

MAINTENANCE MANUAL
and
PROVISIONAL SPARES LIST

Norton

REG. TRADE MARK

ELECTRA

Publication P100

NORTON MOTORS LIMITED

PLUMSTEAD ROAD, WOOLWICH, LONDON, S.E.18
ENGLAND

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THE UNAPPROACHABLE

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Telephone: Woolwich 1223

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Data

ENGINE	Type, twin cylinder O.H.V. four stroke Bore 66 mm. (2.599") Stroke 56 mm. (2.205") Cubic capacity 192 cc (11.67 cu. in.) per cylinder Total capacity 384 cc (23.35 cu. in.) Compression ratio 7.9—1
TAPPET CLEARANCE COLD	Inlet .004" Exhaust .006"
VALVE SPRINGS (free length)	Inner 1.437" Outer 1.515"
IGNITION TIMING	Before T.D.C. fully advanced 30°
CONTACT BREAKER	Points gap .012" (.305 mm.) Sparking plug KLG type FE80 Sparking plug points gap .020" to .025"
CARBURETTER	Amal Monobloc 375 Choke size $\frac{3}{8}$ " Main jet 190 Needle jet 105 Pilot jet 25 Throttle valve No. 3 Needle taper B Needle position 4
TRANSMISSION	Gearbox ratios 1.0, 1.22, 1.68, 2.69 Engine sprocket 22 teeth Clutch sprocket 46 teeth Gearbox axle sprocket 19 teeth Integral brake drum sprocket 52 teeth Overall ratios 5.72, 6.98, 9.62 and 15.4 to 1 Primary chain $\frac{3}{8}$ " pitch Duplex, 66 pitches Rear chain $\frac{1}{2}$ " x .305" x 120 rollers Brakes — Front 8" dia. (203.2 mm.) x $1\frac{1}{4}$ " wide (31.7 mm) Rear 7" dia (177.8 mm.) x $1\frac{1}{4}$ " wide (31.7 mm.) Tyre Pressures — front 24 lbs p.s.i. 1.687 kg rear solo 23 lbs p.s.i. 1.617 kg rear with passenger 30 lbs p.s.i.
GENERAL DIMENSIONS	Seat height (laden) 29" Ground clearance (laden) $5\frac{1}{2}$ " Wheelbase $51\frac{1}{2}$ " Overall width 27" Overall length 80" Overall height 40" Weight 375 lbs
CAPACITIES	Fuel tank 3 gallons (13.7 litres) Oil tank 5 pints (2.8 litres) Gearbox $2\frac{1}{2}$ pints (1.25 litres) Chain case $\frac{1}{2}$ pint (.28 litres) Fork leg (one) 5 ozs (142 cc.)

Introduction

YOUR NORTON MOTOR CYCLE unquestionably provides one of the most healthy, economical and pleasant means of transport. In addition, by reason of its superb braking, high power to weight ratio and ease of control it is, if used with due care, one of the safest vehicles on the road.

It is our sincere desire that every owner should obtain from his mount the service, comfort and innumerable miles of low cost travel that we have earnestly endeavoured to build into it.

It must be borne in mind, however, that although of simple design and construction it is nevertheless a highly specialized piece of engineering and must in consequence be intelligently and efficiently maintained in order to provide unflinching reliability.

In this book we provide non-technical instructions for carrying out all the maintenance operations likely to be called for in normal service, together with assisting illustrations.

To owners of long experience we tender apologies for the elementary nature of some of the contents of this handbook, but owners, whether novice or expert, are advised to read the contents from beginning to end.

We are at all times pleased to give owners the full benefit of our wide experience in matters relating to motor cycles of our manufacture and elsewhere will be found details of the particulars required when making enquiries of our Service Department.

Cleaning the machine

Do not attempt to rub, or brush, mud off the enamelled surfaces because this will soon destroy the sheen of the enamel. Mud, and other road dirt, should be soaked off with water.

The best method is to use a small hose, taking care not to direct water on to the engine, carburetter, magneto and other such parts. As a poorer substitute, a pail of water and a sponge may be used.

After washing down with water, the surplus moisture should be removed with a chamois leather, and, when the enamelled surfaces are thoroughly dry, they may be polished with a good wax polish and soft dusters.

Such parts as the engine crankcase and the gear box can be cleaned by applying paraffin with a stiff brush, and, with a final application of petrol, will come up like new.

Controls

- Petrol Filler** Located in top of tank. To release, press down, turn anti-clockwise and lift off.
- Petrol Tap** Left hand side beneath tank. Provides reserve supply for around five miles. Pull horizontally for normal supply, twist knob and pull further out for reserve.
- Oil Tank** Cap operates in same manner as petrol cap.
- Throttle Twist Grip** On Right handlebar. Rotate inwards to open.
- Air Lever** On Right handlebar. Close for starting from cold. Should be opened as soon as engine temperature permits and remain open till required closed for cold starting.
- Tickler** To flood carburetter when starting from cold, depress plunger on carburetter.
- Kickstarter** Vertical pedal on Right side of machine behind footrest.
- Clutch Lever** On Left handlebar. Pull towards bar when engaging gear. Release gradually to move off.

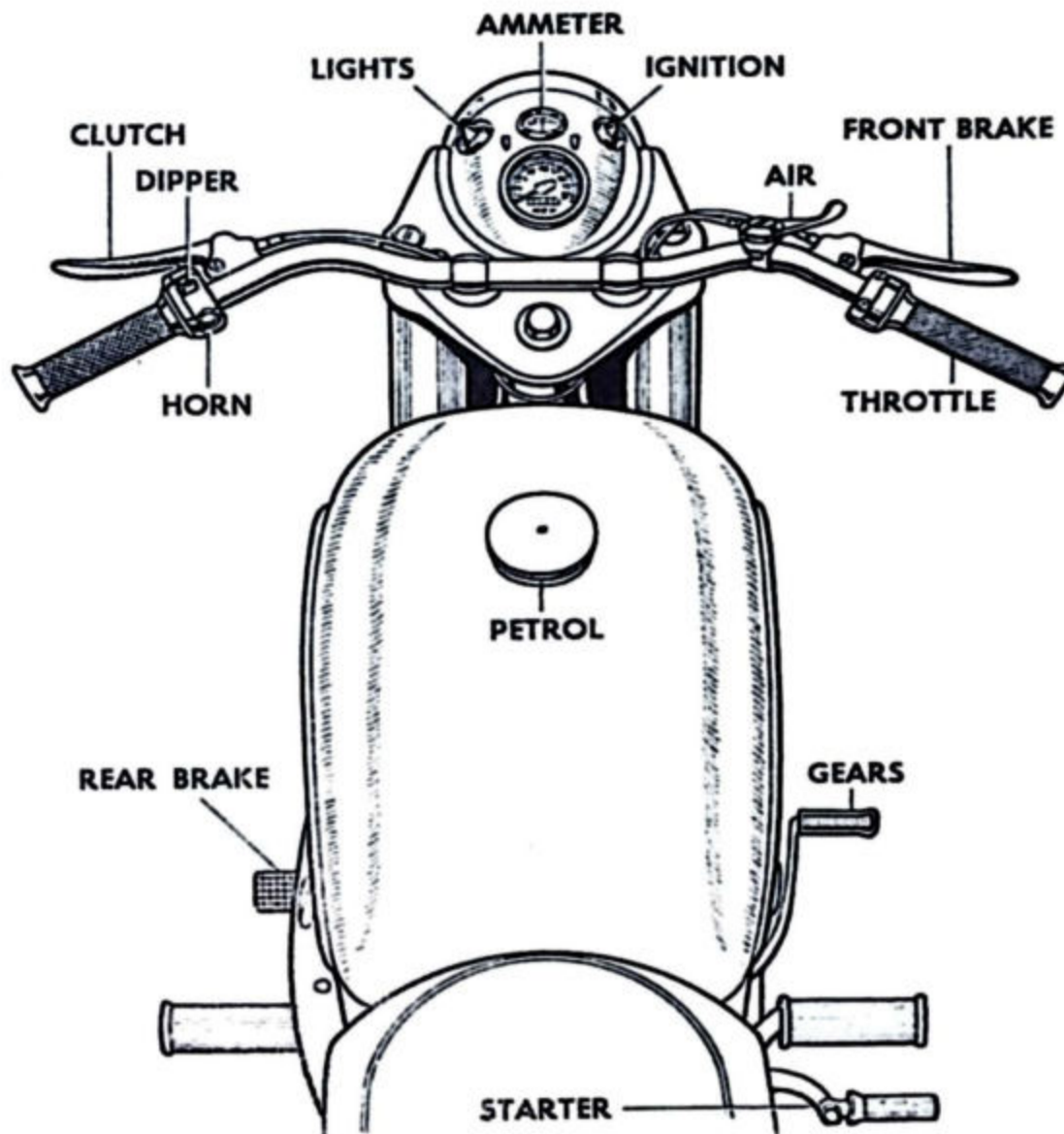


FIG. 1
Plan of Machine showing Controls

Gear Change Lever	Horizontal pedal on Right side of machine near footrest. Raise to engage bottom gear from neutral. Depress to engage a higher gear and vice-versa.
Front Brake Lever	On Right handlebar. Grip to bar to apply. Use in conjunction with Rear Pedal.
Rear Brake Pedal	On left side of machine near footrest. Depress with left foot to apply. Use with discretion.
Light Switch	Left hand switch in top of headlamp. "OFF" when handle in line with machine. Rotate clockwise for high beam and anti-clock for low.
Ignition Switch	Right hand switch in top of headlamp. Rotate clockwise for normal starting and running. Rotate opposite way for emergency starting (flat battery).
Dipper Switch	On left handlebar. Deflects main beam to avoid dazzling approaching drivers.
Horn Push	Small plastic knob below dipper on left handlebar. Push to sound horn.
Direction Light Switch	Attached to right side handlebar.
Starter Switch	Incorporated with the dip switch on left hand handlebar. Depress RED button to operate.

Starting the Engine

With the gear lever in the neutral position:—

Ensure there is sufficient fuel in the petrol tank also that the oil level is TWO inches below the oil tank filler cap orifice.

Pull outwards the plunger on the petrol tap, turn ignition switch clockwise. When starting with a cold engine, fully close the air lever. Depress once or twice the plunger on the carburettor float chamber and set the twist grip a trifle away from the fully closed position. Depress the starter switch to start the engine. When the engine has started, open the throttle to give a fast idling speed then move the air lever into the fully open position. If the engine tends to "spit back" through the carburettor close, or partially close the air lever until the engine temperature rises, then fully open the air lever.

To operate the kickstarter carry out the procedure previously described (without using the starter switch) and give the kickstarter a long swinging kick to the limit of its travel, when the engine will start.

NOTE When the temperature is in the region of 32° F (zero centigrade) or lower, rotate the engine with the kickstarter a few times to free off the engine before using the self starter switch.

Stopping the Engine

Close the throttle until the engine is "ticking over" and turn the ignition switch in an anti-clockwise direction until it lies approximately in line with the machine. Turn off the petrol if the machine is to be left for anything more than a few minutes.

Notes on Driving

If, at first, the lowest gear will not engage, release the clutch lever and after a second or two, make another attempt. This condition may exist in a new machine, but tends to disappear after a little use.

Always endeavour to make the movements of hand (on the clutch) and foot (on the gear pedal) as simultaneous as possible, and remember, in all gear changes, a steady pressure of the foot is desirable. This pressure should be maintained until the clutch is fully released. It is not sufficient just to jab the foot pedal and then release the clutch lever.

When actually in motion, it will be found sufficient to merely free the clutch a trifle, to ease the drive when changing gear and, with reasonable care, changes of gear then can be made without a sound.

Do not unnecessarily race the engine or let in the clutch sufficiently suddenly to cause the rear wheel to spin. Take a pride in making a smooth, silent get-away.

When changing up to a higher gear, as the clutch is freed, the throttle should be slightly closed so that the engine speed is reduced to keep in step with the higher gear ratio. Conversely, when changing down to a lower gear, the throttle should be regulated so that the engine speed is increased to keep in step with the lower gear ratio.

Do not slip the clutch to control the road speed.

The clutch is intended to be used only when starting from a standstill and when changing gear. It must **NOT** be operated to ease the engine, instead of changing gear, or be held out, in order to "free-wheel".

When travelling slowly, such as may occur in traffic or on a hill, and the engine commences to labour, it is then necessary to change to a lower gear. Engine "knocking" or "pinking" and a harshness in the transmission are symptoms of such labour. A good driver is able to sense such conditions and will make the change before the engine has reached the stage of distress. The gear box is provided to be used and consequently full use should be made of the intermediate gears to obtain effortless running and smooth hill climbing.

Keep the feet clear of the brake and gear pedals when not actually using them and keep the hand off the clutch lever when not in use.

Drive as much as possible on the throttle, making the minimum use of brakes.

When using the machine on wet or greasy roads, it is generally better to apply **BOTH** brakes together, because sudden or harsh application of either brake only, under such conditions, may result in a skid.

In all conditions, it is advisable to make a habit of always using both brakes together rather than habitually using the rear brake and reserving the front brake for emergency.

Running in the Engine

Selective assembly of parts, such as pistons, cylinders and big end assemblies, etc., are used in the process of manufacture. It is an established fact that if the engine, when new, is run in as should be, engine trouble or seizures will not occur.

It is a natural desire to learn the capabilities of one's machine, similarly it can be irritating to be overtaken by a rider of a machine fitted with a smaller capacity engine. Nevertheless, the owner of a new machine must, in his own interest, strictly adhere to the principles of running in, which will result in a quieter engine, with a better performance than a similar machine owned by a rider who is unwilling to drive with restraint during the initial stage of running in.

The load imposed on the engine is governed by the amount of throttle that is used, and the makers of your machine, know from experience, that if the throttle or twist grip is not opened in excess of *one-third of its total movement* for the first 1,000 miles independent of road speed, the engine cannot be overloaded.

After this distance the amount of throttle can be progressively increased until the machine has covered 2,000 miles.

For convenience a limit mark can be used on the twist grip and grip body.

The recommendation of limiting the road speed to 30 m.p.h. is most unsuitable for running in, for with this principle the machine could be driven up hill in top gear at 30 m.p.h. and to do so three-quarter or full-throttle would be used, which could seriously and unnecessarily overload the engine.

Special attention must be given, during the running in period, to such details as valve rocker adjustment, chains, brakes, contact breaker points, and steering head bearings, all of which tend to bed down in the first hundred miles or so. Particular note must be made of the adjustment of steering head bearings, which, if run in a slack condition, will be quickly ruined. After this bedding down process has taken place, adjustments to such details will only be necessary at lengthy intervals.

Do not overlook instructions for changing oil.

Lubrication

A vital factor in the life and satisfactory performance of your motor cycle is the regular use of the correct grade of good quality lubricant. At the works Wakefield Castrol Oils have been used exclusively for many years with perfectly satisfactory results. The correct grades for your engine being:—

WAKEFIELD CASTROL XXL FOR SUMMER USE. (SAE40).

WAKEFIELD CASTROL XL FOR WINTER USE. (SAE30).

Other very suitable oils are:—

Shell—X—100—40 or B.P. Energol S.A.E. 40 for Summer use.

Shell—X—100—30 or B.P. Energol S.A.E. 30 for Winter use.

Mobiloil "BB" for Summer use. Mobiloil "A" for Winter use.

Essolube 40 for Summer use. Essolube 30 for Winter use.

Regent/Caltex { Advanced Havoline 40 for Summer use.
Advanced Havoline 30 for Winter use.

For conditions of extreme high temperature, i.e. equatorial or sub-equatorial, a grade heavier than that specified above may be used, whilst for conditions of extreme cold one grade lighter could be employed to advantage.

Note—As soon as possible after 500 miles have been covered, the oil tank should be drained, flushed out and filled with fresh oil. The filter in the base of the sump should also be removed and cleaned.

Gearbox. For normal climatic conditions the following oils should be used:—

Wakefields Castrol Grand Prix.

Shell—X—100—50 or B.P. Energol S.A.E. 50.

Mobiloil D.

Essolube 50.

Regent/Caltex Advanced Havoline 50.

For conditions of extreme cold one grade lighter should be used.

Oil is filled via the clutch cable inspection cover (two screws). The oil level screw is immediately below the inspection cover. Fill oil slowly, allowing time for it to settle, until the excess drains from the level hole.

Primary Chaincase. Engine oil should be poured in via the inspection hole until it commences to drip out at the level plug hole. This hole is sealed with a screw-driver headed plug, below the inspection hole.

Front Forks. 142 cub. cms. of S.A.E. 20 oil should be poured into each leg after draining off old oil and replacing drain plugs.

Hubs. Dismantle, clean and re-pack bearings with grease at approximately 10,000 mile intervals. For this application and for all points at which a grease nipple is provided the following greases are recommended:—

Wakefields Castrolcase medium, B.P. Energrease C3, Shell Retinax A, Mobilgrease M.D., Esso Multi Purpose grease H., or Regent/Caltex Marfak Multi Purpose 2.

General. Any point of relative movement between two or more parts not fitted with grease nipple or other means of lubrication will benefit from the occasional application of a few spots of oil, handlebar levers, cables, brake rod jaws are typical examples. Surplus oil and grease should be wiped off after application.

MAINTENANCE

Periodical Maintenance

Regular maintenance attention to lubrication and certain adjustments must be made to ensure unfailing reliability and satisfactory service. This necessary attention is detailed below and owners are strongly recommended to carefully follow these suggestions and to make a regular practice of doing so from the first.

DAILY

Oil tank Inspect oil level and top-up to top line level if necessary. Check oil circulation.

Petrol tank Check level and re-fill if necessary.

WEEKLY

Oil tank Check level and re-fill to top line level if necessary.

Tyres Check pressures and inflate if necessary.

EVERY 500 MILES

Oil tank Drain at first 500 miles and re-fill to top line level with new oil, and clean filter.

Ignition Check contact breaker points.

Gear Box Drain at first 500 miles and re-fill 2½ pints.

Chaincase Check level of oil when machine is standing vertically on level ground when level of oil should be just below bottom edge of inspection orifice. Fill up if level is low.

Battery Inspect each cell for level of electrolyte and top up with distilled water if necessary. Level of electrolyte should just be over top of plates. Beware of overfilling.

EVERY 1,000 MILES

Oil tank Drain at first 1,000 miles and re-fill with new oil.

Rear chain In wet weather remove and soak in molten grease.

Gear box Top up as required.

Hubs Inject small amount of grease.

Expanders Inject small amount of grease.

Small parts Smear all moving parts with engine oil and wipe off surplus.

Chaincase Drain, and refill, or monthly.

EVERY 2,000 to 5,000 MILES (according to road conditions)

Air Filter (If fitted) clean and re-oil filter element.

EVERY 3,000 MILES

Filter	Clean crankcase metal filter.
Rear chain	In dry weather remove and soak in molten grease.
Brake pedal	Inject small amount of grease.
Ignition	Clean contact breaker points and re-set if necessary.
Plugs	Clean sparking plugs and re-set points as necessary. When re-fitting reverse respective positions.
Steering head	Test steering head for up and down movement and adjust if necessary.
Bolts and nuts	Check all nuts and bolts for tightness and tighten if necessary but beware of over-tightening.
Rockers	Check O.H.V. rocker adjustment and correct if necessary.

EVERY 5,000 MILES

Oil Tank	Drain and re-fill with new oil. If machine is only used for short runs renew oil every three months instead of mileage interval.
Filters	Clean metal mesh filter in oil tank.
Ignition	Clean and adjust as detailed in Electrical section.
Front fork	Check each side of front fork for hydraulic fluid content and, if necessary, top up. Insufficient oil content is indicated by abnormally lively action.
Carburetter	Remove carburetter float chamber side cover and clean interior. Also detach petrol pipe banjo and clean gauze strainer.

Tools

The tools supplied with the machine are sufficient to carry out essential adjustments and such emergency work as may become necessary whilst riding. It is acknowledged that they do not include all tools necessary for a complete overhaul.

The tool kit comprises:

- Screwdriver.
- Feeler Gauges .002", .004" and .012" for valve clearance and contact breakers.
- 2 Tyre Levers.
- Box spanner for cylinder head nut.
- Wheel spindle and sparking plug spanner.
- $\frac{1}{4}$ " \times $\frac{3}{16}$ " Double ended spanner.
- $\frac{3}{8}$ " \times $\frac{1}{8}$ " " " "
- $\frac{1}{2}$ Whit. spanner.
- Allen key.
- Shock absorber spanner.
- Tommy bar.
- 6" pliers.
- 2 Allen keys for rocker covers and handlebar clip.

Additional tools listed in the spare parts list may be purchased from your Norton Dealer.

The Engine

1. Lubrication System

Operating on the dry sump principle, oil flows from the tank to the pump which forces it under pressure to the big ends and thence to other parts of the engine. It drains down to the lowest point of the crankcase, is picked up by the pump and returned to the oil tank. The outer oil pipe below the crankcase is the oil feed pipe.

2. Oil Filters

There are three gauze filters in the lubrication system, one attached to the oil feed pipe adaptor screwed into the base of the oil tank. This should be cleaned when the tank is drained at 2,000—3,000 mile intervals. A second small filter is attached to the pressure release valve body, a hexagon pillar screwed into the inside of the timing cover (Fig. 6). This should be examined whenever the timing cover is removed. The third and main filter is in the base of the crankcase, accessible from underneath and held by four nuts, it should be removed and cleaned every time the oil is renewed.

3. Oil Pump

Worm driven from the mainshaft, the pump consists of two pairs of gears, one for feeding oil into the engine, the other for returning it to the tank. This latter pair have about twice the capacity of the input gears in order to ensure that the crankcase is free from excess oil when the engine is running. To check that oil is in circulation, remove the oil tank filler cap and oil will be seen entering from the top of the tank in an intermittent bubbly stream.

The oil pump will give trouble-free service for many thousands of miles.

4. Oil Level

Remove the oil tank filler cap by pressing down and turning anti-clockwise and lift off. The correct oil level is two inches below the oil tank filler orifice. Provision is made to observe the oil in circulation. It is advisable to do so before each run. With filler cap removed and the engine running, oil returning from the sump can be seen emerging from the return pipe inside the tank. It is preferable to make this check when the engine is cold and has been stationary, when the oil return flow will be most positive and continuous. If the oiling system is deranged it will be apparent by a lack of a steady return flow. Run the engine for a few minutes to scavenge the sump, before topping up the oil tank.

5. Oil Circulation

The oil pump makes an oil tight connection with the timing cover by means of a synthetic rubber washer under compression. Oil from the pump is fed to the crankpins via the timing side mainshaft, an extension of which runs in an oil seal mounted in the timing cover. Surplus oil escaping from the pre-set pressure release valve builds up a level in the timing cover to lubricate the timing gears, subsequently over-flowing into the main crankcase. An external lead from the oil return pipe connection in the base of the tank conducts oil to the cylinder head where drilled oilways carry it to the rocker shafts from whence further holes and an external groove along the top of the rocker arm ensure adequate supplies to the rocker ball ends. This oil drains out via the push rod holes to lubricate the tappets and to augment oil flung from the big ends lubricating the cams and tappet feet. All the oil eventually draining through the sump filter to be returned by the pump.

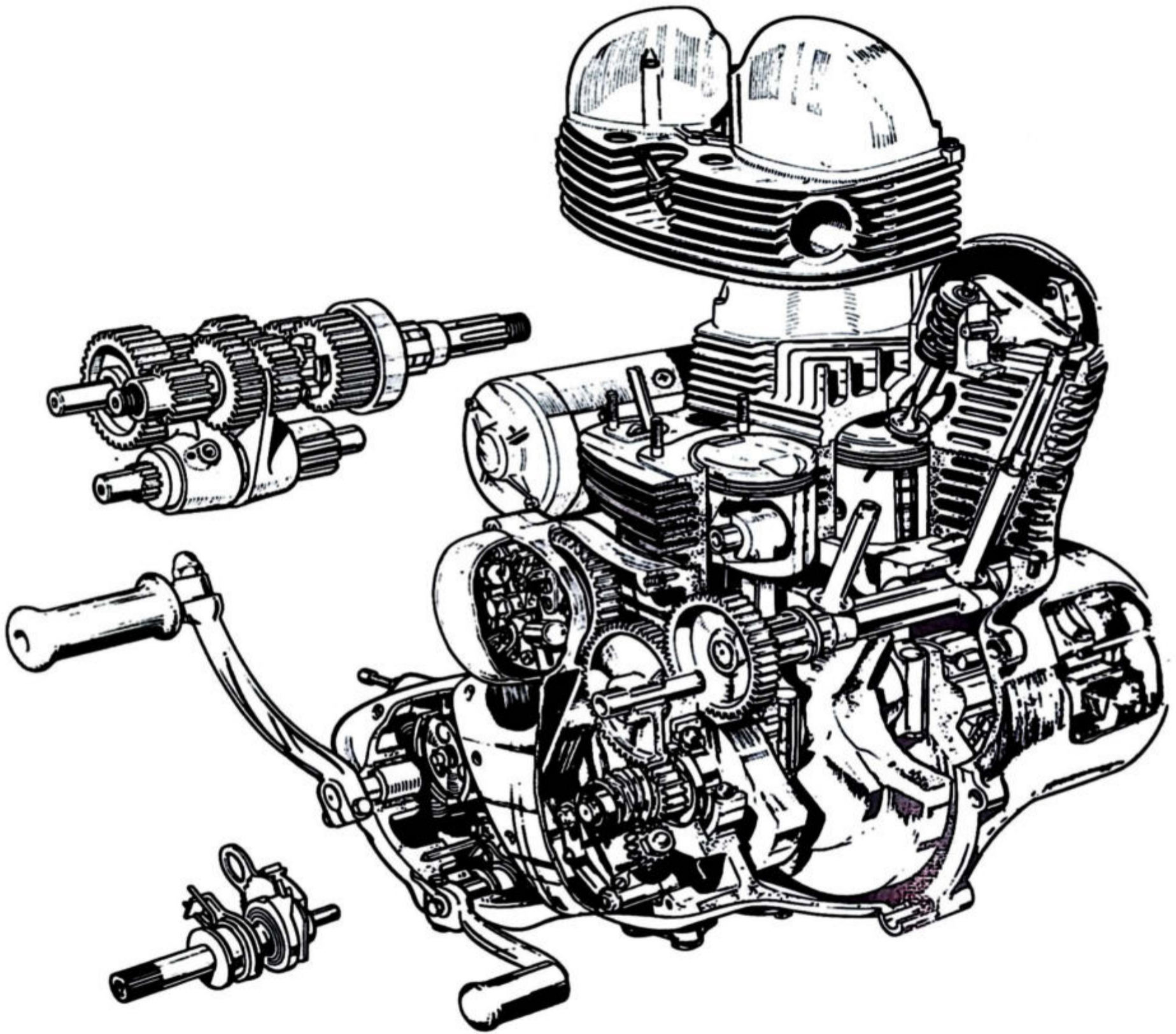


FIG. 2

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6. Seat and Petrol Tank Removal and Re-fitting

The riders seat is removed by releasing the two nuts of the top end of the rear suspension units. Lift the seat upwards and pull backwards to clear front mounting. Disconnect the petrol pipe from the petrol tap. The single bolt holding the petrol tank is now accessible and its removal enables the tank to be withdrawn from the rubber bushed peg protruding from the rear of the head lug. When replacing the tank, push right home on the front peg, (a little grease or water on the rubber bush will assist this operation) and line up the rear bolthole. Place the rubber washers in position as shown in Fig. 3. The shouldered bolt may be fully tightened. Re-connect petrol pipe.

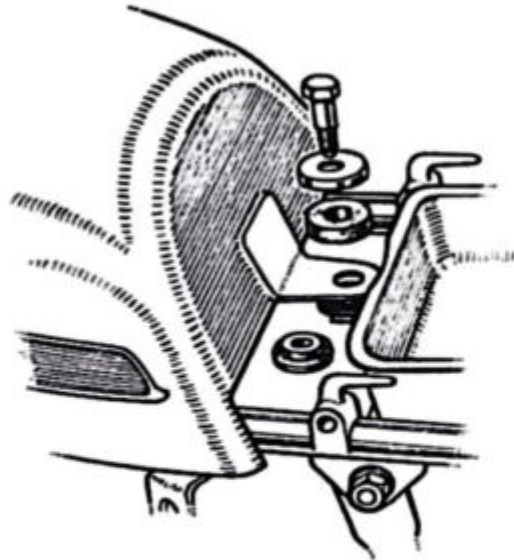


FIG. 3
Tank Bolt and Rubber Washers

7. Cylinder Head and Barrel Removal

Remove petrol tank, silencers and exhaust pipes. The carburetter may now be detached from the manifold and left suspended by its cables. Remove inlet manifold and engine steady stay from between cylinder head and front frame member, remove also high tension leads from sparking plugs. Accessibility of cylinder head bolts will be improved if the coils are detached from the top frame tubes. Remove the oil feed cross-over pipe being careful not to lose any of the fibre washers fitted either side the banjo connection.

Removal of the rocker covers each held by two Allen screws will make all cylinder head nuts accessible. There are six nuts per head—four obvious ones near the middle and one in the corner of each rocker chamber. The cylinder heads may now be withdrawn. Tapping with a mallet or block of wood beneath the inlet port, to break the joint if necessary. When the head has been lifted sufficiently, push the fingers beneath the joint face until the pushrods are felt. Hold them with the finger tips whilst the head is being lifted off. Copper and asbestos washers are fitted between head and barrel, if used again they must be fitted to the original joint and the same way round. Before lifting the cylinder barrel take some action to prevent the tappets dropping into the crankcase. A small rubber band wound round the top of each tappet is all that is necessary.

8. Decarbonisation

Instead of the usual stipulated mileage interval between periods of decarbonisation, it is recommended that this is undertaken only when the need becomes apparent because of loss in power, heavy petrol consumption or generally reduced performance.

When undertaken, unless it is thought necessary to inspect the pistons and rings, the cylinder barrels are left undisturbed.

Before starting this work have available a gasket set, and if the machine has covered considerable mileage, a new set of piston rings also.

Carbon formed on the piston crown and in the sphere of the cylinder head, can be scraped off with a cheap steel rule, with the sharp corners removed, or similar tool. Deal with the cylinder head before removing the valves, and do not use emery cloth or other abrasives for this work.

9. Valve Removal

A normal Universal type valve spring compressor, readily obtainable at most garages, is the only special tool necessary to remove and replace the valve springs. Its application will be self evident when the rocker has been swung out of the way. Each valve together with its springs should be carefully placed on one side so that it may be re-fitted in its original position. Inlet and exhaust valves are of different sizes and are therefore not interchangeable, but it would be possible to mix the two inlets or exhaust valves, which is most inadvisable.

10. Valve Grinding

From time to time it becomes necessary to re-grind the valve on to its seat to ensure a gas-tight joint. Examine the valve facing, if it appears deeply marked or pitted it will be necessary to have it re-faced, an operation most garages can readily carry out.

Lightly smear the seat portion of the valve with fine or medium grinding paste, lower the valve into position, hold the end of the stem in a hand chuck and oscillate as rapidly as possible, raising the valve off the seat occasionally and placing it in a different position. As soon as there is a complete ring of grinding marks on both valve and head, cease operations and wash off all traces of grinding compound. Seats that are badly pitted or distorted may require re-cutting before the grinding operation.

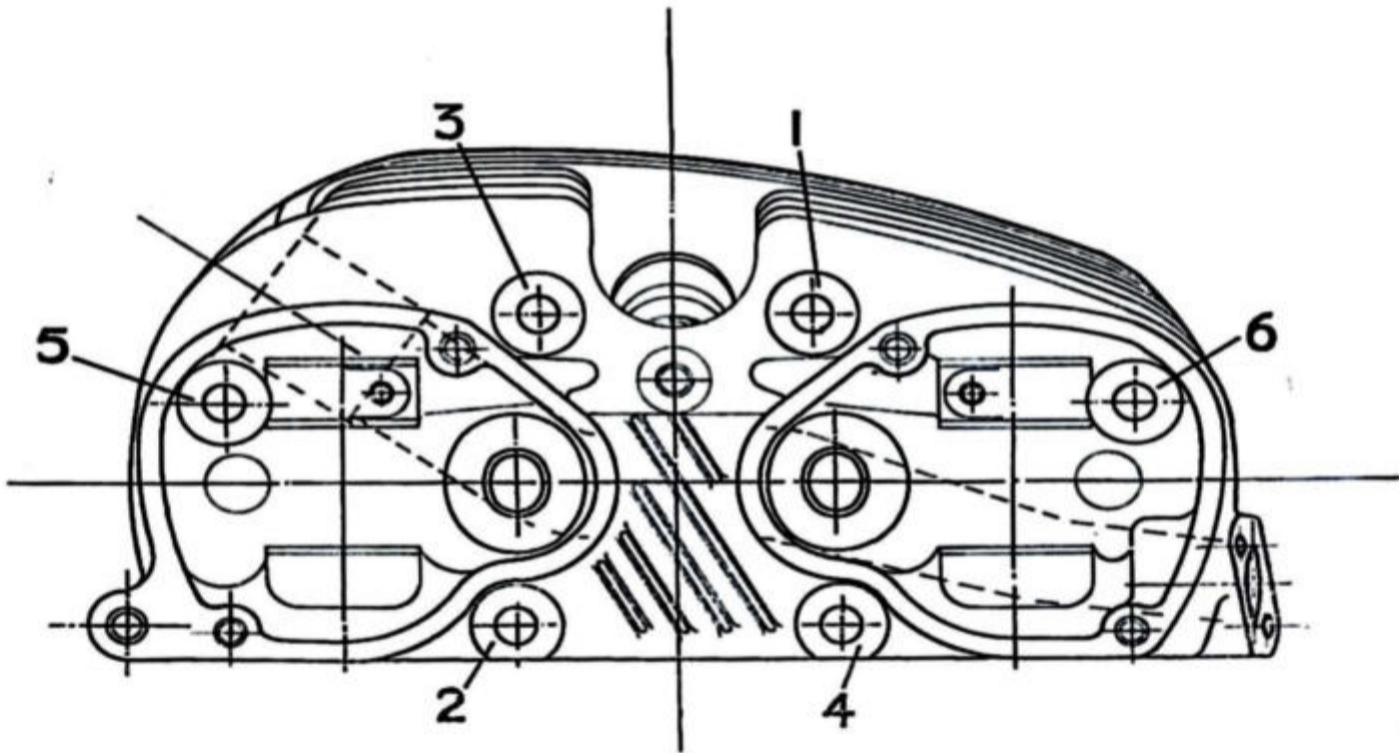


FIG. 4
Sequence of tightening Cylinder Head nuts

11. Valve Guide Removal

Both valve guides are an interference fit in the cylinder heads and located by an external circlip. The cylinder head must be gently and uniformly heated before the guides are removed.

In this condition drive out the guide from inside the port sufficient to enable the circlip to be prised out.

Remove carbon deposit from guide, pre-heat the head and drive the guide out downwards through the port. The head must also be heated when refitting the guide.

It may be necessary to recut the valve seat with a suitable cutter when new guides are used.

12. Valves—Fitting

Thoroughly clean valve seats, valve spring chambers and all loose components. Place heat resisting washer in base of compartment followed by the bottom cup, both springs and the top collar. Lubricate valve stem and insert into guide. Compress the valve spring and fit cotters. A smear of thick grease on the inside of each cotter will hold it in position while the spring is fitted.

13. Valve Clearance Adjustment (Inlet .004", Exhaust .006")

The rocker assembly is shown in fig. 5. Releasing the self locking nut for the clamp pin allows the eccentric rocker spindle to be moved, to either increase or decrease the valve rocker clearance. With both rocker covers removed, deal with the right side cylinder first by rotating the engine until the inlet valve on the left side cylinder is fully opened. Release slightly the nut for the rocker clamp pin, turn the rocker spindle for the right side inlet valve until the rocker moves away from the valve. Using the feeler gauge supplied with the tool kit, place the feeler on the valve end, then turn the rocker spindle in the reverse direction until the rocker just 'nips' the feeler gauge, tighten the clamp pin nut (do not use undue force). Rotate the engine until the left side exhaust valve is fully opened, repeat the process. Deal with the left side cylinder in a similar manner, then re-check all rockers to verify clearance is correct.

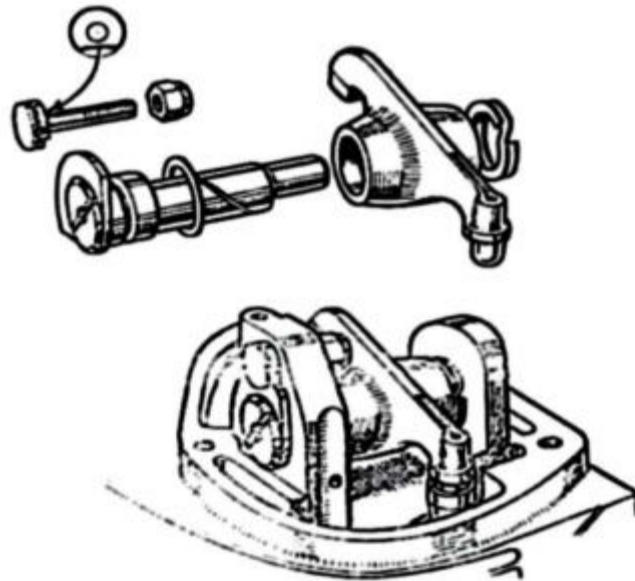


FIG. 5
Rocker Adjustment Details

14. Rocker Removal and Refitting

The rocker and spindle dismantled (fig. 5) is self explanatory. The rockers can be removed with the cylinder head in situ when the oil passages in the rocker posts and spindle can be checked for obstruction. The rockers must be refitted to the original position as they are 'handed' in relation to the quadrant and eccentric portion of the spindle, the four rockers are identical. The small hole in the rocker post for the rocker spindle has an alloy bush, which is not subject to wear. Running the engine with the rocker clamp pin insecurely tightened will cause ovality in the bush aperture, or cause the bush to come loose.

15. Piston Removal

When the cylinder has been removed, position both pistons on top of the stroke. Fill the aperture between the piston and crankcase throat with clean rag. Both pistons are identical and should be refitted in the original position and should be suitably marked for location upon removal, preferably inside the piston skirt viz LF (left front) or RF (right front). Using round nosed pliers extract one of the gudgeon pin circlips and push out the gudgeon pin. Usually the gudgeon pin is a close fit in the piston, in which case, heat applied to the piston in the form of an electric iron on the piston crown, or rag steeped in boiling water (applied in relays) will cause heat transference sufficiently to expand the piston, when the gudgeon pin can be pushed out with ease. Avoid the use of a drift and if difficulty exists, there may be a burr formed alongside the circlip recess, which is removed by a scraper or similar tool.

16. Piston Ring Removal and Fitting

Piston rings should not be removed without good reason. If one or more are discoloured (indicating gas leakage) replacements are required. The use of three narrow tin strips equi-spaced between the rings and the piston will facilitate removal.

Carbon formed in the piston ring grooves behind the rings should not be removed, unless new rings are fitted, when all traces of carbon should be removed. The normal ring gap (checked in the unworn portion of the cylinder) is between .006" and .008". Renew rings when the gap exceeds .016".

The top compression ring is chromium plated and taper faced, the second ring is also taper faced, they are etched with either the word VACROME or TOP on one side of the ring to indicate location in the piston.

17. Refitting the Pistons

Fit new circlips, using a rotary motion, with the 'ears' or projections at 6 o'clock in the pistons. Apply a little clean oil on the gudgeon pins then ensure the circlips are correctly located in the recess.

18. Refitting the Cylinder

Use a new cylinder base gasket and discard the tappet retainers. As a one piece cylinder is used, the assistance of a second person is desirable to hold the cylinder whilst the pistons are introduced. With the circlips located as above, pass a length of $\frac{3}{8}$ " diameter steel rod through both gudgeon pins to steady pistons, the piston rings can then be compressed to enter the cylinder bores. Remove the rag from crankcase throat if still in position, gently lower the cylinder barrel. The cylinder head gaskets must be undamaged. With the cylinder head laid on its side, insert the push rods in the tunnels, with sufficient protrusion to enable them to be held by the fingers whilst the head is placed into position. Ensure both push rods are correctly located in the tappet cup and rocker ball end. Refit the head nuts and washers, tighten lightly then finally tighten in the sequence shown in fig. 4.

19. Timing Cover and Gears Removal

Remove the domed cap on the timing cover by taking out the two screws. The contact breaker base plate is retained by two screws through the elongated slots, also by two hexagon posts which, when removed, will allow the plate to be extracted.

Disconnect the two wires at bullet terminals beneath the petrol tank. The cam operating the contact breaker is a taper fit on the camshaft. Remove the cam retaining bolt, use a withdrawal bolt Part No. 06508 in place of the fixing bolt to remove the cam. Remove 10 screws retaining timing cover, take off the cover with care, to avoid damage to the paper gasket. The timing gears are marked for correct assembly. Release the two nuts for the inlet and exhaust timing pinions, remove the nut for the oil pump worm drive LEFT HAND THREAD, take off the two cam wheel nuts, the three pinions can be extracted. The camshaft pinions are drilled and tapped to accommodate an extractor bar Part No. 24980 obtainable from the Spares Dept.

20. Oil Pump

Removal of the two nuts holding the pump body will enable the pump to be withdrawn from its studs. Should it be tight, lever gently behind the spindle boss on the top cover. The pump is a very accurately made mechanism and it is not advisable to dismantle it unless serious trouble is suspected. After many thousands of miles have been covered it is possible that the pump will permit oil to drain into the sump when the machine is standing and this indicates that

the pump requires re-conditioning. It should be returned to the Service Department. When refitting the pump, lightly smear the joint face with jointing compound, particularly avoiding any excess in the region of the oil holes. Pinch down each nut before finally tightening.

21. Pressure Release Valve

Protruding from the inside of the timing cover is a hexagonal post. This is the pressure release valve and although it is non-adjustable it should be removed occasionally for cleaning. Its construction is clearly shown in Fig. 6, no description would appear to be necessary.

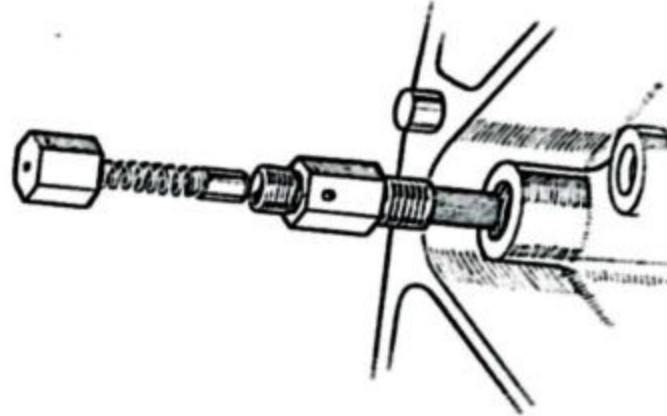


FIG. 6
Pressure Release Valve

22. Timing Cover Oil Seals

Pressed into a recess and secured by a circlip on the inside of the timing cover is an oil seal in which the extended end of the crankshaft runs. This seal ensures that oil under pressure is fed to the crankshaft journals and it is most important that it functions satisfactorily. It is unlikely to fail in use unless oil contaminated with foreign matter is being circulated. It is quite possible to damage the seal when fitting the timing cover and undue force should never be used. Ensure that seal and shaft are in alignment before attempting to push the cover home. For renewal the seal may be extracted by removing the circlip with sharp nosed pliers and carefully levering under the inner diameter of the seal with a screwdriver or similar tool, working a bit at a time on opposite sides and taking care not to scratch or bruise the bore into which the seal fits. The replacement seal should be pressed or lightly tapped home in the recess. It is important that its plain steel face is outwards, i.e. visible when the seal is fitted.

23. Ignition Timing

To ensure satisfactory engine performance and avoid possible damage to the engine, it is vitally important to make this setting accurately also identical on both cylinders. For this purpose, two contact breakers are fitted (see fig. 8) which can be adjusted independently of each other. As the ignition lead (advance) is limited to 30° before top dead centre with the automatic ignition advance unit in the fully advanced position, it is extremely difficult to measure the piston travel with any degree of accuracy other than by the use of a timing disc, or degree plate attached to the driving side main-shaft. The two contact breakers, with one detached, are shown in fig. 8. Unscrew the two hexagon pillar nuts and two screws to remove contact breaker plates.

24. To Check the Ignition Timing

Have available:—

A timing disc 022011.

A stud $\frac{1}{2}$ BSF 4" long and two nuts for the stud.

A feeler gauge .012".

A short length of stiff wire as a pointer for timing disc.

Commence by removing both sparking plugs, the contact breaker cover and the outer portion of front chain case.

It will be seen that the timing disc will have to be used away from the rotor to clear the stator coils and chain case, to do this:—

Take out the bolt securing the starter dog to the mainshaft and screw firmly home into the crankshaft, the $\frac{1}{2}$ " stud mentioned above and run down one of the two nuts.

Fit the timing disc and lightly tighten the second nut.

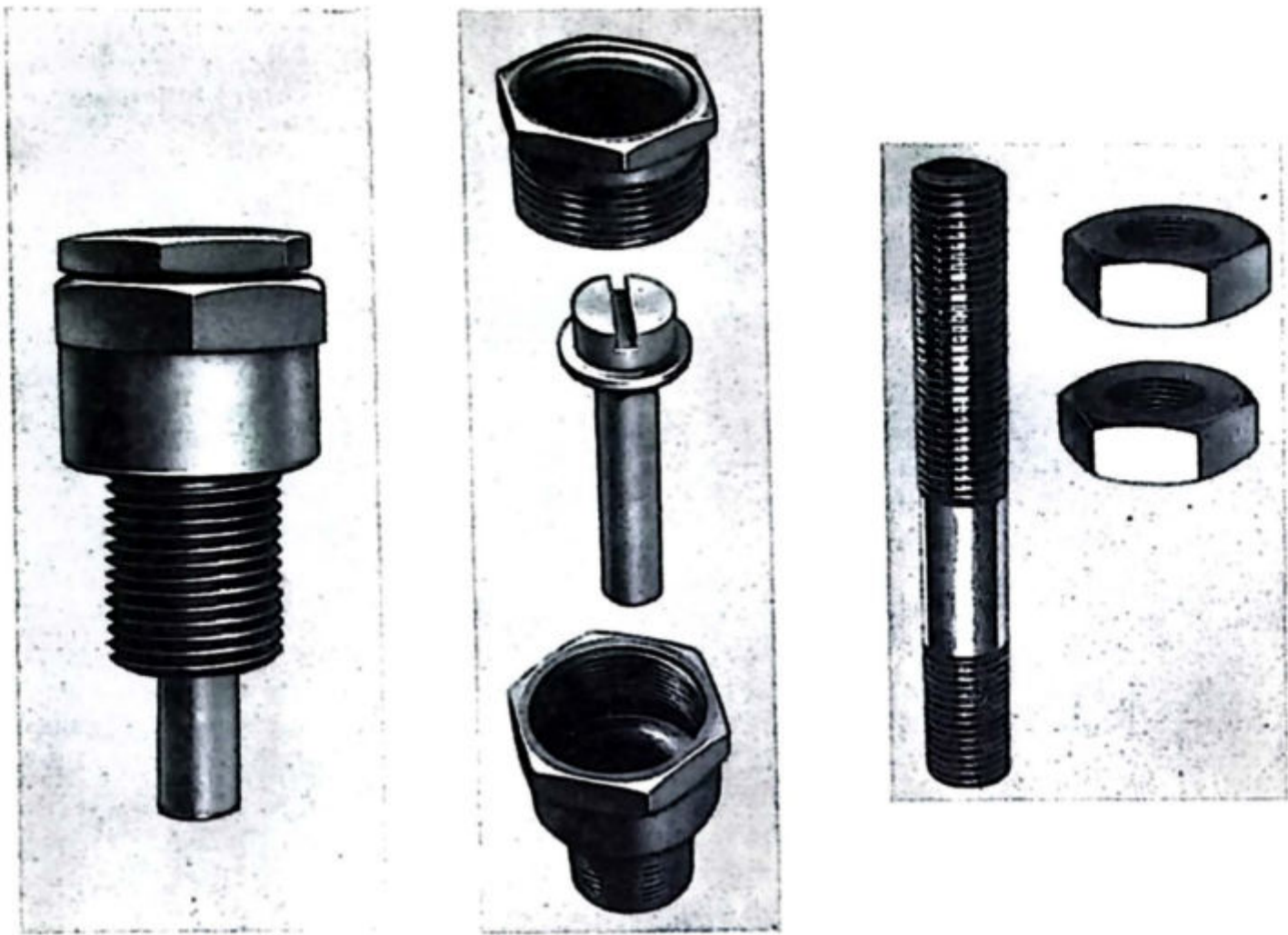


FIG. 7
Timing plug and Stud

Make a loop to one end of the wire and attach it in a convenient place on the chain case and secure it with one of the chain cover screws. Bend the free end of the wire at right angle to the timing disc to act as a pointer, just clear of the disc. Check the contact breaker gap (N fig. 8) for the near side cylinder by rotating

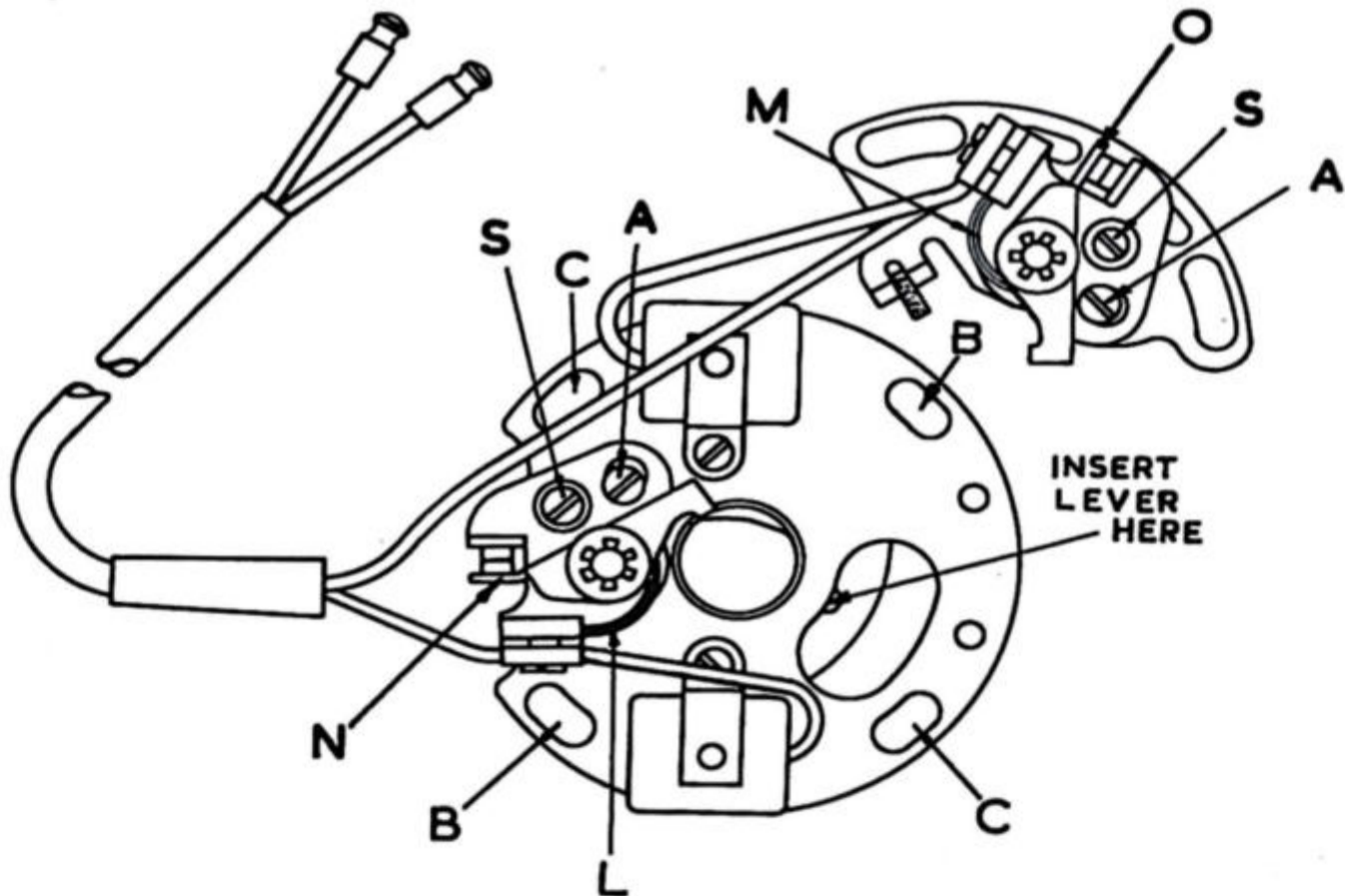


FIG. 8

the engine until the points are at maximum separation viz when the fibre pad is on the peak of the cam lobe. Use the feeler gauge, which must be free from oil or grease, which should just pass through the contact points.

Reset the gap if necessary by releasing the clamp screw S (fig. 8) and moving the eccentric screw A (fig. 8) until the correct gap is obtained then re-tighten the clamp screw. Repeat this process and check the other contact gap.

For contact breaker service see Electrical section.

Remove the rocker covers, and take off the small contact plate as shown in fig. 5.

Rotate the engine until the left side piston is on the extreme top of its stroke with both valves closed, (rockers free) which is the firing stroke.

Position the timing disc so that the zero mark is approximately midway between the cylinder and firmly tighten the nut securing the timing disc, without moving the engine.

Set the end of the wire pointer to register with the zero mark on timing disc. As the ignition timing must be accurate within two degrees of the specified setting it is vital to accurately position the piston on top dead centre.

Owing to the steep angle of the sparking plug hole in the cylinder head, a rod or wire cannot be used sufficiently vertical to record the piston position. Other than removing the cylinder head, the alternative is to use a timing plug as shown in fig. 7 which can be easily fabricated and consists of a scrap sparking plug with the negative point removed and the insulated portion discarded. Insert through the plug body a $\frac{1}{4}$ " diameter cheese-headed screw $1\frac{1}{4}$ " long. Use a suitable washer against the screw head and secure the rod by tightening the plug gland nut. The rod should protrude $\frac{3}{4}$ ".

To locate the top dead centre:—

Turn the engine backwards about 30° with a spanner on disc nut.

Insert timing plug.

Turn the engine slowly in a forward direction until the piston touches the timing rod

Record from the timing disc the number of degrees that register with the pointer

Again slowly rotate the engine backwards past the 180° mark until the piston comes in contact with the timing plug on its upward stroke and, again record the number of degrees that register with the pointer.

Add together the two figures recorded and divide by two, for example, if the first reading is 35 degrees and the second 25 degrees, giving a total of 60 degrees, half this figure is 30 degrees, thus if the pointer is adjusted to register with 30° on the timing disc and the engine is turned until the zero mark registers with the pointer, this is the true top dead centre piston position.

Take out the timing plug.

25. To Adjust the Timing

If the timing is incorrect, adjust by releasing slightly the two hexagon pillars B fig. 8 also the two screws C fig. 8 and move the contact base plate in the required direction. Moving the plate anti-clockwise will advance the ignition timing.

26. Timing the Left side Cylinder

To determine the exact firing point (contact gap separation) use a 12 volt bulb with a short length of wire attached to the bulb body and a similar wire attached to the bulb filament connection.

Connect one wire to a convenient point on the engine, the other to the contact breaker spring L fig. 8 for the left side cylinder.

For technical reasons the timing must be checked with the auto advance unit in the full advanced position, for the left side cylinder.

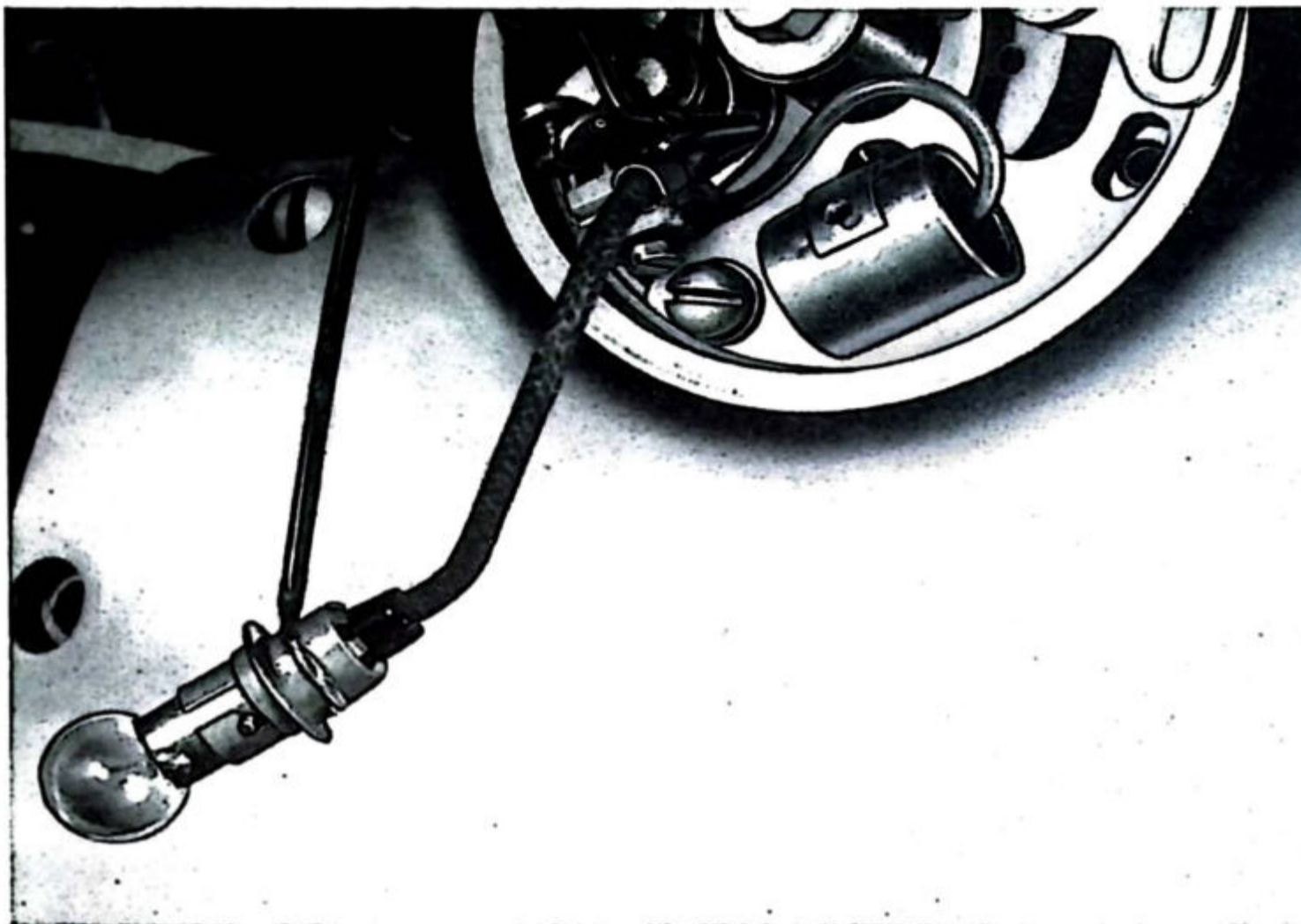


FIG. 9
Bulb connection

Turn the engine backwards, switch on the ignition, the bulb will light then insert a lever or the point of a pen knife into the hole as shown in fig. 10 and lever towards the rear of the engine to move the flyweights into the full advance position, maintaining this position turn the engine forward very slowly and stop immediately the bulb light goes out.

Look at the timing disc and the pointer should register 30° if the timing is correct.

27. To Reset the Timing

If the timing has been deranged and there is insufficient latitude in the elongated slots in the contact breaker base plates to adjust, the operating cam must be released from its taper fit. Remove the cam central fixing bolt and use in its place a withdrawal bolt 06508 and lightly screw home. A light blow on the extractor bolt will dislodge the cam.

When resetting the timing, the cam rotates clockwise when in use.

28. Timing the Right side Cylinder

Having established the correct full advance timing for the left side cylinder, record from the timing disc the number of degrees shown with the auto advance in the RETARDED position which may be 8°.

Fit the small contact breaker plate. Recheck contact gap fig. 8, turn engine one complete turn in direction of rotation until the pointer registers zero on the timing disc. Turn engine slightly backwards until the pointer registers 8° before top dead centre the same amount as for the left side cylinder. Adjust the small contact breaker plate (using the lamp bulb connected to spring M fig. 8) so that the contact points are just about to separate. The timing correctly set will then be identical on both cylinders.

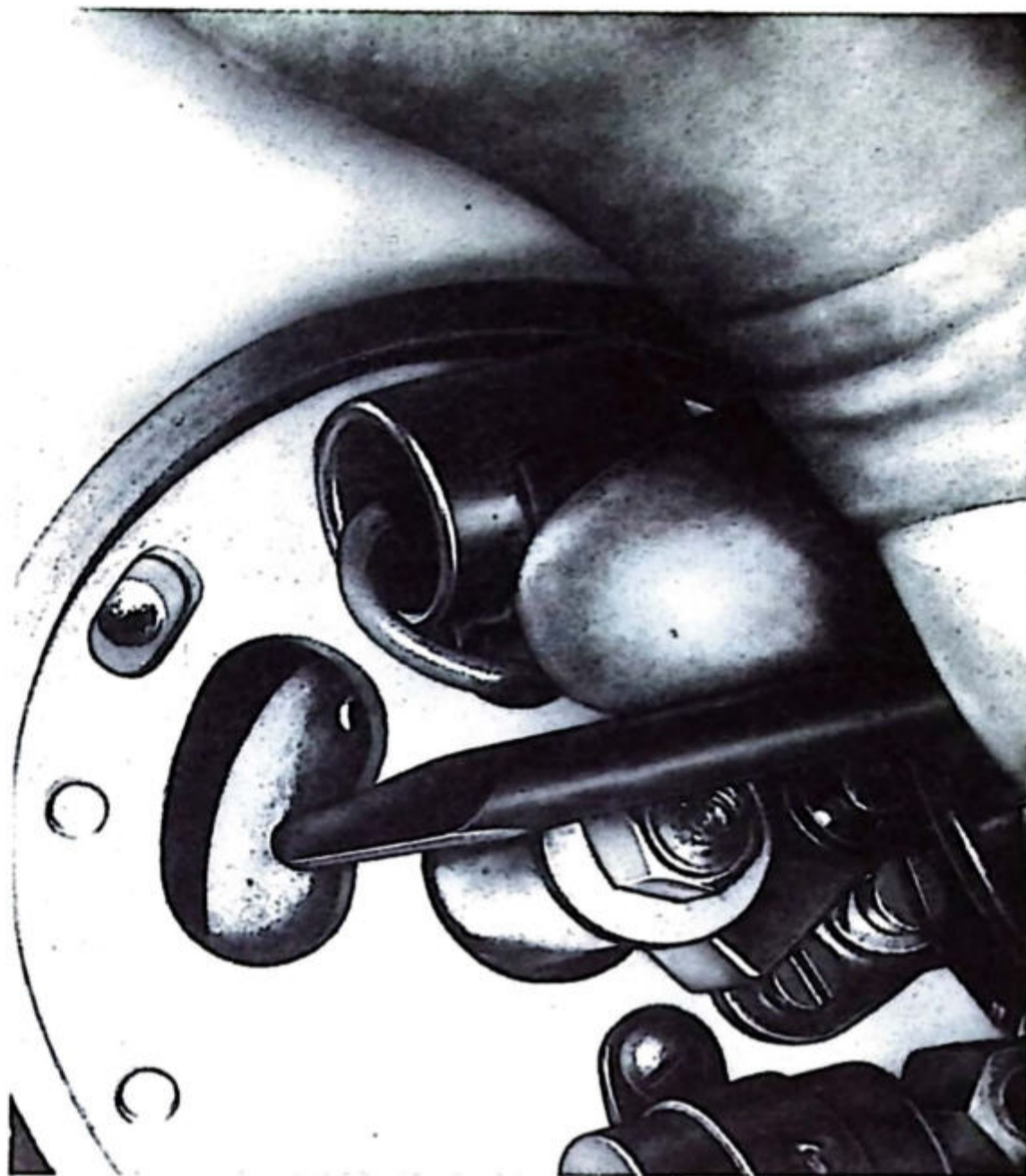


FIG. 10
Ignition Timing

29. Engine Overhaul

If a complete engine overhaul is contemplated cleanliness in working is of vital importance most particularly where plain bearings are used for the crankshaft and connecting rod assembly.

With this in mind, the exterior of the engine should be thoroughly cleaned down with gasolene particularly below the bottom portion of the crankcase to remove all traces of road grit before the engine is finally placed on the bench for dismantling.

Attention is drawn to the details given in paragraph 31 in respect of the assembly of the big end journals and all the oil passages in the crankshaft should be washed out by forcing gasolene through them.

Before the engine is re-installed in the frame, the oil tank should be thoroughly drained also washed out with gasolene before fresh oil is refilled.

After considerable mileage the oil pipe rubber connections should be renewed and retained by a little adhesive, taking care that the material used does not enter the oil pipes.

A little clean oil should be poured down the push rod tunnels before the cylinder heads are refitted to provide instant lubrication as soon as the engine is started.

30. Engine Unit Removal

Support the machine with a box under the engine, strip down as described in previous paragraphs down to removing the cylinder.

- Disconnect the negative battery cable
- Disconnect the starter motor cable
- Disconnect the alternator wires at snap terminals
- Disconnect the contact breaker wire snap terminals
- Disconnect the rear chain
- Disconnect the clutch cable gear box end
- Disconnect the sparking plug H T Cables
- Disconnect the two rubber oil pipe connectors

Catch oil drained from the feed pipe (the outer one) in a suitable receptacle or plug the pipe.

Take away the footrests, brake pedal, release the speedometer drive cable at the wheel end, form a loop in the cable by pulling it away from the wheel.

Take out the studs passing through the frame and crankcase. Before the engine can be lifted out take out one of the frame studs which join the tank rails to the front frame member, which will pivot on the remaining stud to clear the crankcase. The engine assembly should be supported by a second person during this operation.

31. Separating the Crankcase

- Remove the small timing pinion (use extractor ET 2003).
- Remove outer portion chaincase (10 screws).
- Remove outrigger plate (3 nuts).
- Remove the starter drive and chain.
- Remove rotor and engine sprocket, use extractor.
- Remove clutch assembly complete.
- Remove sump filter (4 nuts) at base of crankcase.
- Remove gearbox internals and shafts.

WARNING. In the cylinder spigot bores in the crankcase there are two Allen screws uniting the crankcase, which must first be removed, then take out the remaining Allen screws uniting the crankcase.

The drive side crankcase can now be taken away. Invert the assembly, press off the timing side, or drop the assembly lightly on a wood bench to dislodge. If difficulty exists apply a little heat adjacent to the bearing, watch for shim washers on shaft and identify for assembly.

32. Big End Bearings

Providing clean oil is continually in circulation, attention to this part of the engine should not be necessary until the machine has covered considerable mileage. The normal con rod to journal clearance is .001"—.0025" with dry bearing and nuts torqued to 15 foot lbs. Before removing the connecting rods it is important to mark both the detachable caps as well as the con rods, so that they can be re-installed in the original position. Remove the self locking nuts, a sharp jerk upwards on the con rod will dislodge the cap. The normal journal diameter for the con rods is 1.5005" high limit and 1.5000" low limit, regrind the crankshaft when the wear is .001" to .0015". Remove the screwed plugs in crankshaft end cheeks and clean the cavity after grinding. The journals must have a mirror like finish after regrinding, coat the con rod shells with anti-scuffing compound, (Molybdenum Disulphide) fit new self locking nuts and tighten with torque spanner set to 15 foot lbs.

33. Crankshaft, Re-fitting

If new parts are being fitted or the location of any packing shims omitted it will be necessary to re-locate the crankshaft centrally by checking that when

the crankshaft is hard against the timing side bearing the flywheel rim is central beneath the narrow land between the cylinder spigot holes.

Gently heat the crankcase before pressing or drifting the main bearings into position, ball journal on the timing side and roller on driving side, do not heat the latter half if the oil seal is in position. Fit inner race driving side shaft.

Wipe crankcase joint faces and smear both with jointing compound. Fit crankshaft into timing side ensuring that it is right home in the bearing. Fit both camshafts into timing side crankcase. (The inlet has the extension for contact breaker drive). Fit the crankcase joint washer by sticking it to the timing side joint face.

Now fit the driving side case and tap home with a mallet if necessary taking care that the joint washer is properly positioned all round.

Fit the crankcase studs which do not hold the engine in the frame, including the two Allen screws between the bores. Lightly pinch each one before finally tightening. The driving side oil seal may be drifted into position either before or after the crankshaft is in position.

Refit the sump filter using paper washers either side of the filter flange and smearing all faces with jointing compound. Lightly pinch up each nut in opposite pairs before tightening.

34. Camshaft Bushes

By reason of the four large diameter bushes used, they are not normally subject to wear. The bush dimension in situ is .9378 to .9383.

35. Intermediate Gear

The plain bush is a press fit into the gear. The bush diameter reamed in position is .5622" to .5627". The spindle for this gear is an interference fit in the crankcase and is located by a circlip. The crankcase must be heated to drive out the spindle from inside the crankcase, also when the spindle is re-fitted, when care is necessary to insert the spindle perfectly square before finally pressing home.

The Transmission

36. Clutch Adjustment

In order to obtain clean gear changing and freedom from clutch drag or clutch slip, correct adjustment is essential.

Screw in cable adjustor on rear of engine/gearbox casting to ensure excessive slack in cable. Remove the ten screws securing the primary chain cover and withdraw the cover, taking care not to tear the paper washer. Release the nut locking the adjuster stud in the centre of the clutch pressure plate and screw in the stud until contact with the push rod can be felt. Screw back exactly half a turn and relock the nut. Re-adjust the cable until there is $\frac{1}{8}$ " to $\frac{3}{16}$ " idle movement before tension occurs when the handlebar lever is operated.

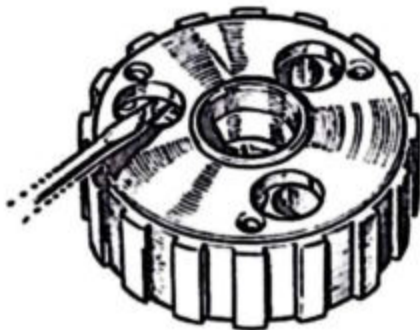


FIG. 11
*Removal of Clutch Shock-Absorber
Cover Plate*

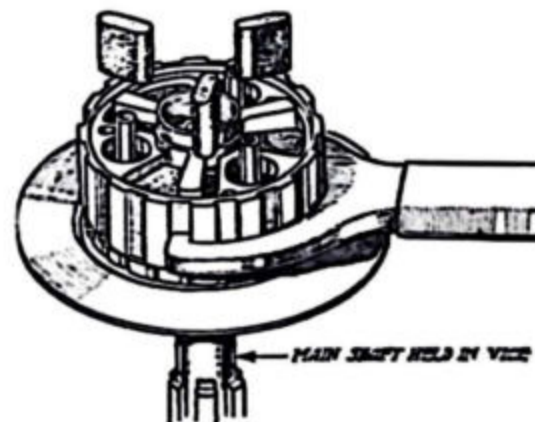


FIG. 12
*Removal of Shock-Absorber
Rubbers*

Correct spring adjustment has been made when the adjusting screws are flush with the ends of the spring boxes and when individual adjustment has been made to ensure that the pressure plate withdraws squarely when clutch lever is operated.

37. Primary Chain Adjustment

It is best to adjust the primary chain when the gearbox/crankcase unit is warm as this is the normal running condition.

Inside the chaincase and held against the bottom run of the chain by two nuts is a nylon steel slipper. Slackening the nuts enables the slipper to be raised or lowered to adjust the chain. There should be $\frac{3}{16}$ " to $\frac{1}{4}$ " up and down movement in the slack side of the chain when the engine is warm. Check the amount of slack in three or four places and adjust with chain in tightest position.

38. Rear Chain Adjustment

With the weight of the machine on the wheels there should be $\frac{1}{8}$ " to $\frac{1}{4}$ " up and down movement in the centre of the slack run of the chain. Check in three or four places and adjust at the position showing least slack. The rear wheel may be moved backwards by slackening the spindle nuts and rotating the adjusting screw which presses against the plain part of the nut in an anti-clockwise direction. It is important that both screws are rotated an equal amount in order to maintain wheel alignment.

To move the wheel in a forward direction, slacken the spindle nuts as before and rotate the adjusters in a clockwise direction maintaining the plain portion of the spindle nut against the end of the adjuster. Adjust rear brake after moving the rear wheel.

39. Primary Chain Removal

The chain is 'endless' and can only be removed by withdrawing simultaneously the engine sprocket and clutch assembly.

Remove chain cover 10 screws (see clutch adjustment).

Remove outrigger plate (three nuts).

Remove starter motor chain (connecting link).

Remove stator assembly (three nuts.) Disconnect snap connectors.

Remove bolt in crankshaft (straighten tab washer) and pull out starter ratchet.

Remove the rotor from parallel portion of shaft.

Remove clutch pressure plate with springs and cups.

Remove gear box mainshaft nut securing clutch.

Release only clutch assembly, use extractor 040449 if difficulty exists.

Release engine sprocket by using extractor JEST/12.

The engine sprocket, clutch assembly together with the primary chain, can be withdrawn.

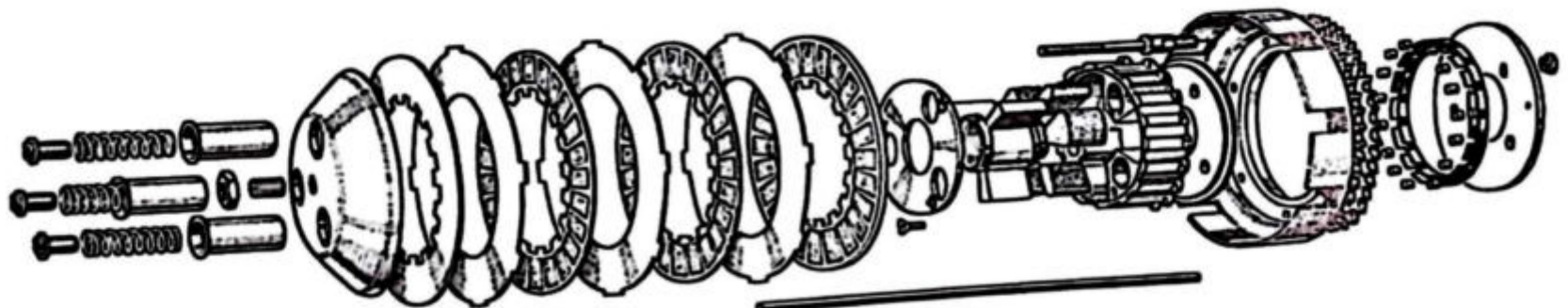


FIG. 13
Exploded view of Clutch

40. Primary Chain Re-fitting

Refit parts removed in the reverse order described for removal, with the following precautions:—

Ensure key for rotor is correctly located before fitting the rotor. Run down the stator nuts evenly before finally tightening. The connecting link for starter chain is fitted with the CLOSED end facing the direction of rotation.

The bolt for mainshaft is finally tightened (use hammer tight spanner) and turn back tab washer.

Check chain adjustment see para 37.

When the clutch is assembled, operate the clutch lever on handlebar and observe if the clutch pressure plate is parallel to the plate behind it. If not adjust the clutch spring adjusting nuts until the gap between both plates are equal. Use a little jointing compound on the chain case to secure gasket and tighten cover screws diagonally.

Fill $\frac{1}{2}$ pint (.28 litres) of engine oil.

41. Clutch Dismantling and Assembly

To dismantle the clutch see details given for primary chain removal para 39. To dismantle the clutch bearing, take off three nuts securing the clutch spring studs and back plate and take off the sprocket and clutch case. The bearing uses 15 $\frac{1}{4} \times \frac{1}{4}$ rollers in a steel spacing cage, use a little anti-centrifugal grease on rollers when assembling. Finally tighten the stud nuts and “centre pop” the threaded portion of the stud and nut.

To renew the shock absorber rubbers take off the steel plate see fig. 12.

If the rubbers are badly worn they will come out easily, if not, compress the thick rubbers by using a tool as shown in fig. 12. Alternatively use an old steel clutch plate with a handle welded to it, the thin rubbers can then be picked out. Take care to very firmly tighten the three countersunk screws and “centre pop” them for security. Assemble the clutch in the following sequence:—

Thick steel back plate (step facing inwards).

Friction plate (double sided).

Steel plate (plain).

Friction plate (double sided).

Steel plate (plain).

Friction plate (double sided).

Steel plate (plain).

Friction plate (single sided) plain side outwards.

Pressure plate with spring cups, spring adjusting nuts.

NOTE. The adjusting nuts should be flush with the spring cups when finally adjusted.

42. To Remove the Clutch Cable

Remove the clutch cable inspection cap (two screws), the styling panel (two nuts) alongside the clutch cable entry. Use a screwdriver through the inspection cover aperture to prise the clutch operating lever in a forward direction, and disconnect the inner cable. Unscrew the clutch cable adjuster then disconnect the cable from the handlebar end.

Gear Box

43. Lubrication

The oil content, after draining, is 2 $\frac{1}{2}$ pints (1.25 litre).

Use one of the recommended engine oils SAE 50, drain and refill with fresh oil at first 500 miles and again at intervals of 5,000 miles. Check oil level at frequent intervals and top up as required. Oil is filled via the inspection plate, the oil level plug is below this plate. Remove level plug, fill oil until excess drains from oil level aperture. Allow a little time for the oil to settle.

SPECIAL NOTE. There are two plugs in the bottom of the gear box casing
The drain plug is the **SMALLEST** of the two.

44. The Gear Box

A strip down condition of the gear box is shown on plate G. There is only one left hand thread used viz the nut retaining the rear chain sprocket on the main gear. The gear box internals can be removed in a cluster if the clutch is taken off the gear box mainshaft. The figures in parenthesis refer to plate G.

45. Dismantling the Gear Box

Remove the clutch (see para 'primary chain removal' for method.

Remove the drain plug, the selector plunger and spring (24) from underneath the gear box shell.

Remove the kickstart crank bolt, loosen the footchange pedal bolt and take off both levers.

Remove five outer cover screws, then the cover.

Remove clutch inner wire from operating lever 39.

Remove circlip retaining clutch actuating assembly and take out the assembly.

Remove clutch push rod.

Remove gear change shaft assembly 20.

Remove mainshaft fixing nut (9).

Remove five nuts and washers for gear box end plate 45.

Remove gear box end plate complete with kickstarter mechanism (45).

Remove gear change ratchet and plate.

Take out together the mainshaft, the layshaft and selector shaft, which will bring with it the gear cluster.

46. Dismantling the Main Gear

Turn back the tab washer 19, remove sprocket nut (18) **LEFT HAND THREAD**. The sprocket can be held by a short length of rear chain attached to a steel bar.

The sprocket should come off the splines without difficulty.

Take away the distance piece and tap the main gear into the gear box shell.

47. The Oil Seal Removal

To remove prise it out of the bearing housing.

48. Removing the Bearing (7)

The gear box shell must be gently heated, when the main bearing also the two bronze bushes can be drifted out. Pre-heat the gear box shell when re-fitting these bearings to avoid "scruffing" the housings.

49. To Assemble the Main Gear (5)

If the oil seal is replaced it should be fitted with the metal backing outwards. The sprocket for the rear chain is refitted with the flat face outwards. Do not omit the distance piece $\frac{1}{4}$ " wide between the bearing and sprocket (17). The left hand sprocket nut must be firmly tightened as it is subjected to reversal loads. Turn back the tab washer.

50. Gear Box End Plate Bearings (48)

The two bronze bearings (48) also the small mainshaft bearing are a force fit in the plate. To remove apply gentle heat, support the plate and press out the bearings.

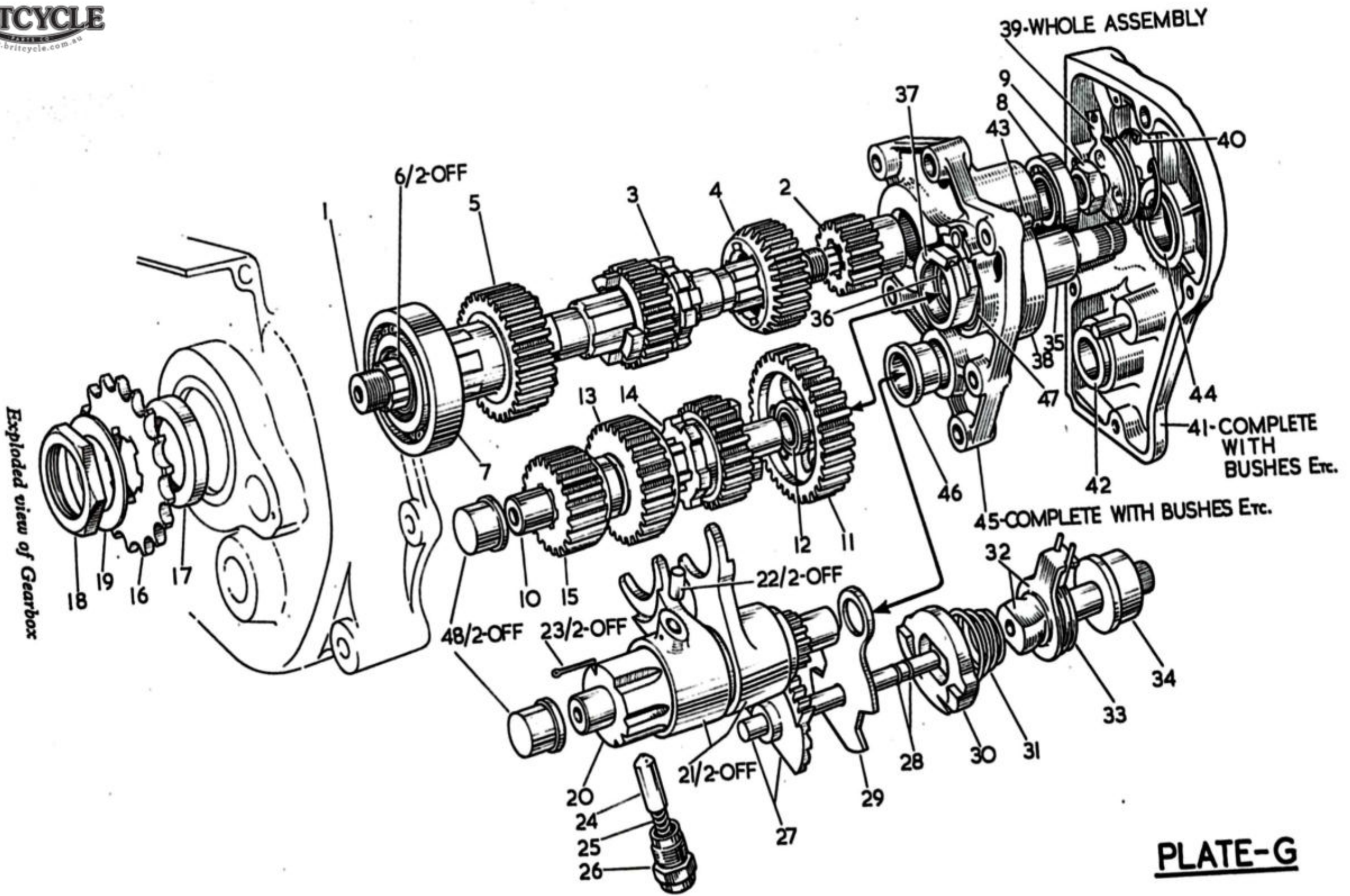


PLATE-G

51. Assembling Gear Box Internals

The assembly sequence is shown on Plate G.

To refit:—

Take up layshaft (10) fit second gear (13).

Take up mainshaft and fit second gear (3).

Take up selector assembly (20) engage striker forks (21), with gears (3) and (14) then introduce the parts assembled into the gear box. Fit mainshaft third gear (4) and first gear (2). Complete assembly by fitting layshaft first gear (11).

52. The Footchange Assembly

The footchange ratchet (27) also the small pinion on the selector shaft are marked so that the gears can be correctly indexed.

Insert the footchange ratchet with line mark on it to register with the line mark on the small pinion.

Fit the footchange actuating plate (29) with letter "O" outwards.

Fit the gear box end cover with kick-starter assembled (five nuts and washers) (45).

Fit the mainshaft nut (9) and tab washer.

Fit the clutch operating assembly (split pin outwards) (39).

Fit the circlip securely in its groove.

Fit the footchange ratchet (30), over the spindle (flat side of ratchet facing the left, or rear of the gear box).

Fit the ratchet spring (31).

Fit the footchange pedal shaft (32), with pedal spring and plate over the footchange spindle and engage the two flats with the ratchet.

Fit the spacing collar (34).

A new or undamaged gasket for the end cover must be used which can be held in position with jointing compound on one side. Alternatively use some grease. Connect the clutch cable to the lever, re-fit the cover and tighten five screws. Put back the drain plug and spring loaded plunger and refill 2½ pints (1.25 litres) SAE 50 engine oil.

53. Dismantling the Kickstarter (35)

Dismantle the gear box as far as removing the gear box end plate described elsewhere. Temporarily fit the kickstarter crank to the kickstarter shaft, then press the kickstarter axle inwards to clear the stop to allow the spring to unwind. Take off the kickstarter crank, press the axle right through the cover, the spring can then be taken away. To refit the kickstarter spring, put back the kickstarter axle, do not engage it with the stop. Fit the spring on to the anchor stud and engage the turned in end with the slot. Fit the kickstarter crank to axle and wind up the spring 1½ turns then press home the axle to engage with its stop.

Front and Rear Suspension

54. Front Fork Maintenance (Plate DA)

Periodical maintenance is unnecessary other than to change the oil at the first 1,000 miles and again at every 10,000 miles. To drain the oil, remove in turn the drain plug screw (7) and washer from the bottom of each fork slider and catch the oil in a suitable container. With both drain plugs removed and the machine on its road wheels, work the forks up and down to drain them completely. Put the machine back on the central stand and refit the drain plug screws. Unscrew the large hexagon bolts (34) at the top of each fork tube in the handlebar lug and raise the front wheel to expose the fork springs, supporting the front wheel with a wood block. Disconnect both damper rods from the top bolts using two spanners. Remove the wood block under the front wheel to extend the forks. Using a measured container slowly fill five fluid ozs (142 cc) of SAE 20 oil down

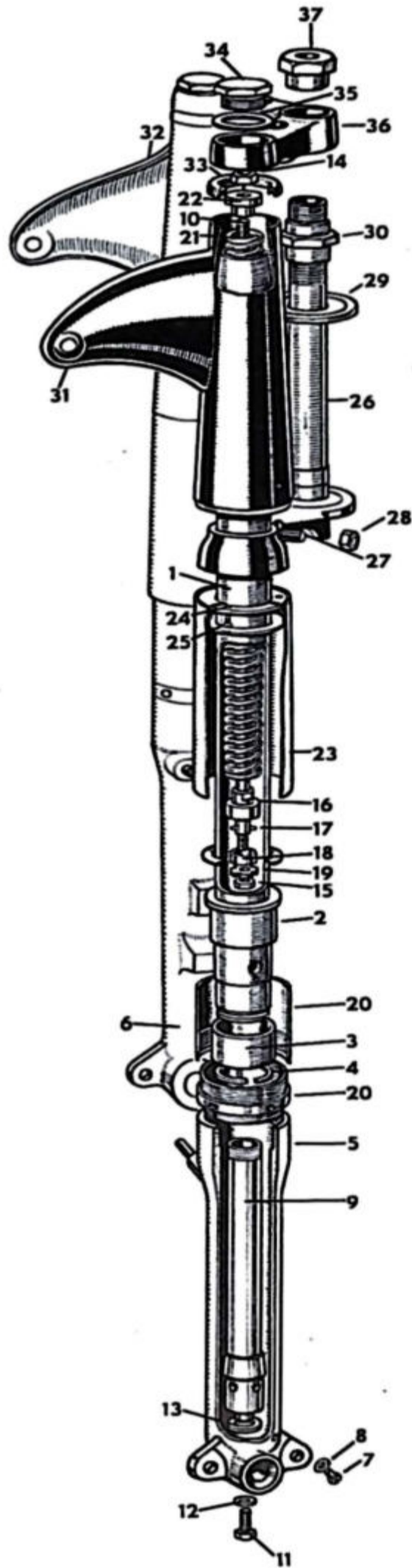


PLATE DA.

each fork tube. Raise the front wheel as previously described and reconnect the damper rods and be sure the nuts are screwed down to the end of the threaded portion and lock both nuts together. Refit the two top fork bolts to complete the operation.

55. Steering Head Adjustment

Should movement develop in the steering head bearings, adjustment should be made promptly to avoid damage to the bearing races. Movement can be detected by raising the front wheel clear of the ground, by means of a wood block placed under the crankcase and with the fingers of the left hand encircling the joint between the dust cover and the top portion of the frame, endeavour to raise the front wheel by grasping the front mudguard with the right hand. If movement exists it can be felt by the left hand. To adjust, release the two fork pinch bolts (27) below the head lamp, release the sleeve lock nut on top of the handlebar lug (37), screw down the adjusting nut under the handlebar lug to take up movement. Retighten the sleeve lock nut and firmly retighten the two pinch bolts. The adjustment is correct when the fork assembly is free and without movement.

56. Front Fork Removal (Plate DA)

Raise the front wheel clear of the ground.

Remove the front wheel by:—

Disconnect front brake cable from expander lever and pass it through the clip on the mudguard.

Remove wheel spindle nut, release nut for spindle clamp bolt left side

Support the front wheel with one hand, withdraw spindle, the wheel will then come away.

Remove the head lamp front, disconnect the speedometer cable.

Remove the head lamp and suspend it by the cables.

Remove the handlebars, use an old coat or sacking as protection and lay them on the petrol tank.

Remove the two fork tube bolts (34) on handlebar lug and disconnect the damper rods (see fork maintenance).

Remove the fork stem lock nut (37).

Remove handlebar lug (36) by tapping it upwards with soft face mallet, to clear the taper on the fork tubes. Remove dust cover.

Remove fork cover (31) tubes and rubbers.

Remove fork crown adjusting nuts and support the fork to prevent them falling.

Extract the forks from the frame and watch for the ball bearings.

57. Refitting Front Forks

Fill the lower fork crown ball race and the top frame race with heavy grease and fill 18 ball bearings to each race. Reverse the procedure described for removing forks and see details on steering head adjustment.

58. Fork Leg Removal

The fork legs can be removed separately, leaving the rest of the fork assembly in situ.

Unscrew the large hexagon bolt (34) for the fork tube, disconnect the damper rod. Release the nut for the fork pinch bolt, when a sharp downward jerk will enable the assembly to be withdrawn. If difficulty exists, put back the fork tube bolt without its washer and screw in several turns. A sharp blow on this bolt with a soft face mallet will separate the fork tube from the lug.

59. Dismantling the Fork Leg

Remove the bolt from the lower end of the fork slider (11) securing the damper tube, catch the oil and take out the spring and damper assembly. Unscrew

the plated cover tube (23). Holes are provided for a 'C' spanner to be used. The fork slider end can now be pulled away from the tube. To remove the steel bush, prise out the circlip (4), slide off the oil seal, paper washer and flanged bush. The damper assembly should not be disturbed.

60. Assembling the Fork Leg

Reverse the sequence described for dismantling, with the following precautions:—

Ensure the oil seal is fitted with the metal backing uppermost.

Press the oil seal into position by using the bush and screwed cover.

Finally tighten the screwed cover when the forks are completely assembled.

61. Rear Suspension

The pivoted fork carrying the rear wheel is mounted on rubber bushes which require no periodic attention. The shock absorber units are sealed and access to the damping mechanism cannot be obtained. Should they become noisy in operation, remove from the machine one at a time having adjusted to the weakest position. Hold vertically in a vice with the top cover uppermost and pull down on the cover till the semi-circular retainers are free to be removed. Remove top and bottom covers and clean and grease external diameter of springs.

62. Adjusting Rear Suspension Units

The units are adjustable to three positions by means of a "C" spanner in the tool kit. Attached to the bottom of the lower spring abutment is a stepped scroll engaging with a round ended stop spot welded to the bottom member. By engaging the "C" spanner in the hole near the scroll, it can be rotated in relation to the stop piece, which action raises or lowers the spring abutment and varies the load on the spring. The highest position on the scroll provides the weakest position. It is important that both units are adjusted to the same position.

Wheels and Hubs

63. Front and Rear Hubs, Lubrication

Hub bearings are packed with grease during original assembly and should not require attention for many thousands of miles. At around 10,000 miles the hubs should be dismantled, the old grease washed out and the bearings re-packed with grease.

64. Brake Adjustment

Brake adjustment to compensate for brake liner wear is made by finger adjuster on the rear brake operating rod or the front brake cable adjuster. After considerable mileage the expander lever will reach a position where the applied leverage is considerably reduced. This can be offset by removing the front brake expander lever and refitting it in a reversed position, thus prolonging the life of the brake linings. Note: this applies to the front brake only. In the case of the rear brake, when the finger adjuster for the brake rod has reached the limit of its thread, the fact of transferring the bolt passing through the brake torque arm and the brake plate to an alternative position, will enable the adjuster to be used in its initial position.

65. Front Wheel Removal and Fitting

Refer to details on front fork removal. When refitting ensure stud on the brake cover plate is correctly located in the slot in the fork slider.

Do not over tighten nut for spindle clamp bolt, undue pressure can cause a fracture.

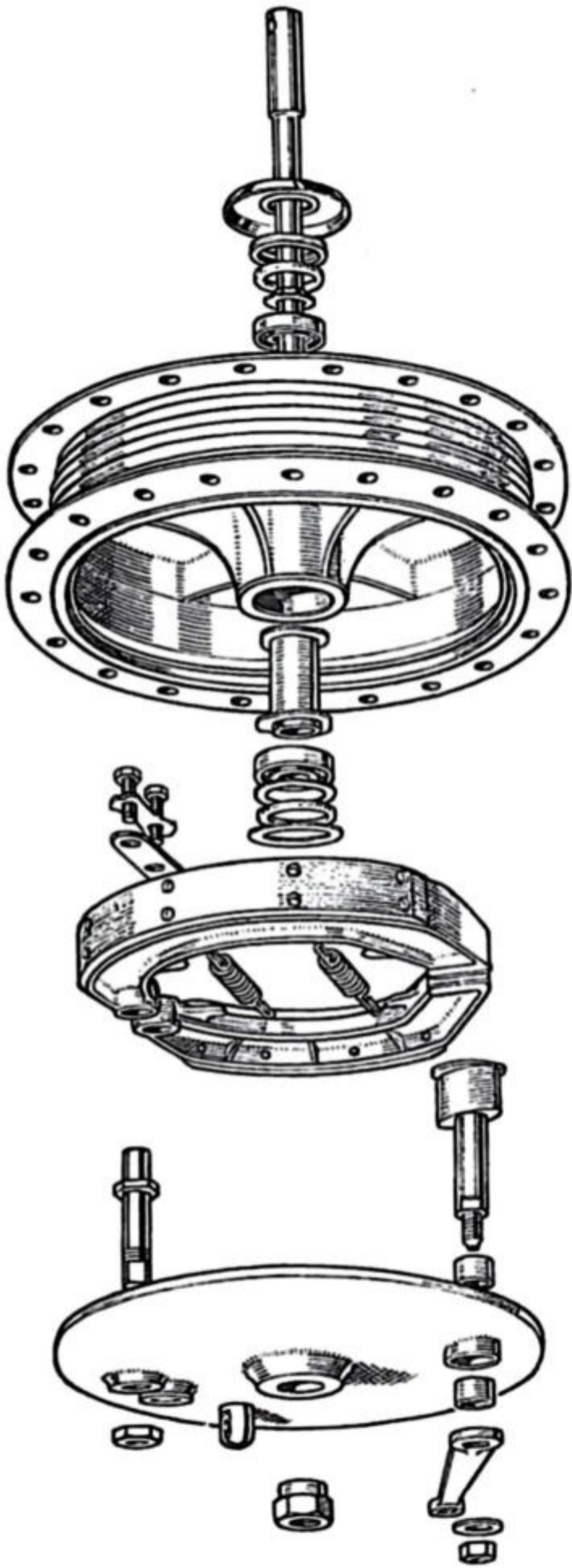


FIG. 14
FRONT HUB

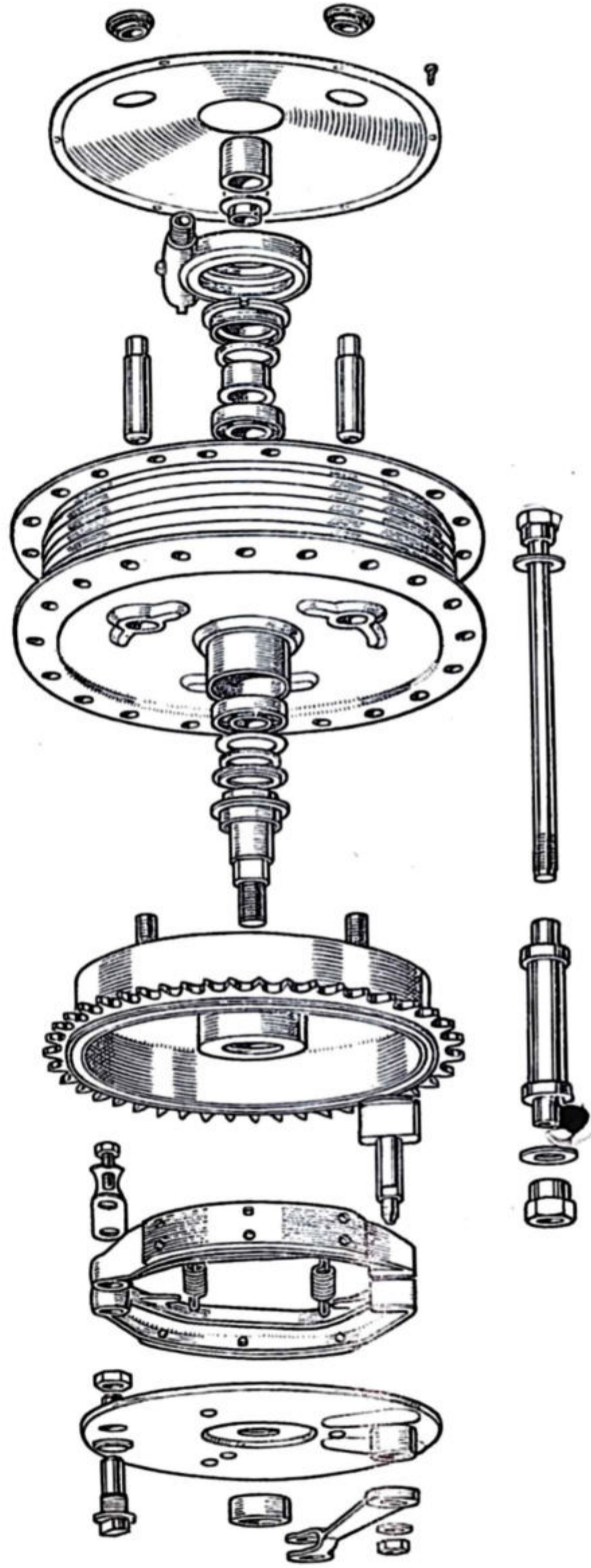


FIG. 15
REAR HUB

66. Rear Wheel Removal

With machine on its central stand:—

Remove three rubber grumets from hub disc.

Remove three extending nuts securing wheel to brake drum.

Remove by unscrewing the wheel spindle on the right side of wheel and withdraw it from the hub.

Remove the distance piece and speedometer drive suspended by the cable.

Pull the wheel away from the drive studs, lean the machine to the right and pass the wheel under the left side silencer.

67. Refitting the Rear Wheel

Refit in the reverse order described for removal, with extreme care to locate the speedometer drive with the two slots machined in the hub. An omission to observe this precaution will damage the drive beyond further use, when the wheel spindle is finally tightened after positioning the drive cable.

68. Rear Hub Dismantling

With the wheel removed:—

Remove the speedometer drive lock ring **LEFT HAND THREAD**.

Remove the distance piece and felt washer.

Remove single row bearing from speedometer drive side of hub.

The wheel spindle with its washer and the distance piece (used between the speedometer drive and frame) placed on the spindle can be used as a drift, if the spindle is passed through the hub from the brake drum side and given a series of light blows with a mallet, until the bearing on the brake side comes into contact with reduced diameter in the hub, thus partially extracting the bearing. Take out the spindle and use a short length of steel tubing slightly smaller than the inside diameter of the brake side bearing. Alternatively use the front wheel spindle and drift out the bearing. Invert the wheel and drift out the remaining bearing which will take with it the steel cup washer, felt washer and thin steel washer.

69. Rear Hub Assembly

Clean and repack both bearings with fresh grease.

The assembly sequence is shown in fig. 15.

Commence by fitting the single row bearing and remainder of parts in the order illustrated.

NOTE. When tightening the lock ring **LEFT HAND** thread, avoid damage to the slots for the speedometer drive.

Invert the wheel to fit the remaining hub parts. After fitting the hub dished washer 'peen' the hub in four equi-distant places to retain.

70. Front Hub Dismantling

With front wheel removed, take off the brake plate and dust cover.

Remove by unscrewing bearing lock plate on left side of hub, holes are provided to use a Peg spanner. Alternatively, use a punch.

If difficulty exists, the use of gentle heat will facilitate removal.

Remove felt sealing washer and distance washer.

The front wheel spindle can be used as a drift if passed through the hub from the brake side. A few light blows on the spindle with a soft faced mallet will eject the bearing. The drift should be used sufficiently to eject the bearing and no more, as the brake side bearing goes into the hub during this process.

Take out the spindle, invert the wheel and insert it through the opposite end of the hub and repeat the process to eject the double row bearing, together with the large steel and felt washer also the thin steel washer.

71. Assembling the Hub

Clean and repack both bearings with fresh grease.

Press the single row bearing (left side) into the hub, insert the distance washer, (flat side against bearing) the felt washer and secure with the lock plates together. Invert the wheel, insert the distance tube small end first, against the bearing. Enter squarely in the hub the double row bearing, put the wheel spindle through this bearing also through the bearing just fitted. A few sharp blows on the spindle will drive in the bearing until it abuts against the distance tube.

Fit the smallest of the two steel washers, the felt washer and large steel washer. Peen the hub in four equi-distant positions to retain the steel washer.

72. Tyres, Maintenance

Always keep tyres at the correct pressures (see data page). Remove any stones which become embedded in the tread and always replace a valve cap if one becomes lost.

73. Tyre Removal

Deflate tube by removing valve cap and core. Remove security bolt nut (if fitted). Push the tyre beads down into the central well of the rim at a point opposite the valve and insert a small tyre lever between the bead and the rim near to the valve. Ease the bead off the rim using a second lever a short distance away. Repeat as necessary until the bead can be pulled clear of the rim. Withdraw inner tube and security bolt and remove the second bead in a similar manner. It is important that that part of the bead opposite the point at which the lever is inserted really is down in the well of the rim.

74. Tyre Fitting

Ensure that rim band is fitted and that it covers all spoke ends. Dust the inner tube, beads and rim with french chalk. Very slightly inflate tube and place within the cover on top of the wheel with the valve in line with the hole in the rim. Fit the underneath bead by hand as far as possible, completing the operation with levers. Pass the valve and stem of the security bolt through the appropriate holes. Fit second bead starting opposite valve and pushing down into well as far as possible. Check that the tube is not pinched between the bolt and cover or rim. Inflate, fit security bolt nut, adjust pressure to recommended figures and fit dust cap.

Carburettor

75. Carburettor Adjustment

With the taper needle projection, main jet size, and type of throttle slide specified (see data) correct carburation except at idling speed is assured.

In the event of difficulty being experienced look for cause under heading Useful Information (pages 49 and 50).

To check for correct idling mixture, first run the engine until it is just warm but not hot when with the throttle nearly closed and air fully open it should fire evenly and slowly.

If it fails to do so, first of all make certain that the sparking plug is clean and the point setting correct. Having done this and idling is still uneven try re-setting the pilot jet air screw.

Adjustment of this air screw is not unduly sensitive and it should be possible to obtain the correct setting for even firing in a few seconds.

In the event of even firing at idling speed being unobtainable by adjustment of the air screw look for obstruction in the pilot jet.

Having obtained even firing all that remains is to adjust if necessary the position of the throttle stop screw until the desired idling speed is obtained.

The size of the main jet should not be altered save for some very good reason. See "DATA" for details of standard sizes of jet, throttle valve, and jet taper needle.

With the standard setting it is possible to use nearly full air in all conditions, except, perhaps, when the engine is pulling hard up hill or is on full throttle, when some benefit may be obtained by slightly closing the air control.

Weak mixture is always indicated by popping, or spitting, at the air intake.

A rich mixture usually causes bumpy, or jerky, running and, in cases of extreme richness, is accompanied by the emission of black smoke from the exhaust.

76. Removing Carburetter

Turn off petrol supply, disconnect the petrol pipe where it joins the petrol tap.

Take off two nuts securing carburettor to manifold and withdraw the carburetter.

Unscrew the knurled ring on mixing chamber and carefully extract the throttle and air valves, taking care to avoid deforming the taper needle.

77. Dismantling Carburetter

A breakdown of the carburetter is shown in fig. 16.

Remove three screws securing side cover, with care to avoid damage to the sealing gasket. Watch for the small brass bush used between the cover and float hinge. The nylon float needle will fall into the float chamber, when the float is taken out.

Clean the interior of the float chamber with petrol (hold it under the petrol tap and turn on).

Remove the main jet cover and unscrew the main jet and check for obstruction also sediment in the jet cover.

Unscrew the banjo bolts, lift up the cover to expose the filter and wash in petrol.

Unscrew the pilot jet cover nut, use a small screwdriver to take out the pilot jet and check for obstruction.

NOTE. Jets should be cleared by compressed air using the tyre pump or blowing through them. On no account use metal probes for this purpose.

78. Assembling the Carburetter

The side cover gasket and all composition washers must be undamaged. When refitting the pilot jet, it should be lightly tightened only, otherwise the seating in the carburetter will become deformed and cause fuel leakage. A thin gasket for the side cover will prevent the float from moving freely and will cause flooding, unless the float spindle bush is reduced in length before refitting the carburetter.

Assemble the throttle and air slides, operate the twist grip and air lever to ensure they work freely.

79. Twist Grip Adjustment

A screw is provided in one of the halves of the twist grip body to regulate the spring tension on the grip rotating sleeve. This screw must be screwed into the body to increase the tension.

The most desirable state of adjustment is that when the grip is quite free and easy to operate but, at the same time, will stay in the position in which it is placed.

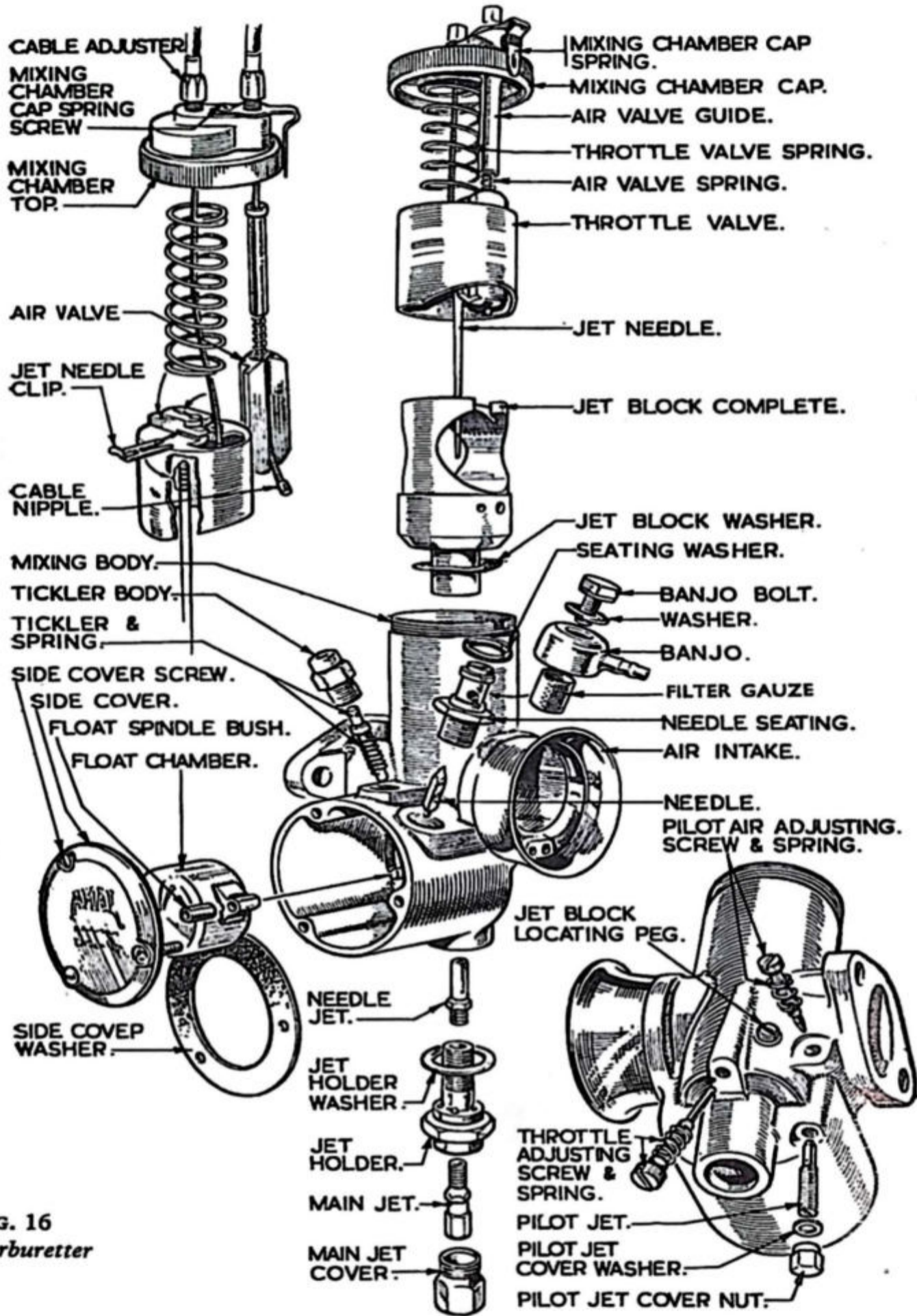


Fig. 16
Carburettor

Electrical Section

80. Ignition

Operated by right-hand switch and key in headlamp. In the OFF position when pointer lying in line with machine fore and aft. Rotate clockwise for normal ON position. Rotate anti-clockwise for emergency starting, i.e. starting with a flat battery. Turn to normal ON position after starting unless it is desired to boost up the battery.

81. Emergency Switch

Although the switch is marked EMG the ignition switch can be used in either position, the charge rate regulated by the Voltage Control Unit.

82. Light Switch

The left-hand switch on the headlamp, it is in the OFF position when pointer is lying in fore and aft direction. Turn clockwise for high beam and anti-clockwise for low beam.

83. Electrical System

The lighting and ignition system consists of a simple 6 pole alternator generating set which supplies current via a metal plate rectifier and relay type voltage regulator to the battery, which then feeds the ignition system, lights, horns, electric starter, etc. The alternator ring carries six coils, two of which provide a constant charge through the rectifier to the battery under all conditions. When the battery becomes partially discharged the remaining four coils are automatically brought into circuit by the voltage regulator to increase the charge rate. When the battery is restored to a condition of full charge the regulator operates again disconnecting the additional four coils.

The alternating current supplied by the generator is converted to direct current by means of the rectifier, which is of the full wave bridge connected type.

The headlamp has a reflector with an extremely efficient reflecting surface provided by vacuum electronic deposition of aluminium. This reflecting surface should not be touched or cleaned in any way and will retain its brilliance indefinitely. The bulb is a pre-focus twin filament type (12 volts 40/50 watts) giving correct beam length and spread in head and dip positions.

Mounted on the handlebars is a Triconsul type switch which is combined horn button, dipper switch and starter button. The red button operates the starter and is insulated from earth.

84. Ignition Switch

This keyed ignition switch is mounted to the right of the headlamp, and although not basically of the locking type it cannot be operated unless the key is inserted otherwise the switch knob rotates freely. Although marked Ignition and Emergency the switch may be used in either position for all operational conditions.

85. Alternator

No maintenance required other than occasionally checking that the snap connectors in the three output leads are clean and tight. The rotor which also holds the engine sprocket on its taper is secured by nut, spacer and key and may be withdrawn when the nut is removed. It may be desirable to remove the stator (secured by three nuts) if the rotor is reluctant to come away. When re-fitting wipe off any metal or other matter from both components and fit the stator with the cable take off nearest to the hole in the chaincase through which the cables pass and with the cables outside as seen in Fig. 17.



FIG. 17
Alternator, Stator and Rotor

86. Rectifier

The rectifier is a full-wave bridge connected unit.

The case must be earthed to the machine, and this earth is connected **POSITIVE**. The three bullet type terminal connectors should be checked for tightness, and also the centre fastening bolt. This bolt forms the "earth" connection and so must meet clean faces on the machine frame and rectifier case.

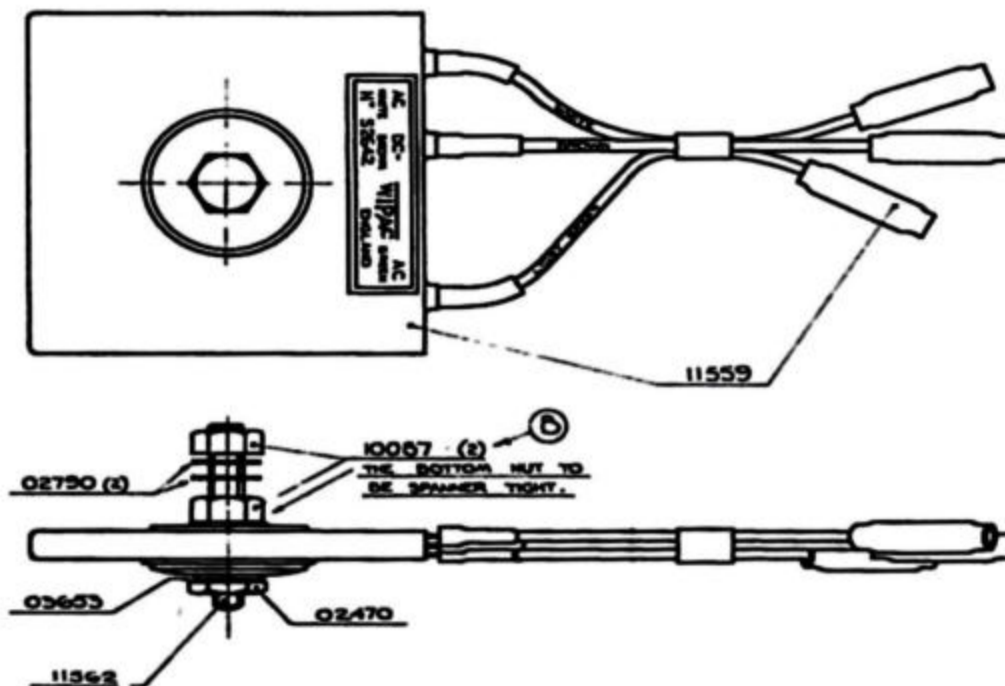


FIG. 18
Rectifier

87. Coils

Two 12 volt coils are attached to the frame top tubes, accessible when the tank is removed. They should only require periodic checking for tightness of terminals and mounting.

88. Contact Breaker Unit

Refer to details on ignition timing for contact point adjustment. Periodically knead a little H.M.P. grease into the felt pad to lubricate the cam. The use of oil is not recommended unless used sparingly. When servicing the breaker unit check condenser fixing for security.

NOTE. The star-shaped washer for contact breaker pivot is not detachable. If the engine fails to start and there is no spark at the sparking plug points, examine the contact breaker by:—

Check the gap at full separation .012" and reset if necessary (ensure feeler gauge is free from oil).

Check condition of contact points which should have a grey frosted condition. The presence of oil or grease in the contact breaker compartment will cause a black matt condition.

Clean points with an abrasive strip or alternatively fine grade emery cloth. Pass a strip of clean paper, or rag soaked in petrol, across the points after cleaning.

Check free movement of contact breaker arm on its pivot.

89. Automatic Advance Unit

This unit is situated behind the contact breaker base plate, which regulates the ignition timing in relation to engine speed. When servicing the contact breaker unit apply a spot of oil on the pivot pins.

90. Headlamp

The main headlamp bulb is of the pre-focus 12 volt type 40/50 watts. The pilot bulb is 12 volt 2.2 watts with M.E.S. cap fitting.

The speedometer is illuminated when the light switch is in use. The bulb is 12 volt .2 amps, miniature bayonet fixing. For access to lamp bulbs take out the screw at the bottom of the headlamp rim, which will come away with the reflector which should be turned upside down, otherwise the main bulb will fall out as no fastening is used.

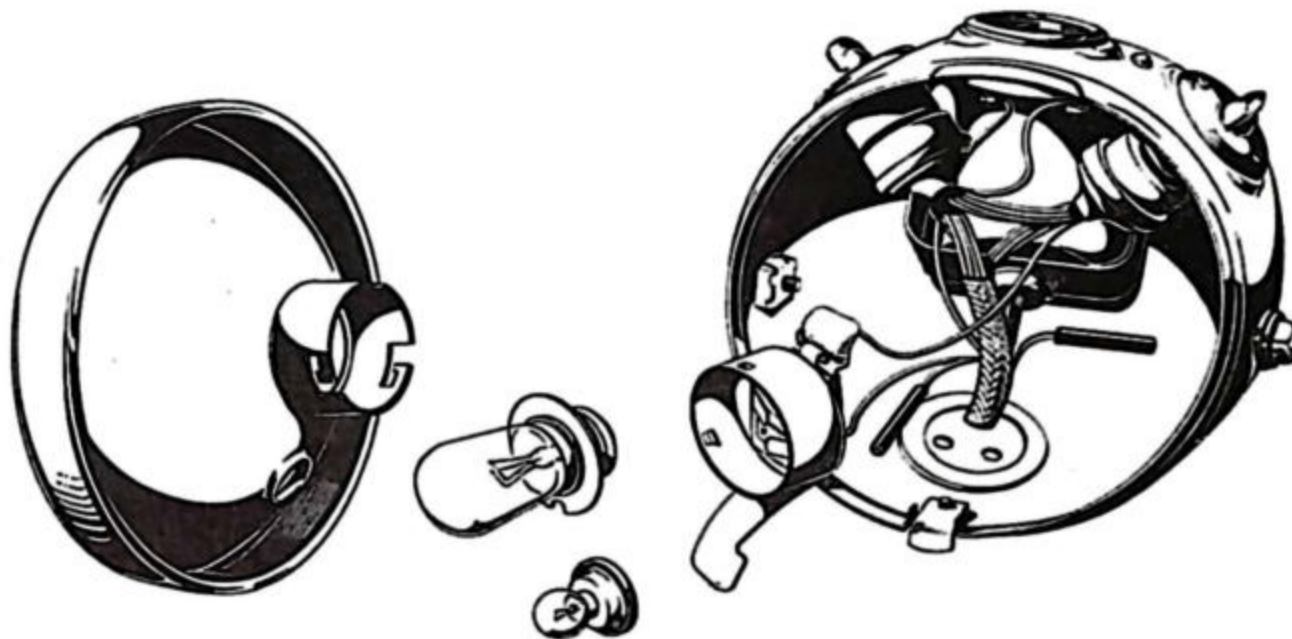


FIG. 19
View inside Headlamp

91. Rear Lamp and Stop Light

A Lucas type L679 lamp is fitted using a 12 volt 21 × 6 watt bulb, for the stop lamp and tail light. When refitting red plastic cover do not overtighten the two fixing screws.

92. Stop Lamp Switch

Operated by movement of the rear brake pedal.

93. Voltage Regulator

The voltage regulator is of the relay type and depending on the state of charge of the battery will switch in or out additional generator coils to increase or decrease the charge rate as necessary. The unit has been carefully adjusted at the factory for optimum performance and any attempt to alter the settings can only impair its efficiency and invalidate the guarantee.

94. Charge Rates

Load Condition	Battery Condition	Charge Rates at 3,000 r.p.m.
No Lights	Regulator in (Battery Low)	7 amps minimum
No Lights	Regulator out (Battery charged)	2 amps minimum
Pilot Lights	Regulator in (Battery Low)	6 amps minimum
Pilot Lights	Regulator out (Battery charged)	Balance minimum
Head Light	Regulator in (Battery Low)	2 amps minimum
Head Light	Regulator out (Battery charged)	4 amps maximum

95. Bulbs

Headlamp	12v. 40/50w. Pre-focus
Rearlamp	12v. 21/6w.
Stop Lamp	12v. 21/6w.
Pilot Lamp	12v. 2.2w.
Speedometer Bulb	14v. 0.8w.
Flashing Indicators	12v. 18w. Festoon type.

DO NOT run with the battery disconnected otherwise the voltage regulator will constantly chatter and accelerate wear on the contacts and pivots, the rectifier will also over-heat. If you switch the lights on all the bulbs will blow.

DO NOT reverse the battery connections, which will burn out the rectifier. Running the machine in this condition will also de-magnetize the rotor.

96. Voltage Control Unit (see para 95).

97. Batteries (Positive Earth)

Two Exide type 3-EV11 batteries of 12 amp hour capacity are housed in the tool compartment also in a carrier underneath the riders seat, both are secured by a rubber band.

"Dry charged" batteries are supplied without electrolyte, but with their plates in a charged condition. No initial charging is required and to bring the battery into service it is only necessary to fill the cells with electrolyte, prepared by mixing concentrated sulphuric acid and distilled water.

Preparation of Electrolyte. In the U.K. and countries where the temperatures are normally below 90°F (32°C) electrolyte of 1.270 S.G. is required, viz. 1 part acid (1.835 S.G.) to 2.8 parts distilled water. In tropical climates where temperatures frequently rise above 90°F, electrolyte of 1.210 S.G. is recommended, viz., 1 part acid (1.835 S.G.) to 4 parts distilled water.

WARNING. ALWAYS ADD ACID TO WATER—NOT WATER TO ACID.

ON DRY CHARGED BATTERIES THE FILLING OF EACH CELL MUST BE COMPLETED IN ONE OPERATION AND LEVELS RESTORED AFTER STANDING FOR AN HOUR OR MORE BY SYPHONING OFF EXCESS ELECTROLYTE.

Electrolyte should be mixed in a glass or earthenware vessel, or lead lined tank.

Temperature of filling room, battery and electrolyte should be maintained between 60°F and 80°F.

Batteries filled in this way are 90 per cent charged. After filling, a dry charged battery needs only the attention normally given to lead-acid type batteries.

Battery Maintenance. Deterioration soon sets in if 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, clean terminals and top up the three cells with distilled water—NOT tap water, as this contains impurities detrimental to the battery. Pour the distilled water through a glass funnel or syringe to the level shown on battery.

Many lighting troubles can be traced to unseen corrosion between the surfaces of the battery terminals; keep the terminals clean. A little grease smeared on them will help to 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. Rain water 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 rust.

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.

WARNING. When refitting the battery to the tool box compartment the **POSITIVE** terminal must be on the left side (facing front of machine) this terminal is earthed on the crankcase.

98. Electric Self-Starter Mechanism

This equipment is comprised of the following components:—

Lucas starter motor 12 volt type M3.

Epicyclic gear in housing attached to starter motor body.

Starter drive sprocket.

Starter drive chain with detachable link.

Starter drive ratchet on engine shaft.

Outrigger plate bolted to chaincase housing the overriding clutch.

Solenoid starter switch 12 volt mounted between the frame channel and rear mudguard.

Starter switch incorporated in "Triconsul" switch mounted on left handlebar.

99. Electric Starter Operation

The electric starter operates when the ignition is switched ON and the red button in the "Triconsul" switch mounted on the left side of the handlebar is depressed. The drive, from the starter motor, is taken through the Epicyclic gear, rotating the overriding clutch via the drive chain.

Three pawls, which are lightly spring loaded by a wave plate, engage with the dogs on the starter ratchet thus rotating the engine. Immediately the engine commences to run, the pawls disengage with the drive on the engine mainshaft.

The electric starter is simple in design yet robust in construction and does not need frequent attention.

The following precautions are however necessary:—

If the machine is used when the temperature is in the region of 32° Fahrenheit (zero Centigrade) the engine should be rotated several times by means of the kickstarter to relieve 'gumminess' between the pistons and cylinder caused by oil adhesion.

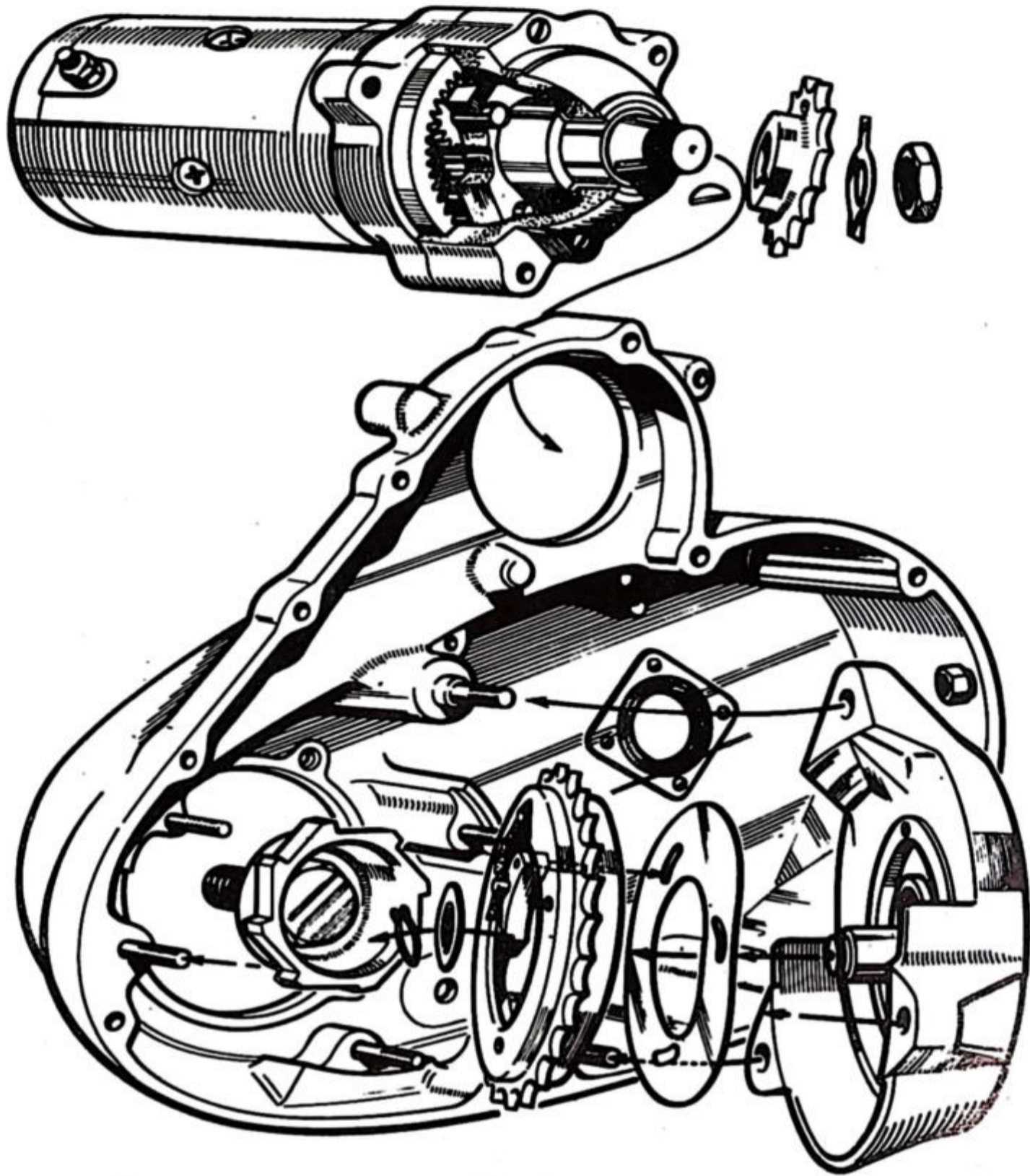


FIG. 20

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Periodically check the electrolyte level in both batteries and top up to the visible level indicated on the battery case.

If the machine is left standing for any length of time, the batteries should have a freshening charge, until all cells are gassing freely, to replace energy lost during standing.

100. To Remove Starter Motor

Take off the heavy duty cable attached to the starter motor.

Remove the outer chain case cover.

Remove the chain connecting link.

Remove three self locking nuts fixing the motor to the chain case. The starter motor together with the Epicyclic gear in its housing can be withdrawn.

101. Direction Lights (12 volt 18 watts)

The operating switch is mounted on the right side handlebar in front of the air control lever. To exchange a bulb, remove four screws retaining the amber plastic covers. Take out the large screw in light body, the bulb can be removed with the fingers.

102. To Remove the Light Body

With the bulb removed, pull out slightly the connector and wire, use a screwdriver and release two or three turns (no more) the expander screw inside the handlebar. A sharp tap on the end of the screwdriver will separate the taper plug retaining the light body.

When refitting, it is preferable to take off the switch and pull back the cable, after tightening the taper plug. A circuit diagram is printed on the flasher unit.

WARNING. Do not overtighten amber cover fixing screws.

Lucas Constant-Mesh Starting Motor

Model M3 Part No. 26509

(1) General

Model M3 constant-mesh starting motor is a four-pole, four-brush, earth return machine with series-connected field coils. The armature shaft is extended to carry a ten-toothed pinion, which acts as the 'sun' gear of an epicyclic reduction gear assembly, through which the starting torque is transmitted, via a chain drive and free-wheeling device, to the engine crankshaft. The free-wheeling device—incorporated between the driving chain sprocket and crankshaft—ensures that the starting gears and motor remain stationary unless actually engaged in turning over the engine.

(2) Maintenance

Keep the supply terminal on the starter yoke clean and tight. If the connection has become dirty, clean the contacting surfaces and lightly smear with petroleum jelly. No periodic lubrication is necessary, but when the engine is stripped down for a general overhaul the starting motor should be removed and given a thorough examination on the bench.

(3) Performance Data

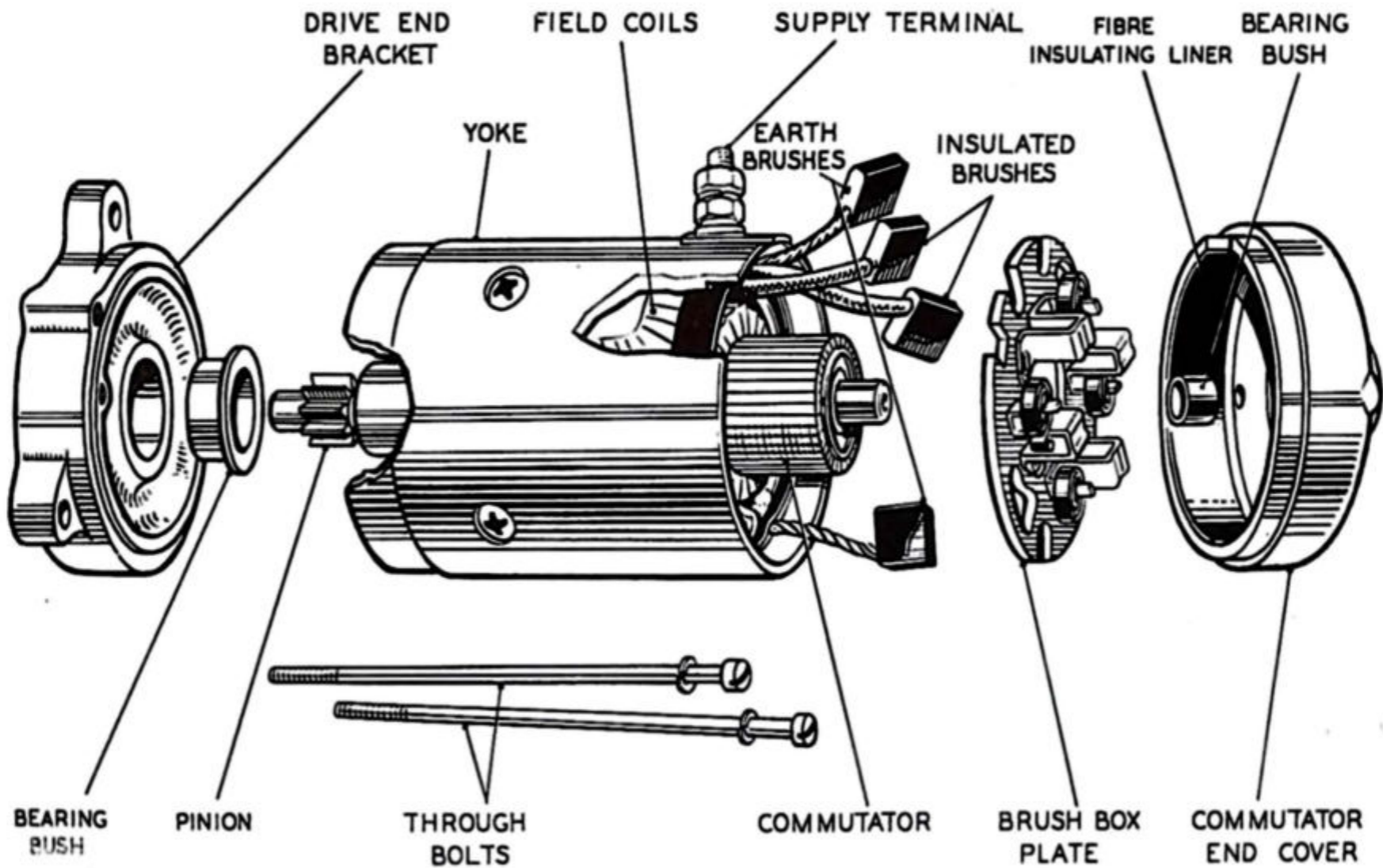
- (a) Light running on 12 volts: 50 amp (max) at 6,500-7,500 r.p.m.
- (b) Lock torque: 4.5 lb.-ft. with 260 amp (max) at 7 terminal volts.

(4) Servicing

(a) Testing in position

Switch on the lamp(s) (or connect a moving coil 0-20 voltmeter between the battery terminals), operate the starter and watch for the following symptoms.

MODEL M3 CONSTANT-MESH STARTING MOTOR PART No. 26509



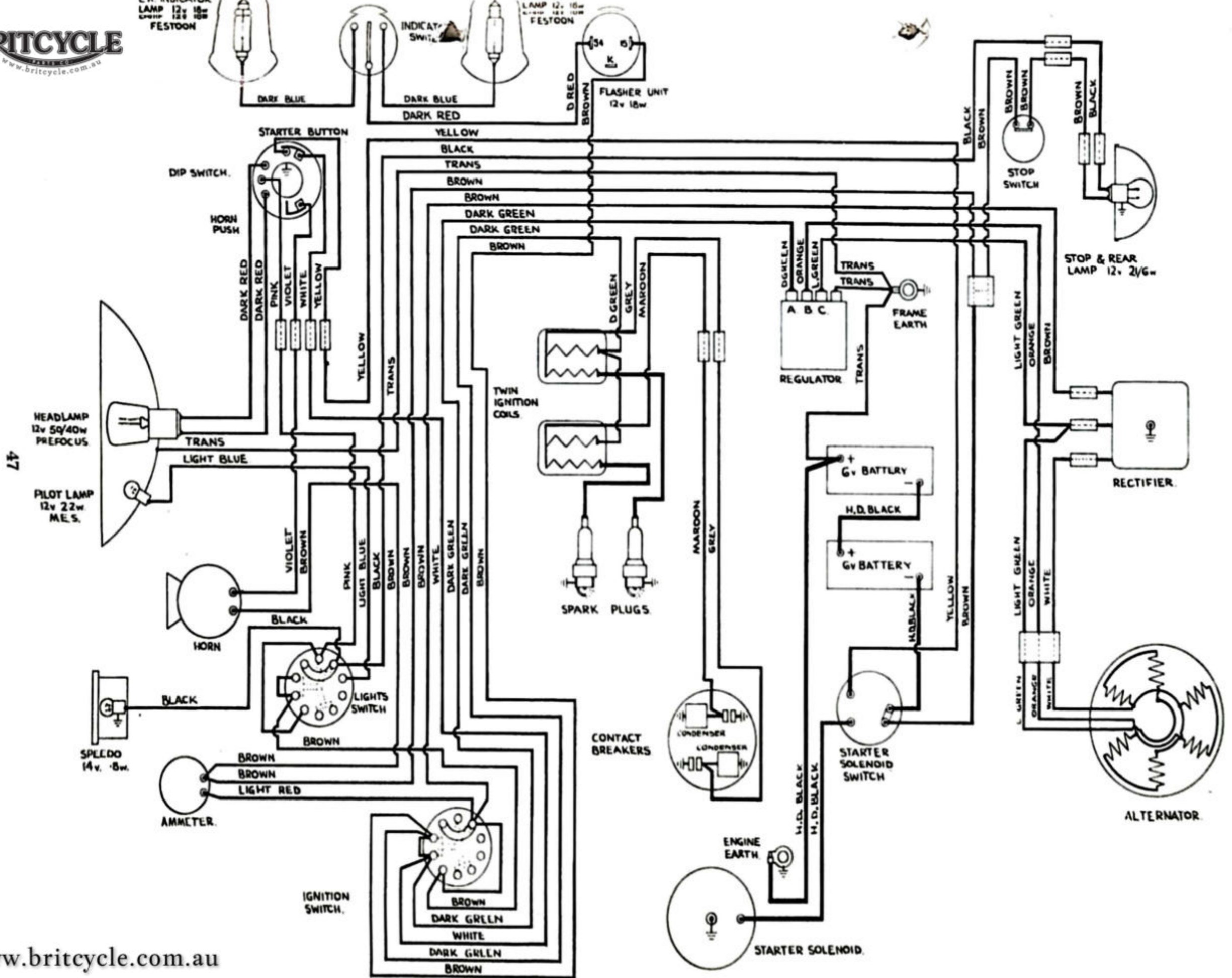


DIAGRAM OF ELECTRICAL WIRING

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- (i) The lamp(s) dim (or the voltmeter reading falls appreciably) but the motor does not crank the engine.**

ACTION. Remove the sparking plug(s) and check that the engine is not abnormally stiff.

Check the battery by substitution.

- (ii) The lamp(s) do not dim (or the voltmeter reading remains unaffected) and the motor does not crank the engine.**

ACTION. Check the starter, starter switch, starter operating push and battery terminal connections for tightness. Check the circuit from battery to starter, including the operating push, with the aid of the voltmeter. If the source of trouble cannot be readily located it will be necessary to remove the starting motor from the engine for examination.

USEFUL INFORMATION

In the following paragraphs are particulars of failures and troubles that can occur together with the probable reasons. These troubles are arranged in the order of their probability.

Tracing Troubles

Engine fails to start, or is difficult to start, may be due to:

- Water on high-tension coils.
- Moisture on sparking plugs.
- Oiled up, or fouled, sparking plugs.
- Throttle opening too large.
- Pilot jet choked.
- Air lever in open position or bad air leak at carburetter joint.
- Lack of fuel because of insufficient flooding.
- Lack of fuel because of pipe, or tap, obstruction.
- Excessive flooding of carburetter (with hot engine only).
- Stuck up engine valve.
- Weak, or broken, valve spring.
- Valve not seating properly.
- Contact points dirty.
- Incorrect contact point gap.
- Ignition not switched on.
- Discharged battery.

Engine misses fire may be due to:

- Defective, or oiled, sparking plugs.
- Incorrect contact point gap.
- Contact breaker lever sticking.
- Contact breaker points loose.
- Rocker adjustment incorrect.
- Oil on contact breaker points.
- Weak valve springs.
- Defective sparking plug wire.
- Partially obstructed petrol supply.

Loss of power may be due to:

- Faulty sparking plugs.
- Lack of oil in tank.
- No rocker clearance, or too much clearance.
- Weak, or broken, valve spring.
- Sticky valve stem.
- Valve not seating properly.
- Brakes adjusted too closely.
- Badly fitting, or broken, piston rings.
- Punctured carburetter float.
- Engine carbonised.
- Choked silencer.
- Bad air leak between carburetter and head, or manifold.

Engine overheats may be due to:

- Lack of proper lubrication. (Quality or quantity of oil).
- Faulty sparking plugs.

Air control to carburetter out of order.
Punctured carburetter float.
Engine carbonised.
Weak valve springs.
Pitted valve seats.
Worn piston rings.
Ignition setting incorrect.
Automatic timing control faulty.

Engine stops suddenly may be due to:

Stuck up valve.
No petrol in tank, or choked petrol supply.
Choked main jet.
Oiled up, or fouled, sparking plugs.
Water on high-tension pick-up, or sparking plugs.
Water in float chamber.
Vent hole in petrol tank filler cap choked.
Loose coil connections.

Excessive Oil Consumption

Excessive oil consumption may be due to:

Stoppage, or partial stoppage, in the pipe returning oil from the engine to the oil tank.
Badly worn, or stuck up, piston rings. (Causing high pressure in the crankcase).
Air leak in dry sump oiling system.
Worn inlet valve stems.

Excessive Petrol Consumption

Excessive petrol consumption may be due to:

Leaks in the petrol feed system. (Damaged fibre washers, loose union nuts on piping, defective float needle action).
Incorrect ignition setting. (Ignition not advanced sufficiently).
Defective engine valve action.
Incorrect use of air control lever.
Moving parts of carburetter badly worn. (Only possible after very considerable mileage).
Bad air leak at carburetter junction, or inlet manifold joint.

Steering Unsatisfactory

Incorrect steering head adjustment (too tight or excessively slack).
Pitted steering head ball races resulting from loose adjustment.
Wheels out of alignment.
Front and/or rear tyre tread not correctly manipulated to run true with wheel (causes handlebar oscillation at low road speed).
Damaged front fork main tubes resulting from impact.

Abnormal Tyre Wear

Abnormal tyre wear may be due to:

Incorrect tyre pressure.
Wheels not in alignment.
Harsh driving methods. (Misuse of acceleration and braking).

G u a r a n t e e

1. 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.
2. 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.
3. 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
4. Any part considered to be defective must be sent to our Works, carriage paid, accompanied by the following information:—
 - (a) Name of purchaser and his address
 - (b) Date of purchase of machine
 - (c) Name of dealer from where the purchase was made
 - (d) Engine and Frame numbers of machine.
5. 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:—
 - (a) Hiring out
 - (b) Racing and Competitions
 - (c) Adaption or alteration of any part or parts after leaving our Works
 - (d) 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.

6. 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 expressed 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.

R e p a i r s G u a r a n t e e

1. 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.
2. 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 loss or damage whether direct or consequential and our liability shall be limited to the cost of so making good.
3. 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 expressed or implied are hereby excluded.

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SPARE PARTS LIST

Spare Parts

GENUINE SPARE PARTS purchased from an Authorised Dealer, or from the Factory, are identical with the parts originally built into your motor cycle. By using them you are assured that they will fit accurately and give satisfactory service.

CORRESPONDENCE AND SPARES ORDERS

Always quote the complete engine number, including all the letters in it. This will enable us to identify the machine.

The engine number is shown on the transmission side of the crankcase. The frame number is stamped on the right side of the rear frame member adjacent to the gear box.

PROPRIETARY FITTINGS

No expense is spared to secure and fit the most suitable and highest quality instruments and accessories for the standard equipment of our machines.

Nevertheless our Guarantee does not cover such parts and, in the event of trouble being experienced, the parts in question should be returned to, and claims made, direct on the actual manufacturers who will deal with them on the terms of their respective guarantees.

THOSE MANUFACTURERS ARE :

Carburettors	...	...	...	...	Messrs. Amalgamated Carburettors Ltd., Holdford Road, Witton, Birmingham, 6.
Chains	...	...	...	...	The Renold & Coventry Chain Co. Ltd., Didsbury, Manchester.
Electrical Equipment	...	...	...	...	Wico-Pacy Corporation, London Road, Buckingham, Bucks. Messrs. Joseph Lucas Ltd., Great King Street, Birmingham, 19.
Sparking Plugs	...	...	...	...	Messrs. K.L.G. Sparking Plugs Ltd., Putney Vale, London, S.W.15.
Speedometers	...	...	...	...	Messrs. S. Smith & Sons (M.A.) Ltd., Cricklewood, London, N.W.2.
Tyres	...	...	...	...	Messrs. Dunlop Rubber Co. Ltd., Fort Dunlop, Birmingham.
Rear Suspension	...	...	...	...	Messrs. Girling Ltd., Kings Road, Tyseley, Birmingham, 11.

D/SIDE

T/SIDE

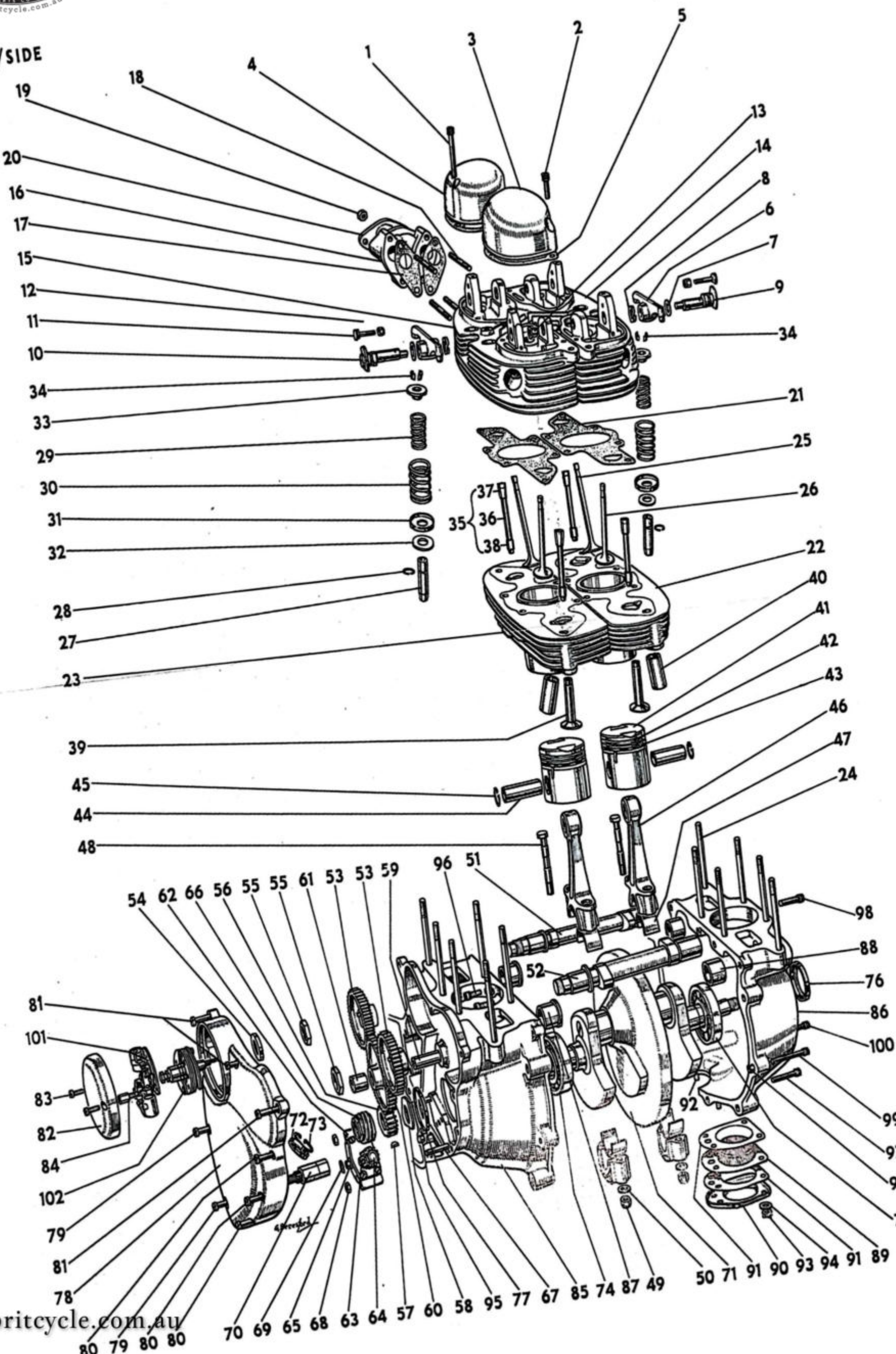


PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
ROCKERS, ROCKER COVERS, SPINDLES, ETC.				
A1	21497	Screw for rocker covers (long)	4	
A2	22016	Screw for rocker covers (short)	4	
A3	20826	Rocker cover (R.H. exhaust/L.H. inlet)...	2	
A4	20824	Rocker cover (L.H. exhaust/R.H. inlet)...	2	
A5	20867	Gasket for rocker covers	4	
A6	20862	Rocker (inlet or exhaust)	4	
A7	21394	Shim for rocker	4	
A8	18103	Spring washer	4	
A9	24633	Rocker spindle (left hand)	2	
A10	24632	Rocker spindle (right hand)	2	
A11	24187	Spindle clamping pin	4	
A12	18403	Nut for pin	4	
A13	20850	Bush for rocker spindle (in cylinder head)	4	
CYL. HEADS, STEADY STAY AND INLET MANIFOLD				
A14	24912	Cylinder head with guides and rocker bushes, L.H.	1	
A15	24913	Cylinder head with guides and rocker bushes, R.H.	1	
—	20873	Rocker oilway grub screw	8	
—	23327	Cylinder head steady stay	1	
—	21524	Fixing stud for stay (in head)	2	
—	19971	Nut for stud	2	
—	E5380	Washer for stud	2	
—	23333	Bolt fixing steady to frame	1	
—	19971	Nut for bolt	1	
—	E5380	Washer for bolt	2	
A16	22854	Inlet manifold	1	
A17	22857	Joint Washer (manifold to head)	2	
A18	21433	Stud (manifold to head)	4	
A19	T2220	Nut for stud	4	
—	T2221	Washer for stud	4	
—	21139	Stud (carb. to manifold)	2	
—	E3231	Nut for stud	2	
—	11796	Washer for stud	2	
A20	22858	Insulating washer for carb.	1	
—	22936	Cylinder head gasket	1	
CYLINDER BARRELS GASKETS AND STUDS				
—	24731A	Cylinder barrel with tappet bushes	1	
—	24710	Cylinder base washer	1	
A24	22929	Studs, cylinder barrel and head fixing	12	
—	T2210	Nut for stud	12	
—	T2211	Washer for stud	12	

FLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
VALVES, GUIDES, SPRINGS, ETC.				
A25	21457	Valve inlet	2	
A26	20744	Valve exhaust	2	
A27	20728	Valve guide (inlet and exhaust)	4	
A28	20729	Circlip for valve guide	4	
A29	21194	Valve spring (inner)	4	
A30	21195	Valve spring (outer)	4	
A31	20905	Valve spring cup (bottom)	4	
A32	20745	Insulating washer	4	
A33	20903	Valve spring cup (top)	4	
A34	20904	Valve cotter (2 halves = 1 cotter)	4	
PUSH RODS AND TAPPETS				
A35	S19/82	Push rod, complete	4	
A36	22946	Push rod (tube only)	4	
A37	T2064	Push rod top	4	
A38	20880	Push rod bottom	4	
A39	20871	Tappet assembly	4	
A40	20751	Tappet bush (in cylinder)	4	
PISTONS AND RINGS, ETC.				
—	24708A	Piston, complete, standard size	2	
—	24834A	Piston, complete, plus .010" oversize	2	
—	24835A	Piston, complete, plus .020" oversize	2	
—	24836A	Piston, complete, plus .030" oversize	2	
—	24708	Piston, bare, standard size	2	
—	24834	Piston, bare, plus .010" oversize	2	
—	24835	Piston, bare, plus .020" oversize	2	
—	24836	Piston, bare, plus .030" oversize	2	
—	23181	Ring, piston, top, chrome, standard size	2	
—	24851	Ring, piston, top, chrome, plus .010" oversize	2	
—	24852	Ring, piston, top, chrome, plus .020" oversize	2	
—	24853	Ring, piston, top, chrome, plus .030" oversize	2	
—	24824	Ring, piston, plain, standard size	2	
—	24854	Ring, piston, plain, plus .010" oversize	2	
—	24855	Ring, piston, plain, plus .020" oversize	2	
—	24856	Ring, piston, plain, plus .030" oversize	2	
—	24825	Ring, piston, scraper, standard size	2	
—	24857	Ring, piston, scraper, plus .010" oversize	2	
—	24858	Ring, piston, scraper, plus .020" oversize	2	
—	24859	Ring, piston, scraper, plus .030" oversize	2	
—	24797	Gudgeon pin	2	
—	22798	Circlip for gudgeon pin	4	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
CONNECTING ROD ASSEMBLIES AND BIG END				
A46	23341	Connecting rod c/w bearing end cap, L.H. or R.H.	2	
A47	17828	Big end bearing (2 halves, 1 bearing) ...	2	
—	24914	Big end bearing, plus .005" oversize ...	2	
—	24915	Big end bearing, plus .010" oversize ...	2	
—	24916	Big end bearing, plus .020" oversize ...	2	
—	24917	Big end bearing, plus .030" oversize ...	2	
—	T2150	Big end cap bolts	4	
—	17827	Nut, for big end cap bolt	4	
—	T2152	Washer, for big end cap bolt	4	
CAMSHAFT AND TIMING GEAR				
A51	22831	Camshaft (inlet)	1	
A52	22832	Camshaft (exhaust)	1	
—	22956	Camshaft thrust plug	2	
—	22970	Camshaft thrust plug spring	2	
A53	20764	Camshaft gear	2	
—	E3683	Camshaft gear key	2	
A54	20765	Oil seal (in timing cover for inlet camshaft)	1	
A55	20732	Nut for camshaft gear	2	
A56	20734	Half time pinion	1	
A57	E3683	Half time pinion key	1	
A58	20730	Washer for H.T. pinion	1	
A59	20731	Shaft for intermediate gear	1	
—	17823	Circlip for intermediate gear shaft ...	1	
—	20742A	Intermediate gear c/w bush	1	
A60	20742	Intermediate gear only	1	
A61	20762	Bush for gear	1	
OIL PUMP AND PRESSURE RELEASE VALVE				
A62	15522	Oil pump assembly	1	
A63	T2077	Oil pump spindle gear wheel	1	
—	17697	Key for gear wheel	1	
A64	15511A	Nut for oil pump spindle	1	
A65	15515	Pump body to timing cover connection bush	1	
—	21146	Packing shim for bush	1	
A66	20735	Mainshaft pump driving worm	1	
A67	E4440	Pump, to crankcase stud	2	
A68	E3231	Nut for stud	2	
A69	T272	Timing cover connection bush washer ...	1	
A70	P17/915	Oil pressure release valve, complete ...	1	
—	20894A	Oil pressure release body and gauze ...	1	
—	20285	Oil pressure release plunger	1	
—	20286	Oil pressure release spring	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	20896	Oil pressure release end cap	1	
CRANKSHAFT ASSEMBLY, OIL SEALS AND BEARINGS				
—	S19/24	Crankshaft assembly c/w connecting rods	1	
A71	23340	Crankshaft only	1	
—	23493	Crankshaft plug	1	
—	24402	Crankshaft plug	1	
—	E4591	Crankshaft oilway screw	1	
—	22012	Crankshaft stud	1	
—	22015	Nut for stud (engine sprocket and rotor retaining)	1	
—	22014	Washer for stud	1	
A72	T2124	Crankshaft t/cover oil seal	1	
A73	17841	Circlip for oil seal	1	
A74	20727	Mainshaft ball bearing (timing side) (28/MJ/30)	1	
A75	20726	Mainshaft roller bearing (driving side) (MRJA/30)	1	
A76	T2187	Driving side bearing oil seal	1	
A77	T2008	Timing side bearing oil seal	1	
CRANKCASE, TIMING COVER AND OIL FILTER				
—	24479	Crankcase, complete, less covers... ..	1	
A78	20791A	Timing cover assembly	1	
—	18548	Timing cover oil retaining ball	2	
—	E4590	Timing cover plug	2	
—	20890	Timing cover gasket	1	
A79	20951	Timing cover screw (long)	2	
A80	20954	Timing cover screw (short)	4	
A81	E4506	Timing cover screw (medium)	3	
—	20953	Timing cover screw	1	
A82	20865B	Contact breaker cover	1	
—	20866	Joint washer for cover	1	
A83	21136	Contact breaker cover fixing screws	2	
A84	23283	Retaining stud for cover	2	
—	23284	Washer for stud	2	
—	21136	Retaining screw for contact breaker plate	2	
—	22140	Washer for retaining screw	2	
A85	24721	Crankcase timing side with bushes	1	
A86	24723	Crankcase driving side with bushes	1	
N.B.—In the event of a replacement <i>half</i> crankcase being required, this can <i>only</i> be supplied providing that the sound "half crankcase" is returned to the Works for matching.				
—	24527	Crankcase joint washer	1	
A87	22925	Camshaft bush (timing side)	2	
A88	20772A	Camshaft bush (driving side)	2	
—	22957	Camshaft thrust plate	2	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
A89	17398	Oil filter gauze unit	1	
A90	24154	Oil filter cover	1	
A91	17400	Sealing washer for cover	2	
A92	24562	Stud for crankcase oil filter	4	
A93	E3229	Nut for stud	4	
A94	T2221	Washer for stud nut	4	
A95	20958	Crankcase dowel	8	
CRANKCASE STUDS, NUTS AND WASHERS				
A96	19226	Crankcase top fixing screw	2	
A97	20960	Crankcase bottom fixing screw	2	
—	20961	Crankcase rear fixing screw	2	
A98	21248	Crankcase rear fixing screw, top	1	
A99	20962	Crankcase front and gearbox fixing screw	2	
—	20956	Crankcase top fixing stud	2	
—	T2221	Washer for stud	2	
—	E3229	Nut for stud	2	
POWER UNIT FIXING STUDS, NUTS, ETC.				
—	21173	Stud, front fixing	2	
G95	21174	Stud, rear fixing top	1	
—	24622	Stud, rear fixing bottom	1	
G97	E3224	Nut for stud (front and top rear)	6	
—	24621	Nut for rear engine bottom stud	2	
—	E5376	Washer for stud (front and top rear)	6	
CRANKCASE BREATHER AND FITTINGS				
—	24796	Breather pipe for crankcase	1	
—	23431	Rubber for breather pipe	1	
—	22314	Union for breather pipe	1	
—	E4590	Grub screw for breather	1	
GEARBOX FOOT CHANGE FITTINGS				
—	21149	Footchange pedal	1	
—	13433	Clinch stud, for pedal	1	
—	E3231	Nut, pedal clinch stud	1	
—	11796	Washer, pedal clinch stud	1	
—	040086	Rubber, footchange pedal	1	
—	24823	Indicator, gear	1	
—	040137	Screw, gear indicator	1	
—	000012	Washer, gear indicator screw	1	
G33	043453	Spring, return, footchange pedal	1	
G27	048256	Footchange ratchet plate and spindle	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
G28	040079	Footchange ratchet plate "O" ring ...	2	
G29	048170	Footchange actuating plate ...	1	
G30	045231	Footchange ratchet... ...	1	
G31	048152	Footchange ratchet spring ...	1	
—	24568	Footchange ratchet shaft "O" ring ...	1	
G32	048254	Footchange ratchet shaft assembly ...	1	
G34	24513	Footchange pedal return spring distance piece ...	1	
GEARBOX PINIONS, SHAFTS AND BEARINGS				
G1	048143	Mainshaft, gearbox ...	1	
G5	048147	Sleeve gear, with bushes ...	1	
G4	048146	Gear, third on mainshaft ...	1	
G3	048145	Gear, second on mainshaft ...	1	
G2	048144	Gear, first on mainshaft ...	1	
G10	048153	Layshaft, gearbox ...	1	
G15	048261	Gear, fixed on layshaft ...	1	
G14	048145	Gear, third on layshaft ...	1	
G13	048146	Gear, second on layshaft ...	1	
G11	048154	Gear, first on layshaft, bushed ...	1	
G6	048149	Bush, sleeve gear ...	2	
G12	048156	Bush, layshaft first gear ...	1	
G7	048150	Bearing, sleeve gear ...	1	
—	040132	Oil-seal sleeve gear bearing ...	1	
G8	040099	Bearing, mainshaft ...	1	
—	048151	Circlip, mainshaft bearing ...	1	
G9	040373	Nut, mainshaft bearing ...	1	
—	048197	Washer, tab, mainshaft bearing nut ...	1	
G20	048260	Selector cam drum assembly ...	1	
G21	048185	Fork, selector ...	2	
G22	048176	Pegs, drive, selector forks ...	2	
G23	000006	Pin, split, selector fork peg ...	2	
G24	040034	Plunger, cam drum ...	1	
G25	040442	Spring, cam drum plunger ...	1	
G26	040036	Bush, cam drum plunger ...	1	
GEARBOX COVERS AND FITTINGS				
G41	24561	Gearbox cover, outer ...	1	
—	24528	Gasket, for outer cover ...	1	
—	24688	Gearbox cover screw ...	2	
—	24689	Gearbox cover screw ...	1	
—	24690	Gearbox cover screw ...	1	
—	24691	Gearbox cover screw ...	1	
—	11775	Washer, fibre, gearbox cover screw ...	5	
—	20861	Oil level screw ...	1	
—	T1084	Washer, oil level screw ...	1	
G45	24536	Gearbox end plate assembly ...	1	
—	24627	Gearbox end plate stud, long ...	2	
—	24628	Gearbox end plate stud, short ...	4	

Exploded view of Gearbox

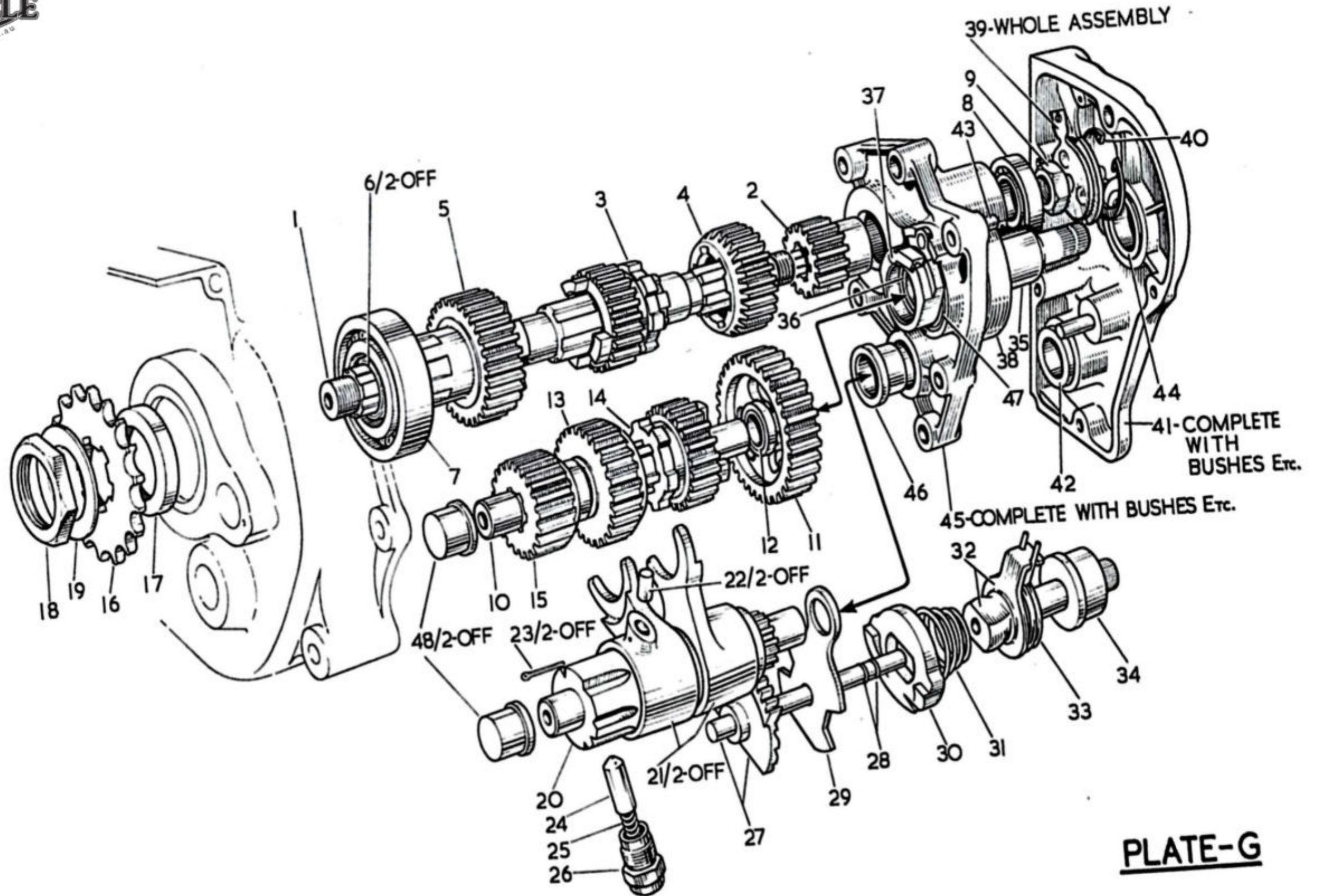


PLATE-G

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	17698	Gearbox end plate stud washer	6	
—	E3229	Gearbox end plate stud nut	6	
—	040138	Gearbox drain plug	1	
—	000200	Washer, fibre, gearbox drain plug ...	1	
—	24564	Gearbox filler plug	1	
—	24565	Washer, gearbox filler plug	1	
G48	048133	Bush, in crankcase, for selector cam and layshaft	2	
—	012233	Peg, layshaft bush	1	
G42	24514	Footchange bush, outer, in outer cover...	1	
—	041102	Kickstarter bush, outer, in outer cover...	1	
G43	24566	Peg, footchange return spring	1	
—	045299	Oil seal washer, in outer cover	1	
G46	048138	Bush, selector cam drum, in end plate ...	1	
G47	041298	Kickstart bush, inner, in end plate	1	
—	048139	Kickstart stop pin, in end plate	1	
—	048137	Kickstart stop plate, in end plate	1	
—	24597	Clutch mechanism dowel, in end plate ...	1	
G44	041104	Clutch cable inspection cover	1	
—	040057	Washer, clutch cable inspection cover ...	1	
—	000450	Screw, clutch cable inspection cover ...	2	
AXLE SPROCKET AND FITTINGS				
G16	048263	Axle sprocket, 19 tooth	1	
G17	048257	Spacer, axle sprocket	1	
G18	048162	Nut, axle sprocket	1	
G19	048163	Washer, axle sprocket nut	1	
CLUTCH OPERATING PARTS				
—	042725	Clutch thrust pad	1	
G39	048195	Clutch lifter cam-plate assembly	1	
G40	24567	Cam-plate circlip	1	
CLUTCH ASSEMBLY				
—	048178	Clutch assembly, complete	1	
—	043444	Clutch sprocket and body assembly	1	
—	043190	Clutch roller cage	1	
—	000075	Clutch roller	15	
—	043339	Race plate	1	
—	043341	Clutch backplate, bonded	1	
—	043192	Clutch friction plate, bonded	3	
—	043191	Clutch plate, plain, steel	3	
—	*043342	Clutch plate, plain, shouldered	1	
—	043193	Clutch plate, outer, bonded	1	
—	040365	Clutch pressure plate	1	
* Not illustrated on Plate C.				

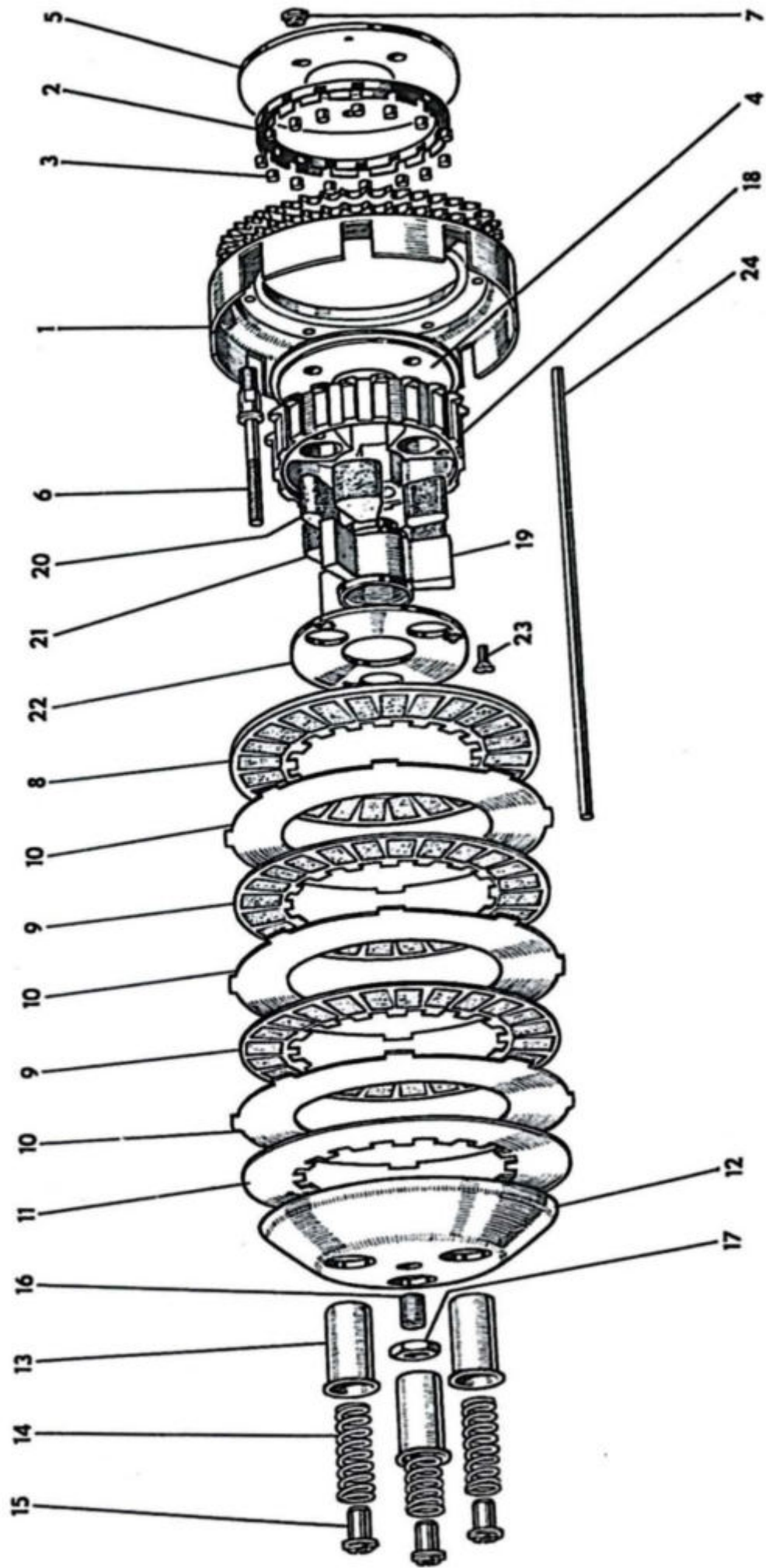


PLATE.C.

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	043174	Stud, clutch spring	3	
—	040388	Cup, clutch spring	3	
—	040356	Clutch spring stud nut	3	
—	040385	Clutch spring	3	
—	040389	Clutch spring adjusting nut	3	
—	040360	Clutch adjuster	1	
—	040376	Clutch adjuster lock nut	1	
—	043337	Clutch centre	1	
—	048187	Shock absorber centre	1	
—	040386	Shock absorber rubber, large	3	
—	040387	Shock absorber rubber, small	3	
—	043345	Shock absorber centre cover	1	
—	043346	Shock absorber cover stud	3	
—	24570	Clutch retaining nut	1	
—	24629	Clutch retaining nut lockwasher	1	
KICKSTART AND FITTINGS				
—	042941	Kickstart pedal, assembly	1	
—	042940	Kickstart crank only	1	
—	042934	Kickstart pedal pin only	1	
—	000010	Kickstart pedal pin washer, plain	1	
—	040432	Kickstart pedal pin nut	1	
—	040433	Kickstart pedal pin washer, spring	1	
—	000367	Kickstart clinch bolt	1	
—	000011	Kickstart clinch bolt washer	1	
—	000004	Kickstart clinch bolt nut	1	
G35	048251	Kickstart shaft assembly	1	
G36	048181	Kickstart shaft bush	1	
G37	045205	Kickstart pawl	1	
—	045206	Kickstart pawl plunger	1	
—	045209	Kickstart pawl plunger spring	1	
G38	045296	Kickstart return spring	1	
—	24568	Kickstart shaft oil seal	1	
FRONT CHAINCASE AND FITTINGS				
—	24806	Front chaincase inner cover assembly	1	
—	22738	Gasket, crankcase to inner cover	1	
—	048066	Front chaincase oil seal	1	
—	24807	Retaining cup for washer	1	
—	24549	Rivet for cup	4	
—	20693	Fixing screw	4	
—	24763	Front chaincase outer cover	1	
—	24775	Gasket for outer cover	1	
—	24788	Fixing screw, medium	2	
A100	24787	Fixing screw, short	4	
—	20841	Filler cap	1	
—	20842	Washer for cap	1	
—	20861	Drain plug	1	
—	T1084	Washer for plug	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
ENGINE SPROCKET AND CHAINS				
—	20766	Engine sprocket, 22T	1	
—	22367	Key for sprocket	1	
—	22051	Front chain, 66 link (Duplex endless, $\frac{3}{8}'' \times \frac{7}{32}''$)	1	
—	20779	Front chain tension slipper	1	
—	23922	Fixing studs for slipper	2	
—	23923	Washer for studs	2	
—	E3223	Nuts for studs	2	
—	23411	Rear chain, 120 link, $\frac{1}{2}'' \times \frac{5}{16}''$	1	
—	A2/480	Rear chain crank link	—	
—	A2/479	Rear chain connecting link	1	
—	23677	Backing plate for tensioner	1	
EXHAUST PIPES AND SILENCERS				
—	23371	Exhaust pipe, L.H.	1	
—	23369	Exhaust pipe, R.H.	1	
—	22790	Silencer, L.H. and R.H.	2	
—	24623	Bracket for silencer, L.H.	1	
—	24624	Bracket for silencer, R.H.	1	
—	17075	Bolt for bracket fixing	4	
—	18202	Washer for bolt	4	
—	16255	Silencer fixing clip	2	
—	E3154	Bolt for clip	2	
—	E3231	Nut for bolt	2	
CARBURETTERS				
—	24826	Carburetter c/w cables 375/48	1	
—	375/005	Carburetter body	1	
—	375/065	Mixing chamber cap	1	
—	375/064	Mixing chamber top	1	
—	4/235	Mixing chamber cap spring	1	
—	4/241	Mixing chamber cap screw	1	
—	4/035	Cable adjuster	2	
—	375/060	Throttle valve No. 3	1	
—	375/061	Throttle valve spring	1	
—	375/062	Air valve	1	
—	4/046	Air valve spring	1	
—	5/047	Air valve guide	1	
—	375/063	Jet needle	1	
—	4/230	Jet needle clip	1	
—	376/068	Throttle adjusting screw	1	
—	376/069	Throttle adjusting screw spring	1	
—	332/017	Pilot air adjusting screw	1	
—	4/148	Pilot air adjusting screw spring	1	
—	229/048R	Air intake tube	1	
—	375/059	Jet block, complete, $\frac{7}{8}''$	1	
—	375/067	Jet block washer	1	

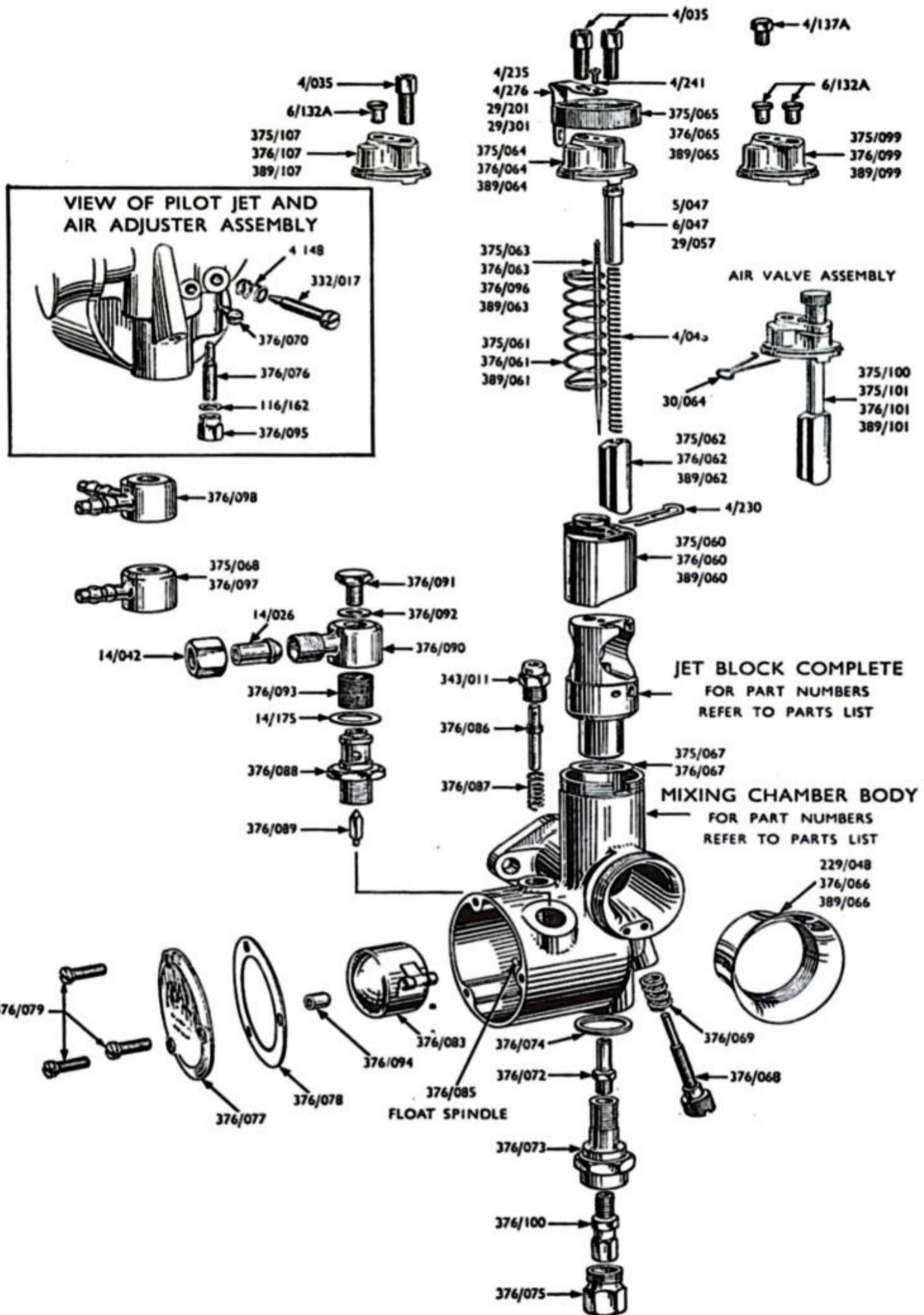


PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	376/072	Needle jet, -105	1	
—	376/100	Main jet, -190	1	
—	376/073	Jet holder	1	
—	376/074	Jet holder washer	1	
—	376/075	Main jet cover nut	1	
—	376/076	Pilot jet No. 25	1	
—	376/095	Pilot jet cover nut	1	
—	116/162	Pilot jet cover nut washer	1	
—	376/077	Side cover	1	
—	376/078	Side cover washer	1	
—	376/079	Side cover screws	3	
—	376/083	Float, complete	1	
—	376/085	Float spindle	1	
—	376/094	Float spindle bush	1	
—	376/086	Tickler	1	
—	343/011	Tickler body	1	
—	343/013	Tickler spring	1	
—	376/088	Needle seating	1	
—	376/089	Float needle	1	
—	376/097	Banjo	1	
—	376/091	Banjo bolt	1	
—	376/092	Banjo bolt washer	1	
—	376/093	Filter gauze	1	
—	244/765	Sealing ring	1	
—	20000	Sealing ring, carburetter	1	
FRONT FORK ASSEMBLY				
—	S19/170	Front fork assembly, complete	1	
DA1	18482	Main tube	2	
DA2	T1055	Main tube top bush	2	
DA3	T1048	Main tube bottom bush	2	
DA4	14298	Main tube bottom bush circlip	2	
DA5	19299	Fork end, L.H.	1	
DA6	19298	Fork end, R.H.	1	
—	16664	Fork end pinch stud	1	
—	E3231	Nut for stud	1	
DA7	T387	Fork end drain plug	2	
DA8	11775	Washer for plug	2	
DA9	20253	Oil damper tube	2	
DA10	15801	Oil damper rod	2	
DA11	14275	Oil damper tube bolt	2	
DA12	T1009	Washer for bolt	2	
DA13	T814	Washer for tube	2	
DA14	E3224A	Nut for rod top	2	
DA15	E3231	Nut for rod bottom	2	
DA16	14605	Damper tube cap	2	
DA17	14119	Piston locating peg	2	
DA18	14118B	Oil damper valve cup	2	
DA19	14117	Oil damper valve cup slotted ring	2	
—	17113	Oil seal	2	
—	T1049	Oil seal paper washer	2	
DA20	50117	Main tube lock ring with cup	2	
DA21	23015	Main spring	2	

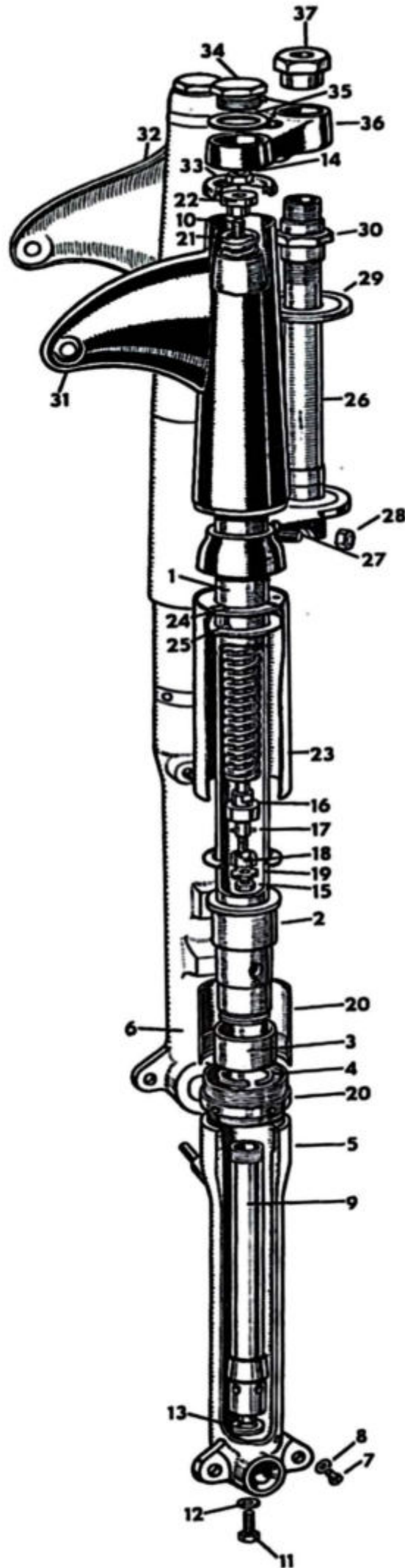


PLATE DA.

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
DA22	16880	Main spring locating bushes	2	
DA23	19307	Spring top cover tube	2	
DA24	T831	Spring top cover tube securing plate ...	2	
DA25	T702	Screws for securing plate	6	
DA26	50259	Crown lug, complete with column ...	1	
DA27	16164	Pinch stud for crown lug	2	
DA28	16187	Nut for stud	2	
DA30	15630	Fork head race adjuster nut	1	
—	23490	Washer for nut	1	
DA31	19275	Top cover with lamp bracket, L.H. ...	1	
DA32	19276	Top cover with lamp bracket, R.H. ...	1	
—	19272	Distance piece for lamp bracket ...	2	
—	15398	Top cover nameplate	2	
—	18810	Rivets for plate, four per set	Set	
DA33	T597	Main tube top cover rubber ring ...	2	
DA34	16998	Fork main tube filler and retaining plug	2	
DA35	T320	Washer for plug	2	
DA36	19019	Fork head clip	1	
DA37	19490	Fork crown and column lock nut ...	1	
—	15627	Washer for column lock nut	1	
—	19021A	Cap for handlebar top clip	2	
—	19437	Screw for cap	4	
—	88/2002	Complete set fork oil seals	1	
		Sets comprise the following:		
		11775 2 F11M2/639 2		
		D3T/616 2 B2/628 2		
		B2/617 2		
—	23897	Dust cover for steering head	1	
—	23380	Steering head cone (upper and lower) ...	2	
—	23381	Steering head cups (frame, upper and lower	2	
—	21711	Steering head balls (1/4" dia.)	36	
—	23378	Steering lock stop plate	1	
—	17075	Bolt for plate	2	
—	E5456	Washers for bolt	2	
		HANDLEBARS AND CONTROLS		
—	19405A	Handlebar bend	1	
—	23646	Front brake c/with air lever combined ...	1	
—	S650/225	Front brake lever only	1	
—	M12-2/228 RH	Front brake lever body	1	
—	M12-2/229	Pivot pin for lever	1	
—	M12-2/230	Nut for pin	1	
—	M12-2/216	Air lever, complete	1	
—	M12-2/217	Air lever only	1	
—	M12-2/218	Air lever body	1	
—	M12-2/220	Air lever cap	1	
—	M12-2/219	Cap screw	1	
—	A2/221	Spring washer	1	
—	M12-2/223	Air lever clip screw	2	
—	23647	Clutch control lever, complete	1	
—	S650/227 LH	Clutch control lever only	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	S650/228 LH	Clutch control lever body	1	
—	A2/222	Half clip for body	1	
—	A2/223	Pins for clip	2	
—	M12-2/229	Pivot pin for lever	1	
—	M12-2/230	Nut for pin	1	
—	19021A	Handlebar half clip	2	
—	19437	Pins for half clip	4	
TWIST GRIP COMPLETE AND FITTINGS				
—	19414	Twist grip, complete	1	
—	M12-2/238	Twist grip top half clip	1	
—	M12-2/239	Twist grip bottom half clip	1	
—	A2/240	Twist grip clip fixing pin	2	
—	M12-2/241	Twist grip control barrel	1	
—	A2/242	Twist grip control adjusting screw	1	
—	A2/235	Twist grip control adjusting screw nut	1	
—	M12-2/243	Twist grip adjusting screw spring	1	
—	M12-2/244	Twist grip cable stop	1	
—	161070	Twist grip plastic grip	1	
—	20267	Dummy grip to match twist grip	1	
CONTROL CABLES AND FITTINGS, THROTTLE CONTROL CABLE				
—	24892	Throttle control cable inner and outer, complete	1	
AIR CONTROL CABLE				
—	24891	Air control cable inner and outer, complete	1	
CLUTCH CONTROL CABLE				
—	24868	Clutch control cable, inner and outer, c/w adj. and nipples	1	
FRONT BRAKE CONTROL CABLE				
—	20295	Front brake control cable, inner and outer c/w "U" clip, adj. and nipples	1	
—	18881	Cable adjuster	1	
—	14759	"U" clip for cable	1	
—	E3255	Pin for "U" clip	1	
—	17735	Cotter for pin	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
		PETROL TANK AND FITTINGS		
—	21026	Petrol tank	1	
—	22183	Petrol tank styling strip, L.H.	1	
—	22182	Petrol tank styling strip, R.H.	1	
—	20230A	Fixing screw for strip (long)	2	
—	20230B	Fixing screw for strip (short)	4	
—	18524	Filler cap	1	
—	16237	Mounting pad	2	
—	024201	Petrol tap with filter	1	
—	13833	Washer for tap	1	
—	22101	Packing shim for tap	A/R	
—	22170A	Petrol pipe	1	
—	22081	Rear fixing bolt	1	
—	22082	Rubber washer for bolt, rear	1	
—	E6743	Rubber washer for bolt, rear	1	
—	E6742	Cup for rear fixing, rear	1	
G87	23408	Front fixing rubber	1	
—	22184	Knee grip, L.H.	1	
—	22185	Knee grip, R.H.	1	
		OIL TANK AND FITTINGS		
—	23064	Oil tank	1	
—	23398	Filler cap for tank	1	
—	P/192	Washer for filler cap (cork)	1	
—	22475	Fixing bolt for tank, bottom	1	
—	22715	Grommet for bolt	2	
—	22716	Sleeve for grommet	2	
—	E5456	Washers for bolt	4	
—	E3223	Nut for bolt	2	
—	23159	Grommet for top fixing (to frame stud)	1	
—	23160	Sleeve for grommet	1	
—	13765	Drain plug	1	
—	13833	Washer for plug	1	
—	19379	Oil filter union assembly	1	
—	E6640	Washer for union	1	
—	23430	Breather pipe	1	
		OIL PIPES AND FITTINGS		
—	23429	Oil feed or return pipe	2	
—	22058	Junction block with pipes	1	
—	21499	Joint washer for block	1	
—	21287	Dowel for block	1	
—	T2006	Stud for block	1	
—	20943	Sleeve nut for stud	1	
—	E5377	Washer for stud	1	
—	S19/699	Rocker feed pipe assembly, complete	1	
—	22166	Rocker feed pipe, to head	1	
—	23390	Rubber connection for feed pipe	1	
—	22264	Ferrules for pipe	2	

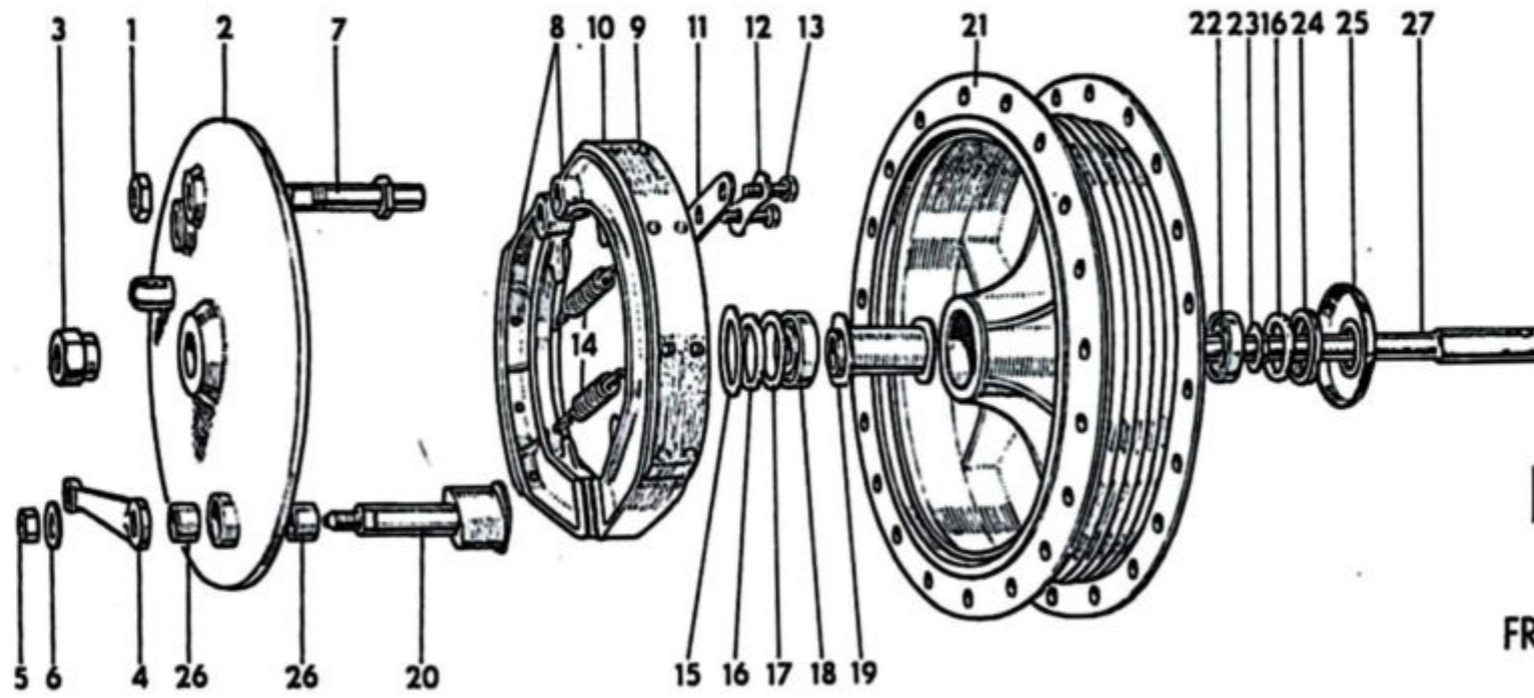


PLATE E.A.

FRONT WHEEL

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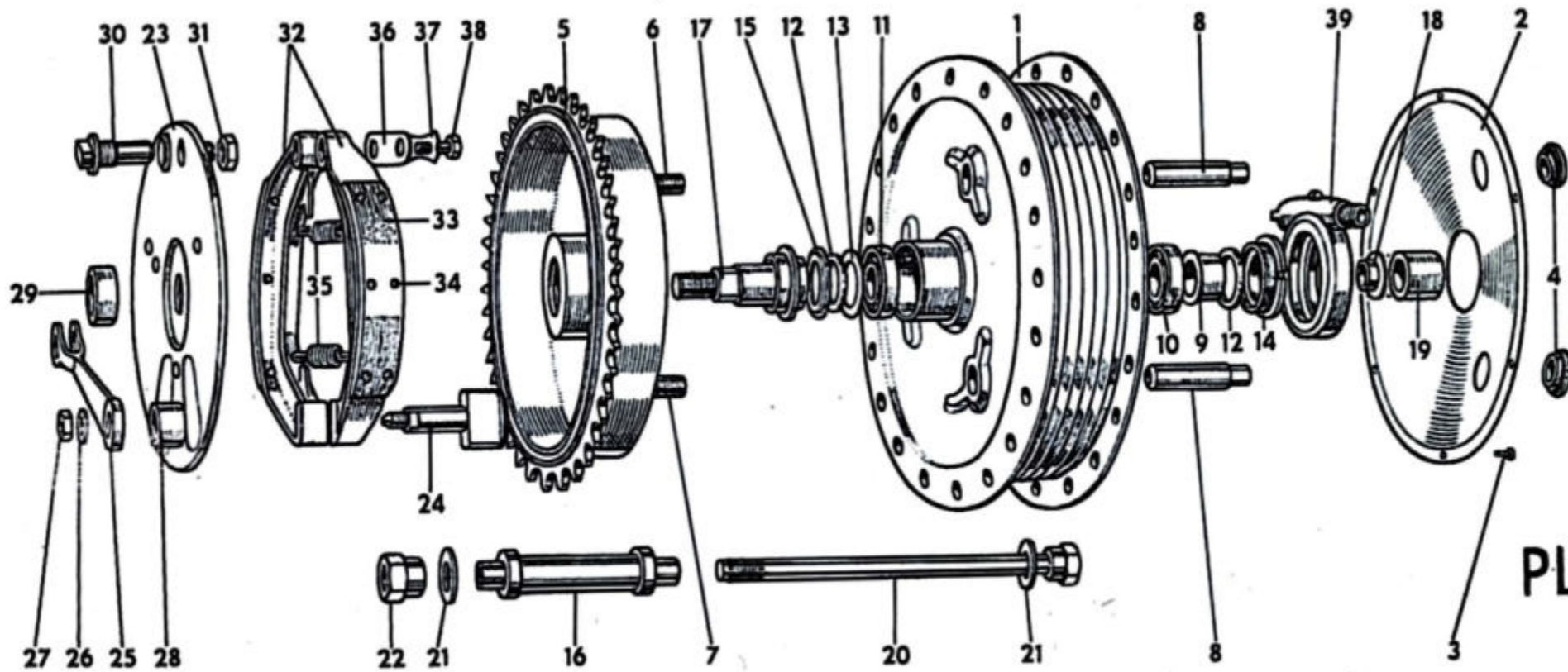


PLATE G

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	18101	Banjo bolt (rocker box)	2	
—	T1084	Washer for bolt	4	
FRONT WHEEL AND FITTINGS				
—	23920	Front wheel with bearing and brake, less tyre	1	
—	M12-2/428	Front wheel with hub shell only	1	
—	18350	Wheel rim	1	
—	20063	Spokes (long head)	20	
—	20061	Spokes (short head)	20	
—	17717	Nipples	40	
EA1	13079	Nut for torque stop pivot pin	1	
EA2	50257	Front hub brake plate	1	
EA3	E4768	Nut for hub spindle	1	
EA4	20052	Front brake cam lever	1	
EA5	18942	Nut for cam lever	1	
EA6	E5455	Washer for lever	1	
EA7	19652	Torque stop pivot pin for brake plate	1	
EA8	18502	Hub brake shoe c/w lining	2	
EA9	E5061	Brake lining rivet	16	
EA10	16782	Hub brake shoe lining	1 pr	
EA11	14454	Brake shoe pivot pin retaining plate	1	
EA12	14506	Tab washer for retaining plate	1	
EA13	12342	Bolt for retaining plate	2	
EA14	E5832	Brake shoe return spring	2	
EA15	19719	Steel plate for hub bearing felt washer	1	
—	E5944A	Brake plate packing washer	A/R	
EA16	E6885	Hub bearing felt washer	2	
EA17	E6889	Hub bearing pen steel washer	1	
EA18	17721	Hub bearing (offside)	1	
EA19	19646	Bearing distance tube	1	
EA20	50249	Front brake cam	1	
EA21	19664	Front hub shell c/w brake drum	1	
EA22	17719	Hub bearing (nearside)	1	
EA23	16783	Hub bearing distance piece (plain side)	1	
EA24	E6888	Hub bearing lock ring	1	
EA25	18551	Hub bearing dust cap	1	
EA26	19680	Brake cam bush	2	
EA27	20249	Front wheel spindle	1	
REAR WHEEL AND FITTINGS				
—	24871	Rear wheel with bearing and brake, less tyre (18")	1	
—	24918	Rear wheel with hub shell only	1	
—	24872	Wheel rim	1	
—	23331	Spokes (long head)	20	
—	23332	Spokes (short head)	20	
—	17717	Nipples	40	
G1	19689	Rear hub only	1	

FLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
G2	18438	Diaphragm for rear hub	1	
G3	18396	Drive screws for diaphragm	6	
G4	18731	Rubber grommets for rear hub	3	
G5	24874	Rear brake drum with studs (52 teeth)...	1	
G6	18338	Locating studs for brake drum	1	
G7	18339	Non-locating studs for brake drum	2	
G8	18233	Sleeve nut for brake drum	3	
G9	18234	Hub bearing distance piece	1	
G10	17719	Hub bearing, right hand	1	
G11	17721	Hub bearing, left hand	1	
G12	E6885	Felt washer for bearing	2	
G13	E6889	Pen steel washer for bearing	1	
G14	18232	Hub bearing lock ring	1	
G15	19714	Hub bearing felt washer, retaining washer	1	
G16	18231	Rear hub inner sleeve	1	
G17	E4760	Brake drum attachment piece	1	
G18	13270	Speedometer drive distance piece	1	
G19	24883	Hub spindle distance piece	1	
G20	24882	Rear hub spindle	1	
G21	19266	Washer for hub spindle	2	
G22	19267	Nut for hub spindle	1	
G23	19852	Rear brake plate	1	
G24	50011	Rear brake cam	1	
G25	23436	Rear brake cam lever	1	
G26	E5455	Washer for lever	1	
G27	18942	Nut for lever	1	
—	18929	Roller for lever	1	
G28	E5082	Rear brake cam bearing	1	
—	E5083	Nut for bearing	1	
—	E5276	Rear brake plate packing washer	A/R	
G30	19847	Rear brake torque pivot pin	1	
G31	19848	Nut for torque pivot pin	1	
G32	19584	Hub brake shoe with lining (rear)	2	
G33	16547	Hub brake shoe lining (rear)	1 pr	
G34	E5061	Brake lining rivets (14 per set)	1 set	
G35	E5832	Brake shoe return spring	2	
G36	14454	Brake shoe pivot pin retaining plate	1	
G37	14506	Tab washer for retaining plate	1	
G38	12342	Bolt for retaining plate	2	
—	24848	Torque plate assembly	1	
—	24849	Torque strap	1	
—	014807	Torque strap fixing bolt	2	
—	24885	Torque bolt washer	2	
—	000003	Torque bolt nut	2	
FRONT MUDGUARD AND FITTINGS				
—	22677A	Front mudguard, chrome	1	
—	19291A	Front mudguard stay, chrome	4	
—	18710	Bolt stay to mudguard	4	
—	18711	Washer for bolt	4	
—	E5379	Washer for bolt	4	
—	13192	Packing washer for bolt	4	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	E3229	Nut for bolt	4	
—	18854	Bolt stay to fork end	4	
—	11796	Washer for bolt	4	
—	19282A	Front mudguard centre stay, chrome ...	1	
—	18709	Bolt, centre stay to mudguard	2	
—	18711	Washer for bolt	2	
—	E5379	Washer for bolt	2	
—	11796	Washer for bolt	2	
—	E3229	Nut for bolt	2	
—	T1085	Stud, centre stay to fork end	4	
—	E5379	Washer for stud	4	
—	E3229	Nut for stud	4	
REAR MUDGUARD AND FITTINGS				
—	24860	Rear mudguard, chrome	1	
—	23060	Bottom bracket for rear mudguard ...	1	
—	24898	Bolt for bottom bracket	3	
—	E5379	Washer for bolt	6	
—	E3229	Nut for bolt	3	
—	22572	Stud, mudguard and shock absorber fixing	2	
—	22636	Washer, mudguard and shock absorber fixing	2	
—	23163	Spacer (long) for fixing stud	2	
—	23162	Spacer (short) for fixing stud	2	
—	E5376	Washer for stud	4	
—	E3224	Nut for stud	4	
—	22634A	Lifting handle, L.H., chrome	1	
—	22633A	Lifting handle, R.H., chrome	1	
—	14481	Bolt, lifting handle fixing	4	
—	E5379	Washers, for bolt	8	
—	E3229	Nut for bolt	4	
—	24897	Spring clip for centre stand	1	
REAR NUMBER PLATE				
—	029427	Rear number plate with cuff	1	
—	000070	Fixing bolt for rear number plate ...	1	
—	000191	Washer for bolt	1	
—	000070	Bracket bolt	2	
—	000172	Washer for bracket bolt	2	
STYLING PANELS AND FITTINGS				
—	23169	Styling panel, L.H.	1	
—	23168	Styling panel, R.H.	1	
—	23171	Bead for panels	1	
—	E5377	Washers for panel fixing	2	
—	23384	Nuts for panel fixing	2	
—	24881	Grommet for panel	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
FRAME ASSEMBLY				
—	23350	Front frame member assembly	1	
—	23079	Frame tube assembly, L.H.	1	
—	23078	Frame tube assembly, R.H.	1	
—	24618	Centre section channel assembly	1	
—	23652	Spray baffle for channel	1	
—	21123	Frame front top fixing stud	1	
—	22610	Frame front bottom fixing stud	1	
—	21124	Frame front bottom fixing stud	1	
—	21971	Nut for stud	6	
—	21102	Frame front spacer washer	5	
—	21839	Frame front distance tube	1	
—	21840	End cap for distance tube	2	
—	21349	Centre section channel stud, top front	1	
—	23096	Centre section channel stud, top rear	1	
—	E3224	Nut for stud	4	
—	E5376	Washer for stud	4	
—	23104	Petrol tank rear fixing bracket	1	
—	23110	Centre section channel distance tube, outer	2	
—	12342	Bolt, locating plate to centre channel	1	
—	E5379	Washer for bolt	2	
—	E3229	Nut for bolt	1	
—	21550	Headlug cover	1	
—	23043	Sealing bead for cover	2	
—	22037	Grommet for cover	2	
—	18285	Grommet for cover	1	
—	22034	Fixing bolt for cover	2	
—	18711	Washers for bolts	2	
—	21099	Frame distance tube (top rear)	1	
—	21134A	Stud for tube	1	
—	E3224	Nut for stud	2	
—	E5376	Washers for stud	4	
—	24902	Spacer, frame front fixing stud, top	1	
SWINGING ARM ASSEMBLIES				
G23	24842	Swinging arm less bearings	1	
G24	21841	Bearing for swinging arm	2	
G25	23161	Swinging arm spindle	1	
G26	23383	Nut for spindle	2	
G27	E5377	Washer for spindle	2	
—	21842	Pivot tube bush	2	
G28	21843	Rear wheel adjuster stud	2	
G29	E3229	Nut for stud	2	
CENTRE STAND AND FITTINGS				
G30	24862	Centre stand	1	
G31	22151	Centre stand spacer tube, inner	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
G32	22150	Centre stand spacer tube, outer ...	2	
G33	21128	Centre stand rod ...	1	
—	11809	Washer for rod ...	2	
—	E3227	Nut for rod ...	2	
G34	24672	Centre stand spring ...	1	
G35	21167	Centre stand stop plate ...	1	
G36	21196	Rubber for stop plate ...	1	
G37	14481	Bolt for stop plate ...	2	
G38	E5456	Washer for stop plate bolt ...	2	
—	E5379	Washer for stop plate bolt ...	2	
G39	E3229	Nut for bolt ...	2	
G40	21165	Centre stand anchor arm ...	1	
...				
...				
...				
REAR SUSPENSION UNITS				
G41	24680	Shock absorber unit (64053939) (black)...	2	
G45	22098	Bolt for shock absorber bottom fixing ...	2	
G46	E3224	Nut for bolt ...	2	
G47	E5376	Washer for bolt ...	4	
N.B.—For shock absorber top fixing bolts or studs, see Rear Mudguards, Group 15				
REAR BRAKE PEDAL AND FITTINGS				
G49	21062	Rear brake cable ...	1	
G50	21845	Circlip for pedal ...	1	
G51	21846	Brake rod assembly ...	1	
G52	21849	Pin for brake rod ...	1	
G53	18291	Split pin ...	1	
G54	21850	Wing nut for rod ...	1	
G55	21164	Brake pedal stop plate ...	1	
FOOTREST AND FITTINGS				
G56	21130	Footrest rod ...	1	
G57	21129	Footrest rod distance tube, outer ...	2	
G58	22019	Footrest hanger ...	2	
G59	22020	Footrest rubber ...	2	
G60	E4549	Footrest rod nut ...	2	
—	C170	Washer for rod ...	2	
G61	11809	Footrest rod nut washer ...	2	
PILLION FOOTREST AND FITTINGS				
—	P17/584	Pillion footrests, complete with all fittings	1 pr	
G62	21353	Pillion footrest lug ...	2	
G63	25842	Stud for lug ...	2	
G64	28254	Pillion footrest hanger ...	2	
G65	26249	Rubber for hanger ...	2	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
G66	16248	Pillion footrest pivot screw	2	
G67	16247	Nut for screw	2	
G68	16250	Washer for screw (Thackery)	2	
—	18202	Washer for screw	2	
G69	E3224	Nut for pillion footrest and silencer fixing	2	
G70	E5376	Washer for nut	2	
REAR CHAINGUARD AND FITTINGS				
—	22341	Rear chainguard top portion	1	
G71	E5379	Washer, front	2	
G72	E3229	Nut for bolt, front	2	
—	22033	Bolt fixing, rear	1	
—	E3229	Nut for bolt	1	
—	E5379	Washer for bolt	2	
—	21161	Rear chainguard bottom portion	1	
—	E5379	Washer fixing, front	1	
—	E3229	Nut fixing, front	1	
—	12342	Bolt fixing, rear	1	
—	E3229	Nut for bolt	1	
—	E5379	Washer for bolt	1	
—	18285	Breather pipe grommet	1	
—	23172	Rear chainguard extension	1	
SIDE PROP STAND				
—	24890	Prop stand complete, less spring	1	
—	22612	Prop stand leg	1	
—	24143	Prop stand lug	1	
—	22615	Prop stand jaw joint bolt	1	
—	22617	Prop stand jaw joint nut	1	
—	24884	Spring, return, prop stand	1	
BATTERY CARRIER AND FITTINGS				
—	24736	Battery carrier assembly	1	
—	24814	Battery carrier fixing spacer	1	
—	12342	Battery carrier fixing bolt	2	
—	17698	Battery carrier fixing spring washer	2	
—	E3229	Battery carrier fixing nut	2	
—	19435	Battery carrier fixing washer	1	
BATTERY BOX, TOOLBOX AND FITTINGS				
—	23097B	Battery box, and toolbox complete with lid and knob	1	
—	23097	Battery box and toolbox body only	1	
—	23068	Lid for box	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	19290	Knob for lid	1	
—	E4764	Circlip for knob	1	
—	24880	Grommet for box	1	
—	23366	Cushioning pad (large)	1	
—	23365	Cushioning pad (small)	1	
—	23551	Mounting ring (rubber) for battery ...	1	
—	22475	Bolt, for battery box and toolbox fixing	2	
—	22715	Grommet for bolt	2	
—	22716	Sleeve for grommet	2	
—	E5456	Washer for fixing bolt	4	
—	E3223	Nut for bolt	2	
—	23159	Grommet for top fixing (to frame stud)	1	
—	23160	Sleeve for grommet	1	
—	24813	Rubber sheet for second battery ...	1	
TWIN SEAT AND FITTINGS				
—	23928	Twin seat	1	
—	21851	Rubber bush for twin seat	2	
—	21852	Rubber button for twin seat	2	
ELECTRICAL EQUIPMENT AND SPEEDOMETER				
ALTERNATOR UNIT (WICO-PACY)				
—	24865	Alternator unit, complete, 12 volt G1697	1	
—	21433	Alternator fixing stud	3	
—	17698	Alternator fixing stud washer	3	
—	E3229	Alternator fixing stud nut	3	
—	S3419	Stator ring and coils assembly	1	
—	S0734	Rotor	1	
—	22038	Rotor key	1	
—	S0735	Leads unit (includes clip and screws) ...	1	
—	02348	Clips (for coil attachment and leads) ...	1	
—	06810	Gasket set	1	
—	08163	Rubber grommet for stator leads ...	1	
—	24013	Alternator lead clamping plate	1	
—	24016	Clamping plate bolt	1	
—	24017	Clamping plate tab washer	1	
DISTRIBUTOR UNIT (WICO-PACY)				
—	S2630	Distributor unit	1	
A101	S2631	Contact breaker plate unit	1	
—	S2634	Contact breaker plate only	1	
—	S2635	Contact breaker plate only (adjustable)...	1	
—	S2767	Condenser set	2	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	S0584	Contact breaker assembly	2	
—	S2632	Cam unit	1	
A102	S2636	Auto-advance unit	1	
—	S2637	Adaptor assembly	1	
—	S0764	Flyweight set	1	
—	S0766	L.T. lead unit	1	
—	S0767	Screws and washers set	1	
—	S0683	Circlip and spring set	1	
—	S1994	Cam grease pad	1	
—	S0812	H.T. lead (7 mm.) 11"	2	
—	24081	Retaining screw for cam and A.T.D.	1	
—	T2221	Washer for screw	1	
—	16555	Fixing bolt for distributor unit	2	
—	E5379	Washer for bolt	2	
IGNITION COIL (WICO-PACY)				
—	24867	Ignition coil	2	
—	S0795	H.T. terminal set	2	
—	S0813	L.T. lead fixing set	4	
—	S0771	Bracket set	2	
—	S1106	Bracket fixing set	2	
—	12342	Fixing bolt for ignition coil	4	
—	E5379	Washer for bolt	8	
—	E3229	Nut for bolt	4	
—	00440	Sleeve	1	
—	00608	Connector (single)	1	
RECTIFIER AND FITTINGS (WICO-PACY)				
—	23711	Rectifier, Wipac S2642	1	
—	10914	Fixing washer for rectifier	1	
HEADLAMP AND FITTINGS (WICO-PACY)				
—	23978	Headlamp, c/w harness	1	
—	S2615	Headlamp, less harness	1	
—		Harness, complete	1	
—	S2611	Headlamp shell	1	
—	S2617	Lamp rim only	1	
—	S2612	Reflector and glass set	1	
—	S0768	Main bulb holder	1	
—	S0877	Pilot bulb holder	1	
—	S0064	Rim locking set	1	
—	S0070	Reflector clip set, set of 4	1	
—	S2688	Headlamp fixing set	1	
—	S0781	Switch unit (lights)	1	
—	S3297	Switch unit (ignition)	1	
—	S0783	Switch knob (lights)	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	S0784	Switch knob (ignition)	1	
—	S3162	Ammeter set	1	
—	S1101	Sealing ring for ammeter	1	
—	00608	Connector (single)	7	
—	01874	Connector (double)	1	
—	01975	Connector (3-way)	1	
—	S3335	Key, ignition switch	1	
VOLTAGE CONTROL UNIT AND FITTINGS				
—	24870	Voltage regulator unit (Wipac)	1	
—	24889	Screw fixing regulator	2	
—	000455	Screw fixing regulator	1	
—	024326	Washer regulator fixing screw	7	
—	24886	Nut, regulator fixing screw	3	
—	24888	Grommet, regulator	3	
—	24887	Sleeve, regulator grommet	3	
DIRECTION INDICATOR				
—	24899	Control switch	1	
—	24900	Direction indicator lamp	2	
—	24901	Flasher unit	1	
—	21654	Bolt, flasher unit	1	
—	021579	Washer, flasher unit bolt	1	
—	E3229	Nut, flasher unit bolt	1	
ELECTRIC HORN AND FITTINGS				
—	24866	Electric horn (Lucas) 8H, 12 volt	1	
—	23869	Fixing bracket for horn	1	
—	23906	Spacer washer for bracket	1	
—	23389	Fixing screws for horn	2	
—	23410	Washers for screws	2	
—	E3221	Nuts for screws	2	
—	24841	Electric horn, dipper switch and starter button	1	
—	S0612	Dipper switch harness	1	
STOP AND TAIL LAMP AND FITTINGS (LUCAS)				
—	24840	Stop and tail lamp, complete	1	
—		Lens	1	
—	23953	Stop lamp switch	1	
—	22754	Rear lamp harness	1	
—	19429	Grommet for lamp harness	1	
—	14490	Clip for switch lead	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
SPARKING PLUGS, BATTERY, ETC.				
—	19451	Sparking plug (F.E.80)	2	
—	18464	Plug cover	2	
—	21582	Battery (Exide E.V.11)	2	
—	22466	Shakeproof earthing washer (earthwire to frame)	1	
SPEEDOMETERS AND FITTINGS				
—	23399	Speedometer head (m.p.h.)	1	
—	23281	Speedometer cable (inner and outer) ...	1	
—	S17/554	Speedometer inner cable only	1	
—	S17/553	Speedometer outer cable only	1	
—	21831	Speedometer gearbox	1	
—	22465	Rubber ring for speedometer	1	
—	14490	Cable clips	2	
—	P17/555	Speedometer fixing bracket c/w bulb-holder clip	1	
—	P17/556	Bracket locknut	1	
STARTER AND FITTINGS				
—	24837	Starter switch (solenoid operated) ...	1	
—	012565	Bolt, starter switch	2	
—	000080	Nut, starter switch bolt	2	
—	024326	Washer, starter switch bolt	2	
—	024327	Washer, spring, starter switch bolt ...	2	
—	24827	Cable, starter switch to battery	1	
—	24828	Cable, starter switch to starter	1	
—	24829	Cable, battery to earth	1	
—	24830	Cable, battery to battery	1	
—	24864	Rubber boot for starter cables	3	
—	24767	Starter ratchet	1	
—	24759	Bolt, starter ratchet	1	
—	24760	Washer, tab, starter ratchet bolt ...	1	
—	24740	Outrigger plate	1	
—	24752	Sprocket shaft assembly	1	
—	24747	Screws, fixing sprocket shaft	3	
—	24756	Nut, sprocket shaft fixing screw ...	3	
—	24748	Washer, tab, sprocket shaft fixing screw	1	
—	24883	Wave spring (.016)	1	
—	24745	Wave spring friction plate	1	
—	24744	Sprocket, complete with bush	1	
—	24722A	Sprocket pawl assembly	3	
—	24770	Sprocket pawl pivot pin	3	
—	24749	Sprocket shaft thrust washer	3	
—	21845	Sprocket shaft circlip	3	
—	24793	Dowels, outrigger plate	2	
—	24794	Stud, long, outrigger plate	2	
—	24795	Stud, short, outrigger plate	1	

PLATE No.	PART No.	DESCRIPTION	QTY.	REMARKS
—	24790	Washer, outrigger stud	3	
—	E3223	Nut, outrigger stud	3	
—	24809	Chain, starter, 66 link $\frac{3}{8}$ " x .225" with conn. link	1	
—	24832	Starter motor	1	
—	24765A	Starter gearbox housing assembly	1	
—	24789	Annular gear	1	
—	24786	Epicyclic gear shaft assembly	1	
—	24781	Planet gears	3	
—	24782	Thrust washers, planet gears	6	
—	000048	Pin, split, planet gear	3	
—	24776	Gasket, gearbox to starter	1	
—	24779	Screw, gearbox to starter	2	
—	24774	Gasket, chaincase to starter gearbox	1	
—	24778	Studs, starter mounting	3	
—	T2221	Washer, starter mounting stud	3	
—	24792	Nut, starter mounting stud	3	
—	24753	Sprocket, starter	1	
—	E3681	Key, starter sprocket	1	
—	24768	Nut, starter sprocket	1	
—	24771	Washer, tab, starter sprocket nut	1	
GASKET SET				
—	24919	Engine overhaul gasket set		
—	24920	Engine de-coke gasket set		
TOOLS				
—	KTU/169	Tool roll c/w tools	1	
		TRU/42 Tool kit bag	1	
		A2/567 Screwdriver	1	
		A2/565 $\frac{1}{4}$ " x $\frac{3}{8}$ " spanner	1	
		A2/573 Tyre levers	2	
—		SBU1/221 Wheel nut and sparking plug spanner	1	
—		P17/580 Cylinder head box spanner	1	
		TBU/28 $\frac{3}{8}$ " x 7" T/Bar	1	
		SFU2/214 $\frac{5}{8}$ " x $\frac{3}{8}$ " O/E spanner	1	
		A2/578 O/E spanner, $\frac{1}{8}$ " Whit.	1	
		19438 Allen key	1	
		18976 S/A adj. spanner	1	
		A2/572 Pliers, 6"	1	
		GFU3/04 Set of feelers	1	
SUNDRIES				
—	17756	Tyre inflator	1	
—	341	Lapel badges (tie pin or brooch, state type required)	A/R	

PLATE No.	PART No.	DESCRIPTION	QTY	REMARKS
		TRANSFER		
—	21467	"Recommended Oil Level" transfer ...	1	
		CABLE CLIPS		
—	17752	Cable clip (size S)	6	
—	18489	Cable clip (size D)	2	
—	19090	Cable clip (size F)	2	