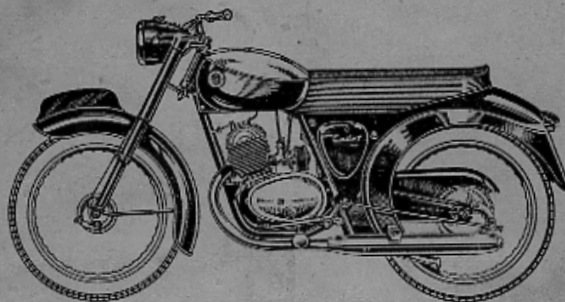


JAMES

INSTRUCTION BOOK

1960/61/62 MODEL LI5A

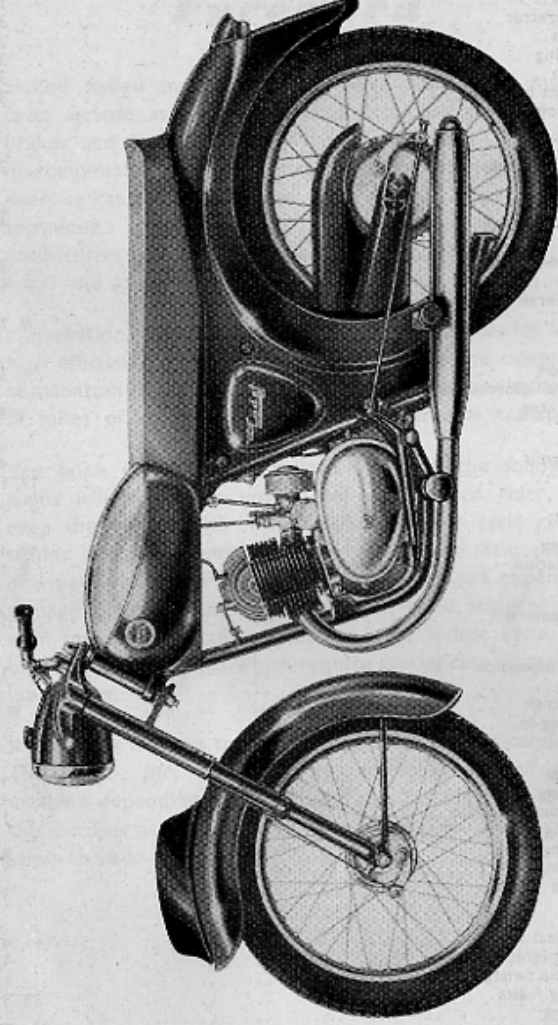
***FLYING
CADET 150***



MANUFACTURERS:

**JAMES MOTOR CYCLES LTD
GREET, BIRMINGHAM 11**

PRICE: 3/-



L15A FLYING CADET 150

INDEX

Brakes	17
Bulbs	40, 41
Cables	11
Carburetter	35
Chains	20
Cleaning	37
Clutch	30
Contact breaker	33
Controls	6
Decarbonising	28
Engine	23
Flywheel magneto	32
Frame	16
Free Service Scheme	4
Fuel	9, 10
Gearbox	34
General Information	4
Guarantee	47
Headlamp	40
Hubs	17, 18
Law	5
Lighting	40, 41
Lubrication	9, 10
Maintenance	11
Rear suspension	15
Riding	7
Road craft	8, 9
Running-in	8
Silencer	43
Sparkling plug	42
Speedometer drive	19
Starting	7
Steering stem	14
Stopping	7
Spokes	19
Technical data	44, 45
Timing ignition	33
Throttle twistgrip	14
Tracing faults	38, 39
Training	9
Tyres	19
Wheels	17
Wiring diagram	40, 41

Foreword

Skilled design and construction have made your motor cycle as safe as possible. It has first-class steering and brakes and is very easy to handle in traffic. The very manoeuvrability of your machine makes it necessary to exercise caution at all times. Take a pride in your riding technique: your example of courteous, careful and unobtrusive riding will materially contribute to road safety and to the reputation of a fine sport.

In operation, your machine is as simple as it is possible for a high efficiency motor cycle to be and only the minimum of attention is necessary for it to give you many thousands of miles of reliable and economical personal transport.

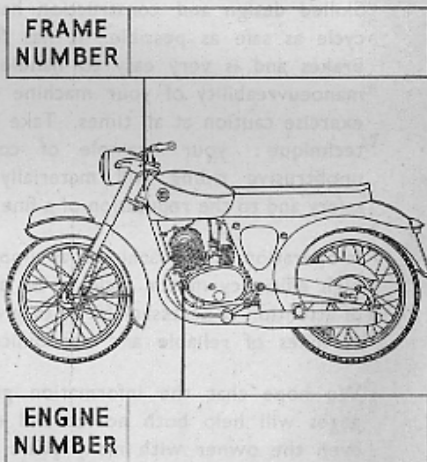
We hope that the information given in the following pages will help both novice and experienced rider, for even the owner with many years of motor cycle riding behind him may commit errors in the care and maintenance of a new machine which may cause serious and expensive damage. The purpose of this booklet is to acquaint you with important details concerning your motor cycle and to indicate those parts which require special care or regular lubrication.

It is in your interest to observe these instructions carefully. The service life, driving safety, and reliability of your machine depend on the care you give it. Please consider this booklet as a guide destined to bring you quickly and safely to your destination.

General Information

FRAME AND ENGINE NUMBERS.

Your motor cycle is stamped with frame and engine numbers and it is in your interests to record these numbers in the spaces below. The numbers allow identification of the machine and must be quoted in any correspondence relating to your motor cycle.



FRAME NUMBER : On the left-hand side of the steering head tube.

ENGINE NUMBER : On top of crankcase front engine lug.

RECORD YOUR FRAME AND ENGINE NUMBERS HERE FOR REFERENCE

FREE SERVICE SCHEME. (UNITED KINGDOM).

All owners of **NEW MODELS** are entitled to one **FREE SERVICE AND INSPECTION** at 500 miles, or, at latest, three months after taking delivery.

This service is arranged by the supplying dealer to whom the **Free Service Card** must be handed. This voucher will be found in the tool box upon taking delivery of a new motor cycle.

The **INSPECTION AND SERVICE** consists of :

- (a) Check, and, if necessary, adjust :
- | | |
|-----------------------------|--------------------------------|
| (1) Contact breaker points. | (6) Brakes. |
| (2) Sparking plug. | (7) Forks and rear suspension. |
| (3) Clutch. | (8) Alignment of wheels. |
| (4) Chains. | (9) Tyre pressures. |
| (5) Wheel bearings. | |
- (b) Tighten all external nuts and bolts, including cylinder bolts.
(c) Check all lighting equipment.
(d) Clean out carburettor and adjust mixture.
(e) Adjust and lubricate all cables.
(f) Grease all nipples.
(g) Check oil level in primary chaincase.
(h) Top-up gear box.
(i) Test machine on the road.

NOTE :—Oils, greases and materials used are chargeable to the customer.

THE MACHINE AND THE LAW. (UNITED KINGDOM).

Every motor cycle used on the public roads of Great Britain must be registered and carry the registration numbers and licence disc allotted to it. The dealer from whom the machine is bought will generally attend to all matters legally essential before it is used on the public roads.

TO REGISTER A NEW MACHINE

Send the Local Motor Tax Department the following :

- Form "RF1/2," duly completed.
- The certificate of insurance.
- The invoice you received from your dealer when you purchased the machine
- The appropriate registration fee.

In due course you will receive :

- A Registration Book. (Commonly called the "log" book).
- A Licence Disc.
- Your Insurance Certificate.
- Your Invoice.

The Registration Book and the Licence Disc will bear the registration numbers that have been allotted to your machine and will also show the date the road licence expires. Your number plates must then be painted, in white upon a black background, with the registration numbers in characters of even thickness as follows :

The numbers on the front plate must be $1\frac{3}{4}$ " high, $1\frac{1}{4}$ " wide and $\frac{5}{16}$ " thick with spaces of $\frac{1}{2}$ " between each two characters.

The numbers on the rear plate must be $2\frac{1}{2}$ " high, $1\frac{3}{4}$ " wide and $\frac{3}{8}$ " thick with spaces $\frac{1}{2}$ " between each two characters.

The Licence Disc must be enclosed in a watertight container, having a glass front, and this must be fixed to the machine in a conspicuous position, near the front and on the left-hand side.

Although it is not legally necessary to carry your Driving Licence, Insurance Certificate and Registration Book while driving your machine, it should be noted that Police Officers have authority to ask for the Driving Licence and Insurance Certificates at any time.

SPEEDOMETER.

A speedometer **MUST** be fitted to all motor cycles over 100 cc. It is supplied as standard equipment on your machine.

LAMPS.

During the official "**LIGHTING UP**" hours the machine must exhibit a white light facing forwards and a red light facing rearwards. The rear number plate must be adequately illuminated by a white light.

Each electric light bulb **MUST** be marked with its "Wattage." (Beware of cheap, imported bulbs, that do not have this marking.)

All motor cycles made by us have electric equipment which complies with the law regarding position, size of bulbs, marking on bulbs and the correct illumination of the rear number plate.

REFLECTOR.

All solo motor cycles **MUST** display a reflector on the rear mudguard as well as a tail light. Reflectors should be $1\frac{1}{2}$ " in diameter mounted so that the reflecting surface faces squarely to the rear at a height between 15" and 42" from the ground. The Wico-Pacy tail light incorporates a reflector surface which complies with British traffic regulations.

Controls

FILLER CAP. On top of fuel tank.

FUEL TAP. On left under tank. Pull knob to turn fuel ON. Push in to turn fuel OFF. Always push knob to Off position when stopping for any length of time.

AIR CONTROL LEVER. Fitted on top of carburettor body. Depress and turn until engaged in down position to enrich mixture for starting. Use in conjunction with tickler.

TICKLER. Small knob on carburettor body. Depress until petrol appears on carburettor body, to provide rich mixture for starting.

THROTTLE TWIST GRIP. On right handlebar. Controls speed of engine. Twist towards rider to open. Away from rider to close.

KICK STARTER. Vertical lever with folding crank on right of gearbox. Use to start engine.

CLUTCH LEVER. On left handlebar. Pull towards handlebar to release engine drive from rear wheel. Use when moving away from rest and also when changing gear. Always ease the clutch in gently.

GEAR CHANGE PEDAL. Horizontal lever in front of right-hand foot-rest. Move UP to select a lower gear. Move DOWN to select a higher gear. Neutral is between First (Bottom) and Second gear.

The pedal will always return to the same position and the foot should be removed from lever between each gear change. Use the clutch lever when changing gears.

FRONT BRAKE LEVER. On right handlebar. Grip to operate front brake. Apply in conjunction with rear brake for maximum braking efficiency.

REAR BRAKE PEDAL. In front of L/H footrest. Press down to operate rear brake.

LIGHTING SWITCH. (Direct lighting set and Rectifier/Battery lighting set). In top of headlamp. Switch has three positions :

L	Pilot and rear lamps lit (with battery fitted).
OFF	No lamps in use.
H	Head, rear and speedo lamps lit.

DIPSWITCH AND HORN BUTTON. On left handlebar.

MAJOR REPAIRS

The contents of this booklet are intended to give the owner a working knowledge of his machine and to enable him to carry out normal adjustments, maintenance and simple repairs. Where major repairs are concerned, we strongly advise the amateur mechanic to leave well alone and entrust difficult jobs, should they ever arise, to a qualified mechanic. Splitting the crankcase halves, for instance, is a very difficult matter and demands great skill and care, while years of experience are needed to replace a big end assembly and true the shafts. Our Repairs Department is fully equipped and major repairs carry a full three months' guarantee. With these facilities at the disposal of owners, we feel that it will repay our customers not to attempt too much but to keep within the limits outlined in this book.

Riding

FUEL. When the machine first comes into the hands of the rider it will be ready, but for fuel, for the road. For full instructions on fuel and lubrication please refer to pages 9 and 10.

PLEASE NOTE : A small reserve of fuel, sufficient to cover 3 to 5 miles, is provided. If it is necessary to use it, incline the machine to the left.

STARTING. See that there is sufficient fuel in the tank.

Ensure gear lever is in NEUTRAL by rolling machine slightly forwards and backwards. (Neutral is between bottom and second gear).

Pull fuel tap to ON position.

Press down the plunger on top of the carburettor body and depress tickler until fuel appears.

Open twist grip about a quarter of its travel.

Standing over machine, depress kickstarter with a steady swinging movement.

When engine starts do not forget to release the plunger on top of carburettor as soon as possible.

Re-starting when the engine is warm will require no flooding of the carburettor, neither will it be necessary to depress the air control plunger.

FAILURE TO START. Commonly caused by over flooding carburettor. If repeated kicks fail to start after flooding (when cold) shut off the fuel supply, open throttle wide and clear crankcase of excessive fuel by turning the engine over rapidly with the kick starter pedal until it fires. Then do not close throttle but keep wide open until engine revolutions have built up and running is normal.

ERRORS IN STARTING. Mistakes often made whilst starting a motor cycle are :-

Opening throttle too wide, thus destroying the advantage of a rich mixture.

Failure to lean the machine slightly to the left, so that pressing of the foot on the kick-starter causes rider and machine to overbalance.

Tickling the carburettor insufficiently. This operation must produce a head of fuel on the top of the carburettor body.

These faults are easily corrected with care and will result in greatly improved starting.

ON THE ROAD. Having started and warmed up the engine and sitting astride the machine, disengage the clutch and engage low gear by moving gear pedal upwards with toe. Next, release the clutch lever slowly and as the machine starts to move forward, open the throttle gently to enable the engine to take up the load. Increase speed gradually and when well under way, disengage the clutch, close the throttle a little and select second gear by pressing the pedal down. Change into top gear at approximately 20 m.p.h. The gear change foot pedal must be moved to the full extent of its travel when selecting a gear.

The change from a high gear to a lower gear is made in a similar manner. A little practice will probably be necessary in order to change gear with ease and certainty, with all movements correctly synchronised, but the gears are very easy to manipulate and will present little difficulty. The gear change mechanism on a new machine is generally a little stiff and will ease considerably when the machine has been run-in.

STOPPING. Before slowing down glance to the rear to ascertain what vehicles are following and if necessary give the signal "I am going to slow down." (Full details of road signals will be found in The Highway Code available from H.M. Stationery Office).

When slowing down, change into a lower gear. The engine will thus assist the wheel brakes. As speed decreases to a few m.p.h., raise the clutch and select neutral, applying the brakes for the last few yards before stopping. When stopping (except in emergencies) apply the brakes gently and gradually. When the machine is to be left standing for any length of time, it is advisable to turn off the fuel supply.

RIDING IN TRAFFIC. In slow moving traffic engage lower gears. This permits the engine to run smoothly and enables overtaking to be accomplished in the minimum of time. The engine must never be allowed to labour, and the judicious selection of the right gear will prolong the life of the engine and the transmission system. Slipping the clutch should be avoided. Whenever in doubt about overtaking, always hang back.

RUNNING-IN. The manner in which a new motor cycle is driven during the first 1000 miles (1600 kms.) can make or mar its eventual performance and useful life, and owners are therefore strongly advised to exercise great care during the vital "running-in" period.

Two-stroke engines are quickly run in, owing to their simple and efficient design. However, here, as in everything else, treatment must follow the dictates of common sense, and not too much should be attempted on the first ride. Do not exceed one third throttle opening for the first 1,000 miles. Never let the engine labour on hills or in traffic, but change down to a lower gear so that the engine turns over lightly at all times.

After 1,000 miles greater throttle openings and short bursts of speed may be indulged in, but full throttle runnings over long periods should always be avoided. During the running-in period many other parts "bed down" and all nuts should be checked with a spanner for tightness after 200 miles. Check also the contact breaker and spark plug gaps, chain, and brake adjustments.

Road Craft

Take a pride in your riding technique: there are, unfortunately, a few motor cyclists whose reckless driving constitutes a menace, not only to themselves but to other road users. Your example of courteous, careful and unobtrusive riding will materially contribute to road safety and to the reputation of a fine sport.

One of the most important rules to remember is: before moving off, pulling out to overtake, turning right and turning left, glance over your shoulder to make sure it is safe to do so and if necessary give the correct signal.

If at first bottom gear will not engage whilst the machine is stationary, do not resort to force—simply raise the clutch and move the machine backwards and forwards for a second or two, then try again. In time this condition will disappear.

Take pride in making a smooth start; it is not clever or wise to race the engine and then let the clutch in suddenly to make a flying start. Make a smooth getaway after first glancing to the rear and signalling your intention.

Always drive on the engine and not on the brakes, thereby saving expense on brake linings. Remember that an engine in low gear is a safe and sure brake and that skidding is well-nigh impossible when using it so.

Change gear on hills **BEFORE** the engine has commenced to labour; a good driver will learn to anticipate such a condition, and change down early.

When changing gear move the lever to the full extent of its travel firmly and smoothly, at the same time as the clutch is disengaged.

Cornering. When approaching an uncertain bend at speed, change down if necessary and brake **BEFORE** entering the curve. On a left-hand bend, ease over near the crown of the road in order to sweep in close to the verge once round the corner. On a right-hand bend, always keep well into the verge. Never accelerate into a bend.

When using the brakes, apply gentle pressure at first, increasing in strength as the road speed decreases. Never brake hard unless the machine is vertical.

Use your full headlight when riding at night unless in brightly lit streets.

Make full use of the dipswitch whilst riding at night; this is a "courtesy control" and its use will be appreciated by oncoming drivers.

Always reduce speed when your visibility is lowered.

Many accidents are caused by rash over-taking. Be cautious, remembering that a small engine has not the acceleration of a larger machine. Every car driver has a blind spot in his mirror within which he cannot see you. Make sure that he knows you are there if you are over-taking. Similarly glance behind you before pulling out.

Remember that pedestrians, young or old, are the most likely to make unexpected changes in direction and speed, step off pavements, come from behind stationary vehicles or, in country districts, suddenly appear round the curve of a blind bend. Constant observation and anticipation is required to avoid them.

TRAINING FOR BEGINNERS.

Skill in motor cycling is not a gift. It has to be learnt and practised. Many clubs operate a scheme in co-operation with the R.A.C. and the A.C.U. for teaching young motor cyclists and beginners to become expert. For details apply to the Motor Cycle Department, Royal Automobile Club, 85 Pall Mall, London, S.W.1.

Lubrication

Oil is the life blood of a motor cycle and it is most important that the correct type and quantity be employed in order to reduce power losses and wear to a minimum.

ENGINE LUBRICATION — PETROIL SYSTEM. This method of engine lubrication is very simple and practically foolproof. Oil is mixed with the petrol and since the mixture enters both crankcase and cylinder, all working parts receive a constant and fresh film of oil. As the amount of fuel used increases with wider throttle openings, a greater quantity of oil is supplied under arduous conditions. The recommended mixture is given in the chart on page 10. The mixture should preferably be prepared and well stirred in a can before filling the tank, but if this is not practicable, close the fuel tap and pour oil in the tank before the petrol, then shake the machine to ensure thorough mixing. Certain oil companies provide special petroil dispensing pumps and these can be set to supply the correct mixture. Always use a recommended brand at the specified ratio.

USE OF ANTI-CORROSIVE OILS. When two stroke engines are used for short journey work exclusively, the temperature does not rise sufficiently to vaporise the corrosive products of combustion and it is then that in certain circumstances, condensation occurs which gives rise to subsequent corrosion. For this reason we strongly recommend the use of anti-corrosive oils, and those shown in the Shell, B.P., Wakefield and Mobil columns on page 10 have these properties.

GEARBOX AND CHAINCASE LUBRICATION. New machines are normally supplied with the correct grade and quantity of lubricant. It is, however, advisable to check oil levels before riding a new model.

The gearbox combined filler plug and dipstick is on top of the gearbox on the kick-starter side. To check oil level, remove dipstick and wipe it before checking that oil reaches the level notch with the dipstick resting on top of the case. The primary chaincase has a rubber filler and inspection plug at the side of the chaincase. The screw in the centre holds the primary case cover in position.

FRONT FORK — DAMPING AND LUBRICATING OIL. The oil level should be checked every 5,000 miles by removing the two oil level grub screws retaining the mudguard bridge clips. If necessary top up with an oil can. The need to drain and refill is unlikely to occur but details are given on page 12.

WHEEL AND STEERING HEAD BEARINGS LUBRICATION. These items are packed with grease when new. They should however, be examined from time to time and it is advisable to dismantle, clean out with paraffin and pack with fresh grease every 5,000 miles.

REAR CHAIN. If the rollers appear dry, oil with a brush and engine oil. Every 5,000 miles, remove and wash the chain in paraffin and soak in molten tallow or recommended grease.

CONTROL CABLES. Control cables should be well lubricated to ensure smooth and sensitive operation. Cables may be oiled by squirting oil along the exposed lengths of inner cable and operating the control levers, but the limited movement makes it difficult for the oil to run through the entire length. If cables become stiff it is best to remove them completely and adopt the following procedure: Suspend the cable vertically and arrange a small "cup" either as a small paper cone attached to the outer cable by cellulose tape or moulded in plasticine, leaving the end of the outer cable exposed within the "cup." The cone can then be filled with oil which will slowly seep down the entire length of the cable. Cables should be left suspended over-night before replacing.

Small lengths of exposed inner cable should be smeared with grease. After a considerable mileage, cables may get damaged and replacements can be purchased from official stockists. The following part numbers should be quoted:—

Throttle cable ..	005546	Clutch cable ..	005547
Front brake cable ..	003637	Speedometer cable	003993

MISCELLANEOUS PARTS. SAE 30 Grade Oil is suitable for all small parts, cables, controls, brake pivots, stand pivots, etc. We recommend that these items be attended

REVISED LIST OF RECOMMENDED LUBRICANTS

	SHELL	B.P.	WAKEFIELD	MOBIL
ENGINE Petrol/Oil Ratio 20 : 1 unless otherwise stated.	Shell 2T Mixture or Shell 2T Two Stroke Oil	B.P. Zoom or Energol Two Stroke Oil	Castrol Two Stroke Oil (16 : 1)	MobilMix TT (16 : 1)
GEARBOX and CHAINCASE	Shell X-100 30	Energol SAE 30	Castrol XL	Mobiloil A
REAR CHAIN	Shell Retinax A	Energol L2	Castrol Graphited	Mobilgrease MP
WHEEL HUBS and STEERING HEAD BEARINGS	Shell Retinax A	Energol L2	Castrol Heavy	Mobilgrease MP
OIL CAN and CYCLE PARTS	Shell X-100 30	Energol SAE 30	Castrol XL	Mobiloil A
FRONT FORK	Shell X-100 20/20W	Energol SAE 20W	Castrolite	Mobiloil Arctic

PLEASE NOTE : 16 : 1 ratio = ½ pint oil to 1 gallon petrol and 20 : 1 ratio = ¼ pint oil to 1 ½ gallons petrol.

Where two-stroke engine oil is not available please use SAE 30 Grade oils, recommended brands as above at ratio 20 to 1.

to every 1,000 miles but more frequent lubrication may be desirable in wet weather. Nuts and bolts should be smeared to prevent corrosion.

Avoid excessive use of oil on the control levers. It is likely to run along the levers and make them slippery and unpleasant to operate. If levers become loose at the pivot point, slackness can be taken up by tightening the pivot pin and locknut.

Maintenance

The efficiency and economy of your machine can only be preserved by careful and regular attention to adjustments and lubrication. Neglect will result in poor performance, rapid depreciation and unnecessary expense.

By adhering to the following simple maintenance plan and the correct lubricants, wear will be reduced to the minimum and maximum performance obtained.

EVERY WEEK.

Inspect tyres and check pressures.
Clean sparking plug.
Clean chrome and enamel parts.

EVERY MONTH.

On models with Rectifier-Battery lighting remove battery, and top up with distilled water. Wipe off any surplus before replacing.

AFTER THE FIRST 200 MILES.

Check and if necessary reset contact breaker point gap
Check all nuts and bolts for tightness.
Check adjustment of rear chain.
Check steering head bearings.
Check adjustment of brakes.

EVERY 500 MILES.

Inspect oil level in gearbox and primary chaincase. If necessary top up with correct grade of oil. See pages 9, 10, 45.

EVERY 1,000 MILES.

Check, adjust and oil control cables, levers and twistgrip.
Check adjustment of rear chain. If rollers appear dry, oil with brush. In winter lubricate more frequently. If chain has collected much dirt remove, clean and grease.
Check adjustment of steering head bearings.
Oil front and rear brake pivot points, centre stand, etc.
Clean and re-oil carburetter air filter.
Clean carburetter union filter gauze.
Check and adjust contact breaker and sparking plug gaps.
Clean out slots at rear of silencer.

EVERY 5,000 MILES.

Drain and refill chaincase and gearbox, whilst engine is warm. See pages 9, 10, 45.
Make thorough examination of lighting cables.
Check front fork hydraulic damping. Top up with an oil can through oil level holes if necessary.
Grease speedometer gearbox. Take care not to over-grease as excess lubricant may reach the brake linings. Lubricate speedometer cable.
Check and if necessary dismantle, steering head and wheel bearings. Clean and pack with fresh grease.
Lubricate contact breaker cam grease pad. See pages 32 and 33.

Front Fork

The telescopic fork consists of steering head and fork crown pressings to which are welded two stanchion tubes with fixed external phosphor bronze bushes, providing bearing surfaces for the sliding members.

Movement of each slider is controlled by a short tension spring encircling a $\frac{3}{8}$ " dia. rod positioned in the centre of the slider. The lower end of the rod locates in a hole in the centre of the fork end where it is secured by a transverse anchor bolt engaging in a slot on the rod.

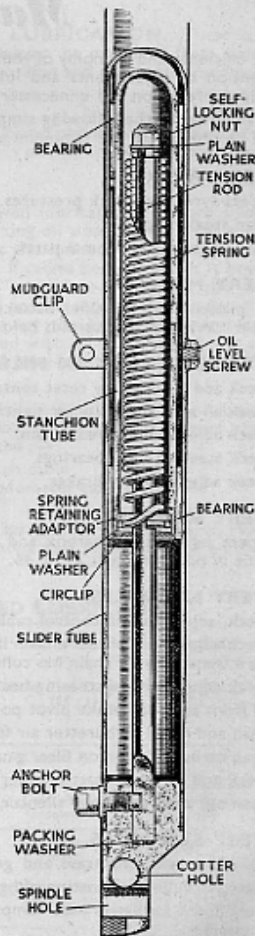
The top end of the spring is tapered and is retained on the rod shoulder by a washer and locknut. The lower coils of the spring are opened out to accept a slotted washer which bears against a shoulder in the stanchion tube and is held in position by a washer and circlip. Hence when the wheel and slider move upwards, the spring is extended in tension. Oil carried in the slider tube provides hydraulic damping on the compression stroke and also lubricates the sliding parts. As the fork is compressed, the slider moves up and oil cannot pass beyond the lower bushes. It is therefore forced through the annulus between the spring retaining washer and the rod, into the stanchion tube. A degree of rebound damping is obtained as a result of the partial vacuum which occurs as the fork re-assumes its static position. The capacity of each fork leg is 82.5 cc. of SAE 20 oil. Grub screws at the mudguard bridge brackets enable the oil level to be checked.

FRONT FORK MAINTENANCE. New machines are supplied with the correct grade and quantity of oil. If a leak is suspected, the oil level grub screws (retaining mudguard bridge clips) must be removed. If oil level has dropped, top up with a few squirts from an oil can. In normal use we recommend checking the oil level every 5,000 miles.

REMOVING FORK SLIDERS. Raise the machine on the centre stand and place a wooden box or similar means of support under the front of the engine loop tube. Disconnect front brake cable at brake cam lever. Remove brake cable abutment bolt (complete with adjuster and cable) and R.H. mudguard bridge clip bolt. Next slacken wheel spindle cotter bolts, tapping the heads to release cotters. Unscrew spindle nuts and remove front wheel. Unscrew cotter bolts and remove mudguard complete with stays and bridge.

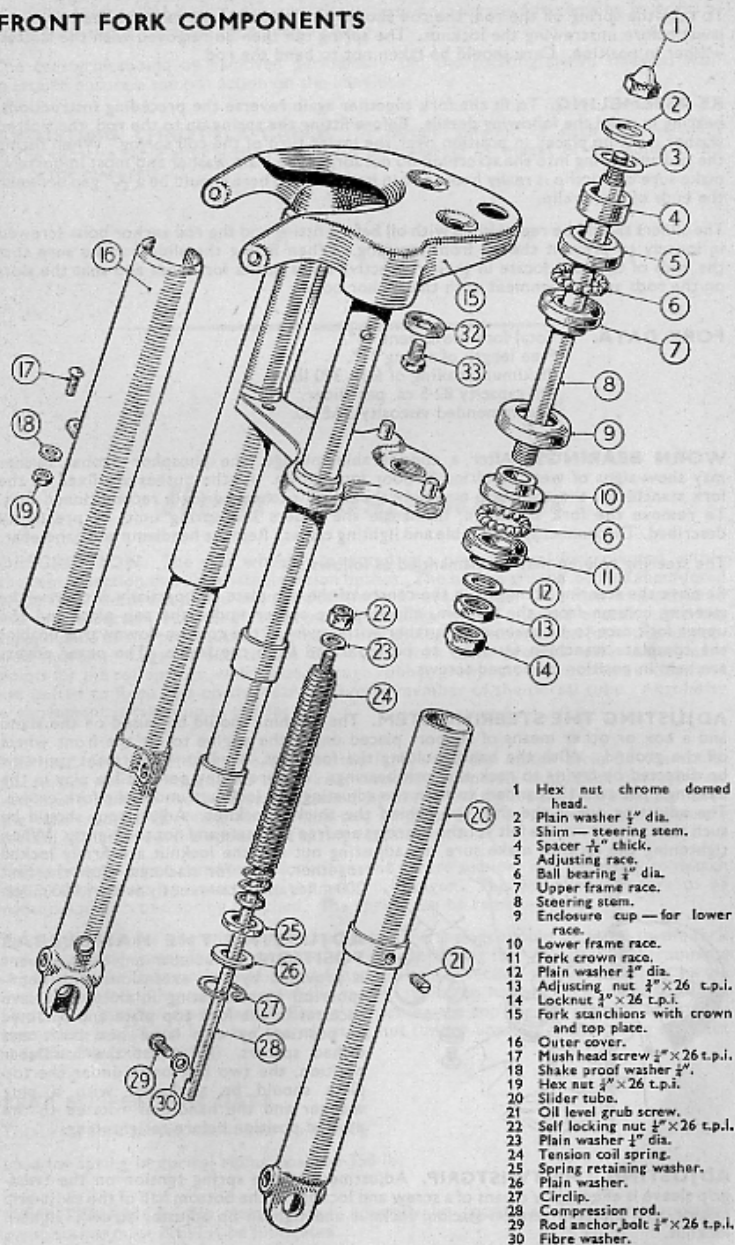
Slacken oil level grub screws two or three turns, then slacken the two rod anchor bolts at the bottom of the sliders, allowing the sliders to be pulled off the stanchion tubes and exposing the two rods.

DISMANTLING FORK RODS AND SPRINGS. Removal of the sliders will reveal the circlips inside the stanchion tube extremities. The circlips should be carefully detached with thin nosed pliers and the complete rod and spring unit withdrawn.



Drawing by "The Motorcycle," London

FRONT FORK COMPONENTS



- 1 Hex nut chrome domed head.
- 2 Plain washer $\frac{1}{2}$ " dia.
- 3 Shim — steering stem.
- 4 Spacer $\frac{1}{8}$ " thick.
- 5 Adjusting race.
- 6 Ball bearing $\frac{1}{2}$ " dia.
- 7 Upper frame race.
- 8 Steering stem.
- 9 Enclosure cup — for lower race.
- 10 Lower frame race.
- 11 Fork crown race.
- 12 Plain washer $\frac{3}{8}$ " dia.
- 13 Adjusting nut $\frac{1}{2}$ " x 26 t.p.i.
- 14 Locknut $\frac{1}{2}$ " x 26 t.p.i.
- 15 Fork stanchions with crown and top plate.
- 16 Outer cover.
- 17 Mushroom screw $\frac{1}{2}$ " x 26 t.p.i.
- 18 Shake proof washer $\frac{1}{2}$ ".
- 19 Hex nut $\frac{3}{8}$ " x 26 t.p.i.
- 20 Slider tube.
- 21 Oil level grub screw.
- 22 Self locking nut $\frac{1}{2}$ " x 26 t.p.i.
- 23 Plain washer $\frac{1}{2}$ " dia.
- 24 Tension coil spring.
- 25 Spring retaining washer.
- 26 Plain washer.
- 27 Circlip.
- 28 Compression rod.
- 29 Rod anchor bolt $\frac{1}{2}$ " x 26 t.p.i.
- 30 Fibre washer.

To take the spring off the rod, the rod should be clamped in a vice (with lead or wood jaws) before unscrewing the locknut. The spring can then be removed with the slotted washer in position. Care should be taken not to bend the rod.

RE-ASSEMBLING. To fit the fork together again reverse the preceding instructions, bearing in mind the following details. Before fitting the spring on to the rod, the slotted washer must be placed in position over the lower turn of the coil spring. When fitting the rod and spring into the stanchion do not forget the plain washer and most important, make sure the circlip is really home and in its groove. There should be a $\frac{5}{32}$ " gap between the ends of the circlip.

The sliders should be replenished with oil before fitting and the rod anchor bolts screwed in loosely to prevent the oil from escaping. When fitting the sliders make sure that the ends of the rods locate in their respective holes in the fork ends and that the slots on the rods are in alignment with the anchor bolts.

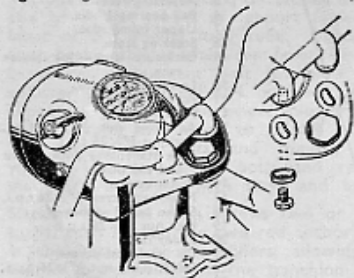
FORK DATA. Total fork movement $4\frac{1}{2}$ ".
Free length of spring 11".
Maximum loading of fork 300 lbs.
Oil capacity 82.5 cc. per slider.
Recommended viscosity SAE 20.

WORN BEARINGS. After a considerable mileage, the phosphor bronze bushes may show signs of wear resulting in poor fork action. As the bushes are fixed to the fork stanchions, the complete assembly should be exchanged for a reconditioned unit. To remove the fork stanchion, dismantle the sliders and spring units as previously described. Disconnect speedo cable and lighting cables. Remove headlamp and handlebar.

The steering column may be dismantled as follows:—

Remove the steering stem nut in the centre of the top plate and partially withdraw the steering column from the bottom, allowing the spacer under the top plate and the upper fork race to be taken off. Further withdrawal of the column downwards enables the complete stanchion assembly to be separated from the frame. The outer covers are held in position by domed screws.

ADJUSTING THE STEERING STEM. The machine should be raised on the stand and a box or other means of support placed under the engine to lift the front wheel off the ground. With the hands holding the fork legs, need for adjustment can now be detected by trying to rock the fork bearings. If there is any perceptible play in the bearings, use two 1" spanners to turn the adjusting and locknuts under the fork crown. The adjusting nut is the thin nut behind the thicker locknut. Adjustment should be such that no play may be felt yet the bearings are free to rotate and not too tightly. When tightening the locknut make sure the adjusting nut and the locknut are firmly locked together. Test for slackness after the first 200 miles and subsequently every 1,000 miles.



ADJUSTING THE HANDLEBAR POSITION. Handlebar angle adjustment is provided by two extensions with hemispherical bases locating in slotted concave recesses in the fork top plate and retained in position by two large hex bolts and dished spacers. To adjust the handlebar position, the two hex bolts under the top plate should be slackened with a plug spanner and the handlebar rotated to the desired position before retightening.

ADJUSTING THE TWISTGRIP. Adjustment of the spring tension on the twist-grip sleeve is effected by means of a screw and locknut in the bottom half of the twist-grip casting. To increase tension slacken locknut and tighten up adjuster screw: tighten locknut.

Adjustment should be such that the grip is easy to operate but remains in position when the hand is removed for signalling, etc.

The twistgrip should be removed periodically and the rotating sleeve smeared with grease to ensure a smooth action on the handlebar.

ADJUSTING THROTTLE CABLE. A certain amount of slack may develop in the throttle cable after a time; this can be taken up by means of the adjuster on top of the carburettor.

Rear Suspension

DESCRIPTION. The rear wheel is mounted in a pressed steel fork pivoted within the centre section on rubber-steel torsion bushes. The bushes are spaced by a shouldered pivot tube and pressed into the ends of the fork torque tube. The fork is attached to the centre section by two $\frac{1}{2}$ " bolts passing through the re-inforced pressing into the tapped ends of the pivot tube. Two barrel coil springs in compression form the suspension medium. Lugs welded to the top of the fork arms provide lower attachment points for the coil springs, which pass through rubber grommets in the centre section and are bolted to fixed lugs on the rear transverse member of the dorsal tube. Angularity of movement is taken up in the springs.

REPLACING SPRINGS. To remove the fork, raise the motor cycle on the stand, disconnect the rear chain and brake rod, slacken the spindle nuts, take out the rear wheel and remove the twin seat attached by six $\frac{1}{2}$ " bolts (2 either side and 2 inside the rear mudguard). Next remove the two $\frac{1}{2}$ " pivot bolts on the sides of the centre section and unscrew the uppermost spring retaining nuts.

Before attempting to remove the fork from the centre section, it is necessary to detach one of the springs by unscrewing the bottom hexagon. This will allow the fork to be withdrawn with one spring attached. The spring can be removed later.

To re-assemble the rear suspension, one of the new springs should be fitted to the fork and the second spring loosely attached to the upper fixing lug. With rubber grommets in position, the fork can be manipulated into the centre section to locate the first spring into its top fixing lug and to screw the second spring to its fork attachment lug. The pivot bolts can now be replaced. Before tightening the top spring retaining nuts make sure there is a $\frac{1}{8}$ " gap between the adjusting nut (under upper lug) and spring stud nut (nearest top coil of spring).

REAR SUSPENSION DATA.

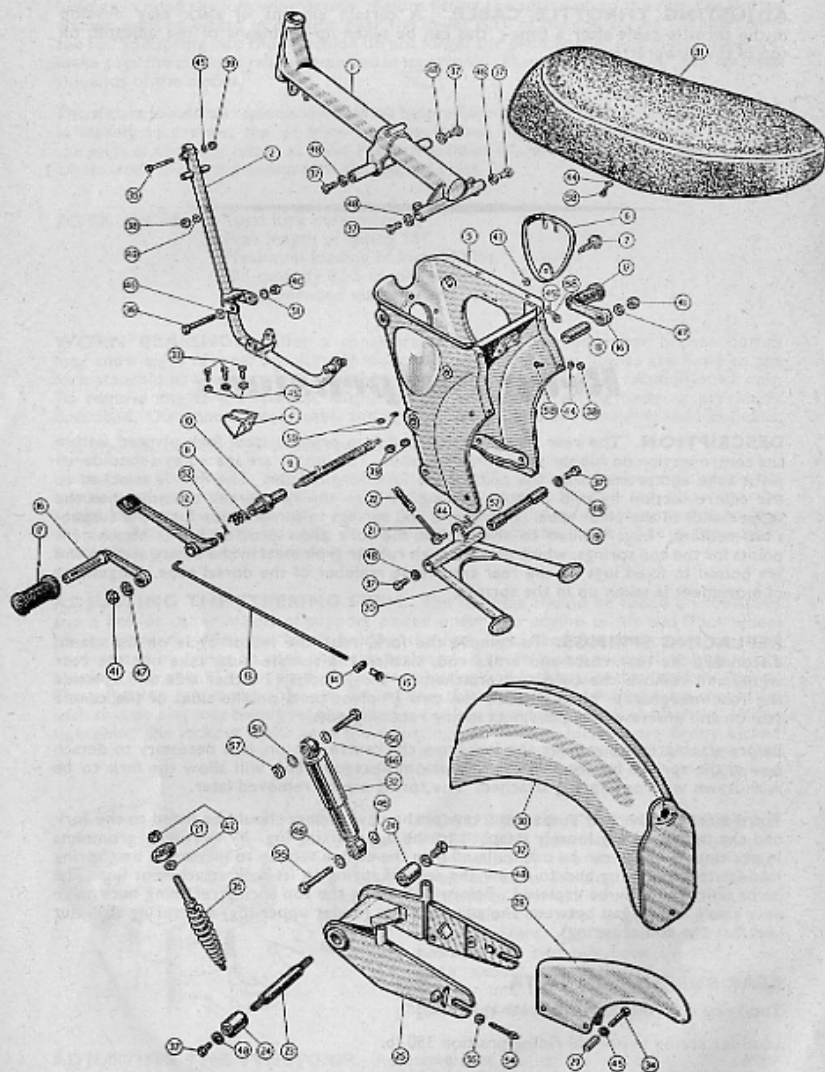
Total rear fork movement at rear spindle $3\frac{1}{2}$ ".

Load for spring in normal riding position 350 lb.

MAINTENANCE. No attention will normally be necessary. The rear suspension pivot bushes must NEVER be lubricated.

FRAME AND REAR SUSPENSION COMPONENTS.

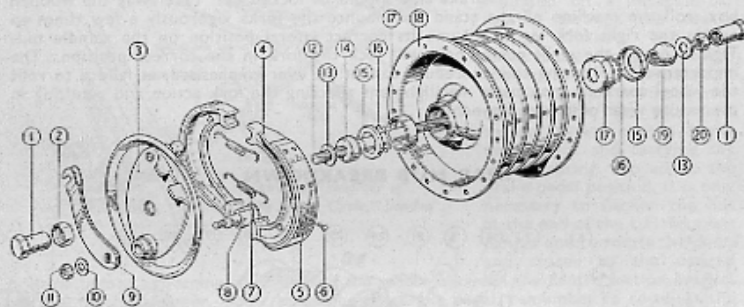
See key at foot of page 17.



Wheels and Brakes

HUBS AND BEARINGS. Both hubs are greased when new and no further lubrication will be required for several thousand miles. It is advisable to dismantle the hubs for examination of the bearings at approximately 5,000 miles. The old grease should be cleaned out with petrol or paraffin and the hubs packed with fresh grease before re-assembling. When dismantling and assembling the hubs refer to exploded drawings. If bearings or seals show any sign of wear, fit replacements. The need to exclude dirt from the bearings cannot be over emphasised.

FRONT HUB BREAKDOWN.



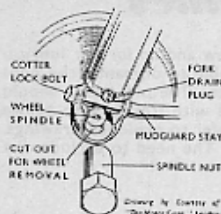
- | | | |
|---|---|--|
| 1 Spindle nut $\frac{1}{2}$ " x 26 t.p.i. | 8 Brake cam. | 14 Fixed cone. |
| 2 Recessed nut $\frac{1}{2}$ " x 26 x $\frac{1}{8}$ " | 9 Brake cam lever. | 15 Dust cap. |
| 3 Brake backplate. | 10 Brake cam special washer. | 16 Ball bearings $\frac{1}{2}$ ". |
| 4 Brake shoe. | 11 Hex nut $\frac{1}{2}$ " x 26 t.p.i. | 17 Bearing cup. |
| 5 Brake lining. | 12 Spindle. | 18 Hub shell and brake drum |
| 6 Brake rivet. | 13 Plain washer $\frac{1}{2}$ " x 16 s.w.g. | 19 Adjusting cone. |
| 7 Brake return spring. | | 20 Hex locknut $\frac{1}{2}$ " x 26 t.p.i. |

BRAKES. Brake cable or rod adjustment should be such that only a slight movement of the lever or pedal is sufficient to operate the brake, but at the same time, the wheels must spin freely when the brakes are off. To obtain the correct adjustment, screw up the adjuster until the liners are just fouling the drum, then slack off two complete turns. Do not forget to reset the brake rod adjustment after adjusting the rear chain. Never use oil to lubricate the bearings as it may easily spread to the brake lining surface and render the brakes ineffective.

ADJUSTING FRONT WHEEL BEARINGS. If play occurs in the front cup and cone bearings, take up as follows: Unscrew R.H. spindle nut and slacken the hex nut inside the fork end, next to the adjusting cone. Turn the adjusting cone clockwise until the wheel is free to rotate with no trace of lateral play and tighten the locknut. Great care must be taken to ensure the bearings are not adjusted too tightly. After adjusting the front wheel bearings, make sure the locknut is tightened hard against the adjusting cone. Always use two spanners for the job to prevent the locknut from rotating the adjusting cone when it is tightened. There are ten $\frac{1}{2}$ " balls each side (20 per wheel).

KEY TO MAIN FRAME COMPONENTS

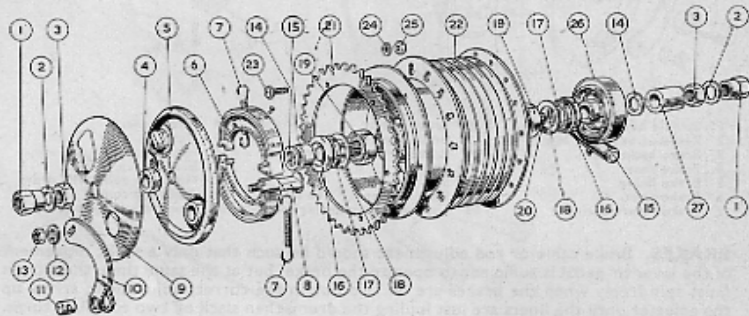
- | | | |
|---|---------------------------------|------------------------------------|
| 1 Frame dorsal tube. | 13 Brake rod. | 24 Rear suspension torsion bush. |
| 2 Engine loop tube. | 14 Brake lever roller. | 25 Rear suspension pivoting fork. |
| 4 Rear engine lug. | 15 Brake rod adjuster. | 26 Rear suspension coil spring. |
| 5 Centre section pressing. | 16 Footrest hanger. | 27 Rear suspension rubber grammet. |
| 6 Toolbox lid. | 17 Footrest rubber. | 28 Chainguard. |
| 7 Toolbox thumb screw. | 18 Footrest spacer, R.H. | 29 Chainguard spacer. |
| 9 Footrest brake pedal hex bar. | 19 Stand pivot tube. | 30 Mudguard and number plate. |
| 10 Brake pedal spring housing and spacer. | 20 Stand. | 31 Twinseat. |
| 11 Return spring. | 21 Stand operating rod. | 32 Damper unit (Extra). |
| 12 Brake pedal. | 22 Stand spring. | |
| | 23 Rear suspension torque tube. | |



REMOVING FRONT WHEEL. To remove the front wheel raise the machine on the stand and place a wooden box under the frame loop tube to raise the front wheel off the ground. Disconnect the front brake cable. Slacken the mudguard stay cotter bolts three or four turns and tap head firmly to release cotter before removing the spindle nuts. The wheel can then be removed through the spindle cut outs in the fork ends. When replacing the wheel make sure the brake back plate anchor slot engages over the locating stud on the left fork leg and replace spindle nuts loosely. Tighten the left (brake side) spindle nut first, then tighten the right side spindle nut, after which the cotter bolt on the brake side should be locked up. Take away the wooden

box, roll the machine off the stand and bounce the forks vigorously a few times to enable the right fork leg to assume its correct lateral position on the spindle nut. Tightening up the right cotter bolt will lock the fork in the correct position. The importance of following this procedure cannot be over-emphasised, as failure to refit the wheel correctly may cause malalignment affecting the fork action and resulting in premature wear of fork components.

REAR HUB BREAKDOWN.

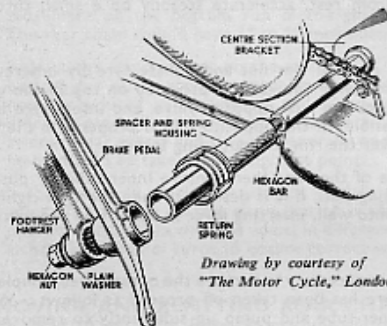


- | | |
|--|--|
| 1 Spindle nut $\frac{1}{2}$ " x 26 t.p.i. | 15 Spacer $\frac{1}{2}$ " thick. |
| 2 Plain washer $\frac{3}{8}$ " x 10 swg. | 16 Seal enclosure cup. |
| 3 Locknut $\frac{3}{8}$ " x $\frac{1}{2}$ " thick. | 17 Felt seal. |
| 4 Spacer $\frac{3}{8}$ " thick. | 18 Seal enclosure washer. |
| 5 Brake back plate. | 19 Journal bearing 42 x 15 x 13 mm. |
| 6 Brake shoe, lining and rivets. | 20 Spindle $\frac{3}{8}$ " dia. |
| 7 Return spring. | 21 Chain sprocket 46 teeth for .335" chain roller. |
| 8 Brake cam. | 22 Hub shell. |
| 9 Hub cover. | 23 Hex bolt $\frac{1}{2}$ " x 26 t.p.i. |
| 10 Brake cam lever. | 24 Shakeproof washer. |
| 11 Brake cam roller. | 25 Hex nut. |
| 12 Plain washer. | 26 Speedometer gearbox. |
| 13 Hex nut $\frac{3}{8}$ " x 26 t.p.i. | 27 Spacer $\frac{1}{2}$ " thick. |

REMOVING REAR WHEEL. Place machine on stand, disconnect chain, taking care not to let it trail on the ground, detach brake rod adjuster and speedo drive gland nut. Slacken both spindle nuts. The wheel can then be eased out. When replacing, make sure the back plate locking boss is engaged in its groove in the fork end. After replacing the rear wheel, remember to check: chain adjustment, rear brake adjustment and wheel alignment.

CHECKING WHEEL ALIGNMENT. It is wise to always check wheel alignment after removal. The simplest way is to use a thin piece of string stretched taut across both wheels with the front wheel pointing straight ahead. The string should just touch each tyre at both sides of the wheel centres.

An alternative method is to use a perfectly straight board placed alongside the wheels so that it touches each one. If necessary turn the handlebar so that the front wheel touches the board at two points. If both tyres do not make contact at two points, slacken the rear wheel spindle nuts and turn adjusters until wheel is correctly aligned.



ADJUSTING FOOTRESTS AND REAR BRAKE PEDAL.

The footrests are mounted on a hexagon bar passing through the centre section bracket. Serrations in the footrest hangers provide the method of adjustment. Tubular spacers are fitted over the hexagon bar, the L.H. spacer serving as the brake pedal pivot and carrying the return spring. To adjust the brake pedal position, it is only necessary to slacken the nut at the end of the L.H. footrest hanger and to rotate the pedal and spacer to the desired

position before tightening, thus locking the spacer between the centre section bracket and the footrest hanger. After re-setting the brake pedal, remember to re-adjust the rear brake rod by means of the knurled adjuster.

SPEEDOMETER DRIVE. If the speedometer drive has been removed do not forget to replace the distance piece behind it as if the engaging projections on the speedo drive are tight in the locations on the hub, the speedo drive will be damaged. Every 5,000 remove the set screw in speedometer gearbox and insert small quantity of grease.

The speedometer cable has a knurled nut at the front where it joins the speedometer head and a hexagon to connect it to the rear wheel speedometer gearbox. The cable should be removed every 5,000 miles and lubricated to ensure complete freedom of movement for the inner driving cable. The speedometer head does not require any lubrication and should never be interfered with.

REPLACEMENT SPOKES. Spoke breakages rarely occur, but if foreign touring is envisaged it is a good plan to carry a few spare spokes. It is possible to replace a spoke without removing the tyre, but there is always a danger of the spoke protruding beyond the nipple into the well of the wheel and puncturing the rim tape and inner tube. We therefore advise owners to remove the tyre and have spokes fitted by a motor cycle repairer, who will grind off any surplus length. If fitted by the owner, the spokes should be filed or ground off flush with the end of the nipple in the well of the rim.

Size of Spokes : front $6\frac{3}{8}$ " x 12 swg. (N.S.)
front 7" x 12 swg. (O.S.) — nipples .250" x 12 swg.
rear $6\frac{3}{8}$ " x 10 swg. — nipples .250" x 10 swg.

TYRES. To obtain the greatest mileage from your tyres and for the sake of your personal safety, the tyre pressures should be maintained at the recommended levels and checked once a week. Most garages have free air lines with pressure gauges, but a good pocket gauge will prove a useful investment.

When checking pressures, examine the outer covers and remove odd gravel chips wedged in the treads.

RECOMMENDED TYRE PRESSURES : Front 16 lbs. Rear 20 lbs.

If a passenger is carried the rear tyre pressure should be increased to 28 — 30 lbs.

The following hints will also assist in prolonging the life of the tyres :

Clean oil and grease from the tyres with petrol as soon as possible.

Ensure correct alignment of the wheels.

Cross tramlines at as near a right-angle as possible. They are dangerous, particularly in wet weather and may damage the tread.

Fierce braking and acceleration quickly wear away the tread. Apply brakes gently to avoid skidding, and when starting from rest, accelerate steadily on a small throttle opening.

TYRE REMOVAL. Remove valve cap and rim nut and deflate tyre by unscrewing the inner valve. A small key for unscrewing the valve is provided on top of the valve cap. Push outer-cover right into wheel rim well opposite valve, and insert tyre lever under cover as near the valve as possible. If the opposite side is properly in the well the edge of the cover should come over the rim without using force.

Work until the cover is off one side of the rim, then remove inner-tube by pushing valve up through hole and gently easing out. If it is desired to take the tyre right off, proceed in the same way — pushing into well, inserting lever in other side and working off.

TYRE REPLACEMENT. It is seldom necessary to remove the outer-cover completely with normal punctures, but if the tyre has been taken off proceed as follows : Work one side of tyre over rim, insert inner-tube and pump up sufficiently to remove any kinks ; place valve in hole and screw the securing nut about $\frac{1}{4}$ " up the valve shaft. The white spot on the side of outer-cover should be positioned over the valve.

Move free edge of cover over rim opposite valve and work round rim, ensuring that inner tube is not pinched, equally on either side of valve until a few inches remain free. The valve should be in the centre of this free length and no difficulty should be experienced in getting it over the edge of rim providing the rest of the cover is right down in the well.

Once tyre is home, inflate to about half pressure and manipulate cover until tread runs evenly ; when rotation of the wheel has shown this to be so, inflate to correct pressure. Do not forget to replace the valve cap. This keeps the petrol or dirt out.

When fitting new tyres it is a good plan to smear a little soft soap or petrol around the rim to ease the cover on.

Chains

A chain is an assembly of links with rollers connected together by outer link plates and held together by rivets. If it is kept clean, adequately lubricated and correctly adjusted a chain will give little trouble and will wear out long before breaking point is reached. The front chain is fully enclosed in an oil bath and consequently wear will be negligible over a long period. The rear chain, being exposed and more heavily loaded is more likely to give trouble through neglect and should be regularly checked for tension and frequently lubricated.

REAR CHAIN ROLLER. Fitted just behind the rear brake pedal to prevent chain rattle. Does not affect rear chain adjustment.

ADJUSTING THE REAR CHAIN. Correct rear chain adjustment is particularly important on motor cycles with pivoted fork rear suspension as movement of the rear wheel causes variations in the sprocket centres with resultant changes in chain tension.

The rear chain should be adjusted after the first 200 miles and subsequently every 1,000 miles. Adjustment is obtained by moving the rear wheel forwards or backwards in the slotted fork ends which are fitted with adjusting bolts and locknuts to enable the wheel spindle to be set in the desired position. Since the rear chain tightens under load, correct chain adjustment must be maintained if the maximum useful life is to be obtained from the chain, sprockets and bearings.

To check and adjust rear chain tension, proceed as follows :

1. Raise the unladen machine on the stand and measure the amount of up and down movement on the bottom run of the chain midway between sprocket centres. The rear chain should have $\frac{3}{8}$ " to 1" movement in this static position.
2. Retract the stand and sit on the machine. If there is no-one to help you, feel the bottom run of the chain by reaching down with the left hand. Chain whip should now be reduced to between $\frac{3}{8}$ " and $\frac{1}{2}$ " up and down movement. Check again in different positions by rolling the machine a little at a time. This is because chains seldom wear evenly and there is generally one spot tighter than the rest. Measurement should be taken at the tightest point.
3. If chain whip is greater or smaller, slacken the rear spindle nuts and turn both adjusters until the correct chain tension is obtained. Tighten locknuts and spindle nuts and check again with the wheel in different positions. Always turn the adjusters an equal number of turns to ensure correct wheel adjustment.

REMOVING AND REFITTING REAR CHAIN. Obtain a piece of strong thin string about 10 feet long. Place the machine on the stand and turn the rear wheel until the connecting link is positioned near the rear sprocket and remove the connecting link. Pass the string through the hole of the end link on the top run and knot the two ends of the string together. Now pull the bottom run of the chain backwards with one hand while keeping the string taut with the other hand. As the end of the top run of the chain is disengaged from the gearbox sprocket, the string will lie one strand each side of the sprocket teeth. When the chain is well clear, cut one side of the string about 12" from where it is looped through the chain link.

The string should be left in position for refitting or replacing the chain. To refit, thread the longer end of the string through the hole in the end chain link and tie the two loose ends together. Then pull the string from the rear end at the same time guiding the chain to engage over the gearbox sprocket teeth. Keep on pulling until the chain encircles the rear wheel sprocket. Remove the string and refit the connecting link, making sure the closed end of the spring clip faces in the direction of rotation. To avoid the chain picking up any dirt or grit on the garage floor, it is advisable to lay some sheets of clean newspaper under the machine.

CLEANING AND LUBRICATING THE CHAIN. A chain cannot be cleaned merely by drenching with oil while in position on the machine.

The best way to do the job is as follows :

Remove spring clip and connecting link and take chain off the sprockets. Soak in a bath of paraffin using a stiff brush to remove all external dirt and allow paraffin to run through the joints of the chain. All grit and dirt between the joints must be removed. Swill in clean paraffin and hang over a pan to allow it to drain.

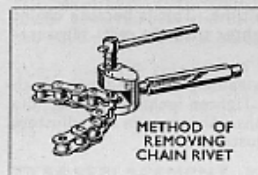
Immerse chain in tin containing graphited grease that has been heated until fluid over a pan of boiling water. Move the chain about in the grease until the grease has cooled off to normal semi-solid state. Remove chain from grease and wipe off surplus.

NOTE:—When replacing chain, see that the spring clip faces in direction of drive, i.e., closed end of link should face forwards on top run of chain.

SHORTENING REAR CHAIN. If chain has an even number of pitches, that is, a cranked link is not used in the chain, remove the rivets holding the second pair of outer link plates (see A) which will shorten the chain by four rollers and two pairs of outer link plates. Replace with cranked double link and single connecting link (B).

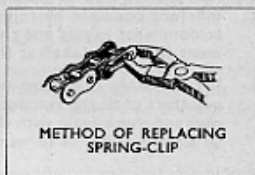


If chain has an odd number of pitches, remove rivets holding the second pair of outer links (see A) (first pair will be cranked) and replace with single connecting link and inner link (B).



METHOD OF REMOVING CHAIN RIVET

CHAIN COMPONENTS



METHOD OF REPLACING SPRING-CLIP



CRANKED DOUBLE LINK



CONNECTING LINK



INNER LINK

FITTING A NEW REAR CHAIN. To simplify the task of fitting a new rear chain, disconnect the old chain at the rear wheel sprocket by removing the single connecting spring link. Connect old chain to new chain, when pulling the bottom run of the old chain, the new one can easily be carried round the gearbox sprocket, whereupon the old chain is disconnected and the ends of the new one connected together. Care should be taken when fitting a new chain to keep it from contact with the floor or any place where it is likely to collect grit, etc.

REPLACEMENT CHAINS. After considerable mileage, chains will require replacing owing to wear and stretch. These can be purchased either from your motor cycle dealer or from the factory.

Primary chain : Renold No. 54130, 58 links, $\frac{3}{8}$ " pitch, $\frac{1}{2}$ " roller, .225" wide, pre-stretched.
Rear chain : Renold 004869, 118 links, $\frac{1}{2}$ " pitch, .335" roller, .205" wide.

Power Unit

150 MODEL 15T TWO STROKE ENGINE AND 3 SPEED GEARBOX.

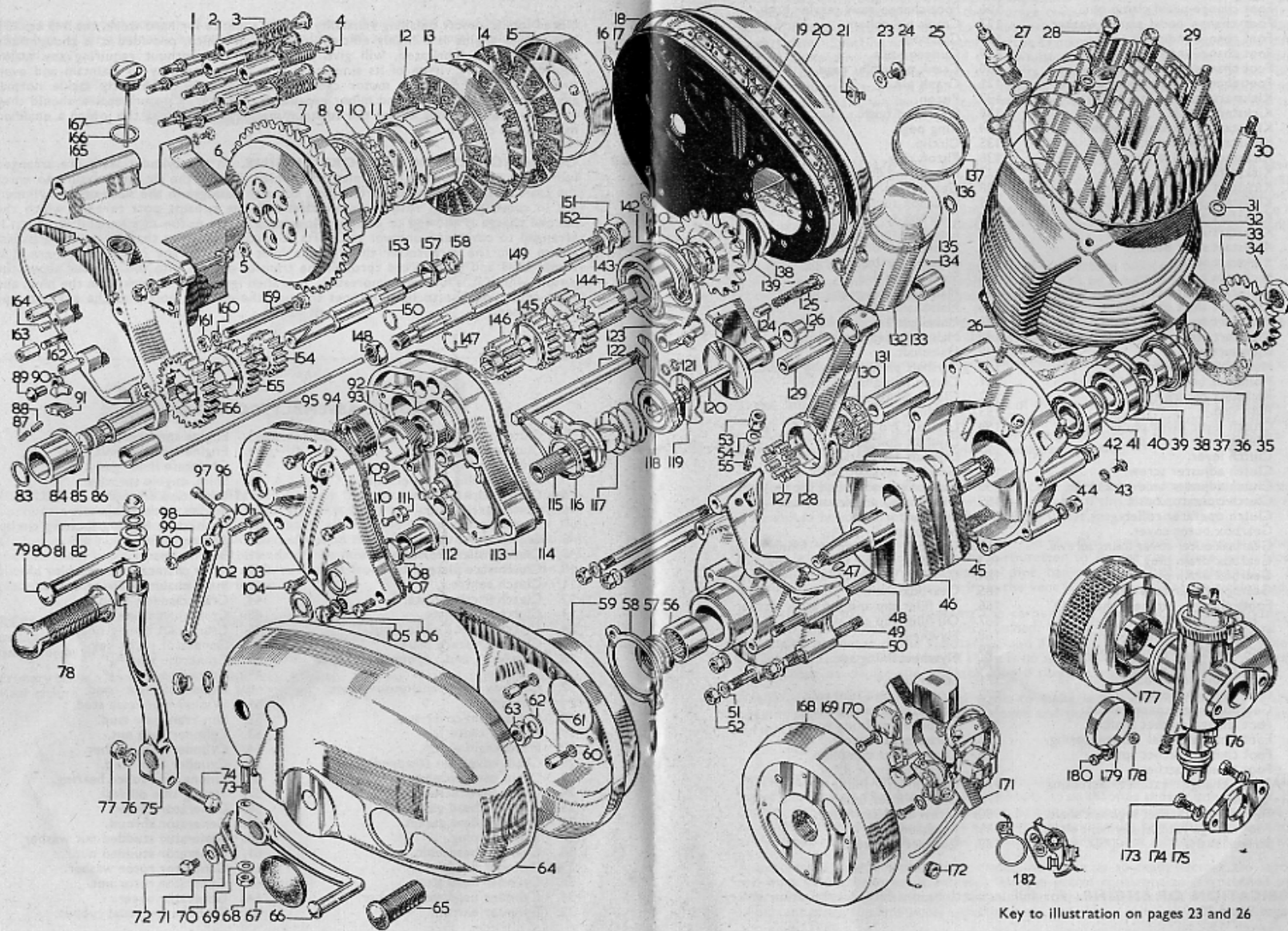
Noted for its almost unfailing reliability and its appetite for hard work, the 149 cc. 15T two-stroke engine is a highly efficient power unit which, provided it is thoughtfully maintained and lubricated, will give years of service without requiring any major replacements. By virtue of its simplicity, it is cheap and easy to maintain and even owners with no previous motor cycling experience can confidently tackle normal adjustments, maintenance and minor repairs. In the case of major repairs, should they ever arise, we strongly advise the amateur mechanic to entrust the job to a qualified motor cycle repairer.

OPERATION OF TWO-STROKE ENGINE. In the cylinder walls are arranged four holes or ports, viz. : one inlet port which permits the air fuel mixture to enter the crankcase, two transfer ports which, through passages in the sides of the cylinder, are in communication with the crankcase, and one exhaust port through which the burned charge is allowed to escape. Movement of the piston in a vertical direction is arranged to cover and uncover the ports at suitable times so that the mixture is first drawn from the carburettor through the inlet port into the crankcase. There it is compressed and then forced through the transfer passage into the cylinder above the piston, where it is further compressed. It is then ignited by a spark from the plug, and after expansion due to heat, escapes through the exhaust port into the exhaust pipe and silencer.

ENGINE ASSEMBLY COMPONENTS

- | | |
|---|--|
| 1. Clutch spring stud. | 33. Engine sprocket. |
| 2. Clutch spring cup. | 34. Engine sprocket nut. |
| 3. Clutch spring. | 35. Chaincase inner gasket. |
| 4. Clutch spring adjuster nut. | 36. Shim, engine sprocket. |
| 5. Clutch back plate nut. | 37. Crankcase drive side oil seal. |
| 6. Clutch back plate. | 38. Engine sprocket spacer. |
| 7. Clutch sprocket. | 39. Crankshaft bearing locating circlip. |
| 8. Clutch roller cage. | 40. Bearing (ball). |
| 9. Clutch roller bearings. | 41. Bearing spacer. |
| 10. Clutch race plate. | 42. Inner chaincase fixing bolt. |
| 11. Clutch centre. | 43. Inner chaincase fixing washer. |
| 12. Clutch friction plate. | 44. Crankcase left hand. |
| 13. Clutch plain plate. | 45. Crankshaft drive side. |
| 14. Clutch friction plate front. | 46. Crankshaft timing side. |
| 15. Clutch pressure plate. | 47. Generator rotor key. |
| 16. Gearbox and chaincase paper washer. | 48. Crankcase stud $4\frac{1}{2}$ ". |
| 17. Gearbox and chaincase inner assembly. | 49. Crankcase stud $3\frac{1}{2}$ ". |
| 18. Front chain cover seal. | 50. Crankcase right hand. |
| 19. Primary chain. | 51. Washer crankcase stud. |
| 20. Front chain cover. | 52. Nut crankcase stud. |
| 21. Chain cover nut (trapped). | 53. Cylinder base nut. |
| 22. Chain cover washer. | 54. Cylinder base washer. |
| 23. Chain cover screw. | 55. Cylinder base stud. |
| 24. Chain cover screw. | 56. Timing side roller bearing. |
| 25. Cylinder head gasket. | 57. Timing side oil seal. |
| 26. Cylinder base gasket. | 58. Generator spacer. |
| 27. Sparking plug. | 59. Generator shroud. |
| 28. Cylinder head bolt. | 60. Generator studded nut washer. |
| 29. Cylinder head. | 61. Generator studded nut. |
| 30. Cylinder head stud. | 62. Generator rotor washer. |
| 31. Cylinder head steel washer. | 63. Generator rotor nut. |
| 32. Cylinder barrel. | 64. Generator cover. |
| | 65. Foot change pedal rubber. |

Engine Assembly



Key to illustration on pages 23 and 26

ENGINE ASSEMBLY COMPONENTS — continued

66. Foot change pedal.	123. Selector fork.
67. Timing side inspection cover grommet.	124. Camplate plunger.
68. Foot change pedal clamp nut.	125. Camplate plunger spring.
69. Foot change pedal clamp washer.	126. Foot change pawl carrier bush.
70. Foot change indicator.	127. Crank pin rollers.
71. Foot change indicator washer.	128. Con rod.
72. Foot change indicator bolt.	129. Gudgeon pin.
73. Foot change crank clamp bolt.	130. Crank pin roller cage.
74. Kickstart crank clamp bolt.	131. Crank pin.
75. Kickstart crank.	132. Piston.
76. Kickstart crank clamp washer.	133. Small end bush.
77. Kickstart crank nut.	134. Ring pegs.
78. Kickstart pedal rubber.	135. Circlip.
79. Kickstart pedal.	136. Piston ring.
80. Kickstart pedal nut domed.	137. Piston ring chrome.
81. Kickstart pedal plain washer.	138. Gearbox sprocket nut.
82. Kickstart pedal spring steel.	139. Gearbox sprocket lockwasher.
83. Kickstart shaft "O" ring.	140. Gearbox sprocket.
84. Kickstart shaft bush.	141. Gearbox sprocket spacer.
85. Kickstart shaft.	142. Sleeve gear oil seal.
86. Kickstart bush inner.	143. Sleeve gear ball bearing.
87. Kickstart shaft pawl spring.	144. Sleeve gear 3rd.
88. Kickstart shaft pawl pin.	145. Mainshaft 2nd gear.
89. Kickstart stop plate rivet.	146. Mainshaft 1st gear.
90. Kickstart stop plate.	147. Mainshaft 1st gear locating circlip.
91. Kickstart pawl.	148. Mainshaft bearing nut.
92. Mainshaft ball bearing.	149. Mainshaft.
93. Mainshaft bearing locking ring.	150. Layshaft pinion locating circlip.
94. Kickstart return spring.	151. Clutch fixing nut.
95. Push rod.	152. Clutch fixing spring washer.
96. Clutch lever pivot pin circlip.	153. Layshaft.
97. Clutch lever pivot pin.	154. Layshaft 3rd gear.
98. Clutch lever.	155. Layshaft 2nd gear.
99. Clutch adjuster screw.	156. Layshaft 1st gear.
100. Clutch adjuster screw locknut.	157. Gearbox layshaft bush.
101. Clutch operator bush.	158. Gearbox layshaft end cap.
102. Clutch operator roller.	159. Gearbox to crankcase stud.
103. Gearbox outer cover.	160. Washer for stud.
104. Gearbox outer cover fixing screws.	161. Nut for stud.
105. Gearbox drain plug.	162. Gearbox inner cover fixing stud.
106. Gearbox drain plug washer.	163. Gearbox inner cover fixing nut.
107. Gearbox outer cover gasket.	164. Gearbox inner cover dowel (see [109]).
108. Foot change ratchet shaft "O" ring.	165. Gearbox shell.
109. Dowel, gearbox inner cover.	166. Oil filler cap and dip stick washer.
110. Foot change stop piece rivet.	167. Oil filler cap and dip stick.
111. Foot change stop piece.	168. Flywheel.
112. Foot change shaft bush.	169. Flywheel fixing set.
113. Gearbox inner cover.	170. Stator unit.
114. Gearbox inner cover gasket.	171. Grommet and lead set.
115. Foot change ratchet shaft.	172. Carburettor fixing bolt.
116. Foot change pedal return spring.	173. Carburettor fixing washer.
117. Foot change ratchet spring.	174. Carburettor spacer.
118. Foot change ratchet.	175. Carburettor complete.
119. Foot change ratchet actuating plate.	176. Carburettor air filter.
120. Foot change ratchet segment shaft.	177. Nut air filter fixing.
121. Foot change ratchet segment shaft.	178. Clip air filter fixing.
122. Striker shaft. ["O" ring.	179. Screw air filter fixing.
	180. Recessed bolt.
	181. Contact breaker.
	182.

LUBRICATION OF ENGINE. For full instructions on Petroil lubrication refer to pages 9 and 10.

ENGINE MAINTENANCE. Periodical decarbonising is the only maintenance job the average owner will want to tackle on the 15T engine and full instructions are given on page 28.

The exploded drawings herewith are self-explanatory, but despite the apparent simplicity of the engine we strongly advise the average owner not to attempt major repair jobs himself, but to entrust the work to an authorised Service Agent or to our own Repairs Department. Splitting and re-assembling the crankcase halves, for instance, is a difficult matter demanding great care and skill, whilst considerable experience is needed to replace a big end assembly and true the shafts. Major repairs undertaken by the Factory Repairs Department carry a full three months' guarantee. With these facilities at the disposal of owners, we feel that it will repay our customers not to attempt too much, but to keep within the limits of this book.

LOCATING TROUBLES. For the satisfactory running of the engine it is essential that three main conditions are fulfilled, and by making a systematic and intelligent investigation the faults can usually be located. If the engine stops, symptoms will generally give a clue to the cause, but where this is not the case, the trouble can be more easily traced by following a definite method of investigation. The three conditions mentioned above are as follows:

- (1) The required quantity of petrol-and-air mixture must enter the engine, which means that a proper supply of fuel has to be available from the carburettor, and that the throttle should open and close freely.
- (2) The sparking plug must give a good spark, at the right time in relation to the position of the piston on its upward stroke.
- (3) The engine must be in good mechanical condition, with no air leaks at the various joints.

There must also be efficient compression of the air in the cylinder and crankcase. This can be easily checked by putting the gearbox into the neutral position, and rotating the crankshaft by means of the kickstarter. On every revolution a definite resistance should be felt, caused by the air in the cylinder being compressed.

Making a Preliminary Check. When the cause of the trouble is not evident, carry out a preliminary check covering the following points: if this fails to trace the cause reference should be made to the "Tracing Faults" Chart (pages 38 and 39).

Having made sure that there is "petrol" in the tank, and that the tap is in the ON position, depress the tickler on the carburettor to ensure that there is no blockage in the fuel supply, either in the tap, fuel pipe, banjo union or fuel needle seating. If the fuel supply is clear, fuel will spurt from the vent hole in the side of the tickler cap.

Being satisfied that fuel is reaching the carburettor, next unscrew the sparking plug, and with the high tension lead still attached, lay the plug on the cylinder head. Turn the engine by means of the kickstarter, and if there is a good spark, it is possible that the ignition timing is incorrect. If there is no spark, hold the H.T. lead $\frac{1}{2}$ " from cylinder head. Clean or change the sparking plug if there is a good spark from the H.T. lead.

Finally examine the carburettor controls to make certain that the throttle is actually opening when the twist grip lever is moved and that the strangler control is operating correctly.

PETROL CONSUMPTION. The carburettor is correctly set before the machine leaves the Factory. An alteration to the main jet or throttle slide is unnecessary, as the correct sizes for best performances and petrol consumption have been selected after prolonged tests. Alteration to the carburettor setting must be confined to the location of the taper needle, attached to the throttle slide, or the pilot mixture regulating screw.

A guaranteed petrol consumption cannot be given as so many factors are involved, and once the carburettor is correctly set the petrol consumption is governed by the internal condition of the engine, the speed at which the machine is driven and, most important of all, the amount of throttle used.

Lowering the taper needle will weaken the mixture up to $\frac{3}{4}$ throttle, but this alteration can also impair acceleration.

If an increase in petrol consumption becomes apparent, its cause should be investigated, and reference to details on "tracing faults" should be made, to find a remedy.

TO CONSERVE PETROL DO NOT :—

Flood the carburetter unnecessarily.

Leave the machine standing with the petrol tap on.

Indulge in the practice of "blipping the throttle."

Use an unnecessary amount of throttle to accelerate.

DECARBONISING. There is no fixed mileage, or stipulated interval, when the engine should be decarbonised, and the necessity for this work is usually indicated by a deterioration in the performance and petrol consumption. When a machine is used continually for short journeys, the formation of carbon deposit in the combustion chamber also the exhaust system, will be more acute than on a machine which is used for frequent long journeys.

With the availability of high octane fuel, detonation or "pinking" is uncommon, consequently decarbonising is less frequently needed. The exhaust port is designed to prevent a carbon formation at this point of the system, in contrast an accumulation of burnt oil or carbon in the exhaust system can cause back pressure which will impair both performance and petrol consumption.

In the event of a loss of performance, it should be verified that the contact breaker gap or sparking plug are not at fault before the cylinder head is removed.

In the case of a machine that is used mainly for short journeys, driving at full throttle, where permissible, for a reasonable distance, will tend to dislodge loose carbon from the combustion chamber and exhaust system, and act as a "tonic" to the engine.

When decarbonising, have available a replacement cylinder head gasket, cylinder base washer and if the engine has covered considerable mileage — a set of new piston rings.

REMOVING THE CYLINDER HEAD. Detach the H.T. cable at the sparking plug end and unscrew the plug. Should the plug become difficult to remove, do not use force; apply a little penetrating oil round the plug threads.

Take away the cylinder head steady and remove in turn the four cylinder head bolts.

Some difficulty may occur in separating the cylinder head from the cylinder barrel, particularly after a long interval between decarbonising. In such an event, one or two light blows with a soft faced mallet *ON THE FRONT OF THE CYLINDER HEAD* will cause separation.

Carbon deposit formed on the sphere of the cylinder head and on the projections can be removed with a suitable tool, taking care not to scratch the machined surfaces. Do not use emery cloth or similar abrasive material for this purpose.

As it is a simple matter to remove the cylinder, the piston can be dealt with more effectively and without the risk of particles of carbon entering the transfer ports and crankcase if the cylinder is removed.

TO REMOVE THE CYLINDER BARREL. Remove the exhaust pipe and silencer as one unit. Do not unduly rock the exhaust pipe sideways, which can distort the pipe and cause gas leakage. Take off the petrol pipe, unscrew the cap on the carburetter body and pull out the throttle slide. Wrap the slide in a piece of clean rag and attach it to a convenient position on the frame rail to avoid damage. Remove rear engine lug bolt and Footrest bar allowing loop tube to swing forward. Take off the four cylinder base nuts and spring washers.

SEPARATING ENGINE AND GEARBOX. This necessitates the removal of the power unit from the motor cycle frame. This completed, the extraction of the five studs at rear of crankcase will facilitate the separation of the two units. The removal of remaining joint studs will enable the separation of crankcase halves, thus permitting access to main bearings which are interference fit in crankcase.

NOTE: The piston rings are located by metal pegs in the piston ring grooves, to prevent the rings turning and the ends fouling the transfer ports. It is, therefore, imperative that the cylinder is raised vertically without rotary movement to avoid piston ring breakage.

With some clean rag in the throat of the crankcase and wrapped round the piston skirt, the crown and recess each side of the piston can be carefully scraped to remove carbon deposits.

Any unburnt oil or carbon formed in the cylinder exhaust port should also be removed.

TO REMOVE THE PISTON. Using a pair of thin nosed pliers, remove one of the gudgeon pin circlips. The gudgeon pin is a close fit in the piston and if pieces of rag immersed in boiling water are placed on the piston crown in relays, this will cause the piston to expand and enable the gudgeon pin to be pushed out. If the pin resists removal, do not use force, but carefully scrape round the recess for the circlip to remove a burr or burnt oil. With the pin removed, lift off the piston and mark the inside of the skirt to indicate which way it was fitted, for re-assembly.

The piston rings should not be removed without good reason. Gas leakage past the piston rings is indicated by brown patches on the cylinder contact area or on the ring extremities; rings so affected should be discarded and new ones fitted.

The rings must be perfectly free in the ring grooves: carbon formed in the ring grooves will prevent free movement. When removing the rings they should be expanded with care and only sufficiently to clear the piston ring grooves.

The top compression ring, (which must be correctly fitted) is chrome plated (to reduce cylinder wear) and taper faced. Its position is indicated by the word TOP etched on the horizontal ring face.

The normal piston ring gap is .009" minimum: maximum permissible gap is .014". Piston rings supplied by our Spares Department do not require fitting, as the gap is allowed for in the process of manufacture. To check the ring gap, place the ring in the unworn part of the cylinder (crankcase end) and push it down about one inch, using the piston skirt to ensure the ring is square with the cylinder bore. The gap can be checked by feeler gauges. The normal cylinder bore sizes are given on page 44. When cylinder wear is to the extent of .008" or more, the cylinder should, whenever possible be rebored or be returned to the Service Department for rotary exchange.

REFITTING THE PISTON. Apply a little clean oil on the gudgeon pin and in the bush. Gently pre-heat the piston and fit it on the connecting rod in its original position and introduce the gudgeon pin. Fit the circlip with a rotary motion and verify it is snugly in its groove.

REFITTING THE CYLINDER. If desired the carburetter can be detached and cleaned before fitting the cylinder.

Remove any broken pieces of base washer from the flange also the crankcase face. Thoroughly clean the ports and cylinder bore. Apply a little jointing compound to one side of the new base washer and stick it to the cylinder. Apply some clean oil on the piston and cylinder bore. A generous chamfer is used on the cylinder to facilitate fitting. Offer up the cylinder and compress in turn the two piston rings, then gently lower the cylinder into position. Fit the four spring washers and base nuts and tighten these diagonally, not one side at a time.

Before refitting the exhaust pipe and silencer, it is opportune to clean these parts internally and externally. Detach the silencer from the exhaust pipe and remove any burnt oil or carbon from the slots in the exhaust pipe, also from the silencer outlet. Refit the exhaust system, the carburetter and throttle control.

TO REFIT THE CYLINDER HEAD. A new cylinder head gasket is preferable. If the original gasket is used, it must be undamaged if a gas tight joint is to be made. Clean the gasket face on the cylinder head and barrel: a little graphite grease on the threads for the cylinder head bolts is beneficial. Locate the gasket on the cylinder, position the cylinder head and fit the four head bolts and washers. These bolts should be tightened diagonally and firmly. See that the sparking plug is in order as described in chapter on ignition and lighting. Apply a little graphite grease on the sparking plug threads, refit the plug and H.T. cable.

PILOT JET AIR SCREW ADJUSTMENT.

1. Set air screw $1\frac{1}{2}$ turns from fully closed position.
2. Run engine until warm.
3. With engine at tick over, adjust air screw until even firing occurs.
4. Finally adjust throttle stop screw until desired idling speed is obtained.

Clutch

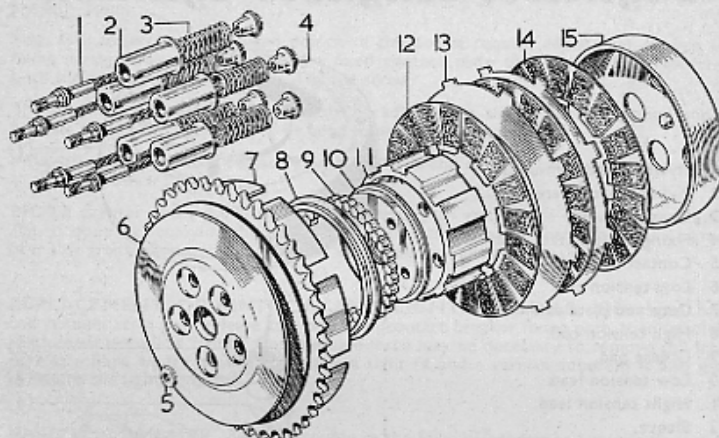
CLUTCH ADJUSTMENT. Attention to the clutch is usually confined to adjustment of the operating mechanism. To avoid clutch slip or clutch drag, the clutch should have $\frac{1}{8}$ of an inch slack between the clutch outer casing and the clutch cable adjuster on the gearbox cover. Without such slack the operating mechanism will be pre-loaded causing wear on the operating parts, also clutch slip. Conversely, excessive slack in the clutch cable will prevent separation of the friction plates and cause the clutch to drag, thus making the gear selection difficult. As the clutch inserts tend to settle down, this has the effect of lengthening the clutch push rod, as the width of the friction inserts is slightly reduced. To deal with clutch drag, or clutch slip, first unscrew the clutch cable adjuster lock nut and run down the adjuster as far as it will go. Unscrew one or two turns the adjuster lock nut (100) shown in illustration of clutch assembly on page 24. With a screwdriver, screw in the adjuster until contact with the push rod can be felt, unscrew the adjuster exactly half a turn and retighten the locknut, taking care the adjuster does not move. Complete the adjustment by unscrewing the clutch cable adjuster until there is $\frac{1}{8}$ " slack between the outer casing and the adjuster, tighten the locknut.

Clutch slip should be dealt with promptly otherwise the friction plates will be damaged and the clutch springs affected by heat. The normal free length of the clutch springs are $1\frac{3}{4}$ ", the clutch pushrod length is $8\frac{1}{2}$ ".

DISMANTLING THE CLUTCH — NOTE: Nuts and screws in the clutch and gearbox assembly have a right hand thread, with the exception of the nut retaining the gearbox rear chain sprocket, which has a left hand thread.

Commence by removing the primary drive cover by undoing centre screw. Unscrew in turn the five clutch spring adjusting screws, take away the clutch spring pressure

CLUTCH ASSEMBLY.



- | | |
|-------------------------------|--------------------------|
| 1 Clutch spring stud. | 9 Roller bearings. |
| 2 Clutch spring cup. | 10 Race plate. |
| 3 Clutch spring. | 11 Clutch centre. |
| 4 Clutch spring adjuster nut. | 12 Friction plate. |
| 5 Nut. | 13 Plain plate. |
| 6 Back plate. | 14 Front friction plate. |
| 7 Clutch sprocket. | 15 Pressure plate. |
| 8 Roller cage. | |

plate complete with the spring cups and springs, leaving the steel and friction plates free for removal. The front chain is endless, consequently the clutch and engine sprockets are removed simultaneously. A box key is required to unscrew the nut on the gearbox mainshaft securing the clutch hub and sprocket. The shaft nut is $\frac{11}{16}$ " across flats, the engine sprocket nut is 1" across flats.

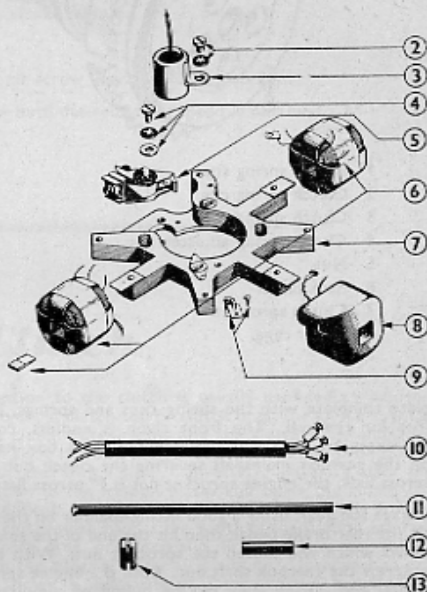
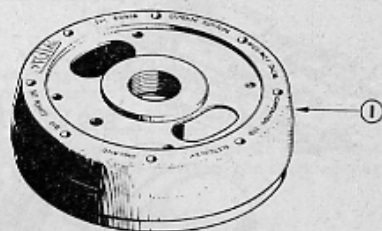
Engage top gear, using a good fitting spanner on the engine sprocket nut, apply pressure on the rear brake pedal, then hit the end of the spanner with one or two light hammer blows which will loosen the sprocket nut. With a box key use the same method to unscrew the gearbox shaft nut. Both the engine sprocket and clutch hub are on splined shafts, and usually they can be pulled off simultaneously after both nuts have been removed. If difficulty is experienced the careful use of two screwdrivers placed behind the sprockets will have the desired effect. For access to the clutch bearing unscrew the five nuts securing the clutch studs and back plate. The clutch bearing arrangement is shown in the illustration on this page.

TO RE-ASSEMBLE THE CLUTCH. Apply a little anti-centrifuge grease to the cage for the clutch bearing, to retain the 12 rollers, whilst the cage is fitted to the clutch race plate, and assemble parts in the reverse order described for dismantling. The five clutch stud nuts should be peened or centre popped for security.

To correctly position the clutch spring adjusting nuts (4) adjust each nut until the slotted end is just flush with the end of the clutch spring stud (1), then unscrew each nut two complete turns. The position of these nuts can be varied slightly to ensure that the pressure plate (15) is withdrawn parallel to steel plate behind it, when the clutch is operated.

Flywheel Magneto Ignition

- 1 Flywheel and cam unit.
- 2 Fixing set (condenser),
- 3 Condenser.
- 4 Fixing set (contact breaker).
- 5 Contact breaker.
- 6 Low tension coil.
- 7 Core and plate assembly.
- 8 High tension coil.
- 9 Grease pad.
- 10 Low tension lead.
- 11 High tension lead.
- 12 Sleeve.
- 13 Grommet.



The purpose of the high tension magneto is to produce a hot spark across the points of the sparking plug. A magneto consists principally of permanent magnets, a high tension coil, a contact breaker and a condenser. In this magneto the magnets are secured to the rotating flywheel, and the high tension coil, contact breaker and condenser are stationary.

The flywheel magneto provides current for both ignition and lighting. The same magneto is used for both DIRECT and RECTIFIER-BATTERY lighting sets although wiring connections differ and references should be made to the wiring diagrams.

If it is necessary to remove the flywheel magneto, begin by removing gearbox outer casing, unscrew centre nut and washer. Withdraw flywheel (1) by means of extractor. Disconnect generator wires at snap connections, and H.T. at plug. Remove the two screws from stator, thus facilitating its withdrawal from locating spigot. Whilst holding the stator, undo the adaptor screw, thus permitting the generator shroud to be removed from crankcase. This leaves the stator and electrical harness in situ ready for re-assembly.

The armature plate which carries the ignition coil, lighting coils and contact breaker assembly is secured to the crankcase by six screws. The high tension lead from ignition coil to sparking plug is detachable by unscrewing from armature plate, and when refitting it is important to make sure that the brass pad carried by the spring and secured to the terminal makes contact with the soldered disc on the outside of the ignition coil.

ADJUSTING CONTACT BREAKER POINTS. Turn engine over until points are fully open.

Test with feeler gauge between points. If the points require adjustment slacken the fixing screw and carefully move the fixed contact plate by means of a screwdriver until the correct gap is obtained. Tighten screw.

The breaker point setting should only be adjusted in the manner described and at no time should the breaker arm be bent to provide adjustment.

If the contact points need replacing both the fixed and movable points must be replaced at the same time.

NOTE: After every 5,000 miles it is necessary to relubricate the cam grease pad. This is done by removing the pad and squeezing and working into it a Summer grade of motor transmission grease. **Do not use ordinary grease.**

REPLACEMENT OF IGNITION AND LIGHTING COILS. First bend back coil retainer strip then release coil lead from contact breaker fixing post, then unsolder earth leads from lead clamp. Considerable force may be necessary to remove coil from core as a fibre wedge is used to ensure a tight fit and a varnish adherent is also used to secure the lighting coils.

IGNITION FAILURE. Serious trouble in the form of condenser breakdown is very rare and any ignition failure will generally be due to the condition of the sparking plug or the contact breaker points, or faulty insulation of the H.T. lead or other connections. The first step in dealing with ignition trouble should be to remove plug from engine and examine the points to see whether they are oily and the gap correctly set at .020". If the insulator is fouled with oil and carbon there may be sufficient leakage to prevent correct sparking and cleaning will be necessary. Fitting a new plug will readily show whether the failure is due to plug or not. The plug lead should then be examined for cracks or other faults. The contact breaker can then be examined to see whether the points are opening correctly. When the points are fully open there should be a gap of .018". The surfaces must also be clean and free from oil and severe pitting. A piece of stiff paper will usually remove oil or grease. If the points are burned or pitted they should be cleaned with a fine carborundum stone if available, otherwise fine emery cloth can be used, wiping off any traces of metal or emery dust with petrol-soaked rag. As a result of wear on the heel of the rocker arm bearing on the cam, the point gap will be reduced. This wear should be negligible if the felt oiling pad is kept moist with a suitable lubricant.

A weak or faulty condenser can be detected by badly burnt and pitted contacts or a continuous intense blue spark across the contacts when running. A very small white spark across the points when running is normal.

The condenser can be removed by undoing the screw securing it and releasing the lead from the terminal post.

Gearbox

If attention to the gearbox is necessary, the assembly sequence shown in the illustration on pages 24 and 25, should be first considered. It will be noted that the gearbox is a separate unit bolted to the crankcase.

DISMANTLING GEARBOX. Commence by removing kickstart lever, gear pedal and indicator. The outer cover, which is secured by one $\frac{1}{4}$ " bolt at forward end and one $\frac{3}{8}$ " nut at top end, can now be taken off. Disconnect clutch cable from operating arm and adjuster. Drain oil into receptacle by means of oil plug, situated below foot change shaft, and remove dipstick. Take out 5 screws and clutch thrust roller; this will allow the removal of outer case (at this stage the kickstart spring is accessible).

Withdraw gear pedal shaft (115) and centralizing spring (116) and take-off ratchet spring (117). Remove mainshaft nut (R.H.) and unscrew 5 nuts securing inner cover, remove gasket. Then the inner cover can be tapped gently off the studs (at this point the kickstart pawl and spring (87, 91) are accessible). Remove ratchet (118) and actuating plate (119).

Withdraw layshaft low gear (156) taking particular note of shims located between low gear and kickstart shaft bush. Unscrew selector shaft (122), thus facilitating the removal of the cam segment and spindle (120). Extract selector fork (123), noting angle of selector pin and withdraw layshaft (153) and two remaining gears.

Remove mainshaft (149), sliding gear (145), gear indexing plunger (124) and spring (125). Should it be required to remove the final drive sprocket, this can be done by straightening locking washer and unscrewing retaining nut (L.H.) and removing chain from sprocket (this will permit removal of sleeve gear).

* To facilitate the withdrawal of the mainshaft (149) the clutch assembly must be removed from the power unit.

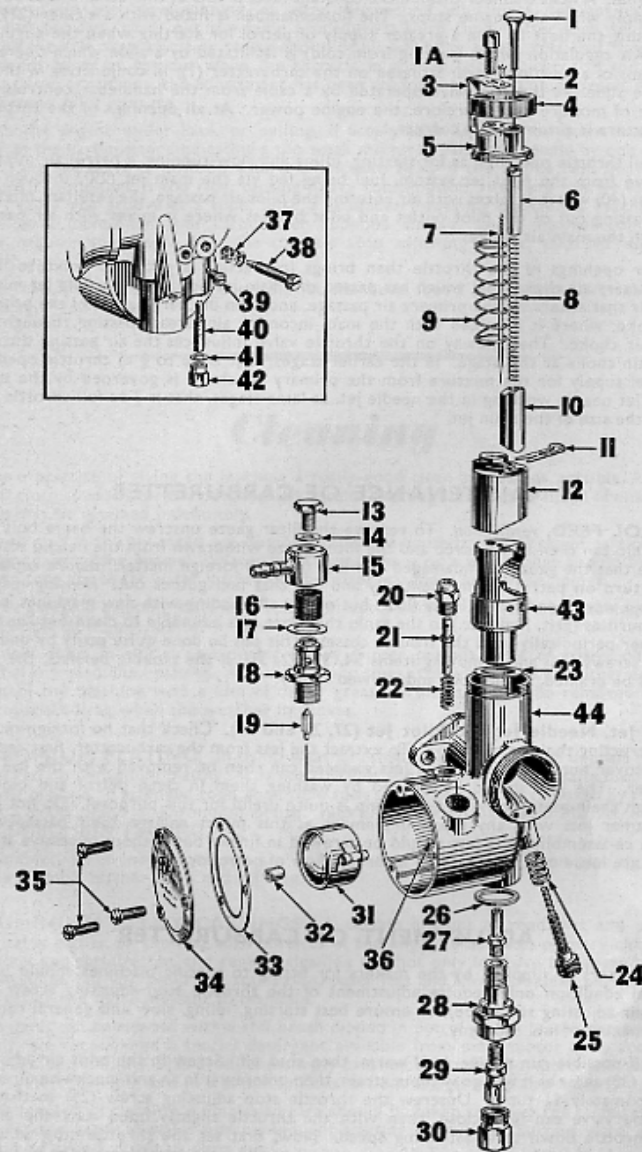
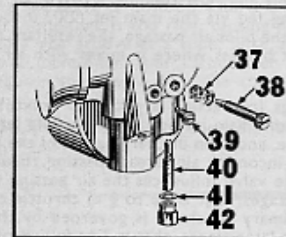
RE-ASSEMBLY OF GEARBOX. Reverse the previously explained procedure, carefully noting the following points:—

1. Be absolutely certain that components are replaced in correct order and position.
2. Check that all joint faces are free from bruises and damage.
3. Gaskets should be renewed to ensure freedom from oil leaks.
4. Smear joint faces with sealing compound.

CARBURETTER COMPONENTS.

- | | |
|--|-------------------------------------|
| 1. Air control lever. | 22. Tickler spring. |
| 1a. Adjuster cable. | 23. Washer for jet block. |
| 2. Fixing screw for cap springs. | 24. Throttle stop screw spring. |
| 3. Cap spring for top with adjuster ferrule. | 25. Throttle stop screw. |
| 4. Mixing chamber top cap ring. | 26. Main jet holder washer. |
| 5. Mixing chamber top (std). | 27. Needle jet. |
| 6. Air valve guide. | 28. Main jet holder. |
| 7. Taper needle. | 29. Main jet (specify size). |
| 8. Air valve spring. | 30. Main jet cover nut. |
| 9. Throttle valve spring. | 31. Float complete. |
| 10. Air valve. | 32. Float spindle bush. |
| 11. Needle clip. | 33. Float chamber cover joint. |
| 12. Throttle valve (specify cutaway). | 34. Float chamber cover. |
| 13. Banjo bolt. | 35. Float chamber cover screws. |
| 14. Banjo bolt washer. | 36. Float hinge spindle. |
| 15. Banjo single. | 37. Air adjusting screw spring. |
| 16. Filter gauze. | 38. Air adjusting screw. |
| 17. Banjo washer. | 39. Locating peg for jet block. |
| 18. Needle seating. | 40. Pilot jet. |
| 19. Float needle. | 41. Pilot jet cover nut washer. |
| 20. Tickler body. | 42. Pilot jet cover nut. |
| 21. Tickler. | 43. Jet block $\frac{1}{8}$ " bore. |
| | 44. Mixing chamber body, type 375. |

AMAL MONOBLOC TYPE 375/37 Carburetter



HOW THE CARBURETTER WORKS

The carburetter atomises the correct amount of petrol with air which is drawn into the engine. A float chamber maintains a constant level of fuel at the jets and cuts off the fuel supply when the engine stops. The float chamber is fitted with a tickler (21) for depressing the float to give a greater supply of petrol for starting when the engine is cold. Air regulation (when starting from cold) is facilitated by a slide which operates, by means of a push/pull lever situated on the carburetter (1), in conjunction with the throttle slide. A throttle valve operated by a cable from the handlebar controls the volume of mixture and, therefore, the engine power. At all openings of the throttle, the mixture is automatically correct.

At small throttle openings, as for starting, idling and slow-running, a petrol/air mixture is drawn from the pilot jet system, fuel being fed via the main jet (29), through the pilot jet (40) where it mixes with air entering the pilot air passage, the resultant mixture then passing out of the pilot outlet and pilot by-pass where it mixes with air passing through the main air choke.

Further openings of the throttle then brings into action a petrol/air mixture from the primary air choke, fuel which has passed the main jet needle and needle jet mixing with air that enters via the primary air passage, and then discharging out of the primary air choke, where it is mixed with the main incoming air stream passing through the main air choke. The cutaway on the throttle valve influences the air passing through the main choke at this stage. In the earlier stages, that is up to $\frac{2}{3}$ of throttle opening, the fuel supply for the mixture from the primary air choke is governed by the taper of the jet needle working in the needle jet, at later stages, that is $\frac{1}{3}$ to full throttle it is solely the size of the main jet.

MAINTENANCE OF CARBURETTER

PETROL FEED, verification. To remove the filter gauze unscrew the banjo bolt (13) the banjo can then be removed and the filter gauze withdrawn from the needle seating. Ensure that the gauze is undamaged and free from all foreign matter. Before replacing banjo turn on petrol tap momentarily and see that fuel gushes out. Flooding may be due to a worn needle or a leaky float, but nearly all flooding with new machines is due to impurities (grit, fluff, etc.) in the tank, therefore it is advisable to clean out the float chamber periodically until the trouble ceases. This can be done quite easily by undoing cover screws (35) and removing items 34, 33, 32, 31. If the trouble persists, the tank should be drained, swilled out and allowed to dry.

Main Jet, Needle Jet and Pilot Jet (27, 29 and 40). Check that no foreign matter is obstructing their passageways. To extract the jets from the carburetter, first remove their cover nuts (30 and 42) the jets exposed can then be removed with the use of a spanner. The jets should be cleaned by washing them in clean petrol and blowing through their passageways (a tyre pump is quite useful for this purpose). Do not prod or reamer jets with any sharp implement as this might enlarge their passageways. When re-assembling the jets should be screwed in firmly but without excessive strain, if jets are loose on their seatings, incorrect flow of petrol occurs.

ADJUSTMENT OF CARBURETTER

Carburetters as supplied by the makers for fitting to specific machines should under normal condition only require adjustment of the throttle stop adjusting screw (25), pilot air adjusting screw (38), to ensure best starting, idling, slow and general running with maximum fuel economy.

First, if possible run engine until warm, then shut off. Screw in the pilot air adjusting screw (38) as far as it will go without strain, then unscrew it in an anti-clockwise direction approximately $1\frac{1}{2}$ turns. Unscrew the throttle stop adjusting screw (25) so that the throttle valve can fully close, then with the throttle slightly open start the engine and throttle down to a fast idling speed. Now, first set the throttle stop adjusting screw to hold this position, and then unscrew it to allow the throttle valve to be further

closed and the engine to slow down until it begins to falter, then screw the pilot air adjusting screw in or out until the engine runs regularly and faster. Then further unscrew the throttle stop adjusting screw until the closing of the throttle valve again makes the engine run slower and just begin to falter, then again adjust the pilot air adjusting screw to get best slow running. If, after this second adjustment, the engine is still running too fast, carry out the same procedure a third time. After each adjustment of the throttle stop adjusting screw and pilot air adjusting screw, test that the engine does not falter or cut out when the throttle is opened fairly quickly; if the engine does falter or cut out, the adjustment has been set for too slow running resulting in an over-weak pilot mixture.

With the engine under load, or pulling, if acceleration is poor, or there is spitting back in the carburetter (indicating a too weak mixture), raise the needle by one groove at a time and leave in position where it functions best. If the engine runs heavily and lumpy, the mixture is too rich, causing heavy consumption. Remedy this by lowering the needle one groove at a time, until a satisfactory running position is reached. As previously mentioned, the carburetter supplied should, under normal conditions, only require adjustment of: the throttle stop adjusting screw, pilot air adjusting screw.

After the best position of the needle jet has been found again check over the slow running.

Cleaning

Make a practice of giving the machine a really good clean as often as possible, keeping a soft cloth specially for the purpose. By careful cleaning the original sheen of enamelled parts may be retained indefinitely.

Where mud is thickly caked on, do not attempt to brush it off; abrasive particles will rapidly damage the enamel. Water from a small hose or a wet sponge should be used, taking care not to let water into the carburetter, magneto and brake linings.

Never garage a dripping machine after a wet run. Remove moisture by dabbing gently with a soft cloth, e.g., butter muslin.

Salt laid down in city streets during snowy winter periods has a corrosive effect on enamel and chromium plating. A useful tip is to smear the wheel rims and other exposed parts of the machine with a film of oil or grease. This can easily be removed with a petrol-soaked rag when the weather improves.

CHROMIUM PLATING. In damp weather, small spots of rust-like deposit may be observed on chromium plating. It is not rust but the action of certain salts used in the plating process. If attended to in good time such spots can easily be removed by rubbing with a good brand of chromium polish. NEVER USE HOUSEHOLD METAL POLISH ON CHROMIUM PLATING.

In summer, when wet conditions are less frequent, it is best to clean plating with a damp chamois leather cloth and soft rag.

ALUMINIUM ALLOY CASTINGS. A certain amount of road dirt and oil will inevitably gather on the cast alloy surfaces of the engine crankcase, primary chaincase, gearbox and carburetter, and regular cleaning will not only improve the appearance of the machine but will avoid dirt stains on trouser legs and shoes. A clean engine unit is also easier and more pleasant to maintain.

Such parts can be cleaned with a stiff brush dipped in petrol or trichloethylene or, alternately, we recommend a special detergent available from most motor cycle accessory retailers, i.e., GUNK. This product is simply brushed on to the alloy parts and hosed off with water. Gunk is sold in tins and full instructions are given by the makers.

If this method of cleaning is employed care should be taken to cover the carburetter to prevent the entry of water and consequent starting difficulties. Surplus water should always be wiped off with a clean rag.

Tracing Faults

Sequence of Testing.	Possible Trouble.	Remedy.
Engine will not start.		
Depress tickler on carburetter to check whether fuel is reaching carburetter.	No fuel reaching carburetter or air lock in petrol pipe.	Turn tap to ON, refill tank, clear air vent in filler cap.
If no fuel, even when tap is on and fuel is in tank.	Choked petrol pipe, filter on tap, filter in banjo. Fuel needle sticking in seating.	Remove and clean out.
Test for spark by holding sparking plug body on cylinder head.	Leak along insulation of plug or high tension lead.	Try a new plug of the type recommended and/or new H.T. lead.
If still no spark : Test for spark at end of H.T. lead held $\frac{1}{2}$ " from cylinder fins.	Plug points may be oily or sooted up. If no spark at end of H.T. lead, contact breaker point gap may be too narrow or points pitted or dirty or oily.	Clean plug or fit new one. Adjust point gap to .015". Clean.
	Moisture on insulation of condenser.	Clean and dry out.
	Damaged insulating sleeving on wires connecting contact breaker to coil or condenser.	Replace with new sleeving.
	Faulty connection to low tension wire of ignition coil.	Correct.
	Faulty condenser.	Replace.
	Faulty ignition coil.	Replace.
	If above tests are satisfactory but engine will not start.	Mixture may be too rich due to use of strangler, or incorrect setting of taper needle.
Air leaks at carburetter stub or manifold joint causing weak mixture.		Tighten joints evenly.
Incorrect ignition timing.		Check instructions given.
Engine Four or Eight Strokes.		
Air control lever may not be fully open or taper needle in a too high position. Air filter may need cleaning.	Mixture too rich.	Lower taper needle by moving to a WEAKER position.

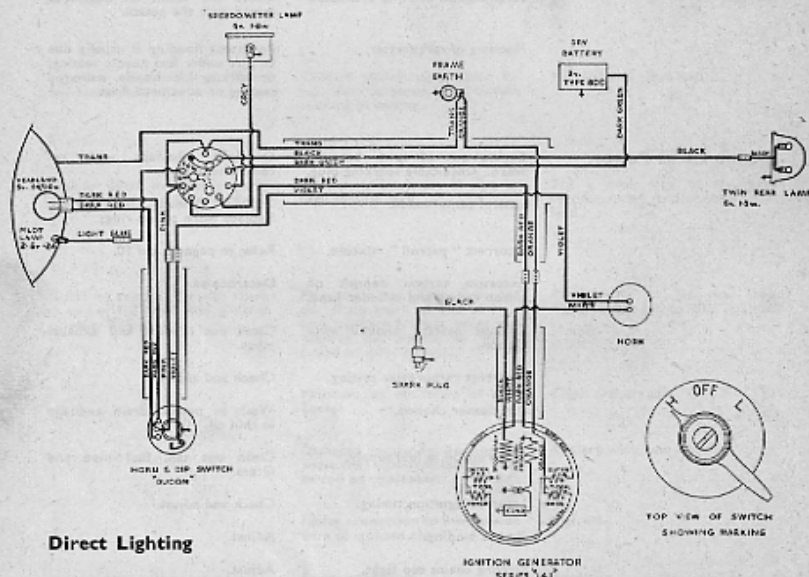
TRACING FAULTS—(continued)

Sequence of Testing.	Possible Trouble.	Remedy.
Engine Four or Eight Strokes— continued		
Check by watching for excessive smoke from exhaust pipe or silencer.	Engine may four stroke for a little while after standing due to accumulation of oil in crankcase.	Usually ceases when engine has been running for a few minutes unless too much oil has been mixed with the petrol.
	Flooding of carburetter.	Persistent flooding is usually due to dirt under fuel needle seating, or sticking fuel needle, damaged seating or punctured float.
Engine Lacks Power.		
	Engine out of tune, bearings worn. Unsuitable sparking plug.	Overhaul. Replace with recommended type.
	Loss of compression.	Tighten cylinder head bolts. Replace worn piston rings.
	Incorrect "petrol" mixture.	Refer to pages 9 and 10.
	Excessive carbon deposit on piston crowns and cylinder head.	Decarbonise.
	Exhaust system choked with carbon.	Clean out silencer and exhaust pipes.
	Incorrect carburetter setting.	Check and adjust.
	Air cleaner choked.	Wash in petrol, drain and dip in thin oil.
	Obstruction in fuel supply.	Clean out tap, fuel pipe and filters.
	Incorrect ignition timing.	Check and adjust.
	Brakes binding.	Adjust.
	Driving chains too tight.	Adjust.
Engine will not run Slowly.		
	Weak mixture due to air leaks at carburetter stub or manifold joint, crankcase and cylinder base joints.	Tighten all joints evenly. Renew "O" rings.
	Crankcase drain screw loose or missing.	Tighten or replace.
	Worn crankshaft bearings or leaking seal.	Replace.
	Ignition timing too far advanced.	Correct.
Engine Suddenly Stops Firing.		
	Sparking plug lead detached.	Replace.
	Plug points bridged by oil, carbon, or deposit caused by use of leaded petrol.	Clean or replace.
	Short circuit of high tension lead to frame possibly by water on H.T. lead.	Insulate. If wet, dry out.

Electrical Equipment

DIRECT LIGHTING. Your machine is normally supplied with direct lighting equipment in which alternating current is supplied by the flywheel generator when the engine is running. The lights are controlled by the main switch in the headlamp shell and the headlamp beam can be dipped by means of the dipper switch on the handlebar.

Provision is made for fitting a twin cell dry battery for parking lights and clips and wiring will be found inside the toolbox. Owners are advised to make maximum use of the direct lighting and to switch on to the dry battery for parking only. The dry battery receives no charge and should be replaced when exhausted.



Direct Lighting

REPLACEMENT BULBS (Direct Lighting).

Headlamp main bulb	6 volt 24/24w.
Headlamp parking light	2.5 volt .2 amp.
Tail light bulb	6 volt 1.8 watt.
Speedometer bulb	6 volt 1.8 watt.

HEADLAMP. The main bulb has twin filaments, one filament providing the main driving beam and the other a dipped beam, brought into operation by the dipper switch on the left handlebar, when required. The pilot bulb is mounted in the reflector under the main bulb.

The design of the lamp holder, lamp and reflector assembly is such that when the bulb is correctly positioned, no focussing is required.

The reflector and front glass are made up as one assembly and no attempt should be made to separate them. The components cannot be purchased separately.

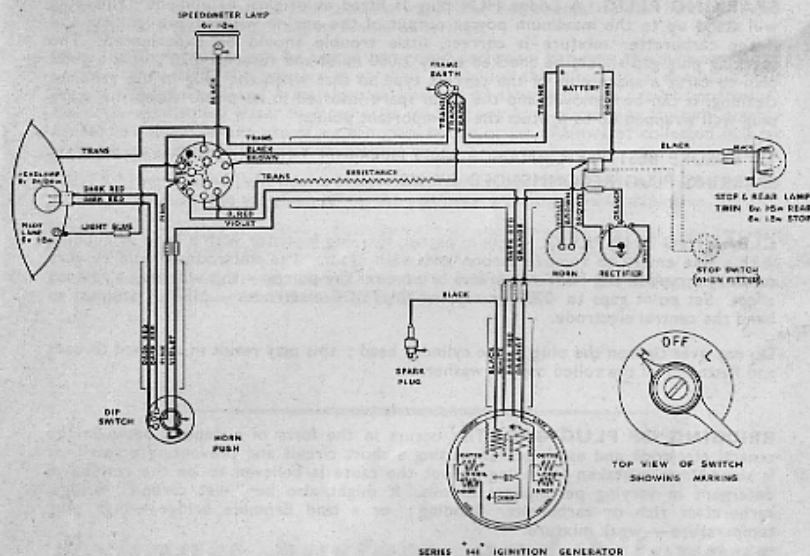
TAIL LIGHT. Of Wico-Pacy design, the new tail light incorporates a reflecting surface complying with British traffic regulations. Twin bulbs are employed.

STOP LIGHT. On models with rectifier-battery lighting, a stop light switch may be fitted and provision is made inside the tail light for a stop light bulb — 6 volt, 18W. S.B.C.

REMOVING LIGHT UNIT AND RIM. Slacken the screw on bottom of the lamp body at the front, pull the rim outwards from the bottom and, as the front comes away, raise slightly to disengage top tag from lamp shell. Twist the back shell in an anti-clockwise direction and pull it off. The main bulb can then be removed from its housing in the reflector assembly. The lamp rim is secured to the light unit by spring clips which can be removed by pressing with a screwdriver blade, at the same time working away from the edges.

REPLACING LIGHT UNIT AND RIM. Lay the light unit in the rim so that the location block on the unit engages with the forked brackets on the rim. Replace the clips by springing in, so that they are evenly spaced around the rim. To replace the back shell, engage the projections on the inside of the back shell with the slots in the holder, press on and secure by twisting it to the right. Engage top tag on headlamp rim with the small slit in the shell, and gently force the bottom of the rim back into the shell, after which re-tighten the locking screw on the bottom of lamp body.

RECTIFIER BATTERY LIGHTING.



REPLACEMENT BULBS (Rectifier Battery Lighting).

Headlamp main bulb	6 volt 24/24 watt.
Headlamp pilot bulb	6 volt 1.8 watt
Tail light bulbs	6 volt 1.8 watt.
Stop light	6 volt 18 watt.
Speedometer bulb	6 volt 1.8 watt.

A rectifier-battery lighting set can be fitted to your motor cycle. The rectifier is fitted under the cushion seat and the battery is a Lucas PUZ/5E/10, 6 volt, inside the frame centre section.

Parking lights and other accessories are always operated on current obtained from the battery.

The advantage of this system is that the rider can be completely independent of the state of charge in the battery for night driving.

When the switch is in the H position, no light can be obtained at the main bulb when the engine is not running, because in this position the bulb is not connected to the battery and no current is being produced by the generator.

In all the other switch positions the lamps are independent of engine speed, as they are connected to the battery through the headlamp switch.

It is recommended that the "H" position should be used on every possible occasion, as by this means no current is being taken from the battery. In addition to this, a small charge will also be given to the battery when the engine is running at moderate speeds.

NOTE: Go over all cables regularly, especially those leading to and from the Rectifier, and make sure that none of them is fraying. Should any show signs of doing so bind them at once with plenty of insulating tape and ensure that they are no longer able to flap about.

SPARKING PLUG. A Lodge HLN plug is fitted as original equipment. This plug will stand up to the maximum power output of the engine without pre-ignition and if the carburetter mixture is correct, little trouble should be experienced. The sparking plug gap should be checked every 2,000 miles and reset to .020". It is a good plan to carry a spare plug of the correct type so that when the plug in use requires cleaning, it can be removed and the clean spare inserted in its place. Keep the spare plug well wrapped up to protect the all important points.

TO ENSURE BEST PERFORMANCE AND MINIMUM TROUBLE, ALWAYS FIT THE SPARKING PLUG RECOMMENDED BY US.

CLEANING THE PLUG. Wash in petrol, scraping insulator with a knife or rubbing with a fine emery to remove carbon and wash again. The electrodes should be very carefully scraped. DO NOT rub a wire brush over the points — this will have a ruinous effect. Set point gaps to .020" by tapping OUTSIDE electrodes — NEVER attempt to bend the central electrode.

Do not over tighten the plug in the cylinder head; this may result in stripped threads and flattening of the rolled copper washer.

BRIDGING OF PLUG GAP. This occurs in the form of a deposit between the central electrode and earth points causing a short circuit and preventing a spark. It is some-times mistaken for oiling-up but the cause is believed to be the residue of detergent in varying percentages in oils. It might also be "wet carbon" bridge, carburetter rich or carburetter flooding; or a lead Bromide bridge — high plug temperature — weak mixture.

The high working temperature of a two-stroke engine appears to be the reason for this bridging and it follows that a weak mixture, retarded ignition, a choked exhaust system or anything likely to increase the working temperature may result in bridging. Attention to the following will result in an increased mileage before it becomes necessary to clean the points.

- (a) Ensure ignition timing is correct and contact breaker gap is .018".
- (b) The carburetter may be set to give a richer mixture.
- (c) The normal spark plug gap should be increased as much as possible consistent with easy starting and good running.

Poor condition of the contact breaker points and connections may lead to spark failure.

IMPORTANT

Provided that the negative battery lead is suitably insulated, and the wiring is in good condition, no damage to the Rectifier will occur if the engine is used without the battery. It should, however, be clearly understood, that the switch should not be put to the "PARKING" position whilst the engine is running.

BATTERY MAINTENANCE.

Deterioration soon sets in if the battery is left standing without attention for any length of time. To keep the battery in good condition, maintenance must be carried out whether the machine is in use or not.

Every month (every fortnight in summer), remove battery from the machine clean terminals, and top-up the three cells to $\frac{1}{8}$ " above the level of the plates with distilled water—NOT tap water, as this contains impurities detrimental to the battery. Pour the distilled water through a glass funnel or syringe.

Many lighting troubles can be traced to unseen corrosion between the surfaces of the battery terminals; the positive is earthed to reduce this effect to a minimum, but keep the terminals clean. A little grease smeared on them will help prevent corrosion. Do not keep distilled water in receptacles made of any kind of metal as this will quickly render it impure—make use of a clean glass bottle or jar. Rainwater collected in a jar makes a satisfactory substitute for distilled water.

NEVER bring a naked light near a battery with vent plugs removed or when the battery is being charged; the gas given off by the electrolyte is dangerously explosive.

Battery acid is highly corrosive; therefore throw away any cleaning rags used to clean the battery lest their use on other parts of the machine causes damage.

NEVER let a battery completely run down; if this does occur, get it charged as soon as possible, or its length of life may be seriously shortened.

Exhaust System and Silencer

The exhaust gases of two stroke engines contain vaporised oil which forms a deposit inside the exhaust pipe and silencer. After a considerable mileage the accumulation of carbonised oil may impair performance and it is, therefore, advisable to remove the exhaust system for cleaning. This can be done by first unscrewing the exhaust pipe attachment bolt at cylinder, and then the silencer fixing bolt: thus the two components can be separated. The whole system may then be flushed out by pouring in a solution of household detergent and boiling water. In severe cases caustic soda may be used, but great care should be taken to avoid damage to the chromium plating. The flushing process should be repeated two or three times to remove all carbon and oil deposits.

IMPORTANT. The slots located in the rear end of the silencer must be kept clear of carbon deposit, due to the fact that a stoppage will impair performance.

Specification

Engine	15T two-stroke unit.
Cubic Capacity	149 cc. (9.0 cu. ins.).
Stroke	62.69 mm. (2.468").
Bore	55 mm. (2.167").
Rebore Sizes	+0.015", +0.030".
Compression Ratio	7 to 1.
Ignition Timing	Points commence to open $\frac{3}{32}$ " (20 $\frac{1}{2}$ °) before T.D.C.
Contact Breaker Gap	.018" maximum.
Sparking Plug Type	Lodge HLN.
Sparking Plug Gap	.020".
Correct Lamp Bulbs (A.C. Direct lighting)	Head-main 6v. 24/24w. twin filament, pre-focus. Head-pilot 2.5v. 2a. Tail (twin) 6v. 1.8w. Speedo 6v. 1.8w.
Carburettor	Type: Amal 375/37. Size of main jet: No. 110. Taper needle: No. B. Normal needle setting: 2nd notch from top. Choke size: $\frac{1}{8}$ ".
Sprockets	Engine: 18 teeth. Clutch: 43 teeth. Gearbox: 16 teeth. Rear: 46 teeth.
Chains	Primary: Renold $\frac{3}{8}$ " x $\frac{1}{2}$ " x .225" pre-stretched. 58 links. Rear: Renold $\frac{1}{2}$ " x .335" x .205". 118 links.
Rear Chain Adjustment	Unladen: $\frac{3}{8}$ " to 1" whip. Laden: $\frac{3}{8}$ " to $\frac{1}{2}$ " whip at tightest point.
Gearbox Ratios	1, 1-33, 2-57 to 1.
Overall Gear Ratios	Bottom: 15:1 : 1. Second: 8.58 : 1. Top: 5.84 : 1.
Engine Bearings	Driveside (2) SKF-RLS6. Timing side (1) Torrington JH-1612.
Big End Bearings	Rollers: $\frac{1}{2}$ " dia. x $\frac{3}{8}$ " long (8 caged rollers) $\frac{1}{4}$ " dia. x $\frac{3}{8}$ " long.
Hub Bearings	Front Cup and Cone: 20 balls $\frac{1}{4}$ " dia. Rear Journal: 15 x 42 x 13 mm. Skefko 6302.
Steering Head Bearings	Top: 17 balls $\frac{1}{8}$ " dia. Bottom: 17 balls $\frac{1}{4}$ " dia.

Wheel Rim Sizes	Front and Rear: WM1 18.
Tyre Sizes	Front and rear: 3-00" x 18".
Tyre Pressures—Solo Pillion	Front 16 lbs. Rear 20 lbs. Front 16 lbs. Rear 28 lbs.
Spokes	Front N.S. (36): 6 $\frac{5}{16}$ " x 12 swg. Front O.S. (36): 7" x 12 swg. Nipples—front (36): .225" x 12 swg. Rear (36): 6 $\frac{9}{16}$ " x 10 swg. Nipples—rear (36): .250" x 10 swg.
Brake Drum Diameter	Front 4" (10.16 cm.). Rear 5" (12.7 cm.).
Total Braking Area	11 $\frac{1}{2}$ sq. ins. (76 cm ²).
Fuel Tank Capacity	2 $\frac{1}{4}$ Imperial gallons (10.2 litres).
Fuel Mixture	Refer pages 9 and 10.
Oil Capacity of Gearbox	Approx. 22 fluid oz. Fill to oil level mark on dipstick.
Oil Capacity of Primary Case	Approx. 22 fluid oz.
Speedometer	Smiths magnetic type, illuminated.
Speedometer Cable	Rear wheel drive, length 4' 7".
Wheelbase	49 $\frac{1}{2}$ " (125.8 cm.).
Seat Height	30" (76 cm.).
Ground Clearance	5" (12.7 cm.).
Width Over Bars	26" (66 cm.).
Overall Length	76 $\frac{1}{2}$ " (194 cm.).
Approx. Weight	171 lbs. (78 kilos).

TOOLS: The standard tool kit supplied consists of:

1 Plug Spanner.	1 Tyre Inflator.
1 Allen Key.	1 Cone Spanner.
2 Steering Head Spanners.	1 Feeler Gauge.
2 Tyre Levers.	

PLEASE NOTE: In order to meet normal requirements the following common tools should be added to your kit:

1 Screwdriver.	1 Adjustable Spanner.	1 Pair Pliers.
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Service Department

SPARES AND REPAIRS. Genuine James spare parts are obtainable from James Dealers almost everywhere. The name of the nearest stockist will be gladly forwarded on receipt of a stamped addressed envelope.

If a James Dealer cannot supply from stock, he will order specially. We can only supply direct in emergency or where no James Dealer is at hand. In such circumstances, please quote James Part Number as per Spares List, price 5/- (or enclose pattern) together with full frame and engine numbers. Owners in Great Britain and Northern Ireland should note that unless money is sent to cover order, (add 1/- in the £1 to cover packing and postage), we despatch C.O.D. post up to 15 lbs. Minimum C.O.D. postage is 2/-.

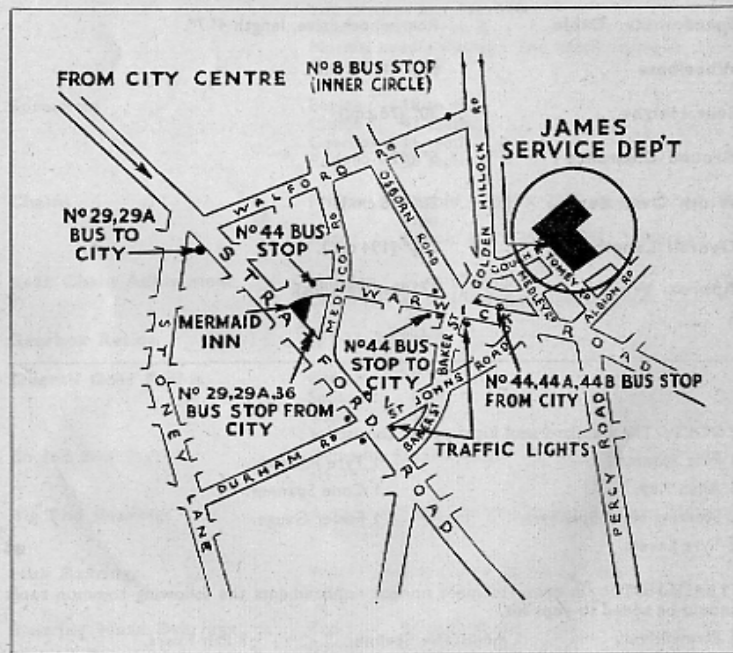
When ordering spare parts, owners are advised to produce the original part as pattern, and to quote their full frame and engine numbers to ensure identification.

Instructions regarding repairs should be clear and definite, otherwise the cost may be greater than expected. We shall be pleased to give estimates for repairs if parts are sent to us for that purpose. If the estimate is accepted, no charge will be made for the preliminary examination, but should the owner decide not to have the work carried out, a nominal charge may be made to cover the cost of whatever work may have been done to prepare the estimate. Parts sent to us as patterns or for repairs, should have attached to them a label with the sender's full name and address. Instructions regarding such parts should be sent separately.

Customers wishing to retain old parts which are replaced during overhaul or repair should state so before work commences, as normally such parts are scrapped upon removal.

If it is necessary to bring a machine, or parts, to the works for an urgent repair, it is essential that an appointment be made beforehand. This can be done by letter or telephone, and will avoid disappointment.

Orders should always be sent in list form and not as part of a letter.



GUARANTEE

NOTICE. We do not appoint agents for the sale on our behalf of our motor cycles or other goods, but we assign to motor cycle Dealers areas in which we supply to such Dealers exclusively for re-sale in such areas. No such Dealer is authorised to transact any business, give any warranty, make any representation or incur any liability on our behalf. Published retail prices are for delivery free of charge at Dealers' premises. All goods are offered for sale subject to the price ruling at the time of delivery. All prices and specifications are subject to alteration without notice.

TERMS AND CONDITIONS OF SALE AND GUARANTEE

- In this Guarantee the word "machine" refers to the motor cycle, scooter, motor cycle combination or sidecar as the case may be purchased by the Purchaser.
 - In order to obtain the benefit of this Guarantee, the Purchaser must correctly complete the attached registration form and return it to us within fourteen days of the purchase.
 - We will supply, free of charge, a new part in exchange for, or if we consider repair sufficient, will repair free of charge any part proved within six months of the date of purchase of any new machine, or within three months of its renewal or repair in the case of a part already renewed or repaired, to be defective by reason of our faulty workmanship or materials. We do not undertake to bear the cost of fitting such new or repaired part or accessory.
 - Any part considered to be defective must be sent to our Works, carriage paid, accompanied by the following information:—
 - Name of purchaser and his address.
 - Date of purchase of machine.
 - Name of dealer from where the purchase was made.
 - Engine and Frame numbers of machine.
 - This Guarantee shall not extend to defects or damage appearing after misuse, neglect, abnormal stress or strain, or the incorporation or affixing of unsuitable attachments or parts and in particular:—
 - Hiring out.
 - Racing and Competitions.
 - Adaptation or alteration of any part or parts after leaving our Works.
 - The attaching of a sidecar in a manner not approved by us or to an unsuitable motor cycle.

This Guarantee shall not extend to machines whose trade mark, name or manufacturing number has been altered or removed, or in which has been used any part not supplied or approved by us, or to tyres, saddles, chains, speedometers, revolution counters and electrical equipment or to parts supplied to the order of the Purchaser and different from our standard specification.
 - Our liability and that of our dealer who sells the machine, shall be limited to that set out in paragraph 3, and no other claims including claims for consequential damage or injury to person or property, shall be admissible.
- All other conditions and warranties statutory or otherwise and whether express or implied are hereby excluded and no guarantee other than that expressly herein contained applies to the machine to which this Guarantee relates or any accessory or part thereof.

REPAIRS GUARANTEE

- Whilst the highest standard of workmanship and materials is aimed at, we cannot accept liability for any defects appearing more than three months after the machine, assembly or component has left our Works after being repaired.
- We will repair or replace at our option free of charge any defective work, materials or parts relating to the repairs carried out by us appearing within that time but shall not be under any further or other liability for any other loss or damage whether direct or consequential and our liability shall be limited to the cost of so making good.
- We do not accept liability in respect of parts of proprietary manufacture, e.g. tyres, saddles, chains, speedometers, revolution counters and electrical equipment which may be used by us in effecting a repair. All other conditions and warranties statutory or otherwise express or implied are hereby excluded.

THE CURRAWAY

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TERMS AND CONDITIONS OF SALE AND WARRANTY

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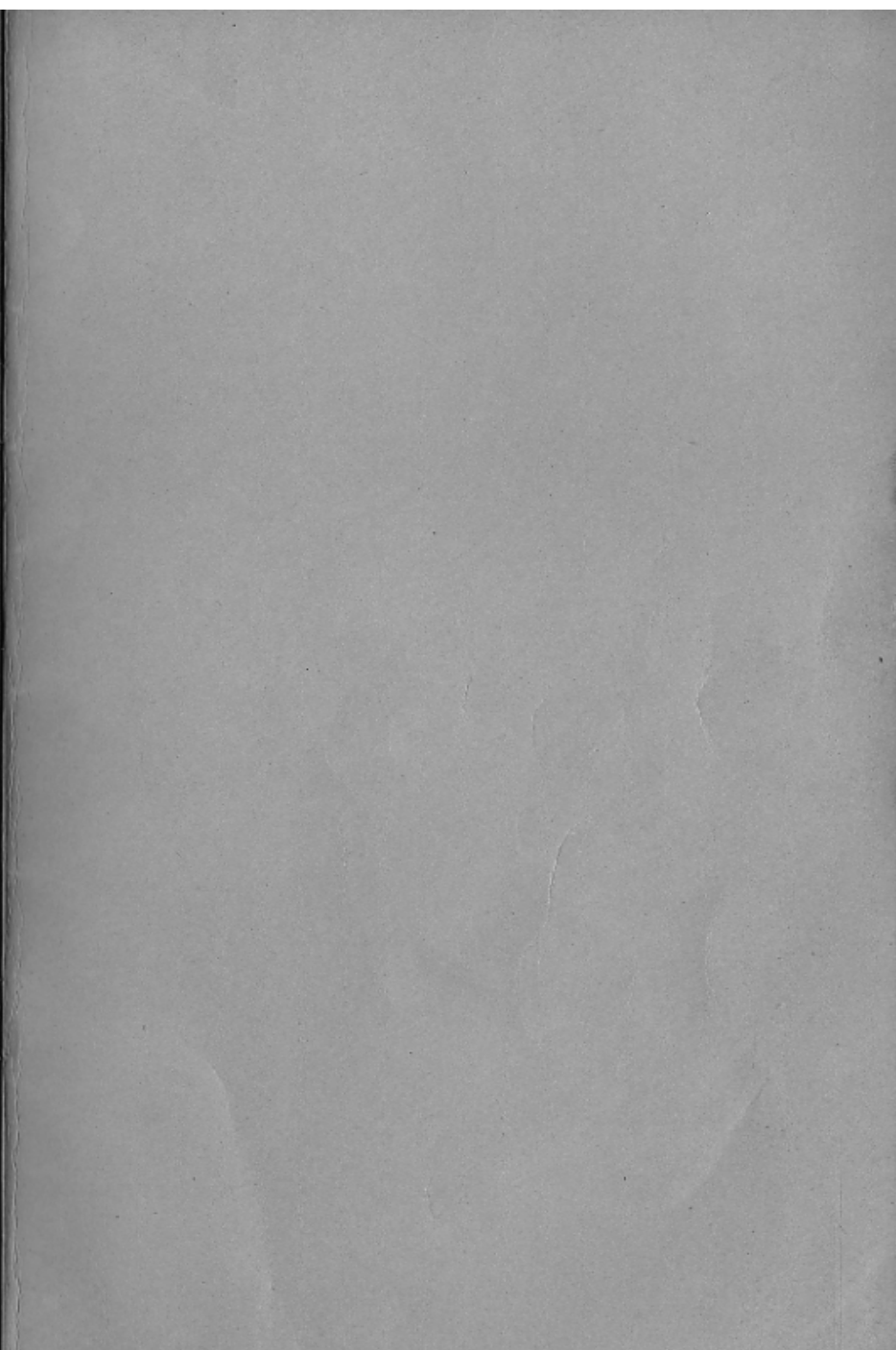
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James Publication No. L15A/3M
Reprinted September, 1961

PRINTED IN ENGLAND