stop and pilot air screws are fitted with rubber O-rings to retain the adjustment and if these screws are taken out, the rings must be carefully retained.

9. Needle
11. Throttle slide
14. Pilot jet
15. Needle jet
16. Needle jet holder
17. Main jet
18. Float needle
19. Float
26. Throttle stop screw
27. Pilot air screw

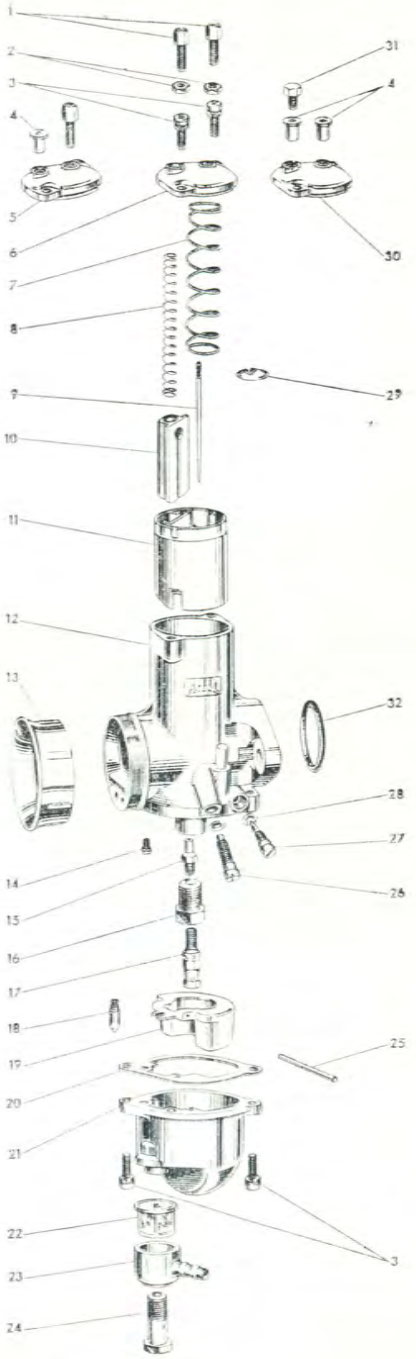

FIG. 17. The Amal carburettor (with concentric float chamber).

Note:—The air slide (10) is not fitted to these carburettors.

Throttle Valve Cut-away

When the pilot adjuster is correctly set, open the throttle progressively up to quarter-throttle and if spitting back occurs, this indicates a lean mixture and a valve with a smaller cut-away should be fitted. If the motor runs 'roughly' under load at this throttle opening, a rich mixture is indicated, when either the jet needle must be lowered or a new valve with a larger cut-away is required.

Jet Needle Position

The needle jet is the major controlling factor from quarter to three-quarter throttle. Run the machine at these throttle openings and test for rich or lean spots as described above. The needle can be raised or lowered by re-locating the spring clip in one of the grooves at the top of the needle. Raising the needle gives a richer mixture and vice versa, but normally the needle should only be moved one groove at a time.

Finally, re-adjust the pilot jet and then a properly balanced mixture should be obtained throughout the full throttle range.

The jets are exposed after removal of the float bowl, the main jet requiring a suitable wrench for removal and a small screwdriver is necessary to unscrew the pilot jet. Removal of the float bowl will be simplified if the carburettor is first withdrawn from its studs, when the two screws securing the bowl are accessible.

The settings, given on page 5, are those normally recommended and will be suitable for most atmospheric conditions. They are intended for use at altitudes of 0—3,000 feet. Above this height some reduction in main jet size is necessary to provide a balanced mixture. At altitudes of 3,000—6,000 feet a reduction in main jet size by 5% is usually necessary and for every 3,000 feet increase over 6,000 feet a further 4% reduction is required.

Air Cleaner

The air cleaner is unscrewed as a unit from the carburettor intake. The ends of the perforated band are held together by means of a small nut and bolt which must be unscrewed before the band can be opened to allow the whole filter unit to be dismantled. The element must be washed thoroughly in gasoline and dried before replacing.

If the machine is being used regularly for competition work or under exceptionally severe conditions, the filter should be cleaned at intervals of not more than one week and preferably before every event.

ROUTINE LUBRICATION

Ref. No.		Page
	Every 250 Miles	
2	Check oil level in tank.	
	Every 1,000 Miles	
10	Check oil level in primary chaincase	31
	Every 2,000 Miles	
9	Check oil level in transmission case (gearbox)	34
	Lubricate prop stand (oil).	
1	Lubricate rear chain	32
3	Lubricate contact breaker cam	21
3	Lubricate auto-advance mechanism	21
12	Grease brake pedal pivot	
4	Oil exposed cables and control rod joints.	
14	Grease clutch cable	8
6	Grease speedometer drive	35
	Every 4,000 Miles	
9	Drain and refill transmission case (gearbox) ...	34
10	Drain and refill primary chaincase	31
2	Drain and refill the oil tank	17
2	Clean oil tank and crankcase filters	17
	Examine pump ball valve	18
11	Lubricate front brake cam spindles (one or two according to model	38
5	Grease rear brake cam spindle	38
	Every 10,000 Miles	
13	Drain and refill front forks	39
	Clean and re-pack wheel bearings with grease	35

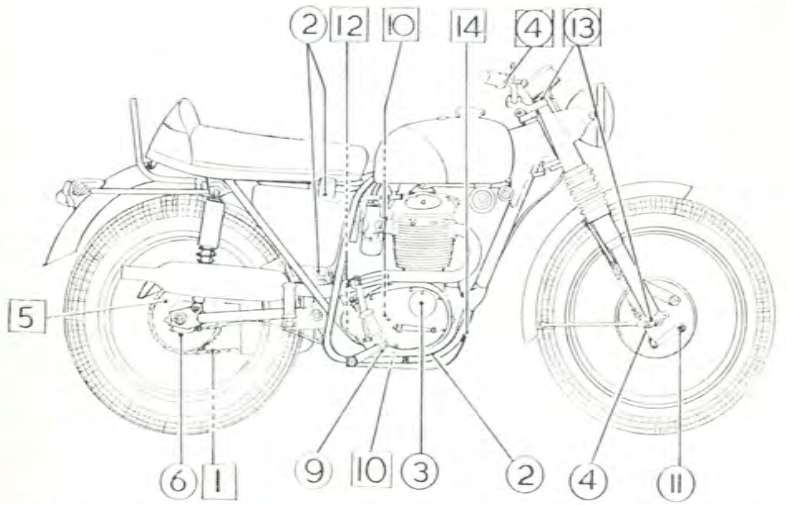

FIG. 18. Lubrication diagram. (The *Victor Special* is shown, but lubricating points for other models are similar).

The numbers in circles refer to the right side of the machine and numbers in squares refer to the left side.

Recommended Motor Oils for U.S.A.

B.S.A. motor oil is specially blended in U.S.A. for B.S.A. motorcycles and whenever this oil is available its use is to be preferred.

Where this oil is not obtainable, the following excellent brands of lubricants are recommended for use both in Summer and in Winter.

Suitable lubricants are also given for other parts of the machine.

ALTERNATIVE RECOMMENDED LUBRICANTS

	OILS			GREASE
Brand	Motor	Transmission (Gearbox)	Forks, Chaincase	
Shell	Super Motor Oil 100	Spirax 90 E.P.	Super Motor Oil 101	Retinax A
Mobil	Super	Mobilube GX.90	Super	Mobilgrease M.P. or Special
Castrol	GTX or XL	Hypoy 90 E.P.	Castrolite	Castrolease L.M.
Esso	Motor Oil 20W/50	Gear Oil 90 E.P.	Motor Oil 10W/30	Multi-purpose H
Regent	Havoline 20W/50	Multi-Gear 90 E.P.	Havoline 10W/30	Marfak All Purpose
B.P. Energol	Visco-Static 20W/50	Gear Oil 90 E.P.	Visco-Static 10W/40	Energrease L2

The chart gives recommendations for conditions in temperate countries. In countries where the climatic conditions are extreme, some alteration may be necessary bearing in mind that the higher the temperature, the higher is the S.A.E. number required.

It is always advisable to make sure that the oil is warm before driving the motor hard.

When taking part in competitive events advantage should be taken of any warming-up period to get the motor warm and the oil circulated.

Primary Chain

Unit construction allows the use of fixed centers between clutch and motor sprockets, so that a pre-stretched endless chain of the Duplex type is fitted. A spring link connection is not provided.

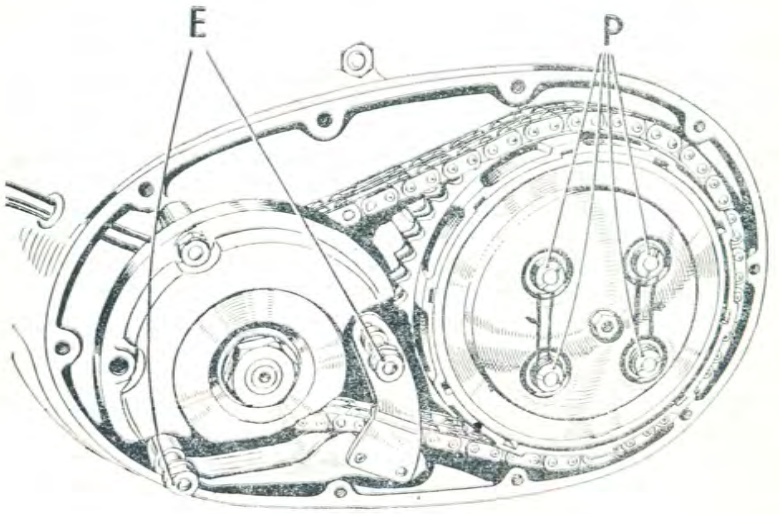

FIG. 19. The primary chain and clutch.

The only maintenance required is to ensure a satisfactory oil level in the chaincase (see following section).

An adjustable slipper-type tensioner is provided for the chain and its slackness can be tested after removal of the filler cap (*J*) Fig. 21. The chain is in correct adjustment when there is a minimum of $\frac{1}{8}$ in. and a maximum of $\frac{1}{4}$ in. of free play at the midway position between the sprockets.

Note:—**The motor must be stationary when making this check.**

When the two lower generator retaining nuts (*E*) Fig. 19 are slackened, the position of the slipper can be altered to give the correct tension.

After the adjustment is completed it is essential to make sure that the clearance between the alternator rotor (mounted on the motor shaft) and the stator poles is not less than .008 in.

Primary Chain Lubrication

There is a small oil supply from the primary chaincase through the non-adjustable metered feed on to the rear chain, so that the oil level can be expected to fall very slowly. The screw (*M*) Fig. 21, which is painted red determines the oil level. To replenish with oil, first

remove this screw and then the filler cap (*J*) at the top of the chaincase. Add oil of the correct grade (see Recommended Lubricants, page 30) and allow to stand until any surplus oil has drained away. Replace the level screw and inspection cap. The machine should be on horizontal ground when this operation is carried out.

A drain plug is provided at (*N*) for draining the case at regular intervals, see page 29.

Rear Chain Lubrication

Lubrication is provided by a chain oiler from the rear of the primary chaincase, which provides a metered supply of lubricant, and should keep the chain in good condition. **This supply is dependent on correct maintenance of the oil level in the primary chaincase** (see page 31). If maximum life is to be achieved, however, periodically remove the chain and wash it thoroughly in gasoline to remove all dirt and grease. Allow the chain to dry completely then immerse it in a tray containing warm graphited grease. When replacing the chain make sure that the spring clip of the connecting link has its closed end pointing in the direction of the chain (i.e., forwards on the top run).

Rear Chain Adjustment

The rear chain must be adjusted when the wheel is at the lowest point in the suspension. Set the machine on its stand or, in the case of the *Special* models place a box or similar article beneath the crankcase to raise the wheel clear of the ground. Rotate the wheel slowly

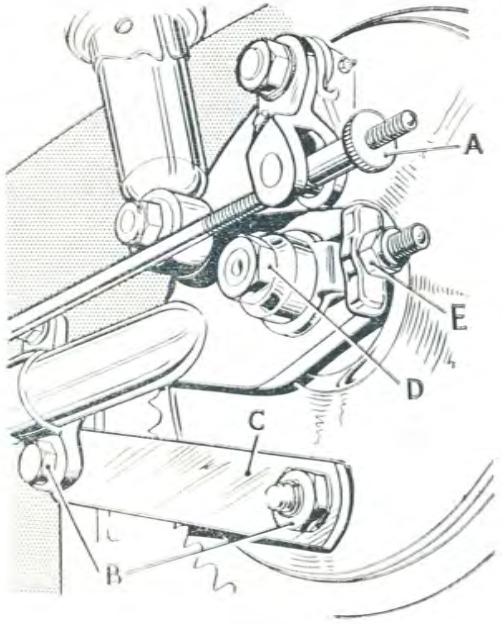

FIG. 20.
Rear chain adjustment.

until the tightest point on the chain is found, then check its up and down movement in the center of the chain run. The total movement should be $1\frac{1}{8}$ in. and if it varies from this setting, then the chain must be adjusted by moving the rear wheel, usually in a rearward direction.

First slacken the nuts (*B*) Fig. 20, at both ends of the link (*C*) (Fig. 20) and then the brake rod adjuster (*A*). Loosen the spindle head on the right side of the machine by one or two turns, followed by a similar action to the spindle nut (*D*) on the left side.

Draw bolt chain adjusters are used at both ends of the spindle and their nuts (*E*) Fig. 20, must be tightened by the same amount on each side until the chain slackness conforms to the figure given above. Retighten the left spindle nut first and then the main spindle head on the right-hand side. Tighten the link nuts and then adjust the brake in accordance with the instructions on page 35.

The chain can be considered due for replacement when the wear exceeds $\frac{1}{4}$ in. per foot of chain length, i.e. for a chain of $\frac{5}{8}$ in. pitch, the limit for 16 pitches would be 10-7/32 ins. (10 ins. when new). NOTE:-One pitch is the distance between two roller centres.

Clutch Control Adjustment

The main adjustment consists of a screw pin (*F*) and locknut (*G*) mounted on the clutch pressure plate. These are accessible after removal of the inspection cover (*H*) Fig. 21.

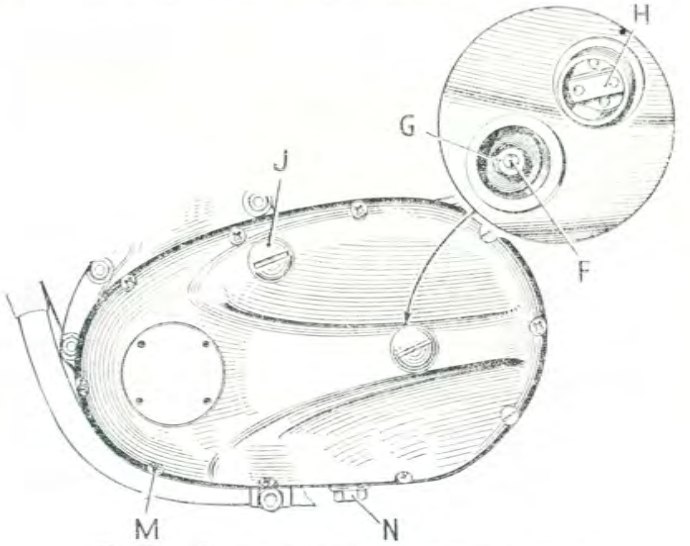

FIG. 21. Clutch adjustment and chaincase oil level.

If adjustment is necessary, slacken off the handlebar cable adjuster (*A*) Fig. 22, and release the cable from the control lever above the timing cover on the right-hand side of the motor. Release locknut (*G*) Fig. 21, and adjust the pin (*F*) until the control lever is inclined outwards by a small amount. Add a short length of tubing to the lever to provide additional leverage and disengage the clutch, when

the lever should take up a position approximately parallel with the timing cover joint face. If necessary the adjustment must be modified until this condition is obtained.

Finally reconnect the cable to the control lever and re-adjust the cable length at the handlebar lever until there is about $\frac{1}{16}$ in. of free-play at the handlebar (see Fig. 22).

There must always be a small amount of play at the lever, otherwise the clutch will slip, with consequent rapid wear of the plates.

The clutch cable can readily be detached or replaced if the handlebar adjustment is first slackened off to its fullest extent and the control arm rotated inwards, when the cable ends can be removed from their sockets.

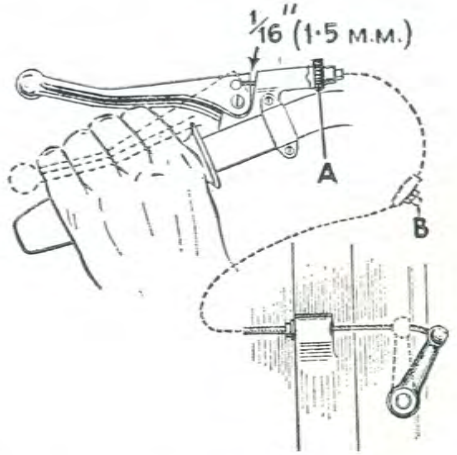

FIG. 22.
Setting the clutch operating lever.

Clutch Spring Pressure

Whenever the clutch has been dismantled, the spring pressure must be reset carefully. The four retaining nuts (*P*) Fig. 19, should be screwed in until the underside of the head of each nut is approximately $\frac{1}{16}$ in. from the face of a spring cup. The figure is an arbitrary one and it is a simple matter to vary it according to circumstances. If the springs are compressed excessively, the handlebar lever will be stiff to operate and tiring to the hand; alternatively, if the spring pressure is insufficient, the clutch will tend to slip.

Adjust for true running of the plates by declutching and then operating the starter pedal, when it will be seen whether the spring pressure plate rotates truly or not. If necessary, adjust the nuts individually until true running is obtained.

TRANSMISSION (GEARBOX)

Apart from topping-up at regular intervals, very little maintenance should be required. The filler plug carries a dipstick (*D*) Fig. 23, and the oil level should be maintained at the mark on the stick.

To drain the oil, which should preferably be undertaken while the oil is warm after a run, unscrew the drain plug (*E*) Fig. 23, below the case. When replacing, make sure that the sealing ring is in good

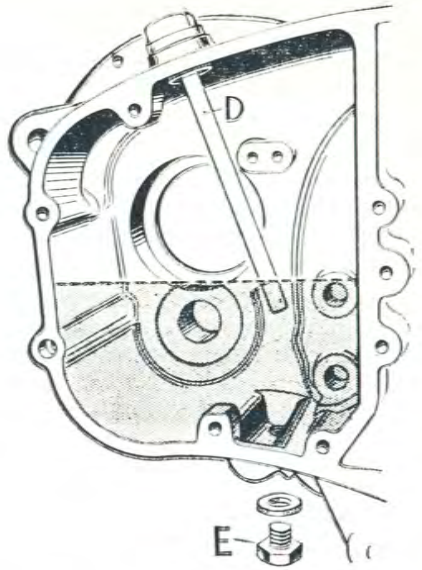

FIG. 23.
The transmission (gearbox) drain plug and oil level.

condition otherwise there may be a leakage of oil. The capacity of the gearbox is approximately $\frac{5}{8}$ U.S. pint ($\frac{1}{2}$ British pint), and suitable oils are detailed on page 30.

WHEELS

Tires

At weekly intervals and always before setting out on a long journey, the inflation pressures should be checked carefully. Under-inflation will not only seriously affect the life of the tire, but will also affect the steering of the machine.

Correct pressures are given under Technical Data, page 5.

Bearings

Both wheels are fitted with ball journal bearings which do not require adjustment. The bearings are packed with grease during assembly and no further greasing is required until the hubs are dismantled for maintenance at the specified intervals, see page 29. Details of this operation are given in the Workshop Manual.

Speedometer Gearbox

The unit requires no attention apart from lubrication at intervals (see page 29). Grease with two applications from a **hand grease gun only.**

Brake Adjustment

The brakes should always be kept at maximum efficiency and for this to be maintained, the shoes should be just clear of the drum when

the brake is off, and close enough for immediate contact when the brake is applied. The brakes must not be adjusted so closely however, that they are continually in contact with the drum, otherwise excessive heat may be generated, resulting in deterioration of braking efficiency.

Rear Brake

The rear brake is adjusted by turning the self-locking sleeve (*A*) (Fig. 20), in a clockwise direction (viewed from the rear of the machine) to shorten the effective length of the brake rod, and open the shoes in the drum.

Front Brake *(Shooting Star and Starfire)*

A two leading-shoe brake is used in the front wheel and the shoes are correctly set before leaving the factory. It should not be necessary to adjust the coupling rod (*C*) Fig. 26, until such time as the shoes are replaced. Details of this operation are given in the Workshop Manual.

The main adjuster is incorporated in the brake cable (Fig. 28). Slacken the locknut (*H*) and unscrew the adjuster (*G*) as required, afterwards locking nut (*H*) securely. A finger adjuster is provided at the handlebar lever.

Victor Special

The cable adjuster is situated at the cable abutment (*F*) on the brake plate (Fig. 25). First slacken the ring locknut on the adjuster sleeve, make the required adjustment and retighten the ring nut against the face of the abutment. Additional finger adjustment is provided at the handlebar lever (Fig. 1).

Front Wheel Removal and Replacement *(Victor Special)*

To remove the front wheel first disconnect the brake cable by withdrawing it from the slotted clevis (*E*) Fig. 25, and then unscrewing it from the abutment (*F*). Remove the torque arm nut (*C*), slacken nuts (*D*), and release the pinch bolt (*A*) Fig. 24. Insert a stout tommybar through the hole (*B*) Fig. 24, at the head of the wheel spindle and unscrew it from the hub. Note that it has a left-hand thread and unscrews by turning in a clockwise direction. Support the wheel as the spindle is withdrawn, and when it is clear, the

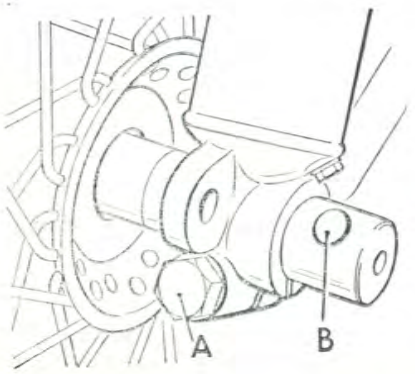

FIG. 24.
Removing the front wheel (*Victor Special*).

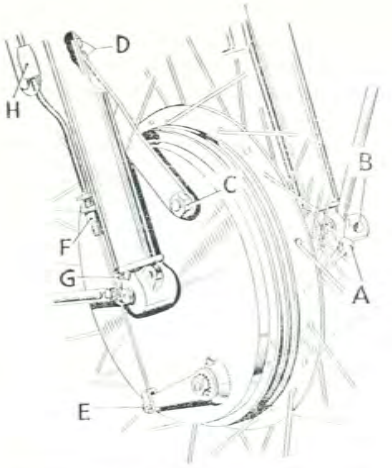

FIG. 25.
The front wheel assembly (*Victor Special*).

wheel can be pulled away from the offside fork leg and removed from the machine.

After removal do not allow the wheel to fall on to the bush which projects from the brake drum side of the hub. Although the bush is pressed in, it may, if subjected to a sharp blow, be forced back into the hub. If this should happen, the bush can be retrieved and re-positioned with the aid of the wheel spindle.

When replacing the wheel it is most important that after the spindle has been tightened and before the pinch bolt is locked up, the forks are depressed once or twice to enable the left side fork end to position itself on the spindle. If this precaution is not observed, the fork leg may be clipped out of position and will not function correctly.

Front Wheel Removal and Replacement *(Shooting Star and Starfire)*

Place the motor-cycle on its center stand. Slacken the brake cable at its handlebar adjuster and uncouple the cable from the brake by

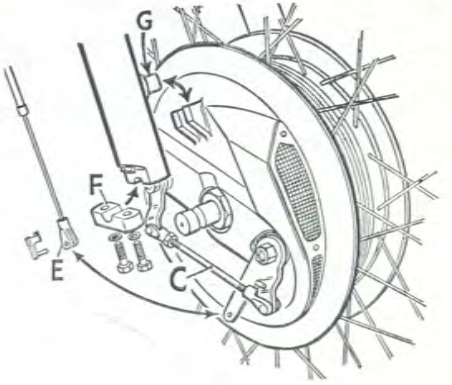

FIG. 26.
Removing the front wheel.
(*Shooting Star and Starfire*)

removing the spring clip from the clevis (*E*) Fig. 26, on the brake lever.

Remove the fork leg end caps (*F*) and as the bolts are removed, support the wheel in order to avoid damage either to the bolts or to their threads.

Lower the wheel to the ground and when the brake plate is clear of the tongue (*G*) Fig. 26, on the fork leg, the wheel can be removed.

When replacing the wheel, first engage the brake plate slot with the fork leg tongue and then raise the wheel spindle into position in the forks. Replace the caps (*F*) and insert the bolts, locating these in the grooves in the wheel spindle. Tighten the bolts equally on each side, finally tightening securely in position.

Rear Brake Cam Spindle Lubrication

One stroke of a hand grease gun is all that is required at intervals of 2,000 miles.

Front Brake Cam Spindle Lubrication (2)

One stroke of a hand grease gun is all that is required at intervals of 2,000 miles. The *Victor Special* has one brake cam only.

Rear Wheel Removal and Replacement

Removal of the rear wheel does not affect the chain or brake adjustment. Disconnect the speedometer driving cable at the hub and unscrew the spindle (*D*) Fig. 27, from the right-hand side. It has a normal right-hand thread, and therefore unscrews in a counter-clock direction. It is also drilled to accept a tommybar to facilitate withdrawal. The spacing sleeve (*E*) between the speedometer drive and the fork end can then be removed and the wheel pulled away from the brake drum and withdrawn from the machine. When detaching

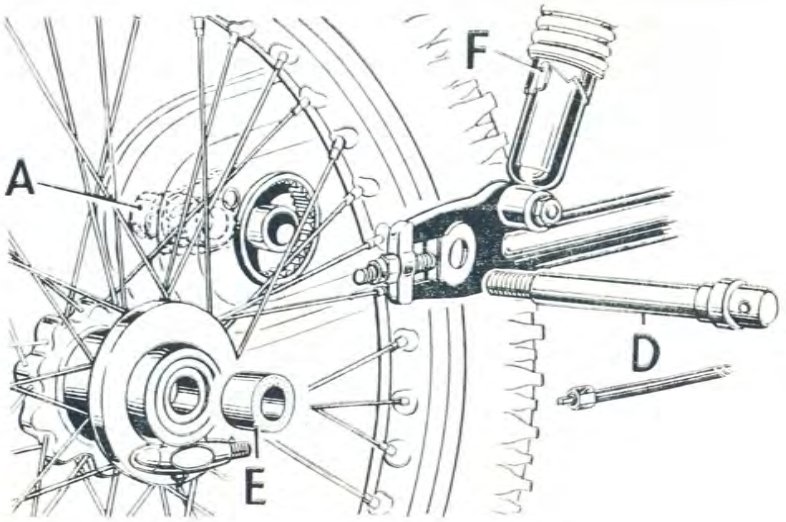

FIG. 27. Removal of the rear wheel.

the rear wheel it is unnecessary to touch the hexagon nut (*A*) on the left-hand side, as this retains the brake drum assembly in position.

Take care not to disturb the setting of the chain adjusters while the wheel is out of the frame and when replacing the wheel make certain that the adjusters are pressed firmly against the end of the forks.

Wheel Alignment

It is advisable to check the wheel alignment whenever the rear chain is adjusted, perferably by means of a long straight-edge placed along the sides of the wheels, but it must be remembered that the edge must clear the stand and suit the difference in tire sizes between front and rear wheels. Apply the straight-edge at a point as much above ground level as possible and keep in a horizontal position. With the front wheel set straight ahead, the straight-edge should touch both wheels at two points.

Wheel Balancing

As soon as the machine is broken-in and the initial stiffness has been eliminated, check that the wheels are still in balance.

A wheel is in balance when, if it is turned gently and released, it shows no tendency to stop in any particular position.

If the wheel always stops in the same position, it is unbalanced and weights must be added to the appropriate spokes until the correct balance is obtained.

When balancing the rear wheel, disconnect the chain and remove from the wheel sprocket.

Important:—When replacing the connecting link, make sure that the closed end of the 'hairpin' spring clip is pointing in the direction of travel of the chain (i.e., forwards on the top run).

SUSPENSION AND STEERING

Front Forks

The only servicing which the front forks require is renewal of the oil.

Unscrew the nuts (*A*) Fig. 28, and the drain plugs in the lower end of the fork sliding members as shown at (*B*). Allow all the oil to drain out, then standing astride the machine, apply the front brake and depress the forks a few times to drive out any oil remaining in the system.

Replace the drain plugs, raise the cap nuts (*A*) a few inches and pour 2/5 U.S. pint (⅓ British pint) of oil into each leg. Replace the top nuts and tighten firmly.

Recommended oils are given on page 30.

Steering Head Adjustment

The steering head should be tested occasionally for play and to ensure that the forks rotate freely. Support the crankcase on a box so that the front wheel is clear of the ground, then grasp the front fork legs and attempt to push them backwards and forwards. If any play is detected the steering head must be adjusted.

Slacken the clamping nuts (*C*) and (*E*) Fig. 28, then tighten down the cap nut (*D*) below the handlebars until the adjustment is correct. Hold the handlebars lightly and move them round slowly. The steering must be free, and the forks must rotate smoothly. If the movement is 'lumpy' it is a sign that the adjustment is too tight or that the ballraces are damaged. When the adjustment is correct, tighten the clamping nuts (*C*) and (*E*). The latter clamp the fork shafts and must be quite tight.

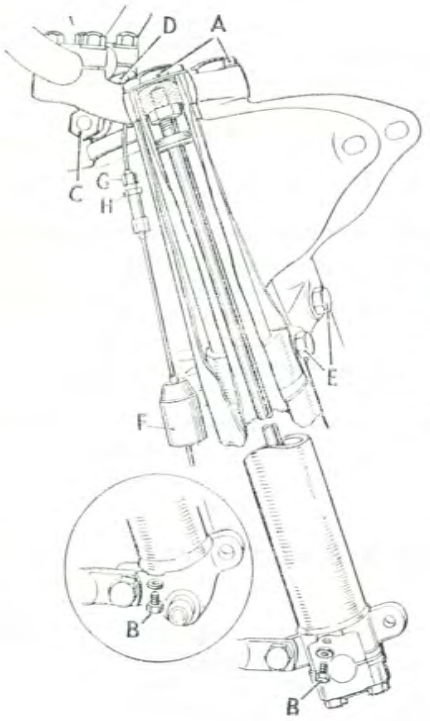

FIG. 28.
Front fork and steering head.
(The encircled fork leg shows the *Victor Special* models)

The mid-cable brake adjuster does not apply to the *Victor Special* models

Rear Suspension

The swinging fork is pivoted on a bonded-rubber type bush and no adjustment or lubrication is required.

The two suspension units comprise a compression coil spring with a hydraulic damper unit.

Static loading on the springs can be varied by a three-position cam ring adjuster (Fig. 29).

Position (*A*) is for the lightest loading, position (*B*) for medium loads, and position (*C*) for heavy loads.

A special wrench is provided in the toolkit for this adjustment and the cams on both units must be set on the same positions to ensure balanced loading.

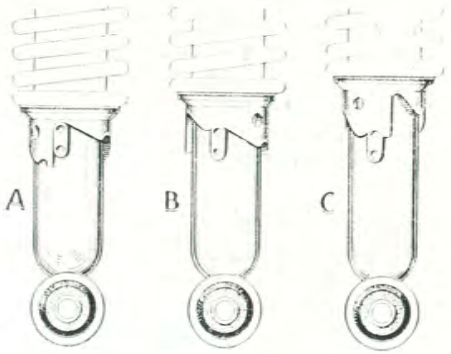

FIG. 29.
Adjustment of the rear suspension springs.

The hydraulic dampers require no attention whatever. They are sealed during manufacture, and if they suffer damage or become inefficient they must be replaced.

THE ELECTRICAL EQUIPMENT

Description

Electrical energy in the form of rectified alternating current passes through the battery from the Lucas A.C. lighting/ignition unit, which comprises a 6-pole alternator and rectifier. The rectifier converts the alternating current output of the alternator to unidirectional current which is essential for battery charging.

Alternator

Except for an occasional inspection of the snap connectors in the output cables (these connectors must be clean and tight) the alternator requires no maintenance.

Ignition Coil

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

Condenser

This is mounted on the frame in front of the battery. It does not require any attention other than ensuring that its connection is clean and tight.

Rectifier

The nuts clamping the rectifier plates together must not under any circumstances be slackened, as the pressure has been carefully set during manufacture to give correct rectifier performance. A separate nut is used to secure the rectifier to the frame of the motor-cycle.

Battery—Topping-up

The battery becomes accessible following removal of the left side panel. Two batteries are used on the *Fleet Star*, each of 6 volts.

At weekly intervals (see Routine Maintenance, page 13), and more frequently in warm climates, check the electrolyte level in the battery cells; if necessary, add distilled water to maintain the level indicated by the line. Do not add the water while the battery is on charge (either on or off the machine), nor use naked lights when examining the conditions of the cells.

Battery—Maintaining Condition

Never leave the battery in a discharged condition. If the motor-cycle is to be out of use for any length of time, have the battery fully charged, and every two weeks give it a short refreshing charge at .7 ampere to prevent any tendency for the plates to become permanently sulphated.

The A.C. lighting/ignition unit has been designed for positive (+) earth systems. If the battery connections are reversed the equipment will be damaged, and it is therefore most important that, whenever the battery leads are being attached, the **positive (+) lead must be connected to the frame.**

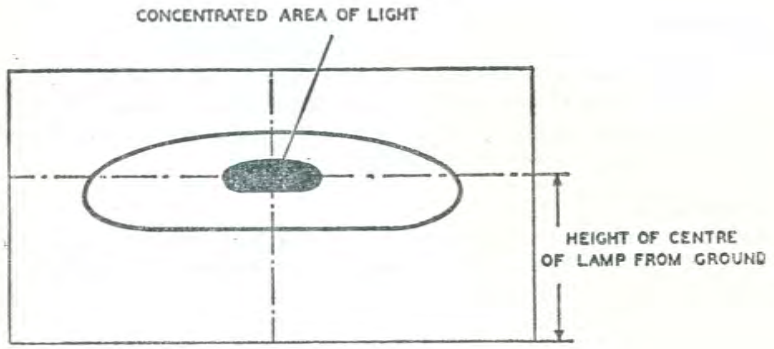

FIG. 30. Headlight beam setting pattern.

Zener-Diode

If at any time the zener-diode is disturbed it is important to note that its fixing nut must not be subjected to a tightening torque of more than 28 lb. in. or less than 24 lb. in. In addition, its seating face must be flat and free from burrs. This unit is mounted on a finned casting below the steering head.

Contact Breaker Unit

The contact breaker points must always be kept free from grease or oil, and the gaps checked at intervals. It is also advisable to check the gaps after the first 500 miles (see page 20).

Lighting Equipment—Headlamp Beam Setting

When the motor-cycle carries its normal load the headlamp driving beam should be projected straight ahead and parallel with the road surface.

Note:—This instruction may require amendment to suit the lighting regulations of individual countries.

When checking setting:—

(a) Front of motor-cycle to be square with screen;

(b) Motor-cycle to be carrying normal load and standing on level ground.

(c) Recommended distance for setting is at least 25 feet.

To make an adjustment slacken the screws securing the headlight and move it until the correct setting is obtained. Finally, retighten the securing screws.

With Lucas pre-focus bulbs fitted in these lamps, the filament is correctly positioned during manufacture in relation to the focal point of the reflector. No further focusing is necessary.

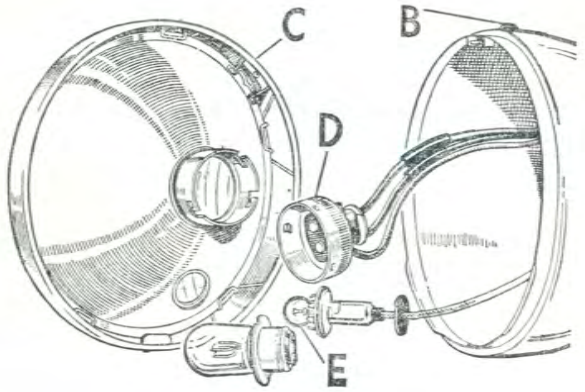

FIG. 31. Headlight dismantled for bulb removal.

Bulb Replacement—Headlight

To gain access to the headlight bulb slacken the front rim retaining screw (*B*) situated at the top of the body (Fig. 31). Disengage and withdraw the front rim and light unit assembly (*C*) removing the upper edge first. Press the adapter (*D*) inwards and turn it to the left. Lift off the adapter and withdraw the defective bulb. After fitting the replacement bulb, reverse the above procedure to reassemble the lamp. The bulbs are of the pre-focus type and are 12 volt, 50/40 watt.

Headlight Main Beam Warning Light

The bulb holder is accessible from within the headlamp shell. Withdraw the holder and to remove the bulb depress and turn. Use a 12 volt, 2 watt bulb.

Parking Light

Disengage and withdraw the front rim and light unit assembly. The parking light bulb holder and bulb (*E*) Fig. 31, can then be withdrawn from the reflector in which it is a push-fit. Use a 12 volt, 6 watt bulb.

Stop-tail Light

Access to the bulb is gained by slackening the two lens retaining screws. When fitting the replacement bulb note that the securing pins are offset to ensure correct insertion into the bulb holder. Use a 12 volt, 5/21 watt bulb.

Wiring Diagram

A diagram of the electrical circuits appears on pages 45 and 46. The insulation of the wires is individually colored and these colors are indicated on the diagrams.

Cable Harness

Connections within the headlamp shell are of the snap connector type and they should be examined occasionally to make sure that they are firmly joined.

CAPACITOR EQUIPMENT

(To order, *Special* only)

Provision is made for the fitting of a capacitor which enables the engine to be run with or without a battery. Hence, for use in competitive events, the rider can remove the battery if he so desires.

A capacitor is also suitable for emergency operation in case of battery failure, since engine can be started without the battery and run as normal, with full use of the standard lighting.

Running without the Battery

Before running the engine with the battery disconnected, it is essential that the battery (—) lead is bound up with insulating tape to prevent short-circuiting by contact with the frame of the machine, otherwise the capacitor will be ruined.

Note:—When a capacitor is fitted, periodically check that it is serviceable by disconnecting the battery, when the engine should continue to run in the normal manner with full lighting also available.

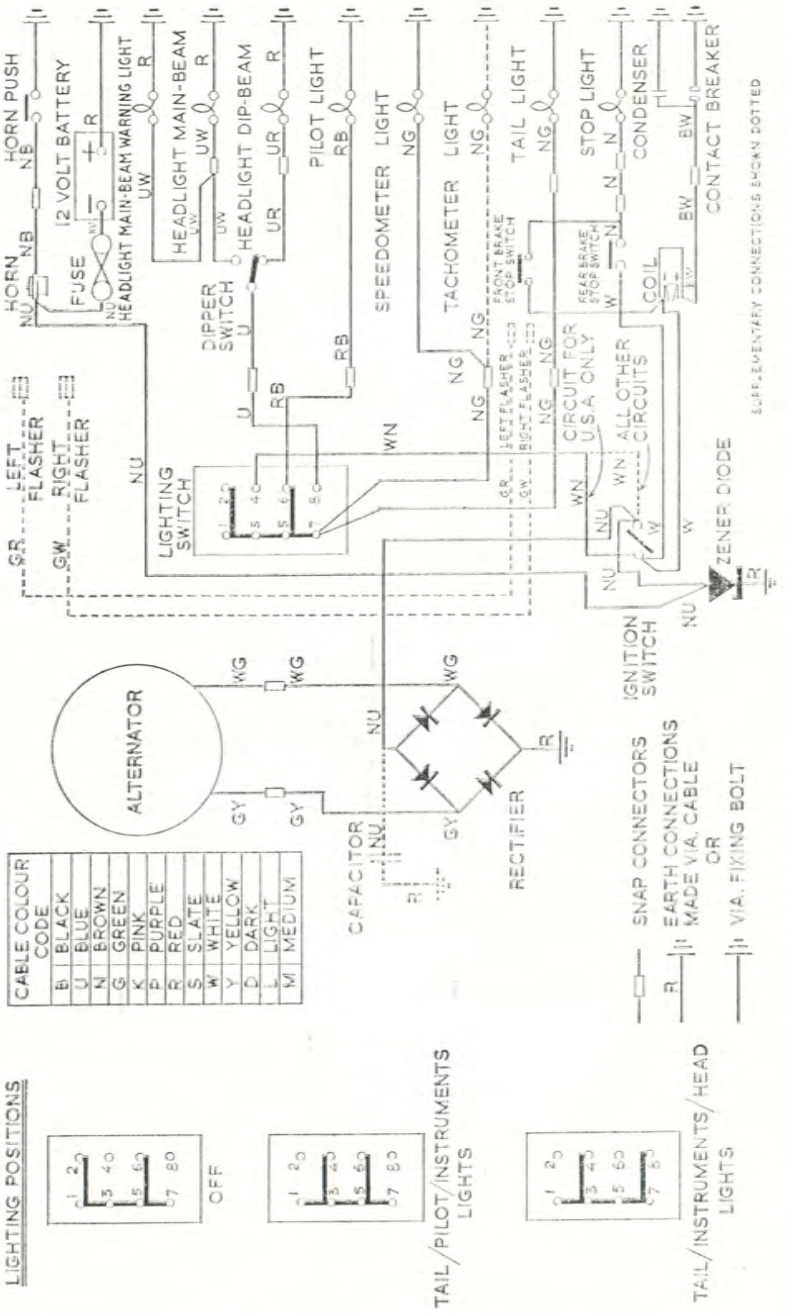

FIG. 32. Wiring diagram (*Special*).

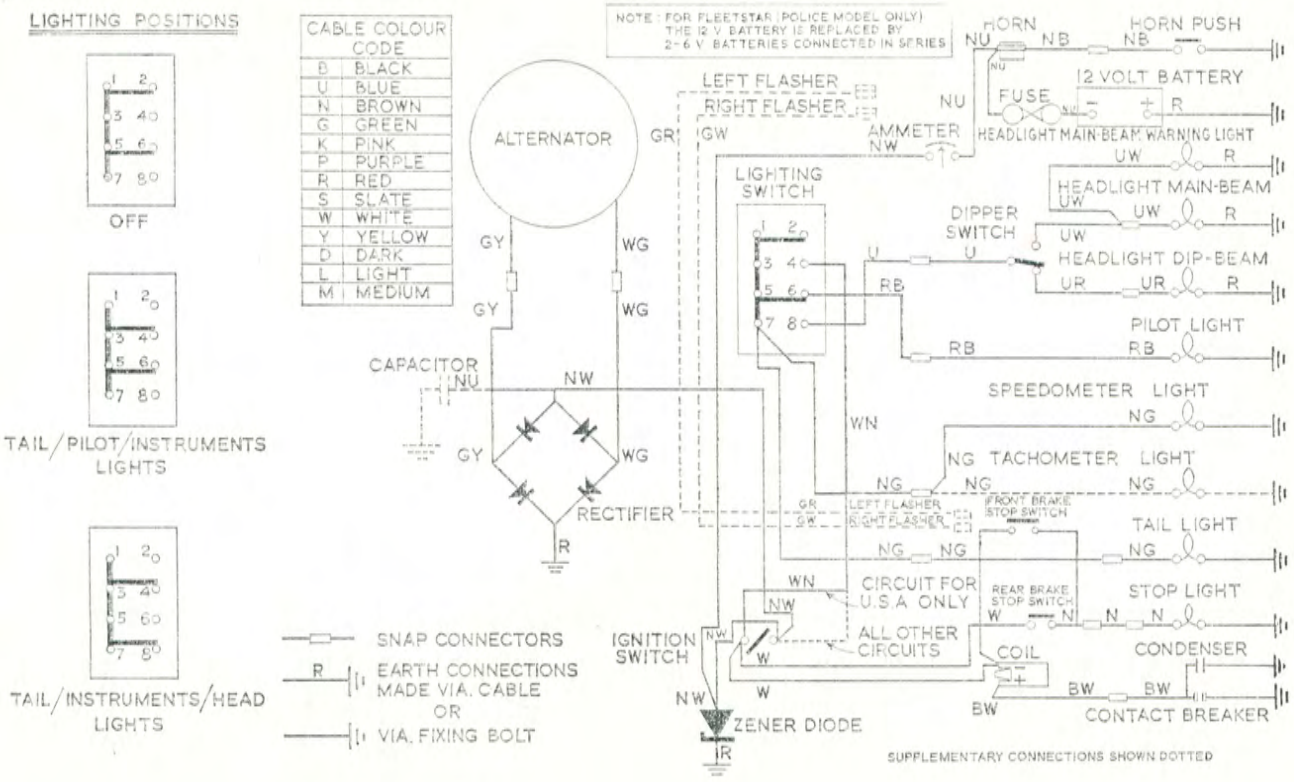

FIG. 33. Wiring diagram (*Shooting Star and Starfire*).