

Cliff
INSTRUCTION BOOK



250 c.c. O.H.V.

MODELS G2 G2S G2CS

350 c.c. O.H.V.

MODEL G5

Issued by:

MATCHLESS MOTOR CYCLES : LONDON S.E.18

Proprietors: ASSOCIATED MOTOR CYCLES LTD.

INSTRUCTION BOOK

MATCHLESS

MODEL G2 250 c.c. O.H.V.
MODEL G2S 250 c.c. O.H.V. SPORTS
MODEL G2CS 250 c.c. O.H.V. SCRAMBLER
MODEL G5 350 c.c. O.H.V.



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PLUMSTEAD, S.E.18

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THE MODERN 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 specialised 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.

Safety on the Road

In the interest of Safety on the Road, a few words of warning will not be out of place.

The outstanding manoeuvrability of a motor cycle over most other vehicles on the road makes it necessary to exercise caution at all times.

There are, unfortunately, a few motor-cyclists whose reckless driving constitutes a menace not only to themselves but also to other road users resulting in the totally false impression in some quarters that motor-cycling is a dangerous pastime.

REMEMBER IT IS NOT THE MOTOR CYCLE THAT CAUSES ACCIDENTS, IT IS THE MAN WHO IS RIDING IT.

Take a pride in your riding technique and never rely upon the other fellow doing the right thing.

Your example of careful and courteous riding will materially contribute to road safety and to the reputation of a fine sporting pastime.

NO ACCIDENTS PLEASE

Your motor cycle, as issued from the factory, is fitted with an efficient silencing system, and with careful and inconsiderate driving, particularly in built up areas, will not cause annoyance to the general public.

Owners who interfere with the silencing system by removing the baffles are purely exhibitionists and such conduct can only bring motor-cyclists in general into disrepute.

Data 350 c.c. Model G5

Identify

Engine Number	On the crankcase near engine plate (24-174)
Frame number	On right side of frame head (49)
Cylinder bore	35.5 mm.
Stroke	36.5 mm.
Case capacity	30 cc. (1.17 cu. in.)

Carburettor

Type	507-43	Actual Monocarb (10 ³ cc./hour)
Max. jet (with max. float)	...	110
Max. jet (with jet float)	...	110
Choke jet	...	7
Yankee jet	...	14
Needle jet	...	106
		21 x 29

Capacities

Fuel tank	31 gal. (117.5 litres)
Oil capacity	2 1/2 pints (1.1 litres)
Gear box	2 pints (0.9 litres)
Frame (lubricate)	500 c.c.

Compression ratio

6.4 to 1

General

Seat height	33 1/2" (854 mm.)
Wheelbase	37" (938 mm.)
Weight	140 lbs. (63.5 kg.)
Ground clearance	6 1/2" (165 mm.)

Cylinder bore

Normal use	35.045" - .0005"
	-.0005"

Piston size

Skirt diameter (taken at right angle to gudgeon pin at top of the skirt)	
High limit	35.038"
Low limit	35.027"

Piston rings

Compression ring	diameter 31.500"
Compression ring	width .640 in. dia.
Compression ring	radial thickness .131" - .163
Scraper ring	diameter 31.500"
Scraper ring	width .111"
Scraper ring	width .109" - .01"
Scraper ring	width .008" - .010"

Ignition timing

4° BTDC

Valve timing

Intake valve open	40° BTDC	Max. 10° rocker clearance
Exhaust valve close	40° ATDC	

Spark plug

K10-17E-10

Chain sizes

Front (22 T/31)	15 1/2" x 7/8" Duplex
Rear (10 T/16)	12 x 3/32"

Gear ratios

Intend. ratio	1.10 to 1, 1.85 to 1, 2.92 to 1
Actual ratio	1.23 to 1
	3.11 to 1
	11.83 to 1
	1.68 to 1

Sprockets

Engine	22 teeth
Clutch	40 teeth
Free drive	18 teeth
Rear wheel	55 teeth

Data 250 c.c. Models G2 and G2S

Identify

Engine Number	On the crankcase near engine plate (24-174)
Frame Number	On right side of frame head (49)
Cylinder bore	25.00 mm.
Stroke	34.00 mm.
Case capacity	24.8 cc. (1.13 cu. in.)

Carburettor

Type	507-43	Actual Monocarb (10 ³ cc./hour)
Max. jet (with max. float)	...	120
Max. jet (with jet float)	...	120
Choke jet	...	14
Yankee jet	...	14
Needle jet	...	106
		21 x 29

Capacities

Fuel tank	31 gal. (117.5 litres)
Oil capacity	2 1/2 pints (1.1 litres)
Gear box	2 pints (0.9 litres)
Frame (lubricate)	500 c.c.

Compression ratio

7.8 to 1

General

Seat height	30" (762 mm.)
Wheelbase	37" (938 mm.)
Weight	125 lb. (56.7 kg.)
Ground clearance	5 1/2" (140 mm.)

Cylinder bore

Normal use	25.000" - .0005"
	-.0005"

Piston size

Skirt diameter (taken at right angle to gudgeon pin at top of the skirt)	
High limit	25.008"
Low limit	25.000"

Piston rings

Compression ring	diameter 21.000 mm.
Compression ring	width .625" - .015"
Compression ring	radial thickness .112" - .108"
Scraper ring	diameter 21.000 mm.
Scraper ring	width .106" - .102"
Scraper ring	width .102" - .108"
Scraper ring	width .008" - .013"

Ignition timing

4° BTDC

Valve timing

Intake valve open	40° BTDC	Max. 10° rocker clearance
Exhaust valve close	40° ATDC	

Spark plug

K10-17E-10

Chain sizes

Front (21 T/31)	15 1/2" x 7/8"
Rear (10 T/16)	12 x 3/32"

Gear ratios

Intend. ratio	1.10 to 1, 1.85 to 1, 2.92 to 1
Actual ratio	1.23 to 1
	3.06 to 1
	7.08 to 1
	11.15 to 1
	30.15 to 1

Sprockets

Engine	22 teeth
Clutch	40 teeth
Free drive	18 teeth
Rear wheel	55 teeth

250 SCRAMBLES MODEL Model G2C5

TECHNICAL DATA.

Engine capacity	...	...	...	...	248 c.c.
Bore and stroke	...	...	...	...	70 x 65 mm.
Compression ratio	...	...	...	...	10.6 : 1
Carburettor	AMAL Monobloc	...	...	...	376/176
Choke Diameter	...	...	...	...	1 1/8"
Main Jet No.	...	...	...	...	230
Pilot Jet No.	...	...	...	...	25
Slide No.	...	...	...	...	3
Needle Position	...	...	...	...	Four
Needle Jet	...	...	...	...	-107
Petrol Tank Capacity	...	...	...	...	2.75 gallons
Oil Tank Capacity	...	...	...	...	2.5 pints
Brakes	...	...	...	...	6" dia.
Rear Chain	...	...	...	...	131 links 1/4" x .205"
Primary Chain	...	...	...	...	35 links 1/4" x .205"
Sparking Plug (for running-in)	...	...	...	...	FE. 80
Sparking Plug (for racing)	...	...	...	...	FE. 220
Front Fork capacity	...	...	...	...	6.5 ozs S.A.E. 20
Ignitor Timing	...	...	...	...	32° B.T.D.C.
Engine Sprocket	...	...	...	...	17 teeth
Rear Wheel Sprocket	...	...	...	...	70 "
Clutch Sprocket	...	...	...	...	37 "
Gear Box Sprocket	...	...	...	...	17 "

GEAR RATIOS. 250 c.c. SCRAMBLES MODELS.

Internal Ratios.

First Gear	Second Gear	Third Gear
2.42 to 1	1.85 to 1	1.30 to 1

Gear Ratios with 17 tooth Engine Sprocket.

First Gear	Second Gear	Third Gear	Top Gear
21.62 to 1	16.55 to 1	11.63 to 1	8.95 to 1

Controls

Throttle twist grip. On right handlebar. Twist inwards to open. When fully closed engine should just die when hot.

Valve lifter. Small lever on left side handlebar.

Air lever. Small lever on right handlebar. Pull inwards to increase air supply to venturi jet. Once set, when engine has warmed up, requires no alteration for different road speeds. Should be fully closed when starting engine from cold.

Clutch lever. Large lever on left handlebar. Grip to release clutch so that drive to rear wheel is disconnected.

Front brake lever. Large lever on right handlebar. Grip to operate from wheel brake and, for normal braking, use in conjunction with rear brake application.

Rear brake lever. Pedal on left side foot rest. Depress with left foot to apply rear brake. Apply gently and use increasing pressure as the road speed decreases.

Gear change lever. Pedal in horizontal position close to right foot rest. Controls selection of the four speeds, or neutral, between engine and rear wheel revolutions, with a "free" or neutral position.

Kick-starter lever. Vertical pedal on right hand side of gear box.

Gear indicator. Moves under the control of the gear change lever and the number registering with a line on gear box indicates gear in engagement (or neutral).

Gear box filler cap. Located on side of gear case cover. Allows insertion of lubricant and access to clutch inner wire and internal clutch operating levels.

Petrol tank filler cap. Located in top of fuel tank. To release, slightly depress, turn fully to the left, and then lift away. There are two locking positions. The middle position, between the fully tightened down and "away" positions, is in the nature of a "safety" device to prevent loss that might be occasioned by unauthorised meddling.

Oil reservoir filler cap. Located on right side crankcase. To remove, unscrew.

Lighting switch. Left hand one on top of head lamp, with three positions:

OFF	ON.
L.	Pilot, rear and speedometer ON.
H.	Major, rear and speedometer ON.

Ignition switch. Right hand one on head lamp. Three positions—EMG., OFF, IGN. Turn clockwise for Ignition.

Ammeter. In top of head lamp. Indicates charge or discharge.

Dipping switch. On left handlebar. Operates when lamp switch is in "H".

Head switch. On left handlebar, incorporated with Dip Switch.

Speedometer. In top of head lamp.

Before using the machine, sit on the saddle and become familiar with the position and operation of the various controls. Pay particular attention to the gear positions.

If any adjustment is made to the rear brake pedal make certain the brake does not bind and also see there is not excessive free pedal movement before the brake comes "on".

Driving

FUEL

Although various quality fuels are again available, owners are advised to use only the best. The small economy that might be considered to arrive by using the cheaper grades is more than offset by the advantages obtained by using only Premium Grades.

FUEL SUPPLY

Two fuel feed taps are located underneath the rear end of the petrol tank. (One each side). Both must be shut off when the machine is left standing for more than a few minutes.

Normally, only use the tap on the right hand side of the machine and then the other side will act as a reserve supply. Always refuel as soon as possible after being forced to stop upon the reserve side then, of course, close the "reserve" tap.

STARTING THE ENGINE FROM COLD

SPECIAL NOTE

It is NOT necessary to flood the carburettor, by depressing the plunger on the float chamber, before attempting to start the engine. Flooding the carburettor unnecessarily will result in difficult starting.

Check that there is sufficient fuel in the petrol tank.

Check that there is sufficient oil in the oil reservoir.

Check that the gear pedal is in the neutral position.

Turn down lever of off-side petrol tap.

Check that the air control lever is in the fully closed position.

Depress the kickstarter two or three times to rotate and free the engine.

Open the throttle to the slightest amount possible.

Turn the ignition switch to IGN. Raise valve lifter to release compression.

Give the kickstarter a long, deliberate swinging kick when the engine should commence running.

Do not allow the kickstarter to return violently against its stop.

The kickstarter mechanism must be allowed to engage properly before putting heavy pressure on the kickstarter crank pedal. That means there are two definite and separate movements when operating the mechanism by depressing the crank.

The first is a slow and gentle movement which ends when it hits the pawl, has engaged with the teeth on the ratchet pinion.

After the engine has started, slowly open the air lever. Then set the throttle so that the engine is running at a moderate speed (neither racing nor stalling over) and allow to warm up. While doing this, check the oil circulation as detailed in page 11. The machine can then be taken on the road.

STOPPING THE ENGINE

To stop the engine close the throttle, TURN OFF IGNITION. Before leaving the machine, turn off the fuel supply.

ON THE ROAD

Having started and warmed up the engine, take the machine off the stand, as advised. Free the clutch by pulling up the large lever on the clutch bar and engage the lowest gear. Next, slowly release the clutch lever and the machine will commence to move forward. As it does this the engine speed will tend to drop as it picks up the load so it will be necessary to increase the throttle opening, gradually, to keep the engine speed fairly running.

When well under way, disengage the clutch, slightly close the throttle, engage second gear and release the clutch lever. Then open up the throttle to increase the speed of the machine. Repeat these operations in order to engage third and top gears.

To engage a higher gear the pedal is pressed downward with the toe and a lower gear is obtained by raising the pedal with the instep. To engage first gear from the neutral position, the pedal is therefore raised. After each pedal movement, instep springs return the pedal to its normal horizontal position.

The pedal must be moved to the full extent of its travel when selecting a gear, either up or down. It must not be "stamped down" or "pulled" but freely and decisively moved till it stops. A half-braced movement may not give full engagement. Keep the foot of the pedal when driving and between each gear change because unless the lever can freely return to its normal neutral position, the next gear cannot be engaged.

RUNNING IN THE ENGINE

It is a natural desire to learn the capabilities of one's machine, similarly it can be wrong to be overthrown by a trial of a machine fitted with a smaller capacity engine. However, unless the owner of a new machine must, in his own interest, strictly adhere to the principles of running in, which will result in a quicker "break in" with a better performance than a similar machine owned by a man who is unwilling to drive with extra care 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 is wide open is not opened in excess of one third of its total movement for the first 1000 in its judicious out of road speed, the engine cannot be overloaded.

After this stage the amount of throttle can be progressively increased.

Special attention must be given, during the running in period, to such details as valve rocker adjustment, chain, brakes, running 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, when a run in such condition will be easily ruined. After this bedding down process has taken place, adjustments to such extent will only be necessary at long intervals.

Do not overlook instructions for changing oil (see page 14)

Lubrication

LUBRICANTS TO USE

Efficient lubrication is of vital importance and it is false economy to use cheap oils and greases. The use of multi-grade oils is not recommended.

We recommend the following lubricants to use in machines of our make.

FOR ENGINE LUBRICATION

HOT above 50° F	COLD 32° F to 50° F	EXTREME COLD below freezing point (32° F)
SAE 50	SAE 10	SAE 20
Mobilol D Castrol Grand Prix Energol SAE 50 Essolube 50 Shell X-100 Motor Oil 150	Mobilol A Castrol XL Energol SAE 10 Essolube 30 Shell X-100 Motor Oil 30	Mobilol Arctic Castrolite Energol SAE 20 Essolube 20 Shell X-100 Motor Oil 20/20W

NOTE—For the British Isles and much of Europe the Cold and Hot recommendations approximate to Winter and Summer conditions respectively. The Extreme Cold recommendations refer to wintry conditions in parts of Northern Europe, Canada, the Baltic and Scandinavian countries, and high mountainous districts where extreme cold is the average condition.

FOR GEAR BOX LUBRICATION

HOT above 50° F	COLD 32° F to 50° F	EXTREME COLD below freezing point (32° F)
SAE 50	SAE 57	SAE 30
Mobilol D Castrol Grand Prix Energol SAE 50 Essolube 50 Shell X-100 Motor Oil 50	Mobilol D Castrol Grand Prix Energol SAE 50 Essolube 50 Shell X-100 Motor Oil 50	Mobilol A Castrol XL Energol SAE 30 Essolube 30 Shell X-100 Motor Oil 30

NOTE—For the British Isles and much of Europe the Cold and Hot recommendations approximate to Winter and Summer conditions respectively. The Extreme Cold recommendations refer to wintry conditions in parts of Northern Europe, Canada, the Baltic and Scandinavian countries, and high mountainous districts where extreme cold is the average condition.

FOR HUB LUBRICATION AND ALL FRAME PARTS USING GREASE

Mobilgrease No. 4 Castrolase Heavy Energrease G3
Esso Pressure Gun Grease Shell Rotina A. or C.D.

250 c.c. TELEHYDRAULIC FRONT FORKS

Mobilol A (SAE-10) Castrol XL (SAE-10) Energol (SAE-10)
Essolube 30 (SAE-30) Shell X-100 Motor Oil 30 (SAE-30)

350 c.c. TELEHYDRAULIC FRONT FORKS

Mobilol Arctic (SAE-20) Castrolite (SAE-20) Energol (SAE-20)
Essolube 20 (SAE-20) Shell X-100 Motor Oil 20 (SAE-20)

FOR REAR CHAINS

Mobilgrease No. 1 Esso Huc Grease Energrease A.D.
Castrolase Grease Graphited Hucol Chain Lube Fluid

When buying oils and greases it is desirable to specify the brand as well as the grade and, as an additional precaution, to buy only in sealed containers from branded outlets.

CHECKING OIL CIRCULATION

Provision is made to observe the oil circulating, which is visible after removing the oil filler cap on the right side of the crankcase.

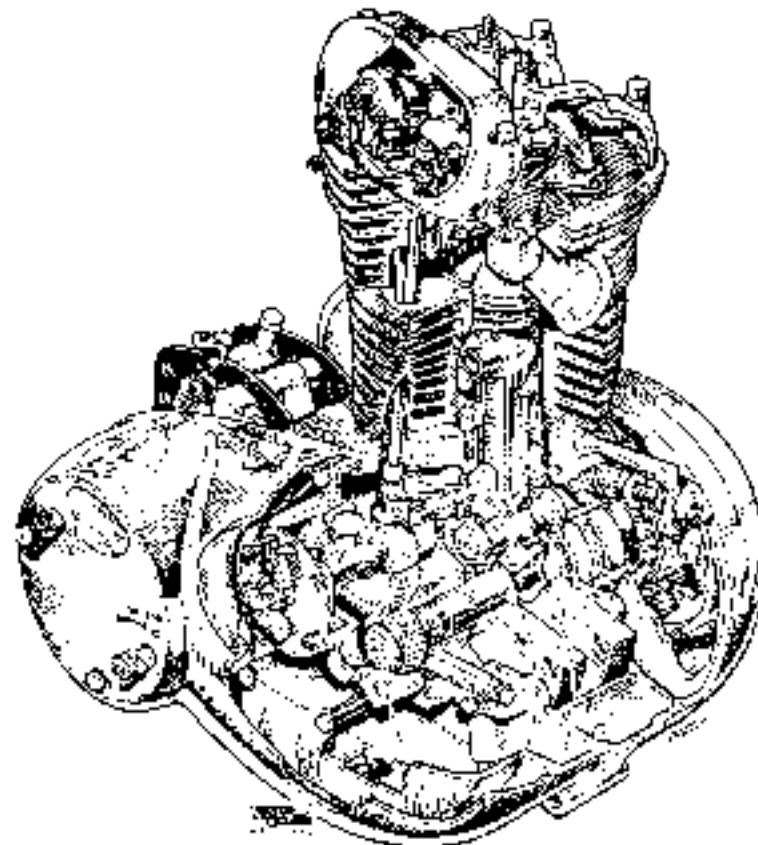


Illustration 1

Cutaway section of engine

ENGINE LUBRICATION SYSTEM

This is a wet sump system. The oil tank, or reservoir, is integral with the crankcase. The oil pump has only one moving part, i.e. the oil pump plunger, which rotates and reciprocates. Rotation is created by the worm gear on the timing side flywheel axle. Reciprocation is caused by engagement of the oil pump guide pin with the profiled groove in the oil pump plunger. The oil pump is designed so that the pump scavenging capacity is greater than the delivery, thus keeping the crankcase sump free of oil during normal running conditions.

While the oil reservoir is integral with the crankcase, oil is led to the pump by gravity, on the same principle as a machine fitted with a separate oil tank, but without the use of external oil pipes.

ENGINE OIL PUMP (see Illustration 1)

If, for any reason, the crankcase is dismantled the oil pump plunger must be removed from its housing before attempting to separate the crankcase halves. It is also necessary to remove the small timing pinion.

IMPORTANT

Under no circumstances must either the pump plunger or guide screw be disturbed in ordinary routine maintenance.

ENGINE OIL CIRCULATION

The oil pump forces oil through—

- Passages drilled through the timing side fly-wheel axle, timing gear fly-wheel and crank pin to lubricate the timing side bearing and the big-end bearing. The oil then passes to interior of cylinder, to lubricate the cylinder and piston and then fall into the sump.
- From the front oil pump bearing to the rocker box via passages in the cylinder barrel, lubricating the rocker gear and valve stems. Oil from the rocker gear drains by gravity via the push rod tunnels to the timing gear cover and pre-determined level. The excess drains into the crankcase sump.
- The oil pump extracts oil from the crankcase sump, most impurities are collected by a magnetic filter incorporated in the sump drain plug. The oil is again filtered by a felt filter housed in the crankcase (see Illustration 1), before returning to the oil tank reservoir.

For valve guide lubrication see paragraph "Adjustment of oil feed".

THE OIL RESERVOIR

The normal oil level is 1 inch below the filler cap orifice, the oil content is 2½ pints. Run the engine for a short period to scum off the sump before "topping up". After the first 500 miles (800 kilometres) again at 1,500 miles (2,400 kilometres) and subsequently at 3,000 miles (4,800 kilometres) the oil reservoir should be drained, the oil filter cleaned in petrol and the reservoir replenished with new oil. It is preferable to drain the oil after a run and when the oil is warm. A drain plug is fitted on both the crankcase sump and the oil reservoir. The drain plug for the reservoir is close to the bottom front crankcase bolt.

THE CRANKCASE FILTER

The filter is cylindrical in shape made from a coarse metal mesh, supported by a wire cage. The filter is housed in the drive-side crankcase. (See Illustration 1).

TO REMOVE THE FILTER

Use Allen Key 01967 to unscrew the domed nut and take out the spring. Remove the cap washer, withdraw the filter with care to avoid damage. Thoroughly clean filter in petrol and replace when dry.

TO REMOVE MAGNETIC FILTER

Incorporated with the crankcase sump plug is a powerful magnet, which does not require frequent attention. For cleaning place a tray under the crankcase, unscrew the sump plug, wash the end of a good fitting ring spanner.

Metal particles adhering to the magnets can be removed by wiping with a grease coated rag, the grease will collect metal particles on the rag. Keep the magnets away from large pieces of steel or iron, as contact can impair the efficiency of the magnet.

ADJUSTMENT OF OIL FEED

The normal flow of oil is controlled by fixed restrictions, with the exception of the oil feed in the inlet valve guide, which is regulated by a needle seated screw located in the cylinder head (see Illustration 3) and secured by a lock nut.

To adjust the oil feed loosen the lock nut and screw home lightly the regulating screw, then adjust it the smallest amount possible and retighten the lock nut. An excess of oil to the inlet valve guide will cause a smoky exhaust and heavy oil consumption.

EXHAUST VALVE STEM LUBRICATION

From a drilling in the exhaust rocker shaft boss in the rocker box, oil is fed to a cavity in the cylinder head. A further drilling from this cavity, through the cylinder head to an oil hole in the valve guide, provides positive lubrication for this part of the engine and needs no adjustment.

CRANKCASE RELEASE VALVE

Crankcase pressure is released into the atmosphere through a small and ported release valve. The vented portion for the valve is situated between the two dry ring side bearings, the valve outlet is adjacent to the gear box housing. The valve cannot become jammed and needs no attention.

GEAR BOX LUBRICATION

To top up or replenish oil for the gear box remove the inspection plate secured by two screws on the gear box end cover. Use one of the grades of oil specified, no account must grease be used. The normal oil content is 1 pint (1.0 litres), the gear box must not be completely filled with oil. After draining and replenishing the oil at the first 500 miles (800 kilometres) top up every subsequent 1,000 miles (1,600 kilometres) to a level just below the bottom of the orifice for the inspection plate.

FRONT CHAIN LUBRICATION

The front chain is lubricated with engine oil filled to the front chain case, which forms an oil bath. If the lower of the two slotted screwed caps on the chain case is removed, the oil level can be observed. The normal oil level is just above the bottom run of the primary chain. In top up remove both slotted screwed caps and fill oil through the uppermost aperture, checking the level through the lower. A drain plug is situated immediately below the clutch assembly. If the chaincase is drained, refill with 1 pint (1.6 litres) of engine oil.

REAR CHAIN LUBRICATION

When a totally enclosed rear chaincase is fitted, the chain is lubricated by oil meter discharged from the crankcase release valve tube on to the chain. Additional lubrication should not be necessary. Where the rear chain is exposed it should be lubricated periodically, particularly during wet or prolonged inclement weather. For effective lubrication the chain should be removed, cleaned in paraffin kerosene and immersed in grease that is heated until it becomes fluid. Remove surplus grease before refitting.

CAUTION: When refitting the chain connecting link, the closed end of the spring clip must face the way the chain travels.

WHEEL HUB LUBRICATION

Both hubs are pre-packed with grease during assembly which prevents the entry of water as well as lubricating the bearings. After the first 5,000 miles (8,000 kilometres) and before 10,000 miles (16,000 kilometres) dismantle and clean the hub bearings and repack with fresh grease.

SPEEDOMETER LUBRICATION

Manual lubrication is not necessary, if a grease nipple is not fitted to the speedometer gearbox.

REAR FORK HINGE (SWINGING ARM)

Apply grease gun or nipple mounted on the right side of the fork hinge, during routine maintenance (see S.A.C. 143-1).

REAR BRAKE PEDAL

A grease nipple is fitted underneath the pivot part of the pedal.

GENERAL

Occasionally apply a little engine oil to parts such as control levers, and cables, brake rods, stands, etc. Use a little grease to lubricate the twist grip motor.

Maintenance

PERIODICAL MAINTENANCE

Regular maintenance attention to lubrication and certain adjustments must be made to ensure optimum reliability and satisfactory service. If a necessary attention is denoted below and owners are strongly recommended to carefully follow these suggestions and to make a regular practice of doing to their the best.

DAILY

Oil Reservoir Inspect oil level and top-up if necessary. Check oil condition.
Petrol tank Check level and refill if necessary.

WEEKLY

Oil reservoir Check level and top-up if necessary.
Tyres Check pressures and inflate if necessary. Inspect under each seat.

EVERY 300 MILES (500 KILOMETRES)

Oil reservoir Drain at first 300 miles and re-fill with new oil and clean filters.
Ignition Check contact breaker points. Regrease felt pad.
Gear box Drain at first 300 miles and re-fill 3 pints (1.8 litres).
Chaincase Check level of oil when machine is standing vertically or level ground. (See chain lubrication).
Battery Inspect each cell for level of electrolyte and top up with distilled water if necessary. Level of electrolyte should just cover top of plates. Beware of over-filling.

EVERY 1,000 MILES (1,600 KILOMETRES)

Oil reservoir Drain at first 1,000 miles and re-fill with new oil.
Rear chain In wet weather remove and soak in molten grease. (See page 13)
Gear box Check oil level.
Small parts Insure all moving parts with engine oil and wipe off surplus.
Chaincase Drain and re-fill, or monthly.

EVERY 1,000 to 5,000 MILES (1,200 to 8,000 KILOMETRES) (According to road and tone)

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

EVERY 3,000 MILES (4,800 KILOMETRES)

Oil reservoir Drain and re-fill with new oil. If machine is only used for short runs, renew oil every three months instead of mileage interval.
Filter Clean filter in tankcase.
Rear chain In dry weather remove and soak in molten grease.
Brake pedal Inject small amount of grease.
Speedometer Inject grease into gear box if nipple is fitted.
Ignition Clean contact breaker points and reset if necessary. Regrease felt pad.
Plug Clean sparking plug and reset points if necessary.
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.
Rocker Check O.V.V. rocker adjustment and correct if necessary.

EVERY 5,000 MILES (8,000 KILOMETRES)

Ignition Clean and adjust contact points. Check gap.
Front fork Drain and re-fill with fresh oil. Insufficient oil content is indicated by abnormally lively action.
Carburettor Remove carburettor float chamber side cover and clean interior. Also detach petrol pipe clamp and clean gauze strainer.

Engine Service

TAPPET ADJUSTMENT

The top ends of the two long push rods have screwed extensions. These are locked in position by nuts, thereby providing tappet adjustment.

The correct tappet clearances, with valves closed and engine warm (just hot) is NIL. This means the push rods should have free play on revolution and, at the same time, there should be no appreciable up and down play.

Prepare to adjust tappets by:

Set piston to T.D.C. (from valve timing).
 Remove the three nuts and fibre washers under them, retaining tappet cover in rocker box.
 Take away cover.

Adjust tappets by:

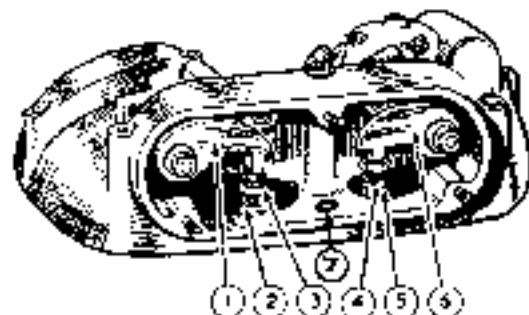
With spanners, hold the sleeve 5, in the valve illustration 2) and sticker lock nut 2. Then screw in or out the head 3 until the clearance is nil.
 Tighten lock nut 2 and re-check the clearance.

Finally

Check adjustment so that, with no up and down movement, the long push rods are free to revolve when the valves are closed.

Illustration 7

Tappet adjustment



- 1 INTAKE ROCKER ARM (TAPPET END)
- 2 NUT, LOCKING ADJUSTING CLIPPED SCREW
- 3 CLIPPED ADJUSTING SCREW
- 4 CLIPPED ADJUSTING SCREW AND LOCK NUT
- 5 SLEEVE TO ACCOMMODATE ADJUSTING SCREWS ON TOP END OF PUSH RODS
- 6 EXHAUST ROCKER ARM (TAPPET END)
- 7 ROCKER BOX NUT

Complete adjustment by:

Replace rocker tappet cover taking care to replace the fibre washer that is under each retaining nut.
 As mentioned elsewhere do not over-tighten the nuts. In case the joints are made with a rubber filler and undue pressure is not necessary.

NOTE—In normal conditions tappet adjustment should not be necessary more frequently than about every five thousand miles or after decarbonising and grinding valves. If adjustment is found necessary more frequently the cause should be investigated at once.

For service work on the upper part of the engine, with the exception of tappet adjustment, the twin tank and petrol tank should be removed for accessibility.

TO REMOVE TWIN SEAT

Remove two bolts under the rear end of the seat, release the nuts securing the front portion of the seat, which now can be lifted off.

TO REMOVE THE PETROL TANK

Close both petrol taps, withdraw the two clip nuts securing the petrol pipe (watch for 4 brass washers same side of the bike engine). Take out two bolts securing the front of the petrol tank and a further bolt securing the rear, noting the location of the tank belt rubbers and spacers, the front ones are thick in rear and thin, the steel washers are also different.

TO REMOVE THE ROCKER BOX

Remove the three nuts and fibre washers securing the rocker box cover, also the sparking plug.

Turn the engine until both valves are closed, i.e., after the inlet valve has opened and just closed.

Remove two nuts and the bolt securing the engine steady brackets to the rocker box and frame. Disconnect valve cover cable.

Take out the three bolts securing the rocker box to the cylinder head (one of these bolts is inside the rocker box (see illustration 2), the location of these bolts must be noted as they are vital).

Turn upwards the right side of the rocker box, extract both push rods and identify their location for replacement in their original positions, remove the rocker box from the cylinder head.

TO REMOVE THE CYLINDER HEAD

Remove the exhaust pipe and gasket as one unit, then the secondary compartment cover and air filter tube if fitted. Do not rock the exhaust pipe sideways unduly to extract it from the manifold port which can cause the end of the pipe to rattle in and result in gas leakage, also mark out between the pipe and the port when the engine is hot. Instead squirt a little paraffin or petrol into the port and try again.

Withdraw the cap on the carburettor mixing chamber, take out both slides, wrap them in a piece of rag and attach to the frame out of harm's way.

Undo the petrol pipe union and take away the petrol pipe. Four screw nuts and one bolt retain the cylinder head on the barrel, with these removed the cylinder head with carburettor attached to it can be separated from the cylinder.

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, an test is thought necessary to inspect the piston and rings, the cylinder barrel is best left undisturbed.

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

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

TO REMOVE AND REPLACE THE VALVES AND GUIDES

The valve springs are removed by inserting the index finger through the coil of the spring and pulling upwards sharply.

A light tap on the valve spring collar will expand the valve split collars (which should be put in a piece of safety), then take out the valve.

Both valve guides are located by an external clamp on cylinder head must be gently and uniformly heated before attempting to remove or replace the guides.

With the head propped up the guide is pushed towards one of the ports sufficiently to enable the collar to be prised out of its groove. Release the head and drive out the guides through the cylinder head. When refitting the guides, pre-heat the head and verify that the oil holes are in alignment with holes in the cylinder head.

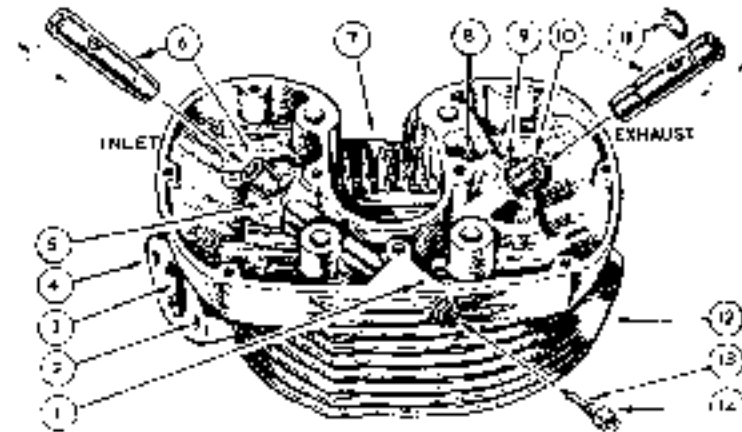


Illustration 3

The valve guides and the needle adjusting screw are also shown withdrawn

- | | |
|--|--|
| 1 FLANK HOLE FOR OIL FEED TO INLET VALVE | 7 FLANK HOLE FOR OIL FEED TO EXHAUST VALVE |
| 2 TAPPET HOLES TO ACCOMMODATE CARBURETTOR RETAINING NUTS | 8 HOLE TO ACCOMMODATE DOWN INLET VALVE SPRING SEAT |
| 3 INLET PORT | 9 LOCK FOR PRIMARY VALVE |
| 4 TAPER HOLE TO ACCOMMODATE CARBURETTOR RETAINING NUTS | 10 CIRCLIP (BUSH GUIDE) |
| 5 HOLE TO ACCOMMODATE DOWN EXHAUST VALVE SPRING SEAT | 11 NEEDLE SCREW ADJUSTING THE FEEL TO INLET VALVE |
| 6 GUIDE FOR INLET VALVE | 12 LOCK NUT FOR NEEDLE ADJUSTING SCREW |
| 7 TAPER HOLE FOR SPARKING PLUG | |

VALVE GRINDING

The grinding is accomplished by assuming a thin layer of fine grinding paste (obtainable ready for use in any garage) on the valve face and then, after inserting the valve in the head, partially revolve, forwards and backwards, while applying light finger pressure to the head, raising the valve off its seat and turning to another point on the face every few movements. (Never revolve the valve continuously in one direction.)

When the abrasive ceases to bite, remove the valve and examine its face. The grinding may be considered to be satisfactorily completed when a fine smooth mil ring is observed on both valve face and seat.

After grinding, all traces of abrasive must be carefully washed off with petrol and a piece of rag, moistened in petrol, should be pulled through the bore of each valve guide to remove any abrasive that may have entered.

A holder for the valve, when grinding in the valve, can be supplied. The part number is C17482.

REPLACING THE VALVES

A valve spring compressor is required to compress the springs, a special tool which is inexpensive, can be obtained from dealers, or from our Sports Parts Department. The application of this tool is shown in illustration 4. Before fitting the valve spring position correctly the valve spring seat—the raised portion on the underside—is located with the depression (5) in cylinder head. (See illustration 3).

The inlet valve is the larger of the two valves and it is vitally important to fit the correct size twin tap collectors from the previous or next valve stem.

Clean the valve guide bores with a piece of clean rag, apply a little oil on the valve stems and also inside each guide before assembly.

REMOVING THE CYLINDER AND PISTON

With the cylinder head removed, the barrel can be raised vertically so clear the heading down studs. Before going in position the engine with the piston on the top of its stroke, have available a piece of clean rag. Raise the cylinder sufficiently to enable the rag to be put into the rear of the crankcase under the piston as a protection against a broken ring falling into the crankcase, then lift the cylinder clear of the main studs passing through it. Make a mark inside the piston to indicate front.

The gudgeon pin is a sliding fit in both the piston and connecting rod. Use round nose pliers to compress and extract the wrist pin. It is immaterial which one is removed; then push out the gudgeon pin and lift the piston off the connecting rod.

Do not disturb the piston rings unless absolutely necessary.

If new piston rings are fitted and if they are obtained from our Spare Parts Department they are ready for fitting as the ring gap is allowed for during manufacture.

The top compression ring is chromium plated and has a slightly tapered extension.

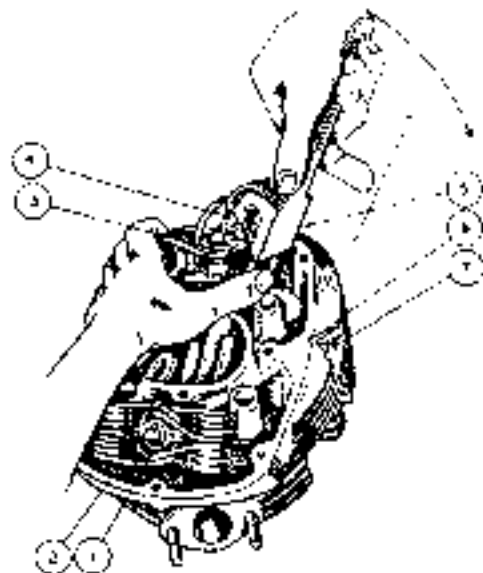
When new, the word TOP is etched on the ring face to indicate which way it should be fitted. Fit the scraper or oil control ring, then the two compression rings, to avoid breakage do not expand these rings unnecessarily.

REFITTING THE PISTON

Before refitting the piston apply a little oil to the gudgeon pin also to the grooves for the gudgeon pin in the piston. Move the piston over the connecting rod in the same way as it was removed or in accordance with the marking made, and then introduce the gudgeon pin through the piston, connecting rod and piston lower.

It is vitally important to correctly locate the gudgeon pin wrist pin and a little extra care and time should be devoted to this most simple and important operation. Use round-nose pliers to introduce the wrist pin into its groove, avoid a rotary motion; then verify that the wrist pin is correctly located.

Illustration 4
Application of
valve spring compressor



- 1 COLLAR FOR VALVE
- 2 COLLAR, INT. VALVE SPRING
- 3 COLLAR, EXH. VALVE SPRING
- 4 BOLT THROUGH TOOLS AND COLLAR OF VALVE SPRING

- 5 VALVE SPRING COMPRESSOR TOOL
- 6 OIL PASSAGE FROM ROCKER BOX TO INLET VALVE GUIDE
- 7 SCREW WITH LOCK NUT ADJUSTING OIL FEED TO INLET VALVE

REFITTING THE CYLINDER BARREL

Fit a new cylinder base gasket after removing broken studs of the old one. Use a jacking compound on the base of the cylinder and stick a new gasket to it; no jacking compound should be on the crankcase face. Set the piston ring gaps at 110°, pass the cylinder over the four long studs and lower it gently at the same time compressing each piston ring in turn with the fingers, until the cylinder has passed the scraper ring when it can be lowered on to the crankcase.

NOTE—Some clean up under the piston in the front of the crankcase with a scraper and against a broken piston ring falling to the crankcase.

REFITTING THE CYLINDER HEAD

The cylinder head gasket also acts as an oil seal for the push rod joints; consequently it must be in good order if it is to be used again. To avoid the possibility of subsequent attention a new gasket is desirable.

This gasket is neither symmetrical nor tapered and it must be placed on the cylinder in the correct way.

A study of the cylinder barrel face will show an elongated hole (where the push rods operate).

Just below it is a tapped hole for the cylinder head bolt.

Close to the cylinder bore and to the right of the cylinder head bolt hole is a smaller hole, which is the oil feed passage from the pump to the rocker gear.

Place the gasket on the cylinder so that the oil feed hole in the cylinder registers with the small hole in the gasket.

Put the cylinder head in position, refit the four cylinder head sleeve nuts and the long cylinder head bolt, do not omit the five washers.

First tighten the four sleeve nuts diagonally—two on one side at a time—then tighten the long bolt, until all are firmly tightened.

A torque spanner is available it should be set to 35 foot lbs. for the four sleeve nuts only.

REFITTING THE ROCKER BOX

Before attempting to refit, make sure the piston is on T.D.C. of the firing stroke, with both cam followers down.

Use a new rocker box gasket for this assembly. In the rising portion of this gasket is a projection with a small hole in it. There is also a similar size hole in the cylinder head which is the oil feed passage from the oil pump through the cylinder to the rocker gear. It will be readily seen that if the rocker box gasket is reversed the oil feed passage will be sealed, therefore ensure that the gasket is properly located before fitting the rocker box. With the rocker box gasket correctly located, take up the rocker box, fit all the holding down bolts through it, put the rocker box into position.

Take up the two engine push rods, on the right side of the rocker box upwards, then introduce the push rods through the head and cylinder. The exhaust push rod overlaps with the cam follower nearest to the contact breaker. (See illustration 1).

Locate the rocker arms in the push rod adjusters and first tighten the two central rocker box bolts which have screwed extensions.

Tighten the remainder diagonally, starting the one inside the rocker box.

Washers are fitted under the heads of all these bolts.

It should be remembered that a soft gasket is used between the cylinder head and the rocker box, therefore the degree of tightness for these bolts is a matter of good judgment and commonsense.

Re-adjust the tappets as previously described.

IGNITION TIMING

Before setting or checking the ignition timing, make sure the contact gap at full separation, is .012".

(See details on Contact Breaker).

Reference to illustration 5 will indicate the principle used.

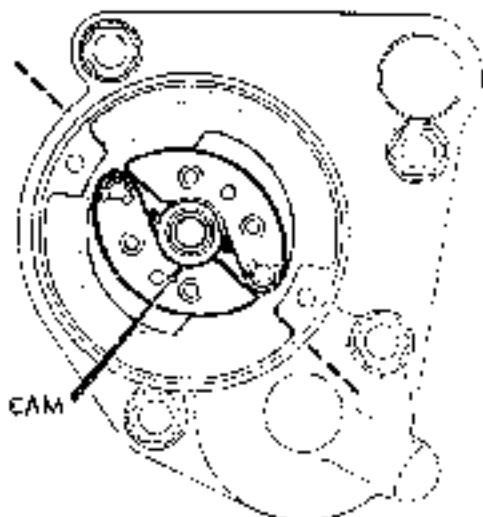


Illustration 5
Automatic Ignition Advance Mechanism
(Approximate Ignition Setting)

TO CHECK THE TIMING

Position the engine as detailed for tappet adjustment. Remove the sparking plug, the cover for the contact breaker and engage top gear.

Obtain a short length of soft wire or wheel spoke about 5" long. Insert the wire through the sparking plug hole, until it touches the piston crown. By slowly moving the rear wheel backwards and forwards the top dead centre of the piston travel can be ascertained. Keep the wire vertical as far as the plug hole will permit—make a mark on the wire to register with the seating for the sparking plug on the cylinder head. Take out the wire and make a further mark on it $\frac{1}{2}$ " ABOVE the previous mark.

Put the wire through the sparking plug hole, then turn the engine **BACKWARDS** until the top mark on the wire registers with the seating for the sparking plug, the piston is now $\frac{1}{2}$ " before top dead centre.

A $\frac{1}{8}$ " hole is drilled in the contact breaker base plate to enable a small screwdriver to be inserted, and engaged between the two bob weights for the automatic ignition control. (See Illustration 5).

Turning the screwdriver clockwise will separate the bob weights to the fully advanced position. If the timing is correct the contact points should be just about to separate.

The exact point of separation can best be found by inserting a thin piece of cigarette paper between the points, which when pulled lightly will be free when the contact points separate.

TO ADJUST IGNITION TIMING

By slackening the two screws in the spaced holes on the contact breaker base plate, the plate can be moved either clockwise or anticlockwise to adjust the timing as required.

Move the plate clockwise to advance and use the method described for checking to obtain the correct timing.

TO RESET IGNITION TIMING

As the ignition advance is limited to $\frac{1}{2}$ " B.T.D.C., this setting is critical and must be carefully carried out. The automatic ignition control unit is a taper fit on the camshaft, retained by a central bolt. To remove this unit take out the retaining bolt, use in its place a withdrawal bolt, Part No. G42247. Screw home this bolt—do not use undue force—then tap the head of the bolt lightly which will separate the unit from the shaft.

NOTE—The contact breaker cam is datarable and if it is inadvertently removed, the timing should be rechecked after refitting the cam, before attempting to start the engine.

VALVE TIMING (including Scrambler Models)

The cam wheel, also the small timing pinion which drives it, are both marked to facilitate assembly.

4. For any reason, the cam wheel is removed, on re-assembly rotate the engine until the piston is on T.D.C. of the stroke, the mark on the small timing pinion tooth will then be at 11 o'clock. Take up the cam wheel, raise both inlet followers, then introduce the cam into the crankcase with the mark on the tooth gap to register with the mark on the small pinion.

Timing markings have been selected to give the most effective valve timing and best engine performance.

To check the valve timing, as a single piece camshaft is used, it is only necessary to record the inlet valve opening also the exhaust valve closing positions to verify that the valve timing is correct. The average valve timing taken with 0.10" rocker clearance is:—

Inlet valve opens	40° B.T.D.C.
Exhaust valve closes	40° A.T.D.C.

See TAPPET ADJUSTMENT for running adjusted clearance.

Carburettor Service

The information given in this section includes all that will normally be required by the average rider. For further details, particularly those concerned with racing and the use of special fuels, we refer the rider to the manufacturer of the carburettor. Amal Ltd., Hillford Road, Witton, Birmingham, 6.

Our Spare Parts Department does not stock every part of the carburettor but confines its stock to those parts that, from time to time, may be required. These parts include floats and float needles, jet taper needles, pilot jets, main jets, needle jets and washers.

CARBURETTOR FUNCTION

The petrol level is maintained by a float and needle valve and, in no circumstances, should any alteration be made to these parts. In the event of a leaky float or a worn needle valve, the part should be replaced with new. (Do not attempt to grind a needle to its seat.)

The petrol supply to the engine is controlled, firstly by the main jet and, secondly, by means of a taper needle (see illustration A) which is attached to the throttle valve and operates in a tubular extension of the main jet.

The main jet controls the mixture from three-quarters to full throttle, the adjustable taper needle from three-quarters down to one-quarter throttle, the jet-way portion of the intake side of the throttle valve from one-quarter down to about one-eighth throttle, and a pilot jet, having an independently adjusted air supply, takes care of the idling from one eighth throttle down to the almost closed position. These various stages of control must be kept in mind when any adjustment is contemplated. (See illustration B for location of the pilot jet air adjustment screw.) The pilot jet unlike earlier models is now detachable for cleaning.

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

Weak mixture is always indicated by popping, or spitting, at the air intake. A rich mixture usually causes humpy or jerky running and, in cases of extreme richness, is accompanied by the emission of black smoke from the exhaust.

CARBURETTOR ADJUSTMENT

With the taper needle projection, main jet size, and type of throttle also specified correct carburettor excess air idling speed is assured.

In the event of difficulty being experienced look for cause under heading Useful Information (pages 46 and 47).

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 observe the runner's action 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.

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.

The complete twist grip can be moved on the handlebar by slackening the two screws that clamp together the two halves of the body. The most desirable position is that in which the throttle cable makes the cleanest and most straight path to the underside of the petrol tank.

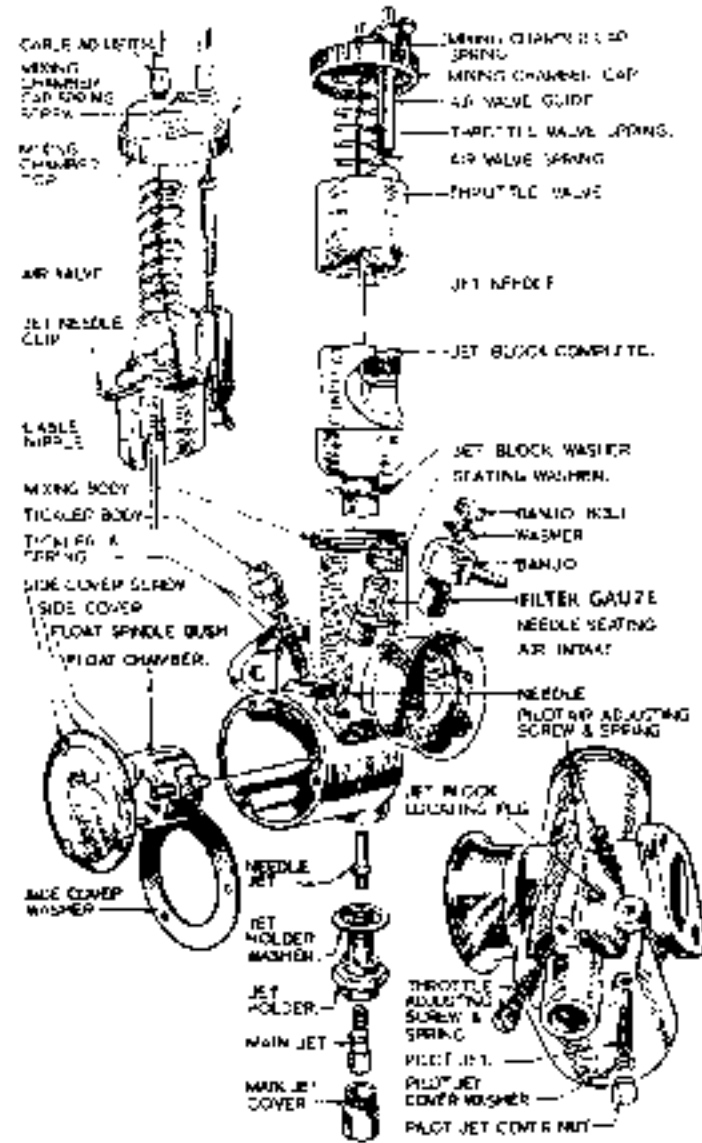


Illustration 6
Carburettor details in assembly order

AIR FILTER

In locations such as the United Kingdom where the roads and atmosphere are particularly free from dust, it is not considered necessary to have an air filter fitted to the carburetor, but in countries where the atmosphere contains a heavy haze of dust, an air filter is essential in order to prevent excessive wear.

The filter available (original type) for the conditions mentioned above is of the "Oil Wicket" type, and this requires periodical servicing.

When servicing the air filter, withdraw the filter element. Thoroughly wash this in petrol, paraffin or other suitable solvent and allow to dry. Then re-oil, using one of the light oils (SAE-20), enumerated in the next table on page 10, and allow to drain before replacing in the filter case. Clean at intervals of 1,500 to 5,000 miles according to road conditions, and renew the element every 10,000 miles.

TO REMOVE THE AIR FILTER ELEMENT

Remove the accessory compartment cover, by unscrewing the top central screw, then take out the bolts under the cover.

Slide the rubber connection along the carburetor intake, remove the nut for the filter clamp, take out the filter.

To dismantle the filter remove the central bolt.

CARBURETTOR TUNING INFORMATION

Poor idling may be due to:

- Air leaks. At junction of carburetor and cylinder head, or by reason of badly worn intake valve stems or guides.
- Rough engine valve seatings.
- Sparking plug faulty, or its points set too close.
- Ignition advanced too much.
- Contact breaker points dirty, or too loose, or set too closely.
- High-tension wire defective.
- Points not operating correctly. Partially choked or incorrect wire supply.
- Rockers adjusted too closely.

Heavy petrol consumption may be due to:

- Late ignition timing.
- Bad air leaks. Probably at carburetor joints.
- Weakened valve springs.
- Leaky float. (Causing flooding).
- Taper needle extension insufficient.
- Poor compression due to worn piston rings or defective valve seatings. (Test compression with throttle wide open).

Transmission Service

THE GEAR BOX

The gear box, cylindrical in shape, is housed in an iron machined on the crankcase, and retained by two high carbon steel straps. As the gear box mechanism is screwed to the gear box shell, partial movement of the gear box into housing provides latitude for front main adjustment.

The gear box provides four speeds and has a positive foot change, operated by the right foot and a kickstarter.

The transmission shock absorber is incorporated in the clutch assembly.

TO REMOVE GEAR BOX OUTER COVER

Remove the silencer body nut, the two nuts on the exhaust pipe bracket and take off the silencer and pipe as a unit.

Remove the right side footrest.

Remove gear indicator and bolt.

Remove footchange pedal (release the pinch bolt).

Remove kickstarter pinch bolt, then the crank.

Remove four screws securing timing cover.

The cover can now be removed.

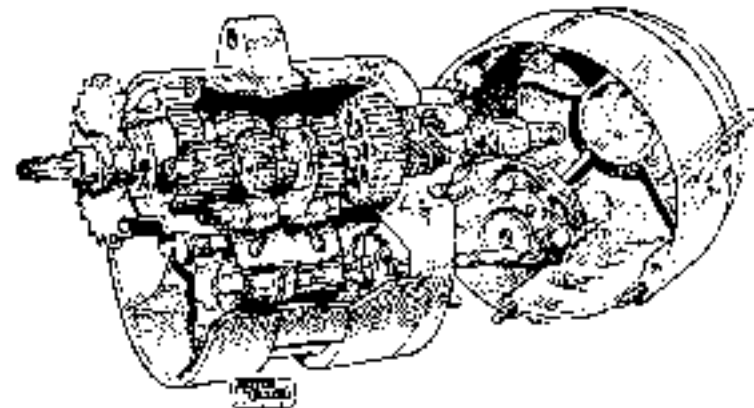


Illustration 7

Gearbox with end cover removed

TO REMOVE GEAR BOX END COVER

Remove the outer cover as described.

Use a pry under gear box to catch oil and remove drain plug.

Remove six screws securing end cover.

Temporarily hold footchange pedal to pull off the cover.

NOTE—If the gasket is renewed, the cut-away for clutch cable entry is at 11 o'clock.

Replenish parts in reverse order, after again removing footchange pedal.

The gear box with end cover removed is shown in illustration 7.

TO REMOVE GEAR BOX INNER COVER

For full instructions for removing the outer and end cover, after selecting reverse position, disconnect clutch cable.

Unscrew clutch body lock ring (take out the body guard for the $\frac{1}{2}$ " ball bearing, and the insulating ring, which can fall out of petrol tank).

The gear box mainshaft nut is now exposed, remove the nut, also the nut on the footchange quadrant spindle—the end cover can then be removed.

DISMANTLING THE KICKSTARTER

When the gear box cover is removed, the kickstarter mechanism will come out with the cover.

The face ratchet pinion is under tension of the ratchet spring. To remove this pinion temporarily fit the kickstarter crank and relieve the spring tension, the pinion will then be released.

Remove the end clip located in the kickstarter shaft flange.

To remove the kickstarter chain or to cut the end of the return spring from its anchorage, the shaft can then be extracted.

REFITTING THE GEAR BOX END COVER

With the kickstarter mechanism assembled the end plate can be refitted in the reverse order described for dismantling.

The gasket must be undamaged to avoid leakage. The only necessary precaution is to ensure that the foot change opening bearing is not cut or bent by mis-firing the chain washer with the foot change distributor hole over the shaft for the foot change spindle before the gear box end cover is fitted. After fitting the end cover the thick weather gasket over the spindle followed by the foot change ratchet, the washer fit the pawl teeth and finally the foot change ratchet and shaft out. The assembly is clearly shown in the illustration. Caution or care should be made of the pawl spring location.

The cover gasket spring washer is placed to hold it in position, while the cover is refitted. When the assembly is completed, one of the gear box drain plug is firmly tightened and filled with 3 plus of S.A.E. 50 oil as shown in the list of recommended lubricants. Allow time for the oil to seep through.

TO REMOVE THE SLEEVE GEAR SPROCKET

It is preferable to remove this sprocket with the end plate in position, follow the instructions to dismantle the clutch.

Take off the rear portion of the primary drive cover, this is done by loosening screws. The nut securing the sleeve gear sprocket is firmly tightened and has a LEFT HAND thread.

A well fitting ring spanner is required to release it after turning back the tab washer. Engaging top gear and pressing the rear brake pedal will prevent the gear sprocket turning, while the nut is unscrewed.

Disconnect the rear chain, the sprocket is on a splined gear and can be extracted without difficulty.

REFITTING THE SLEEVE GEAR SPROCKET

As this sprocket is part of the transmission and subjected to reversal loads, the importance of firmly tightening the fitting nut cannot be too highly stressed. Turn down the tab washer and assemble in the reverse order given for dismantling.

TO REMOVE GEAR BOX INTERNALS

If the gear box is to be completely dismantled, remove parts in the following order — the clutch, drive gear (top ket) and the gear box end cover.

Fit in the gears axially, turn the selector fork shaft, using a spanner on the two flats machined on it, the gears, shafts and operating mechanism can then be withdrawn.

The spring faced plunger and cam plunger both are situated immediately below the sleeve gear sprocket.

TO ASSEMBLE GEAR BOX INTERNALS

Fit the shafts with gears in the sequence shown in the illustration. Fit the plunger and spring for the cam segment are in position, then clamp the cam segments axially.

Take up the selector fork with the projection at three o'clock and put the fork in the slot for the slide gear with the projection in the profile slot of the cam segment.

Fit the flylight with gears in third and free position. Take up the sliding gear, fit the remaining selector fork into the sliding gear, slip the gear on the flylight and engage the projection in the cam segment slot. Take up the selector forks and refit the shaft and tighten. Fit the low gear pinion to complete the assembly.

TO REMOVE CHAINCASE OUTER COVER

Use a tray under chain case to catch oil.

Remove drain plug.

Remove rear side footrest.

Remove engine plate (loosening three screws).

Remove three trap connections on wire in the kick shaft, push the sheath towards the chain case a small amount.

Remove six cover screws and inspection cap.

Carefully pull off the cover, without strain on the starter cables.

If the cover is completely removed, turn back one of the stop nuts on the chain case rear portion, to permit the black sheath to pass through the metal duct of the chain case rear portion.

When refitting the case the gasket must be undamaged, ensure the gasket colours match with those in the case outer pack.

Replace parts in reverse order, gently take up the cable slack by pulling the sheath at the rear of the case.

Screw locations (length under head):

Top right and bottom left $1\frac{1}{2}$ "

Top left $\frac{1}{2}$ "

Top centre $1\frac{1}{2}$ "

Bottom centre $1\frac{1}{2}$ "

Bottom right $1\frac{1}{2}$ "

TO REMOVE ALTERNATOR ROTOR AND ENGINE SPROCKET

Remove the chain case outer cover as described previously.

Release and remove the engine shaft (Illustration 5).

Use four measures of screw filing.

Take off the shaft washer, rotor, shaft key and finally the engine sprocket (See front chain removal, 350 Model).



TO REMOVE CLUTCH CONTROL CABLE

Remove the oil filler cap from the kickstarter case cover.

Screw right hand the clutch cable adjuster (adjacent to the handlebar lever).

Disengage, from the operating lever, the clutch cable inner wire by operating through the oil filler cap opening.

Disengage, from the handlebar operating control lever, the clutch inner wire.

Put cable by its lower end, if removed from the machine, easing it through the frame cable clips while doing so.

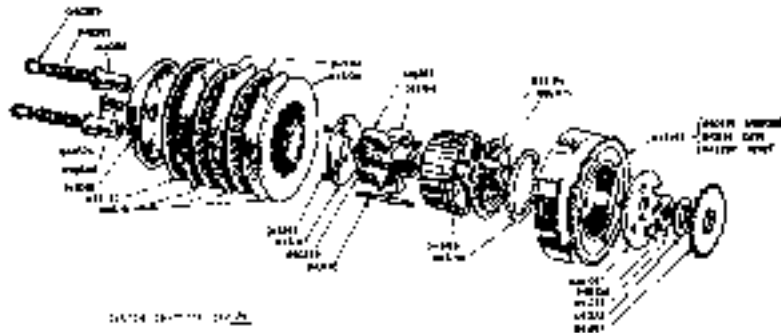


Illustration 9

Exploded view of Clutch Mechanism

TO REPLACE CLUTCH CONTROL CABLE

Reverse the above instructions and, finally, adjust as detailed earlier. Locate the cable in front of the gear box clamp bolt.

CLUTCH ADJUSTMENT

Attention to the clutch is usually confined to adjustment of the operating mechanism. To avoid clutch slip or clutch drag, it is essential to have $\frac{1}{16}$ " of free movement between the clutch cover lining and the clutch cable adjuster. Without such movement the operating mechanism will be preloaded causing wear on the operating parts, also clutch slip. Conversely, excessive movement in the clutch cable will prevent separation of the friction plates and cause the clutch to drag, thus making the gear selection difficult. As the clutch starts to settle down, this has the effect of lengthening the clutch push rod as the wear at the friction inserts are slightly reduced. To deal with clutch drag, or clutch slip, first unscrew the clutch cable adjuster lock nut which is located at the wheelbar nut, run down the adjuster as far as it will go.

Remove the clutch inspection cap, unscrew one or two turns the adjuster lock nut, shown in illustration of clutch assembly on page 17.

With a screwdriver screw in the adjuster until contact with the push rod can be felt, unscrew the adjuster exactly half a turn and tighten the lock nut, taking care the adjuster does not move. Complete the adjustment by unscrewing the clutch cable adjuster until there is $\frac{1}{16}$ " movement between the outer casing and the adjuster, tighten the lock nut. Replace the inspection cap.

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

DISMANTLING THE CLUTCH

NOTE—Nuts and screws in the clutch and gear box assembly have a right hand thread, with the exception of the nut retaining the gear box rear chain sprocket, which has a LEFT HAND THREAD.

Commence by removing the primary drive cover.

Unscrew in turn the three clutch spring adjusting screws, take away the clutch spring pressure plate complete with the spring caps and springs, leaving the steel and friction plates free for removal. A box key is required to unscrew the nut and sprocket. The shaft nut is $\frac{11}{16}$ " across flats.

Engage top gear, apply pressure on the rear brake pedal.

With a box key unscrew the gear box shaft nut.

Remove the chain connecting link, the clutch hub which is on a splined shaft can be pulled off after it has been removed.

For access to the clutch bearing unscrew the three nuts securing the clutch studs and back plate. The clutch bearing arrangement is shown in illustration 9, page 27.

TO DISMANTLE CLUTCH SHOCK ABSORBER

The six rubber blocks used in the shock absorber can be replaced by:

Removing front chaincase

Removing clutch spring pressure plate together with spring and spring caps

Removing three screws also place for shock absorber components (see illustration 10).

A "C" shaped spanner engaged with two slots in the clutch hub or a clutch steel plate with an extension handle welded to it can be used to compress the three rubbers, whilst the thin rubbers are extracted.

To do this engage top gear, apply pressure on the rear brake pedal, position the tool as being and pull the handle upwards, or opposite to the direction of clutch rotation. With the aid of a short piece of wheel spoke with a pointed end the thin rubbers can be first prised out then the thick ones.

Reverse this procedure to refit replacement rubber blocks.

NOTE—If clutch hub is removed, a rod similar to a gear box mainshaft

held in a vice will be required to hold the hub, whilst rubber blocks are extracted.

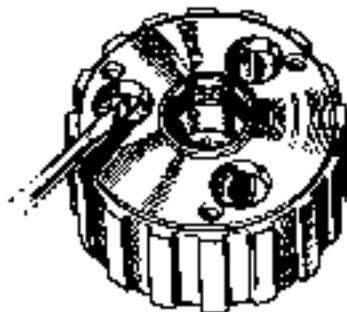


Illustration 10

CLUTCH SPRING ADJUSTMENT

In the event of clutch slip, first ascertain that the operating mechanism is correctly adjusted (see clutch adjustment).

After dismantling the clutch, when refitting the clutch spring adjusting pins, they should be screwed on until the spring ends just protrude through the bottom of the recess in the adjuster nut.

FRONT CHAIN ADJUSTMENT

Remove inspection cap from front chaincase, remove the two wheel nut straps on the rear engine cowling, lift the cowling to expose the gear box adjuster bolts.

Slacken Nut on left hand side of gear box top fixing bolt.

Two clamping strap bolts.

Adjust chain by means of adjuster nut-hole and two nuts.

(The correct chain whip is $2\frac{1}{2}$ ").

Check the adjustment in several positions and adjust at tightest part of chain.

Tighten two clamping strap bolts, and gear box fixing bolt.

Refit rear engine cowling and securing screws.

Replace chaincase inspection cap.

NOTE—After adjusting front chain, check rear chain adjustment.

REMOVING THE FRONT CHAIN (350 c.c. Model)

The front chain fitted to this model is duplex and end-axle, with an inertia that the clutch sprocket, also the engine sprocket must be withdrawn simultaneously if the front chain is to be removed. To proceed, follow the instructions given for dismantling the clutch, as far as removing the gearbox main axle shaft nut. Then remove the nut and washer retaining the rear to the driving side engine shaft, take out the key for the roller from the rear. The engine sprocket and clutch, together with the chain in position, can then be withdrawn.

NOTE—One or more thin washers may be fitted at the rear of the engine sprocket, which must be replaced during assembly.

REAR CHAIN ADJUSTMENT

Prior to adjusting rear chain, check front chain and adjust if required.

Loosen both nuts on the rear wheel spindle.

Loosen lock nuts on the adjuster and turn the adjusters until correct chain adjustment is obtained, taking care to move both adjusters exactly the same amount to maintain wheel alignment.

Whilst on the stand the chain whip should be $2\frac{1}{2}$ " to ensure $3\frac{1}{2}$ " whip when rider is seated. Check the adjustment in several positions and adjust at tightest part of chain.

Remove the rubber cap on the top of the enclosed chain guard to check chain tension.

Re-tighten wheel spindle nuts, and adjuster lock nuts.

NOTE—After chain adjustment rear brake should be checked and readjusted as necessary. See brake adjustment.

REMOVING AND REFITTING REAR CHAIN

To protect the rear chain from mud and water it is very closely shrouded by the chain guard and removing the chain without first detaching the chain guard, can present considerable difficulty. A simple procedure however, is as follows—

First obtain a piece of thin string about ten feet long.

With cycle on the stand turn the rear wheel until the chain connecting link is in position near the rear sprocket and remove the connecting link.

Now pass the string through the centre hole of the end link of the top run, draw the two ends of the string front and rear together.

Then pull the bottom run of the chain backwards with one hand while keeping the string taut at the rear end with the other hand.

As the end of the top run of the chain draws past with the gear box sprocket it will leave the string attached lying one strand each side of the sprocket teeth.

When the chain is well clear cut the string near rear only at a point about one foot from where it is looped through the chain link.

Leave the string then in position for chain refitting.

To refit the chain

Pass the longer end of the string through the central hole of a round chain link and then tie the two loose ends of the string together.

Then pull the string from the rear end, at the same time guiding the chain up to engage with the gear box sprocket.

Continue pulling until the chain encircles the sprocket, remove the string, refit the connecting link with the spring clip clipped end facing direction of rotation.

Fork and Frame Service

250 c.c. Models G2 and G2S

STEERING HEAD ADJUSTMENT

With the machine on the stand, need for adjustment of the steering head bearings may be detected by trying to rock the forks with hands holding the fork legs. The bearings should be reset for clearance after the first 200 miles and subsequently every 1,000 miles. Two spanners should be used, one turning the adjusting nut (34) the other to slacken and retighten the lock nut when the oil adjuster has been turned out.

Adjustment should be such that the play is felt, yet the bearings are free to rotate and are not over tight.

Adjusting the bearings too tightly will wear them, and induce heavy steering.

NOTE—It is important that adjusting and locking nuts are always locked together.

FRONT FORKS

The construction of the forks is clearly illustrated in the exploded drawing, and it will be noted that the structure comprises of two main tubes with fixed external bearings, and welded-up crown and top pivots. Long coil springs are attached to the top pressure, and to damper pins fixed at the lower ends of the slider tubes.

As the fork slides and damper tube move upwards against the resistance of the main spring, oil is forced up through the shoulder clearance between the damper tube and the inner leg. Because the damper tube is tapered, the clearance diminishes progressively resulting in increased hydraulic resistance to upward movement of the fork slider.

When the maximum diameter of the damper tube enters the end of the tube, oil flow is prevented, thus providing a hydraulic lock which prevents "fork booming".

FRONT FORK MAINTENANCE

The forks are self-lubricating and normally require no attention beyond changing the oil every 5,000 miles.

The oil should be drained by removing plug (7).

After the fork legs have drained, the drain plugs and washers should be replaced. With the machine on the stand, remove the filler Plug (2) and refill each leg with 70 cc. of SAE 30 oil.

Since 30 cc. of oil will remain trapped in the damper plugs after draining, the addition of the above mentioned 70 cc. of oil will give the correct 100 cc. of oil in each leg.

After refilling, the machine should be rolled off the stand to secure the top spring adapters and to replace the top filler plugs and washers.

TO REMOVE THE COMPLETE FRONT FORK ASSEMBLY

Owners are advised not to interfere with the forks unless absolutely necessary. If the fork has been damaged, it is best to remove it complete and obtain a service exchange unit.

To remove the fork assembly follow the sequence—

Place the machine on the centre stand and remove the front wheel and mudguard.

Remove the battery, headlamp shell, speedometer cable, reflexion unit, ignition warning light, horn gear leads, lighting and ignition sockets. Disconnect the control cables and the two wires from the dip switch harness to the main harness. Remove the handlebar.

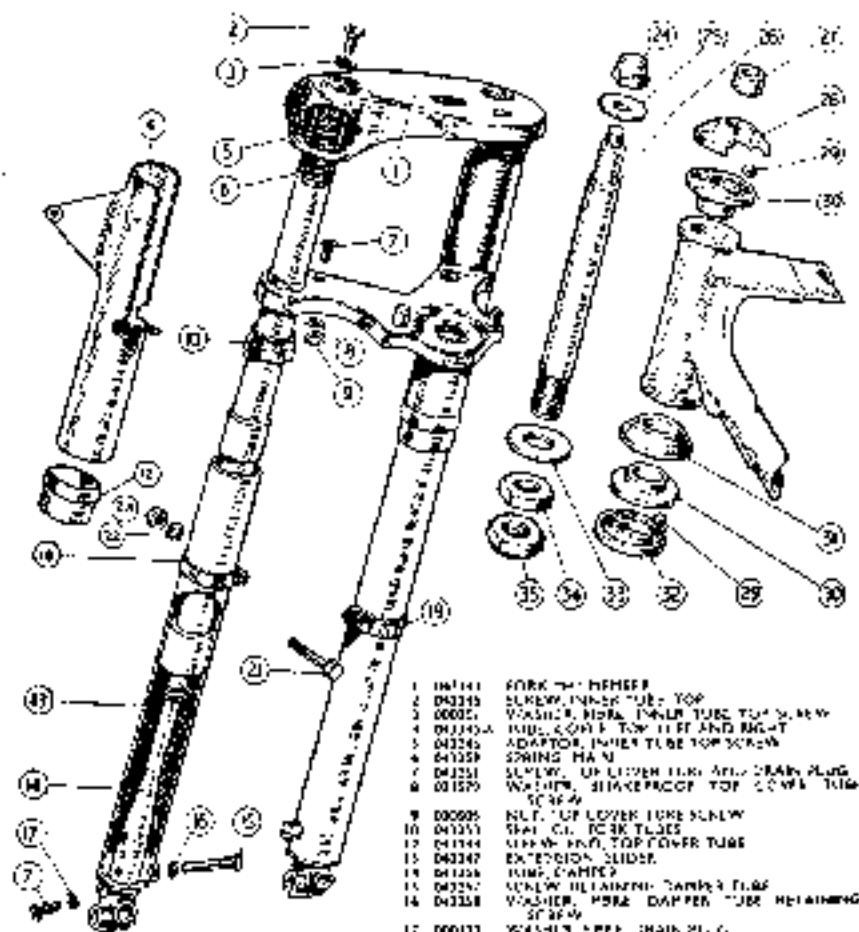
Remove steering column top nut (24) and withdraw column itself (26) from the bottom whilst holding the fork in position. The fork unit can be taken away after removal of distance piece and washer (wash for 24 ball bearings).

If it is desired to dismantle the slider units, the fork sliders complete with oil seals and springs may be withdrawn after removing top filler plug covers.

Care should be taken not to damage the oil seals when pulling them over the bearings.

TO REFIT THE FORKS AS A UNIT

Reassemble in reverse sequence.



- 1 04141 FORK TOP MEMBER
- 2 04335 SCREW, INNER TUBE, TOP
- 3 00002 WASHER, HORN, INNER TUBE TOP SCREW
- 4 04334A NUT, CONE, TOP LEFT AND RIGHT
- 5 04334B ADAPTOR, INNER TUBE TOP SCREW
- 6 04335P SPRING, MAIN
- 7 04331 SCREW, UPPER FURK AND DRAIN PLUG
- 8 04329 WASHER, STRIKEPROOF TOP COVER TUBE SCREW
- 9 00006 NUT, TOP LOWER FURK SCREW
- 10 04331 SCREW, FORK TUBE
- 11 04334 SCREW, HORN, TOP COVER TUBE
- 12 04340 EXTENSION, SLIDER
- 13 04336 KING, DAMPER
- 14 04328 SCREW, RETAINING, DAMPER TUBE
- 15 04328 WASHER, HORN DAMPER TUBE RETAINING SCREW
- 16 00003 WASHER, SPRING, MAIN NUT
- 17 04330 CLIP, MUDGUARD ATTACHMENT, LEFT
- 18 04331 CLIP, MUDGUARD ATTACHMENT, RIGHT
- 19 00003 BOLT, MUDGUARD ATTACHMENT CLIP
- 20 04331 WASHER, MUDGUARD ATTACHMENT CLIP BOLT
- 21 00004 NUT, MUDGUARD ATTACHMENT CLIP BOLT
- 22 04330 NUT, FRONT HEAD LUG TOP
- 23 04331 WASHER, HEAD LUG TOP CONED NUT
- 24 04332 STEM, HEAD
- 25 04336 SPACER, HEAD STEM
- 26 04340 BALL, ADJUSTING TOP
- 27 00001 BEARING, BALL, HEAD LUGS
- 28 04332 RACE, FRONT HEAD LUG, TOP AND BOTTOM
- 29 04331 COVER, SHIT, BOTTOM BALL RACE
- 30 04331 RACE, FURK, LOWER BOTTOM
- 31 04334 WASHER, HEAD STEM BOTTOM NUTS
- 32 04340 NUT, ADJUSTING, HEAD STEM BOTTOM
- 33 04340 NUT, LOCK, HEAD LUG, BOTTOM

350 c.c. Model G2CS and 350 c.c. Model G5

STEERING HEAD BEARING ADJUSTMENT

The steering head bearing must be set in close adjustment whenever it becomes loose which is not promptly corrected, damage can occur to the fork tubes. To make this adjustment, the front wheel must be raised clear of the ground by using a box under the axle or one or two blocks, one placed under each footrest.

To tighten the steering head bearing, first release the two Allen screws which pass through the fork crown (No. 38) in position 12. These screws clamp the fork tube to the fork crown.

Loosen the dome nut at the end of the fork crown (No. 41, illustration 11) and tighten the nut underneath until it turns freely. Place the fingers of the left hand on the handlebar lug at the rear, and then lift up the front wheel assembly with the right hand on the mudguard. Any movement will turn the fork, and retighten the dome nut as necessary until all movement is taken up, leaving the bearings free from friction and not over-tightened.

It is vitally important to very firmly tighten the two Allen screws that clamp the fork tubes, otherwise "friction" between the tube and the crown will take place.

FRONT FORKS

A break-down of the front forks is shown in illustration 11, and the only attention necessary is to check the oil column every 5000-6000 miles. The normal oil column with the forks dry is 5 1/2 fluid ozs. (154.6 c.c.) in each fork leg.

To top up or change the oil, first unscrew the two hexagonal bolts (No. 47, illustration 12) from both fork tubes. Use a suitable receptacle to trap the oil when draining, and then remove the drain screw fitted to each fork leg (No. 56, illustration 11). The handlebars must be turned to the left when draining the left side slider, conversely turned to the right when draining the right side slider. When the oil has ceased to flow, slacken off the hexagonal bolt to allow it to slip slightly to create a pumping action, with the object of ejecting oil trapped in the damper tubes. After a period of 1/2 minute a little more oil will drain, then the drain screw can be replaced and 6 ozs. of SAE-20 oil should be poured down the fork inner tube through the aperture exposed by the removal of the hexagonal bolt. The reason why 6 ozs. is added, is due to the fact that there must be a little oil left in the fork tube that cannot be removed by draining. If, however, the forks are completely dismantled, then the contents should be 6 1/2 fluid ozs. as previously stated. See and also illustration 11, represents 184.6 c.c., and 6 fluid ozs. is 170.4 c.c.

TO DISMANTLE THE FRONT FORKS

First unscrew both Allen hexagons (No. 7, illustration 12), then raise the front wheel clear of the ground as previously described.

Remove the following parts in the sequence described:

- (1) The front brake cable from the fork.
- (2) The front wheel.
- (3) The front mudguard.
- (4) The handlebar. (Before removing the handlebar, disconnect the speedometer drive cable.)

It will be seen that the damper rods are attached to the hexagonal bolt, and three bolts must be detached by releasing the locknut (No. 23). With the slider extension rigid at the slider, a sharp kick downwards should enable the fork slider, together with the damper rod and tube attached, to be withdrawn from the fork inner tube.

The fork oil seal (No. 51) will slide in the slider, and if difficulty exists in separating the slider from the fork tubes, an application of gentle heat to the top part of the slider where the seal is situated will cause it to expand and thus enable it to be withdrawn without difficulty.

TO REMOVE THE FORK INNER TUBE

These are retained to the fork crown and clamped by the Allen screws (No. 38) and with these screws removed, the fork tube can then be pulled clear of both the handlebar lug and the fork crown. To dismantle the forks further, the assembly sequence is clearly shown in illustration 11.

When reassembling the oil seal, make sure that the metal face is pointing upwards as illustrated.

TO REMOVE THE FORK CROWN

Take off the dome nut and the locknut underneath it from the fork stem, then with a soft mallet tap the handlebar lug clear of the stem and watch for the steering head balls which will probably drop out during this process. Twenty-eight balls are used in the top frame race and 26 balls in the bottom race, which are retained by grease applied to the bearing caps before assembly.

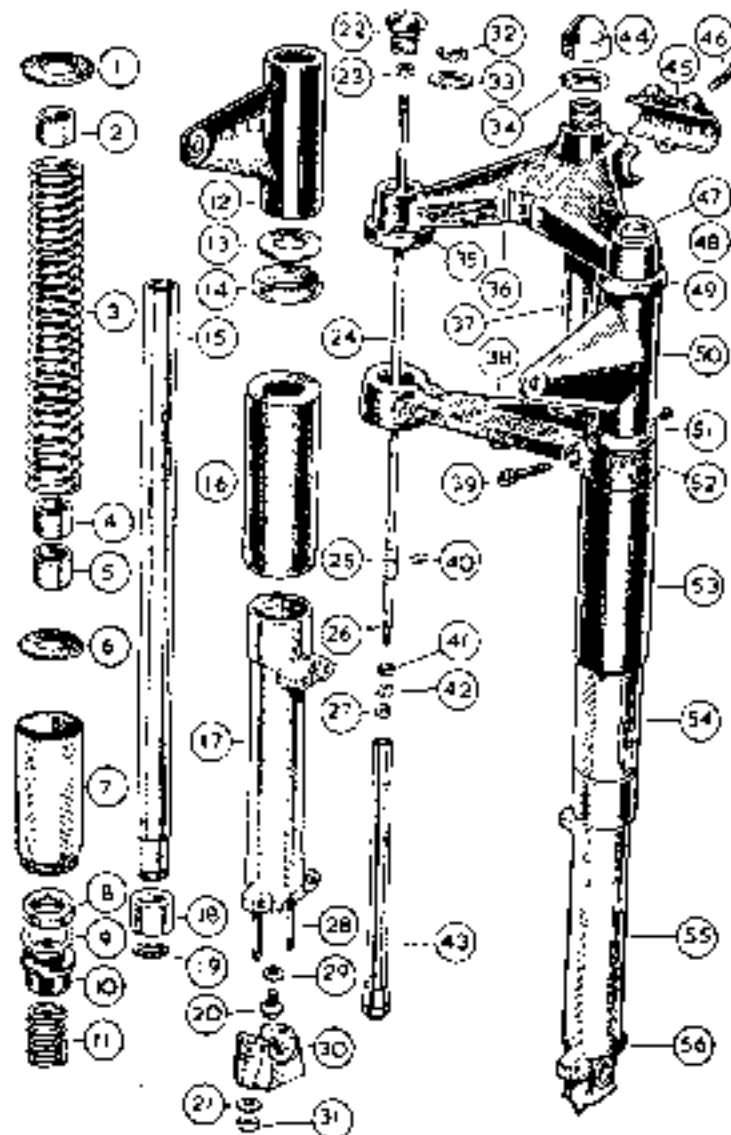


Illustration 11

For description see page 34

REF. NO.	DESCRIPTION
1	WASHER, LEATHER, FOR FORK SPRING TOP SEATING.
2	RUBBER, CUNBER, FOR FORK INNER TUBE COUPLER THROAT.
3	SPRING PLATE, FOR FRONT FORK.
4	RUBBER, CUNBER, FOR FORK INNER TUBE COUPLER THROAT.
5	RUBBER, CUNBER, FOR FORK INNER TUBE COUPLER THROAT.
6	WASHER, LEATHER, FOR FORK SPRING BOTTOM SEATING.
7	EXTENSION, FOR FORK SLIDER.
8	US. SEAL LUMBER, FOR FORK INNER TUBE (AN ALTERNATIVE SEAL IS MADE OF LEATHER).
9	WASHER, PAPER, FOR USE ONLY WITH LEATHER ON SEAL.
10	GUSSET, TOP, PLASTIC, FOR FORK INNER TUBE.
11	SPRING, BUTTER, FOR FRONT FORK.
12	TUBE, FORK COVER, TOP, RIGHT, WITH LAMP LUG.
13	WASHER, RUBBER, FOR TOP COVER TUBE BOTTOM CAP.
14	CAP, FOR FORK TOP COVER TUBE BOTTOM LOCATION.
15	TUBE, FORK, INNER.
16	TUBE, FORK, COVER, BOTTOM.
17	WIPER, FOR FORK, WITH STUDS.
18	WIPER, BOTTOM, STEEL, FOR FORK INNER TUBE.
19	CIRCLIP, LOCATING FORK INNER TUBE BOTTOM WIPER.
20	SOLE, HINGE DAMPER TUBE TO SLIDER.
21	WASHER, FLAIN, FOR FORK SLIDER CAP SECURING STUD.
22	SOLE, TOP, FOR FORK INNER TUBE.
23	NUT, LOCK, FOR TOP END OF DAMPER ROD.
24	ROD, FOR FORK DAMPER.
25	SLEEVE, PLUNGER, ON FORK DAMPER ROD.
26	HN. LIP, FOR FORK DAMPER VALVE.
27	NUT, LOCK, FOR DAMPER VALVE SEAT.
28	STUD, SECURING CAP TO FORK SLIDER.
29	WASHER, IRON, FOR DAMPER TUBE BOLT.
30	CAP, FOR FORK SLIDER.
31	NUT, FOR FORK SLIDER CAP SECURING STUD.
32	RING, RUBBER, SEALING, FOR INNER TUBE TOP NUT.
33	WASHER, FLAIN, FOR INNER TUBE TOP BOLT.
34	NUT, ADJUSTING, FOR FORK STEM.
35	CAP, TOP TUBE TOP COVER TUBE, TOP LOCATION.
36	LUG, HIE HANDLEBAR AND STEERING HEAD.
37	STEM, FOR FORK CROWN (NOT SOLD SEPARATELY).
38	FORK CROWN (SOLD ONLY AS AN ASSEMBLY OF CROWN, STEM AND STEM CIRCLES).
39	SCREW, PINCH, FOR FORK CROWN.
40	CLIP, RETAINING DAMPER ROD SLEEVE.
41	VALVE, FOR FORK DAMPER.
42	SEAT, FOR FORK DAMPER VALVE.
43	TUBE, FOR FORK DAMPER.
44	NUT, LOCK (LOCKED), FOR FORK STEM.
45	CLIP (HALF ONLY) FOR HANDLEBAR LUG.
46	SCREW, PINCH, FOR HANDLEBAR LUG CLIP.
47	BOLT, TOP, FOR FORK INNER TUBE.
48	WASHER, FLAIN, FOR INNER TUBE TOP BOLT.
49	CAP, FOR FORK TOP COVER TUBE, TOP LOCATION.
50	TUBE, FORK COVER, TOP, LEFT, WITH LAMP LUG.
51	CAP, FOR FORK TOP COVER TUBE, BOTTOM LOCATION.
52	FORK CROWN.
53	TUBE, FORK COVER, BOTTOM.
54	EXTENSION, FOR FORK SLIDER.
55	WIPER, FORK IRON WITH CAP, STUDS AND NUTS.
56	SCREW, PLUG, WITH IRON WASHER, FOR FORK SLIDER ON BRAIN HOLE.

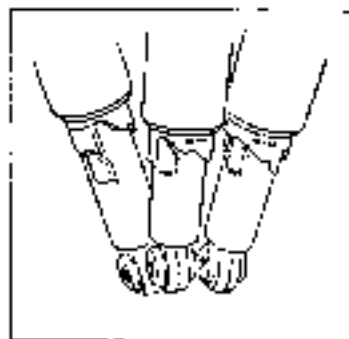


Illustration 13

"Ghost" view of Rear Suspension Unit

REAR SUSPENSION

The rear wheel is mounted in a fork which is hinged just behind the gear box.

The fork works in bronze bearings and is lubricated by an oil reservoir around the bushes and this can be replenished with heavy gear oil (SAE 140) by means of a grease nipple situated above the crown on the right hand side. Movement of the fork is controlled by Girling telescopic units. These units are of the sealing unit type, and topping up is not necessary. The springs are lubricated before assembly and the fluid in the damper unit is the same quantity and sufficient for life of the unit.

The unit is shown in illustration 13.

Maintenance is confined to external cleaning and occasional greasing of the cam ring as used.

Should a squeak or rubbing noise develop as the units move, remove and turn each unit, uncover the spring by removing the top split collars, grease the external diameter of the springs and reassemble.

THE CAM RING ADJUSTER

Raising the base of the spring by turning the cam clockwise (see illustration 13), preloads the spring for varying loads.

CENTRE STAND

The centre stand is mounted on the forefork spindle and can be removed by supporting the machine on a suitable bar and removing the exhaust system, both foot rests and the stand top plates. The forefork spindle can then be removed and after unhooking the operating rod, the centre stand can be removed.

TO REMOVE THE REAR CHAIN GUARD

Fully Enclosed Type

Remove bottom fixing nut on left hand rear suspension unit and slide the lower end of the unit off the stud, slacken the left hand wheel spindle nut. Remove the two chain case securing bolts. The large spindle washer is used outside the guard.

The top and bottom halves of the chain case can then be removed.

Reverse this procedure for reassembly.

Standard type

Remove bottom fixing nut on left hand rear suspension unit and slide the lower end of the unit off the stud. Remove rear brake rod adjuster nut, rear chain and speedometer cable, slacken wheel spindle nuts. Remove the two chain case securing bolts. Lift the rear of the chain guard and slide the rear wheel out of the fork ends. The rear chain guard can now be removed.

Reverse this procedure for reassembly.

Wheels and Brakes

TO REMOVE THE FRONT WHEEL (Models G2CS and G5)

With the front wheel clear of the ground, disconnect the front brake cable. Then remove the nut that secures the brake torque arm to the front brake cover plate. Release the four nuts (No. 11, Illustration 12), unscrew the front wheel spindle right side sleeve nut, then the wheel spindle can be withdrawn, leaving the wheel free to be taken away.

TO REMOVE THE FRONT WHEEL (Models G1 and G2S)

Place the machine on the centre stand and disconnect the front brake cable.

Release the two nuts at the back of each fork slider which secure the bottom front mud-guard stay and tap the threaded end of the extension slightly to centralise the stay which clamps on to the sleeve nut and spindle. Take away the right side axle sleeve nut, then the wheel spindle can be withdrawn and the wheel will then come away from the fork.

TO REMOVE REAR WHEEL

Remove the fully enclosed chain guard if fitted. Disconnect speed drive cable, release both wheel spindle nuts. With the rider standing on left side of the machine, lean the machine to the left and take away the wheel. When refitting ensure speed drive is correctly located.

HUBS AND BEARINGS

Rear hubs are greased when new and no further lubrication will be required for 5,000 miles, it is then advisable to renew the grease, the old grease should be removed by washing in petrol or paraffin.

When dismantling and reassembling the hubs refer to illustration for assembly order. If bearings show any signs of wear, fit replacements.

BRAKES

If the brakes are correctly adjusted and oil is not used to lubricate the bearings, the brakes will not require attention for many thousands of miles. Petrol or paraffin should not be used to wash brake shoes, these liquids have an adverse effect on the linings and braking efficiency will be lost.

Front brake adjustment is effected by a cable adjuster on the left hand fork slider.

Rear brake adjustment is effected by a lever adjuster at the rear end of the brake rod.

BRAKE PEDAL ADJUSTMENT

To adjust the position of the pedal, slacken the brake pedal spindle nut, move the pedal to the desired position, hold the pedal in this position and tighten the spindle nut.

After altering the pedal position slack the brake rod adjustment.

REAR BRAKE ADJUSTMENT

With the rear wheel clear of the ground screw down the adjuster on the rear brake rod until the brake is just lining up. Then unscrew the adjuster four or five complete turns. On machines with a frame number before 5858, the brake adjuster should be unscrewed eight complete turns.

TYRES

To obtain maximum mileage from the tyres, maintenance should be regular and painstaking. Once a week check tyre pressures with a gauge and at the same time remove any road grit which is wedged in the crests.

A comprehensive booklet produced by Messrs. Dunlop, on "How to keep your motor cycle tyres fit", which includes instructions on tyre removal and refitting is issued with each new machine. A table of minimum inflation pressures for specified loads per tyre is also included. As a rough guide, and with a rider of average weight and normal equipment, without a pillion passenger, the pressures should be 17 p.s.i. for the front tyre and 22 lbs. for the rear tyre.

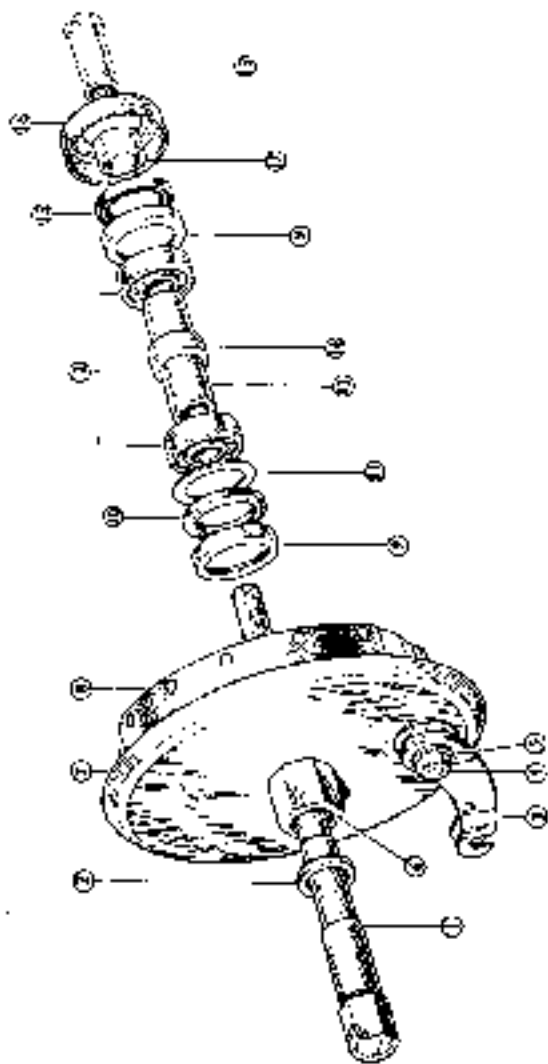


Illustration 14
Front Hub Assembly

- | | | | |
|---|--|--|--|
| <p>1 SPINDLE, FRONT WHEEL...
2 WASHER, FRONT WHEEL
SPINDLE/DRUM OR DRUM
LEVER, BRAKE SHOE
LEVER, BRAKE SHOE
4 "A" BRAKE SHOE
EXPANDER LEVER</p> | <p>5 WASHER, BRAKE SHOE
EXPANDER LEVER
6 SPACER, PARAGON
FRONT COVER PLATE
7 FRONT FRONT BRAKE
PLATE
8 BRAKE SHOES, REAR</p> | <p>9 ENCLUCUM, CLY OIL
SPAT
10 SEAL, FILLS FOR BEARING.
11 WASHER, LEAKING FELT
SEAL
12 BEARING, FOR REAR
13 SPACING, TUBE BEARING</p> | <p>14 PRESSING, SPACING RING
15 STEEL ALUMBER, FOR
BEARING.
16 ENGLISH/LURE CAP.
17 SPACER FRONT TENDIT
18 NUT FRONT SPINDLE</p> |
|---|--|--|--|

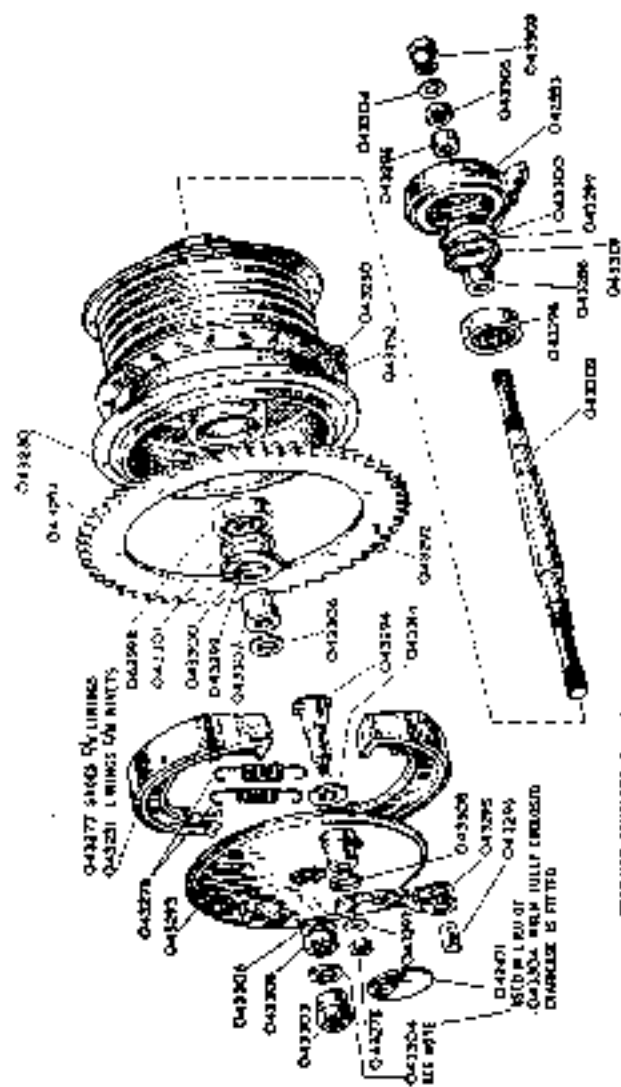


Illustration 15
Rear Hub Assembly

REAR HUB COMPLETE (Q43204)

Electrical Service

GENERAL

The lighting and ignition systems are combined, using a six-pole permanent magnet excited A.C. generator, which charges the battery via a selenium rectifier. The remaining electrical units are fed from the battery in the normal manner.

The alternator has an inherent regulating property which combined with circuit switching gives the correct charge rate under all conditions.

Emergency starting is provided by switching the six-pole generator coils on to the battery, which gives immediate voltage supply for the ignition coil. The emergency switch position may also be used to provide high rate boost charge when the rate of charge of the battery is low. The use of the high charge rate should be limited to fifteen minutes.

Prolonged use of the high charge rate will cause evaporation of water from the electrolyte (and will possibly damage the battery).

SIX-POLE ALTERNATOR

The A.C. Generator used is called an "Alternator". The rotating member is a six-pole permanent magnet and, which is of special design and magnet quality, and may therefore, be removed from the Stator Coil assembly without loss of magnetism.

The six coils of the Stator are connected in two sets of three in series. As three leads only are brought out, one is common to both sets (this is WHITE). For test purposes, the same output is obtained between green and white as between orange and white.

By switching in a resistance unit we can obtain the following changes in the circuits to provide varying outputs from the alternator.

The resistance unit is wound in the main loop of wires and is not visible as a separate unit. Its location can be seen in the wiring diagram.

The switch positions are:

OIL-IGN	Normal charge rate
LOW-IGN	Normal charge rate
HIGH-IGN	Normal charge rate
OFF-EMG	Boost charge rate
LOW-FMC	Boost charge rate
HIGH-FMC	Normal charge.

EMERGENCY STARTING

An EMERGENCY starting position is provided in the ignition switch for use if the battery has become discharged. Under these conditions, the alternator is connected direct to the ignition coil, allowing the engine to be started independently of the battery. Once the engine is running, turn the ignition switch back to the normal running position.

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 connections should be checked for tightness, and also the centre fastening bolt. This bolt forms the "ignition" connection and so must meet clear faces on the machine frame and rectifier case.

Illustration 16—Rectifier



COIL IGNITION

The coil, also the air filter body (when fitted) is housed in the accessory compartment on the left side of the machine. To remove the non-terminal cover unscrew the top cover screws, then take away the two bolts located below the cover.

The coil needs attention beyond keeping the exterior clean, particularly between the terminals, which must be securely tightened.

CONTACT BREAKER UNIT

This unit comprises the contact set, condenser and rain-lubricating pad.

The contacts are adjusted by releasing the locking screw and then setting the distance by a slight movement of the adjusting screw while the rubber arm feels on the peak of the camlobe, and finally tightening the locking screw firmly.

When dry the lubrication pad should be removed, and heavy H.M.P. grease kneaded into it, and then replaced. Oil is not advised, but if used sparingly and frequently it is better than complete neglect. Excess oil may reach the contact surfaces and would be harmful.

When service attention is given to the breaker unit always check tightness of the live condenser connection and earth fixing screw.



Illustration 17—Contact Breaker

AUTO-ADVANCE MECHANISM

Behind the contact breaker base plate is the advance mechanism which by means of weights and springs moves the cam in order to provide a retarded position for starting and gradually to advance the ignition timing as the engine speed increases.

HEADLAMP

The reflector is of the latest pattern aluminium gun casting design in high vacuum, and gives a much greater light reflection than the older plated types.

As this high efficiency coating is extremely thin, the reflecting surface should never be touched. This also means that reflectors cannot be supplied as spares without the glass front which acts as protection during transit and working.



Illustration 18—Headlamp

HEADLAMP BULB—30 x 24 Watts

The bulb is a double filament pre-focus type, and is removed after the contact unit has been taken off. By holding the reflector and rim unit up side down and taking care to CATCH the bulb, it will POP out, as no other fastening is employed.

HEADLAMP SWITCHES

The switches are connected inside the lamp to the wiring system by means of plug sockets. These are arranged with a missing pin and hole so that incorrect mating is impossible. The operating portion with the brass contact legs is the same in both the L/N and R/L-T/S switches—the only difference being the names on the escutcheon plates.

The lamplens fiber socket portions which are connected to the wiring loom are coloured BLUE and BLACK. The BLUE one is the LIGHTING switch connector and the BLACK one is for the IGNITION switch.

SPARKING PLUG (SINGLE OR 3-POINT)

The A.L.G. Type RE85 "Con-rodite" Plug is fitted to all models. It has a thread of 14 mm, and the reach is 2". The point gap is .020 to .022. Check the point gaps every time the engine is re-combusted and, if necessary, re-set the points. See that the plug is fitted with its external seating washer.

Coat the threads with "Oil Rag" or Graphite paste.

Finely tighten the plug by using the standard box spanner and screw bar (Part No. 017252). All that is required is a GAS-TIGHT joint. Therefore do not over-tighten, which will not make a gas-tight joint more gas-tight, but can, and possibly will, distort and damage the body of the plug.

Set the gaps to .020 to .022. Never try to move the central electrode. To widen or narrow the gap between the electrodes only move the earth (side) electrodes. Check the gaps first with a gap gauge. If they are too wide tap the earth side electrode(s) towards the central electrode, using preferably a small rapping coil and light hammer. Check the gaps between each tap and stop when the gauge is a nice sliding fit between the central electrode and the three earth side electrodes.

If the gaps are too small to start with gently lever the earth electrodes away from the centre electrode using a small screwdriver and then tap them back as described above. Avoid damaging the centre electrode and do not attempt to move the electrodes apart by forcing anything between them.

For maximum efficiency, plugs should be cleaned at every 1000 miles. To take the plug to pieces for cleaning, unscrew the plug nut by heading the ratchet head on the plug nut, slide down as a vice and then using the box spanner to unscrew the target head on the body.

Then take away the central electrode assembly which should be worked in petrol or paraffin. Then, using fairly coarse glass paper, remove the carbon deposit and wash again.

The central firing point should be cleaned with fine entry cloth. The inside of the body should be scraped clean with a knife and finally rinsed in petrol.

There is an internal washer, between the insulator and its heading to the body. On re-assembly tightly secure this with the oil and then screw up the gland nut sufficiently tight to give a gas-tight joint.

Finally adjust the gap to .020 to .022.



Illustration 19

BATTERY TYPE 3-ER7L POSITIVE EARTH

"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. The cell filter holes are sealed to exclude moisture and air before the battery is brought into service and the seals should be removed immediately before electrolyte is poured in.

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 (1.815 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 4-3 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. Directions on soon see it 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 is simpler) remove battery, clean terminals and top up the three cells to 1" above the level of the plates with distilled water—NOT tap water, which contains impurities detrimental to the battery. Pour the distilled water through a glass funnel or syringe.

Many lighting troubles can be traced to uneven corrosion between the surfaces of the battery terminals. Keep the terminals clean. A little grease smeared on them will help prevent corrosion.

Do not keep distilled water in receptacles made of any kind of metal as this will quickly render it impure. The use of a clean glass bottle or jar. Rain water collected from a park 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 rag 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.

BULBS BLOWING

This can only be due to an open circuit in the accessory line and the fault should be located before new bulbs are fitted. To locate the fault, check in the following order—

- (1) Bad earth connection on battery positive lead.
- (2) Loose or corroded battery terminals.
- (3) Loose or dirty contact in the 4-hole 3-way connector which is interposed in the battery negative lead. (Brown wire).
- (4) Loose ammeter connector.
- (5) Battery dry due to electrolyte evaporating.

150 c.c. SCRAMBLES MODEL

ELECTRICAL AND IGNITION EQUIPMENT

When a lighting system fitted two separate electrical circuits are used to enable the stops and lighting circuit to be removed for competition events. The necessary connections to be made when the lighting circuit is removed can be seen in the wiring diagram.

The main lamp bulb uses alternating current drawn from the motor coil.

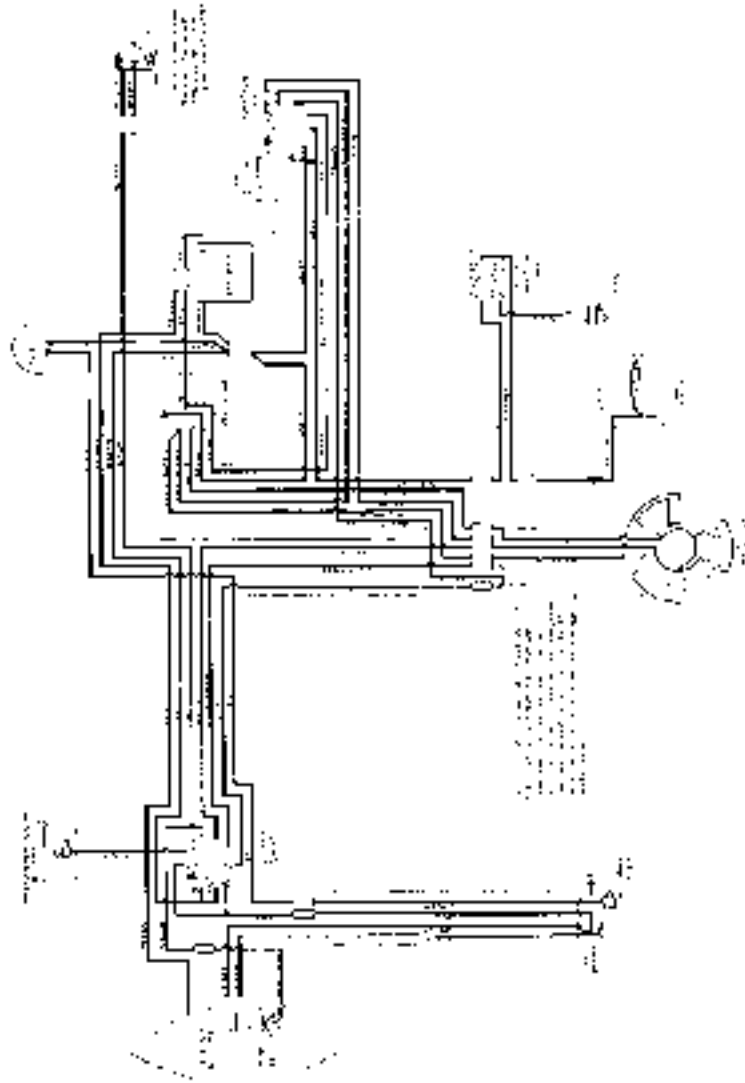


Illustration 20
 Wiring Diagram: 250 c.c. Scrambler

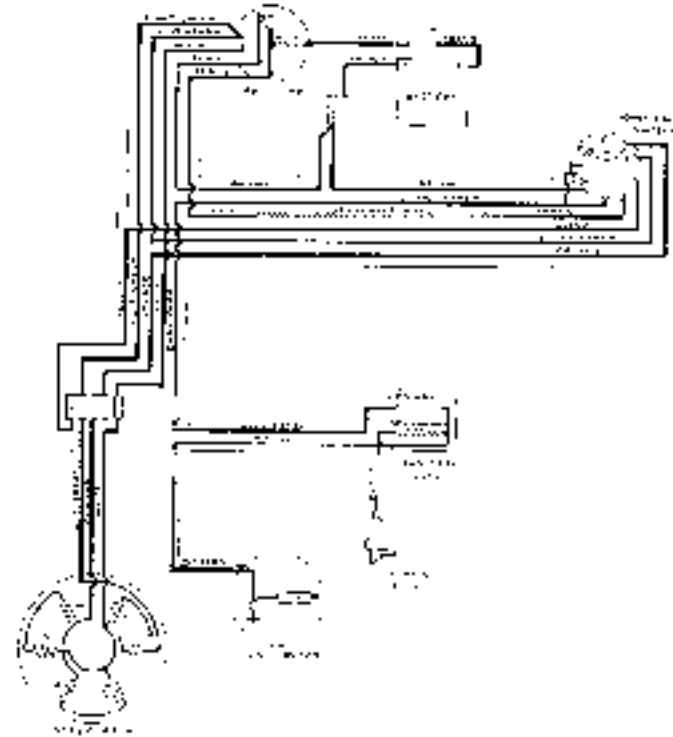


Illustration 21
 Wiring diagram: 250 c.c. Scrambler (with light removed)

Useful Information

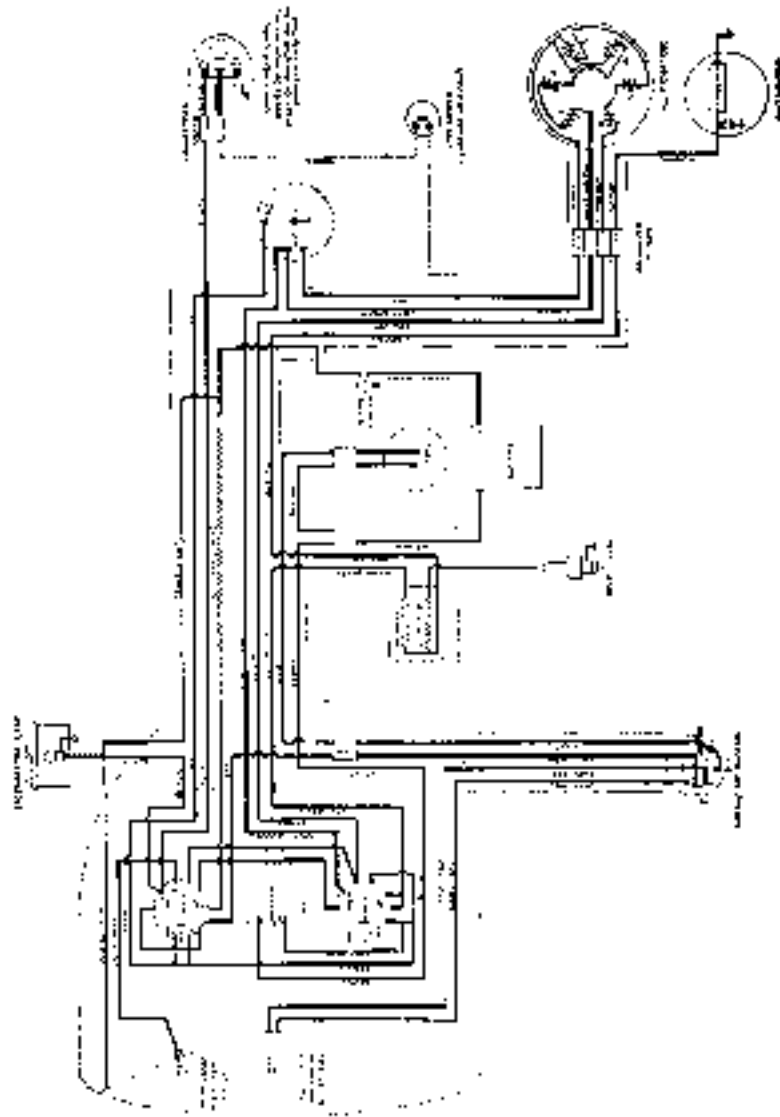


Illustration 22
Wiring diagram (Model B and 141)

TRACING TROUBLES

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

- Carburetor flooded unnecessarily.
- Water on high-tension cable.
- Moisture on sparking plug.
- Oil on, or fouled, sparking plug.
- Throttle opening too large.
- Pilot jet choked.
- Air lever in open position or bad air leak at carburetor joint.
- Lack of fuel because of pipe, or tap, obstruction.
- Valve not seating properly.
- Contacts loose or dirty.
- Incorrect contact point gap.
- Ignition not switched on.
- Faulty coil or condenser.

Engine misses fire may be due to:

- Defective, or oiled, sparking plug.
- Incorrect contact point gap.
- Contact pressure rocker arm striking.
- 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 plug.
- Lack of oil in tank.
- No rocker clearance, or too much clearance.
- Weak, or broken, valve springs.
- Sticky valve stems.
- Valve not seating properly.
- Breaks slipped and clean.
- Badly fitting, or broken, water rings.
- Faulty carburetor float.
- Engine carbonised.
- Choked silencer.
- Bad air leak between carburetor and head.

Engine overheats may be due to:

- Lack of proper lubrication (Quality or quantity of oil).
- Faulty sparking plug.
- Air control to rich incorrect or out of order.
- Punctured carburetor float.
- Engine carbonised.
- Weak valve springs.
- Peened valve stems.
- Worn piston rings.
- Ignition timing incorrect.
- Choked silencer.
- 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 plug.
- Water on sparking plug.
- 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:
Badly worn, or stuck up, piston rings. (Causing high pressure in the crankcase).
Worn 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 fuel needle action).
Incorrect ignition setting. (Ignition not advanced sufficiently).
Defective engine valve action.
Incorrect use of air control lever.
Moving parts of carburettor badly worn. (Only possible after very considerable mileage).
Bad air leak at carburettor junction.

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 handling difficulties 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 accelerator and braking).

CLEANING THE MACHINE

On no account to rub, or brush, mud off the enamelled surfaces because this will soon destroy the finish 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, carburettor, magnets and other such parts. As a pressure water hose, a pair of water and a sponge may be used.

After washing down with water, the surplus moisture should be removed with a clean dry 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, with some up-lift noise.

CHROMIUM PLATING

Under some climatic conditions, a rusty looking deposit may be observed on ferrous parts that are chromium plated. This is not ordinary rust (ferrous oxide) but is a salt deposit that, in most cases and in its early stages, can be quickly and easily removed with a damp chrome leather. In stubborn cases, it may be necessary to use a special chromium cleaning compound.

The safest procedure during winter is to wipe over all chromium plated parts with a soft rag soaked in "TEKALL", which is a lanoline base rust preventive in solution, in small quantities available at most garages. This material, so applied, leaves on a thin invisible film that is impervious to moisture and its use saves the too highly recommended to owners who value the appearance of their machines.

In summer, when these rust dews do not prevail, chromium parts should be frequently cleaned with a damp chrome leather and afterwards polished with a soft cloth.

If a polish is used it must be one of the special compounds for chrome plating only. Ordinary metal polishing liquids, in particular, must not, on any account, be used because these, almost without exception, contain acids which attack chromium.

NOTE: "Tekall" is a product of 10th Century Finishes Ltd., 175-177, Kirkgate, Wakefield, and is available in ½ pint and 1 pint tins. It can be obtained from our Spare Parts Department, as follows:
½ pint tin "Tekall" Part number 211957.
1 pint tin "Tekall" Part number 211958.

Repairs and Service

REPAIRS

The instructions regarding repairs should be clear and definite, otherwise the cost may be greater than that expected. We shall be pleased to give estimates for repairs if parts are sent to us for that purpose. If the estimate is accepted, no charge is made for the preliminary examination, but should it be decided not to have the work carried out, it **MAY** be necessary to make a charge to cover the cost of warehouse forwarding and re-assembly may have been done to prepare the estimate.

Customers desiring that old parts which are replaced with new during the course of overhaul or repair be returned must make the firm known prior to the work being put in hand because normally, such parts, having no further useful life, are scrapped upon removal.

Parts sent to us as patterns, or for repair, should have attached to them a label bearing the sender's full name and address. The instructions regarding such parts should be sent under separate cover.

If it is necessary to bring a machine, or parts, to the Works for an urgent repair, **IT IS ESSENTIAL** you **MAKE AN APPOINTMENT** beforehand to **AVOID DISAPPOINTMENT**. This can be done by order or telephone.

CORRESPONDENCE AND ORDERS

Our machine is organised into different departments, therefore delay cannot be avoided if matters relating to more than one department are contained in one letter.

Consequently, it is desirable, when communicating with more than one department, to do so on **SEPARATE SHEETS**, each of which should bear your name and address. When writing on a technical matter, or when ordering spares, it is essential to quote the **COMPLETE ENGINE NUMBER**. Some numbers have one, or more, letters incorporated in them and these letters **MUST BE QUOTED**, otherwise model identification is not possible.

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

Owners are strongly advised to purchase a Spare Parts List so that correct part numbers can be quoted. Most parts are clearly illustrated in this list which makes it very easy to recognise the part or parts required.

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 a claim made, direct on the actual manufacturers who will deal with them on the terms of their respective guarantees.

These manufacturers are:

Carburettors	Moore Agricultural Machinery Co., 101-103, Road, Wotton, Burwellton, 4
Chains	The Revell and Loring, Chain Co. Ltd., Brixham, Devonport.
Miscellaneous Equipment	Woolley Sons Corporation, Huddersley, Bucks.
Sparkling Plug	R. L. G. Sparking Plug Co., Putney, York, London, S.W.15.
Speedometers	Timex & Smith & Sons (M.A.) Ltd., Crutchedon, Luton.
Tyres	Timex Dunlop Rubber Co. Ltd., 202 Dunlop, Birmingham.
Rear Suspension	Garage Ltd., High Road, Tring, Hemel Hempstead, H.

All the above manufacturers except S. Smith & Sons (M.A.) Ltd. issue instructive literature regarding their products which is obtainable by writing to them.

To register a new machine:

Send to the Local Registration Authority the following:

- (a) Form "KH(2)", duly completed.
- (b) The certificate of insurance.
- (c) The invoice you received from your dealer when you purchased the machine.
- (d) The appropriate registration fee.

On due course you will receive:

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

The Registration Book and the Licence Disc will bear the registration number that have been allotted to your machine and will also show the date the Road Licence expires.

Your number plates must then be painted, or stenciled upon a black background with the registration numbers in characters of even thickness as follows:

The numbers on the front plate must be 1½" high, 1½" wide and ¼" thick with spaces of ½" between each two characters.

The numbers on the rear plate must be 2¼" high, 1½" wide and ½" thick with spaces of ½" between each two characters.

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

It is not legally necessary to carry your Driving Licence, Insurance Certificate and Registration Book while driving your machine.

Ignition Suppressors

All registered by-law machines for the Home Market are issued with an approved type of radio interference suppressor already installed.

Speedometer

A speedometer MUST be fitted and it MUST BE ILLUMINATED that is possible to read the dial after lighting-up time.

Lamps

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

Each lamp must have a white light bulb MUST be marked with its "Wattage", (throwaway cheap imported bulbs that do not have this marking).

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

SERVICE

The Service and Repair Department is situated in Burrage Grove, Plumstead, London, S.E.18, and is open on Mondays to Fridays from 8.30 a.m. to 11.55 p.m.— 2.0 p.m. to 5.30 p.m. It is closed on Saturdays, Sundays and National Holidays.

It exists for the purposes of:

- (a) Giving technical assistance verbally or through the post.
- (b) Supplying spare parts over the counter or through the post.
- (c) Repairing and re-conditioning machines or parts of machines of our make.

Burrage Grove is the first turning on the left from Burrage Road when entering Burrage Road from the Plumstead Road. (See final paragraph below).

The nearest Railway Station is WOOLWICH ARSENAL, SOUTHEASTERN REGION RAILWAY. This station is five minutes walk from our Service Depot in Burrage Grove. There is an excellent service of electric trains from Charing Cross, Waterloo, Cannon Street and London Bridge Stations, Southern Region Railway.

Bus routes 51, 163, 54, 99, 112 and 127 pass the end of Burrage Road (one minute from the Service Depot).

Bus routes 88, 75 and 261 serve Beresford Square which is a five minutes walk from the Service and Repair Department.

Visitors from the North can get into Woolwich via the Free Ferry between North Woolwich and Woolwich. North Woolwich is a British Railways terminus and is also served by bus routes. There is also a tunnel under the River Thames at this point for foot passengers. The Free Ferry accommodates all types of motor vehicles and there is a very frequent service. The Southern landing stage is less than a mile from the Service Depot.

Visitors arriving by road, if they are strangers to the locality should enquire for Beresford Square, Woolwich. Upon arrival there, the road skirting the Royal Arsenal should be followed in an easterly direction for about four hundred yards, and Burrage Road is the second turning on the right after leaving the Square. Burrage Grove is then the first turning on the left.

THE DRIVER AND THE LAW

The driver of a motor cycle MUST be INSURED against Third Party Claims and MUST be able to produce an INSURANCE CERTIFICATE showing that such an insurance is in force.

If your Insurance Certificate specifies you can only drive one particular machine you MUST NOT DRIVE any other machine unless its owner has a current Certificate covering "ANY DRIVER" and it is advisable to remember that, in the absence of such a provision the penalties for doing so are very heavy.

The driver of a motor cycle MUST hold a current DRIVING LICENCE. If you are a learner and hold a Provisional Driving Licence, your machine must show front and back the standard "L" plates in red and white and you must not take a PILETON PASSENGER unless that passenger is the holder of a current UNRESTRICTED driving licence.

As soon as you receive your driving licence, sign it in the appropriate place and do so each time it is renewed. It is an offence not to.

Make sure you are well acquainted with the recommendations set down in the "Highway Code".

THE MACHINE AND THE LAW

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

Free Service Scheme

FREE SERVICE SCHEME

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

This service is arranged by the supplying dealer to whom the Free Service Voucher must be handed. This voucher, together with the Instruction Manual, are supplied by us upon receipt of the signed registration form found in the tool box upon taking delivery of a new motor cycle.

The **INSPECTION AND SERVICE** consists of:

- (a) Check, and, if necessary, adjust:
 - (1) Rocker clearances.
 - (2) Contact breaker points.
 - (3) Sparking plug.
 - (4) Clutch.
 - (5) Cloints.
 - (6) Wheel bearings.
 - (7) Brakes.
 - (8) Forks and steering head.
 - (9) Alignment of wheels.
 - (10) Tyre pressures.
- (b) Tighten all external nuts and bolts including cylinder head nuts and fork crown pinch screws.
- (c) Top-up battery and check all lighting equipment.
- (d) Clean out carburettor and check for correct idling.
- (e) Adjust all cables.
- (f) Grease all joints.
- (g) Drain oil system. Clean filter and replace it.
- (h) Check oil level in front chaincase.
- (i) Top-up gear box.
- (j) Test machine on the road.

NOTE - Oil, grease and materials used are chargeable to the customer.

FOR THE CONVENIENCE OF OWNERS,
SPARES STOCKISTS
ARE APPOINTED FOR MOST DISTRICTS. TO
SAVE DELAY AND THE DELIVERY SURCHARGE
CUSTOMERS ARE RECOMMENDED TO ALWAYS
APPLY TO THEIR NEAREST SPARES STOCKIST

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.

SPARES STOCKISTS

For the convenience of owners Spares Stockists are appointed for most districts. To prevent delay and save the delivery surcharge customers are recommended always to apply to their nearest Spares Stockist.

CORRESPONDENCE AND SPARES ORDERS

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

Last series of frames is numbered from zero upwards, therefore, the quotation of a frame number only does not facilitate identification.

SPARES LIST

An illustrated spares list covering the models described in this Instruction Book is available on application. Price 3s. 6d. each.

PART NUMBERS

If there is any doubt about the names of parts required, or their part numbers, please send the old parts as patterns.

REMINDER

Do not forget to include your name and full postal address. We can receive orders without this very necessary information.

PAYMENT

- (1) Cash with order.*
- (2) Cash against performance.
- (3) Approved ledger account.

We do not send C.O.D. (Cash on delivery).

* Add 5% per cent of total value for carriage and packing. Minimum 1%.

GUARANTEE

Full details of the guarantee relating to the models described in this book are given on page 34.

INSTRUCTION BOOKS

A copy of this book is issued free of charge to all purchasers of a new machine.

Tools and Special Equipment

TOOLS

The standard tool kit included with each new machine contains:

1	017251	Tool Roll.
2	017027	Tyre levers.
1	044351	Pump.
1	017249	Adjustable Spanner.
1	017257	1" x 1/2" Spanner.
2	017252	1/2" x 1/4" Spanner.
5	017253	3/16" x 3/8" Spanners.
1	017252	Plug spanner and ratchet bar.
1	021384	Suspension unit spanner.
1	021623	6" Screwdriver.
1	042540	Feeler gauge.
1	018667	Allen key.
1	042570	Braking head adjusting spanner.

SPECIAL TOOLS (Not supplied in tool kit)

1	043331	Tuning pin on retrometer.
1	042247	Automatic advance on 1 extra for bolt.
1	022511	Tuning disc. A circular timing disc, graduated in degrees and made of brass. A very useful device.
1	017482	Holder for valve grinding.
	018476	Valve spring compressor.

OPTIONAL EQUIPMENT

The following items of optional equipment are available. They are described and priced in the Spares List.

Prog Stand Assembly (Part Number 049329).

Air Cleaner.

GASKET SETS

For convenience in ordering, standard sets of engine washers and gaskets are available. Full details of contents and prices are included in the Spares List.

BADGES

New monogram badges are now available at a cost of £6, plus 60p postage. They can be supplied as a brooch or for fitting in a button hole. When ordering state type required.

GUARANTEE

1. This Guarantee covers 24 months or 7000 miles in the normal cycle, whichever is the greater, or whichever is first reached, provided that the machine is used for the purposes for which it is designed.
2. It is intended to obtain the benefit of this Guarantee, the purchaser must properly maintain the machine in accordance with the instructions given and report it to his dealer in every step of its purchase.
3. We will supply replacement parts—piston, rings, valves, etc.—and complete or suitably repaired parts free of charge, any parts proved defective within the date of purchase of any new machine or within three months of its removal or repair in the case of a machine previously repaired, not to be delivered by reason of our faulty workmanship or materials. The dealer is required to bear the cost of fitting such new or repaired parts or accessories.
4. Any parts considered to be defective must be sent to us. We will, on receipt, accept payment of the following information:
 - (a) Name of purchaser and his address.
 - (b) Make of machine or make of parts.
 - (c) Name of dealer from whom the purchase was made.
 - (d) Engine and frame numbers of machine.

5. This Guarantee shall not extend to defects of faults resulting from misuse, neglect, improper operation, or the transportation or storage of a machine in an unsafe condition or in any way, or from any cause other than the operation or wearing of parts of the machine. It shall not apply to:
 - (a) Housings.
 - (b) Bearings and Components.
 - (c) Adjustment or alteration of any part or parts after leaving the works.
 - (d) The machine or its accessories if repaired and approved by an authorised motor engineer.

This Guarantee does not extend to machines which have been repaired or manufactured elsewhere but does extend to repaired or rebuilt machines and any parts not supplied or approved by us, or to machines, whether built, reconditioned, rebuilt or repaired and electrical equipment or to parts supplied to the operator or the owner or to a third party who uses the machine.

6. Our liability is limited to our best work. It shall not extend to third parties (except paragraph 3), and no other claims, including claims for consequential damage, shall be payable or recoverable, except as stated.

All other conditions and warranties, written or otherwise, which may be included in any form included in a purchase order when placed correctly with the order, apply to the machine to which this Guarantee relates if a purchaser has purchased it.

REPAIRS GUARANTEE

1. We, in the highest standard of workmanship and materials, intend to do our best to repair any machine defect appearing within three months of the machine's purchase or completion but without delay after being reported.
2. We will endeavour to replace or repair any defective part or change the design of such part, without charge to the customer, and we will endeavour to repair or replace any part damaged by our negligence, or by any other cause, but we will not be liable for consequential or other damage which may be caused by the use of the machine while being repaired.
3. We do not accept liability in respect of parts of machinery repaired by our staff, or by third parties, unless we receive notification in writing of such defects, together with details of what has happened, and the time and date of the report. If a defect does occur and is attributable to our work, or to the work of a repairer or fitter, and a further report is received, we will endeavour to rectify the defect.